

The impact of marine protected area taman wisata perairan timur pulau bintan (TWP-TB) on the fishermen's catch in mapur village bintan regency

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Abstract. Bintan Island is designated as a marine protected area through the Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 18 of 2022 called Taman Wisata Perairan Timur Pulau Bintan (TWP-TB) which consists of three areas: Teluk Sebong, Gunung Kijang, Bintan Pesisir. Mapur Village is one of the villages in Bintan Pesisir Regency, which includes the area. The research aimed the impact of the establishment of marine protected area on the fishing grounds and catches of Mapur Village fishermen. The research was conducted in July 2024 in Mapur Village, Bintan Regency, Riau Islands Province. The descriptive and quantitative research method used questionnaires and FGD (Focus Group Discussion). Marine protected area has no impact on fishing catches. Most fishermen catch pelagic fish, and most fishing gear is handline. Fishermen do not change their fishing grounds even though there is a marine protected area because in general the fishing grounds are 1-17 miles from Mapur Village. Fishermen who make changes to the fishing area are the majority of fishermen who do not use fish aggregating devices (FADs).

1 Introduction

Riau Islands is one of the Archipelago Provinces in the western part of Indonesia, directly bordering Singapore, Malaysia, and Vietnam. 96% of the Riau Islands Province is ocean, with only 4% land [1,2]. This makes the fisheries potential in the Riau Islands huge enough for further exploration. The fishing fleet owned by fishermen does not support the great potential. The fishing fleet used by fishermen generally is less than 5 GT, so it cannot reach the Indonesian EEZ, which results in illegal fishing by neighboring countries' fishermen who can get the area. The small fleet of fishing boats can only reach the coastal regions of the Riau Islands, resulting in overexploitation in the coastal areas.

The Ministry of Maritime Affairs and Fisheries, as the authority in marine and fisheries management in Indonesia, has a vital role in creating appropriate regulations to maintain

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sustainable fisheries resources. Efforts are made to establish marine protected areas. The benefits of conservation areas for stakeholders are more fish (biomass) in the waters and an increase in the number of tourists [3,4]. Based on the Decree of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 18 of 2022, the Eastern Region of Bintan Island, Riau Islands Province is designated as a Marine Protected Area. The purpose is to protect, preserve, and utilize marine biodiversity. The marine protected area of the of Bintan Island is managed as the Taman Wisata Perairan Timur Pulau Bintan (TWP-TB) consists of 3 areas, namely area I of Teluk Seborg, area II of Gunung Kijang, and area III Bintan Pesisir [5].

Mapur Village is one of the villages located III, namely the Bintan Pesisir [6]. The Mapur Village community generally works as fishermen who carry out fishing activities [7]. Marine Protected Area management involves the community so that it can have a positive impact on the community. The purpose of the research was to the impact of the establishment of the marine protected area on the fishing grounds and catches of Mapur Village fishermen.

2 Method

The research was conducted in July 2024 in Mapur Village, Bintan Regency, Riau Islands Province. The method used was descriptive quantitative. The quantitative descriptive method makes measurements based on mathematical and statistical calculations that will be explained simply in the form of data tabulations and graphs. Data collection was carried out using observation, questionnaire, and FGD (Focus Group Discussion) techniques. Sampling was done using purposive sampling. The population and samples in the study were fishermen of Mapur Village.

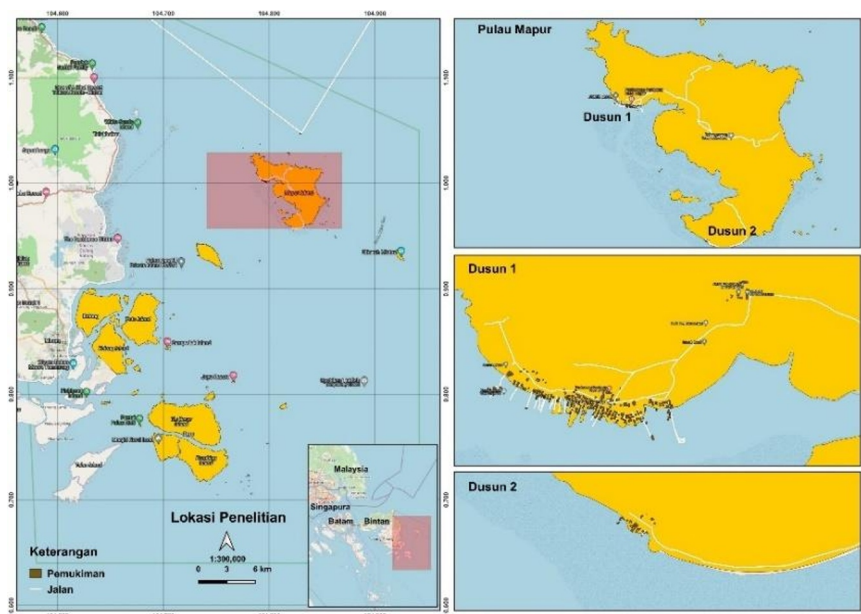


Fig. 1. Research Location

Researchers do not yet know the population of fishermen in Mapur Village, so they use the lemeshow formula to determine the number of samples to be used in the study. The lameshow formula is used to calculate the sample size of the total population that is not

known with certainty in research [8][9]. The study sample consisted of 30 respondents from the fishermen.

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{L^2} \dots\dots\dots (1)$$

Description :

- n : Total Sample
- Z : Standardized values of the normal distribution according to the desired confidence level (90%=1.65)
- p : Maximum Estimate (50%=0.5)
- L : Error Rate (15%=0.15)

$$n = \frac{1,65^2 \times 0,5 \times (1-0,5)}{0,15^2} \dots\dots\dots (2)$$

$$n = 30.25 \dots\dots\dots (3)$$

Data analysis used to answer the research objectives is quantitative descriptive data analysis to determine changes in fishing grounds. It was caught after establishing the Taman Wisata Perairan Timur Pulau Bintan (TWP-TB) Marine Protected Area in Mapur Village, Bintan Regency, through interviews and FGDs with fishermen. The analysis used to answer the objectives using descriptive analysis.

3 Result and Discussion

3.1 Responden Characteristic

According to [10,11], the productive-age population is in the age range between 15-64 years. The productive age population is considered capable of producing goods and services in the production process. The research respondents were Mapur Village fishermen. The average age of respondents is 45 years. Most respondents had a low level of education, with the highest level of education only reaching elementary school (57%). In addition, there are also fishing communities that do not pursue education (27%). The middle and upper education levels are junior high school (3%) and high school (13%). The average Indonesian fisherman has a low education [12,13]. Boat fishermen use in fishing are 1-3 GT in size, with the standard fishing gear used being hand line (70%). Fishermen also use bubu (10%), nets (10%), and cuttlefish fishing (10%). The size of the vessels respondents use varies from 1-3 GT, included in the small boat category. In addition, some respondents do not own boats but carry out fishing activities by riding other boats.

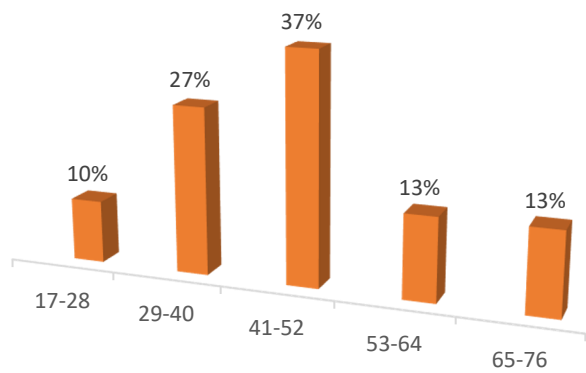


Fig. 2. Age of fishermen

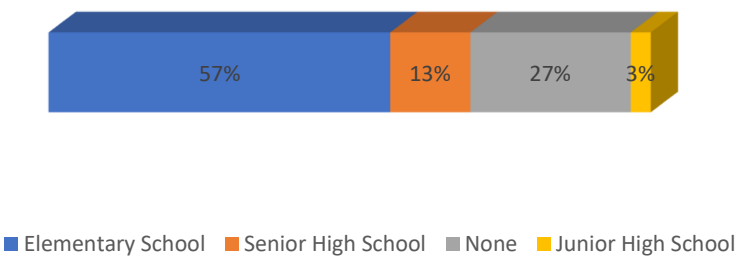


Fig. 3. Fishermen education

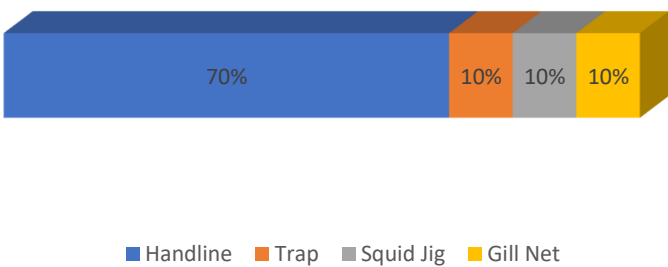


Fig. 4. Fishermen's fishing gear

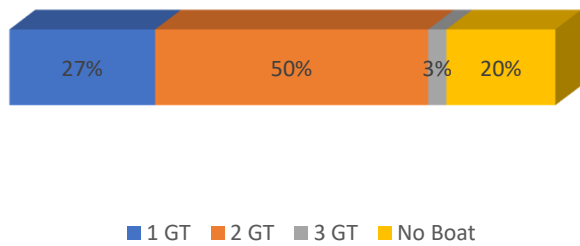


Fig. 5. Boat Size

3.1 Fishing Grounds and Fish Catch

Fishermen's knowledge of the existence of Marine Protected Area in Mapur Village was measured through an interview process, with 87% of respondents knowing the area. The knowledge of fishermen on the existence of Marine Protected Area is crucial because it can measure the impact felt by fishermen, especially the impact on fishermen's catch. Based on the interview results, it is known that the existence of Marine Protected Area has no impact on fishermen's catches (73%).

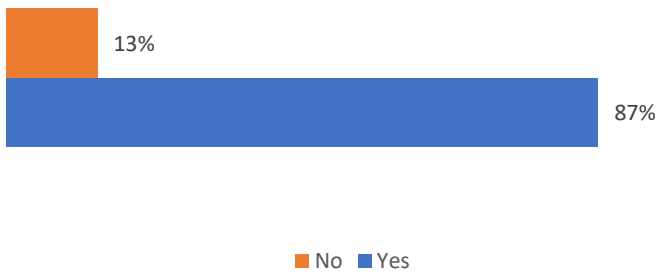


Fig. 6. Knowledge of marine protected areas

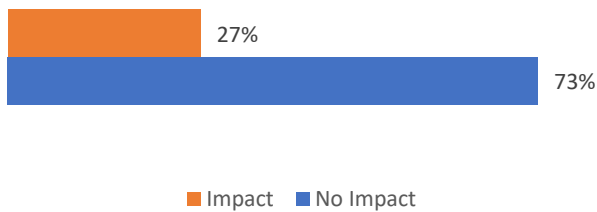


Fig. 7. Impact of marine protected area on fishermen's catch

Most fishermen catch pelagic fish (77%) because most fishing gear is handline. The type of catch of handline fishing is economically important fish such as mackerel (pelagic) [14,15]. Since 2022, Taman Wisata Perairan Timur Pulau Bintan (TWP-TB) has not made fishermen change their fishing ground (53%) because, in general, the fishing ground are far from the marine protected area, which is 1-17 miles from Mapur Village. The fishermen who changed their fishing ground (47%) did not alter their fishing ground due to the existence of the marine protected area but because of the fishing activities using trawls and fish bombing in the fishermen's fishing ground. Most fishermen who change their fishing ground do not use fish aggregating devices (FADs).

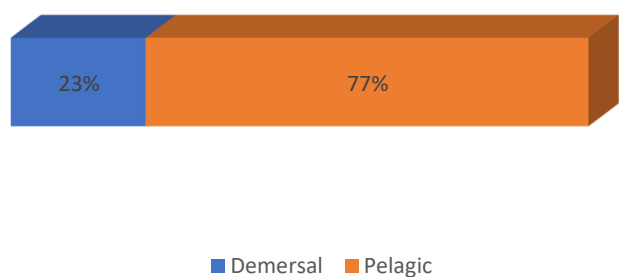


Fig. 8. Fishermen's catch

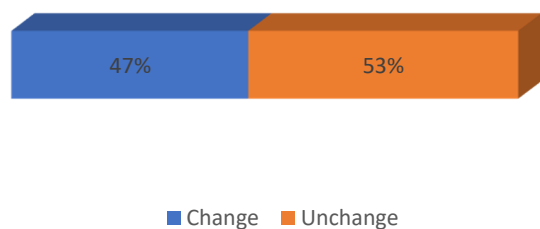


Fig. 8. Fishing ground changes

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