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ESTIMATING FISHING SEASONS FOR SCADS IN BARRU DISTRICT: AN APPROACH FOR EFFICIENCY AND EFFECTIVENESS FISHING BUSINESS OF MANAGEMENT

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ABSTRACT

With a coastline of about 78 km, the potential for capture fisheries in the waters of Barru Regency is very prospective, especially for several groups of purse seine fishermen for kite fishing. This study aims to estimate the pattern of scads fishing season in Barru Waters, and to simply describe an effective fishing management instrument. This study used CPUE time series data (catch per unit effort) from the Marine Fisheries Agency of Barru Regency in 2017-2020 and interviews with several purse seine fishermen in the last year of 2021. In addition, simple satellite imageries of sea surface temperature (SST) and chlorophyll-a were also used to describe environmental conditions during the peak fishing season for the study period June-August 2021. The CPUE moving average time series analysis was used to calculate the fishing season index (IMP). The results showed that the peak season for scads fishing occurred in the east season around Barru coastal Waters, especially in June. This condition may correspond to warm temperatures, and relatively high chlorophyll concentrations. Such conditions create potential fishing grounds for scads fishery along the study area. This information on scads fishing season is very helpful in improving the quality of management of small pelagic fisheries in Barru and surrounding waters particularly, when is the best time to increase the fishing efforts.

Keywords: IMP, Fishing season pattern, Oceanographic conditions, Scads, Time series CPUE data.

INTRODUCTION

Barru Regency is known as the regency with the longest coastline (about 78 Km) in the northern area of South Sulawesi (DKP Barru, 2019). This area is one of the regencies in South Sulawesi which extends from north to south in the western part of the Island of Sulawesi. The magnitude of the sustainable potential of small pelagic fish and large pelagic fish in the Makassar strait region, one of which is Barru Regency, is strongly influenced by environmental conditions in the local area, where the Makassar strait is one of the areas traversed by the west monsoon and east monsoon so that the chance for upwelling phenomena occurs and very high downwelling which results a good feeding opportunity (Nahdyah et al. 2017).

Scads (Decapterus sp) is one of the catch productions that has economic value in South Sulawesi, one of which is in Barru Regency, with catches in 2019 of 76 tons/year. The fishing gear most often used by fishermen in Barru Regency to capture scads is the purse seine.

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In fishing operations, one of the challenges in catching scads is the lack of information about the fishing ground both spatially and temporally. Changing climatic conditions make it more difficult to determine the fishing ground for scads , therefore fishing activities are less effective, wasteful of fuel and time-consuming but the results are less than optimal (Suhartono et al. 2013).

To increase the efficiency of the fly fishing business in Barru Waters, it is deemed necessary to find a pattern for the fishing season. Therefore, this study aims to estimate the seasonal pattern of scads fishing in Barru waters so that the management of the fishing effort of this species becomes more optimal.

MATERIAL AND METHOD

In this study, the data used is the CPUE time series data for scads (catch per month) for four years (2017-2020). The data was obtained from the Marine and Fisheries Affairs of Barru Regency (DKP). In addition, data from interviews with purse seine fishermen at the Sumpang Binangae Fish Landing Place (TPI) were used, Barru Regency, South Sulawesi. Analyses of time series data and moving average, which refers to Zainuddin et al. 2016 and Hamka and Rais 2016, were used to analyze the seasonal pattern of scads fishing. The criteria for determining the fishing season, if the IMP is greater than 100%, it is categorized into scads fishing season, but if the IMP value is less than 100%, it is categorized as not scads fishing season. If the IMP = 100% is categorized as normal or normal season. The peak season occurs at the highest IMP value.

To describe simply the environmental conditions of fishing areas during the peak season, satellite image data of SST and chlorophyll-a concentrations were used. The image data has a spatial resolution of 4 km and a monthly temporal resolution in 2020.

RESULTS AND DISCUSSION

The results showed that the average catch of scads for the last four years (2017-2020) was 300.5 tons/year (DKP Barru Regency, 2020). The data shows that there are annual and monthly variations although on average the highest overall occurs in June. But the results still vary around April to August. This strengthens the suspicion that this fish season will occur in the east monsoon.

Based on the analysis of the movement pattern of the average catch over a 4-year period, it was found that the peak season for scads fishing occurred in June (IMP=166%) (Table 1 and Figure 2). This is presumably because the food sources of scads fish such as phytoplankton and zooplankton (Utami et al., 2014) are abundant in the east season, especially in June. This result is similar to the previous study where the peak season for this

fish is in July around the Flores Sea (Jumriani et al., 2020). The difference in estimating the season may be due to the different types of purse seine used in different locations. While the scads fishing season can be seen from March to August. The implication is that purse seine fishermen should take advantage of this kite fishing season pattern to optimally regulate and manage their level of fishing effort. Thus the catch obtained is expected to be more efficient. The fishing effort of fishermen is intensified in June so that the catch tends to increase.

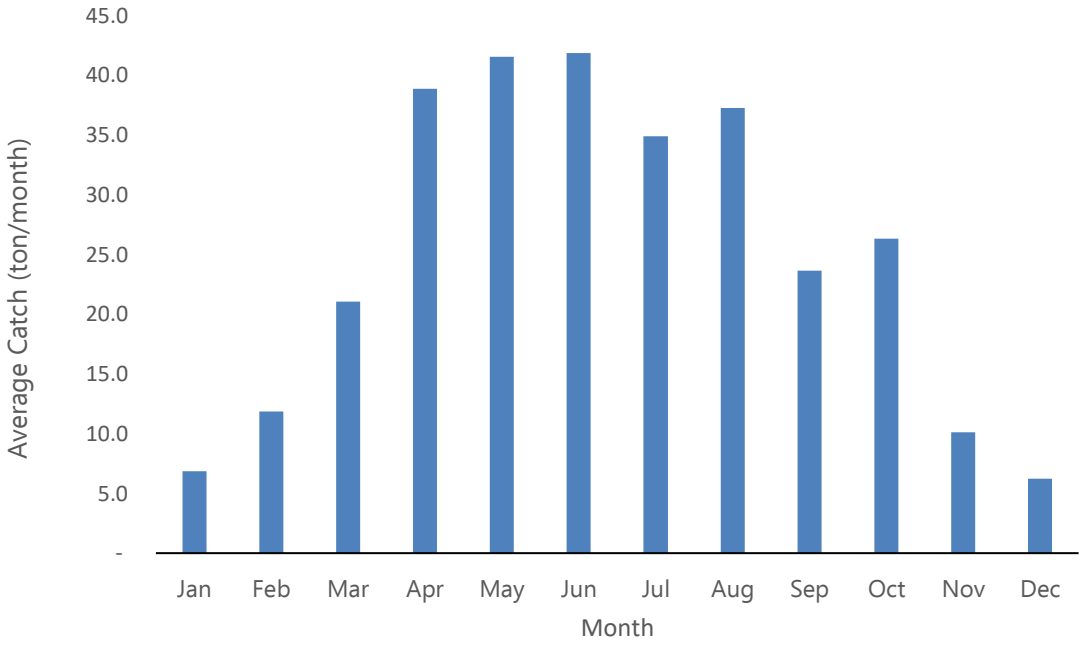

Figure 1. Average catches of scads fish during 2017-2020 (Data source: DKP Barru 2017-2020).

Table 1. Scads IMP Distribution Value in Barru Coastal Waters

Month	IMP (%)	Remark
Jan	26.46891	Poor Season
Feb	41.792406	Fair Season
Mar	104.19205	Fishing Season
Apr	146.06561	Fishing Season
May	160.91936	Fishing Season
Jun	166.4871	Peak Season
Jul	128.00709	Fishing Season
Aug	157.71761	Fishing Season
Sep	95.036312	Fair Season
Oct	98.190659	Fair Season
Nov	45.14353	Fair Season
Dec	29.979375	Fair Season

Meanwhile, in the western season, especially from September to February, the level of fishing effort should be reduced. Besides being risky because of the west monsoon where

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the sea waves tend to be bigger, also because the catch tends to decrease. Specifically, the lowest catch was obtained in January. This is presumably due to the large waves in the west monsoon making the technical capability of fishing gear operations suspected to have decreased. The normal season and the famine season can be used by fishermen to repair fishing gear and boats (Hamka and Rais, 2016).

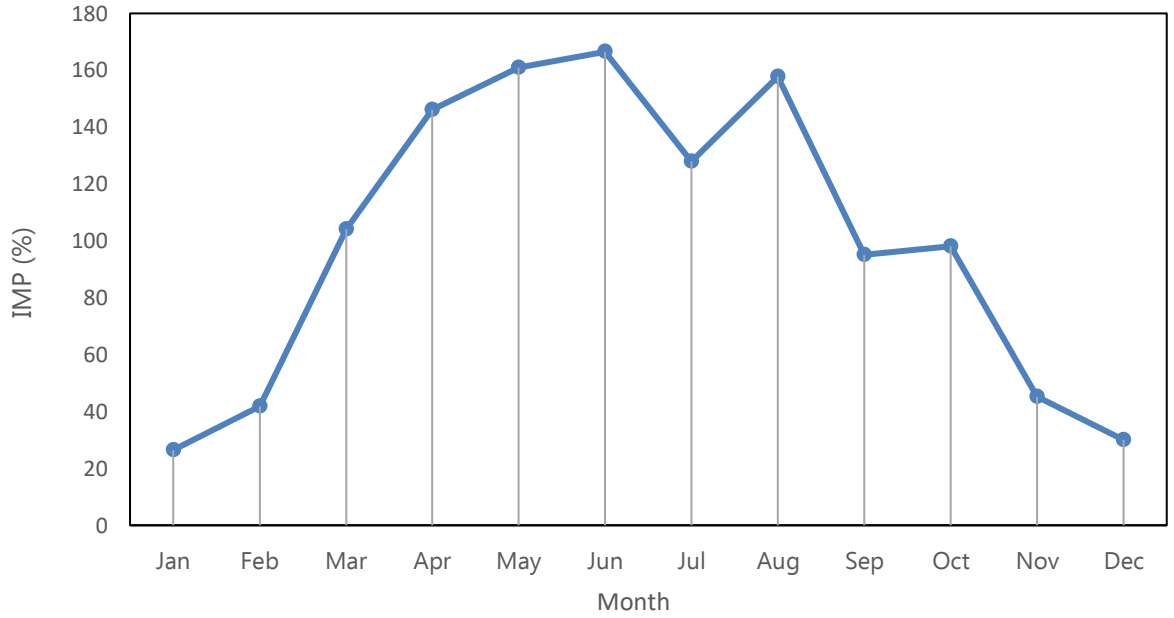

Figure 2. Pattern of scads fishing season based on IMP value from January to December

Figure 2 shows the pattern of the scads fishing season starting in March and reaching a peak in June. This condition is supported by the condition of the marine environment with a relatively warm sea surface temperature of 30-30.6°C and a high concentration of chlorophyll-a above 0.2 mg m^{-3} around the Barru Waters (Figure 3).

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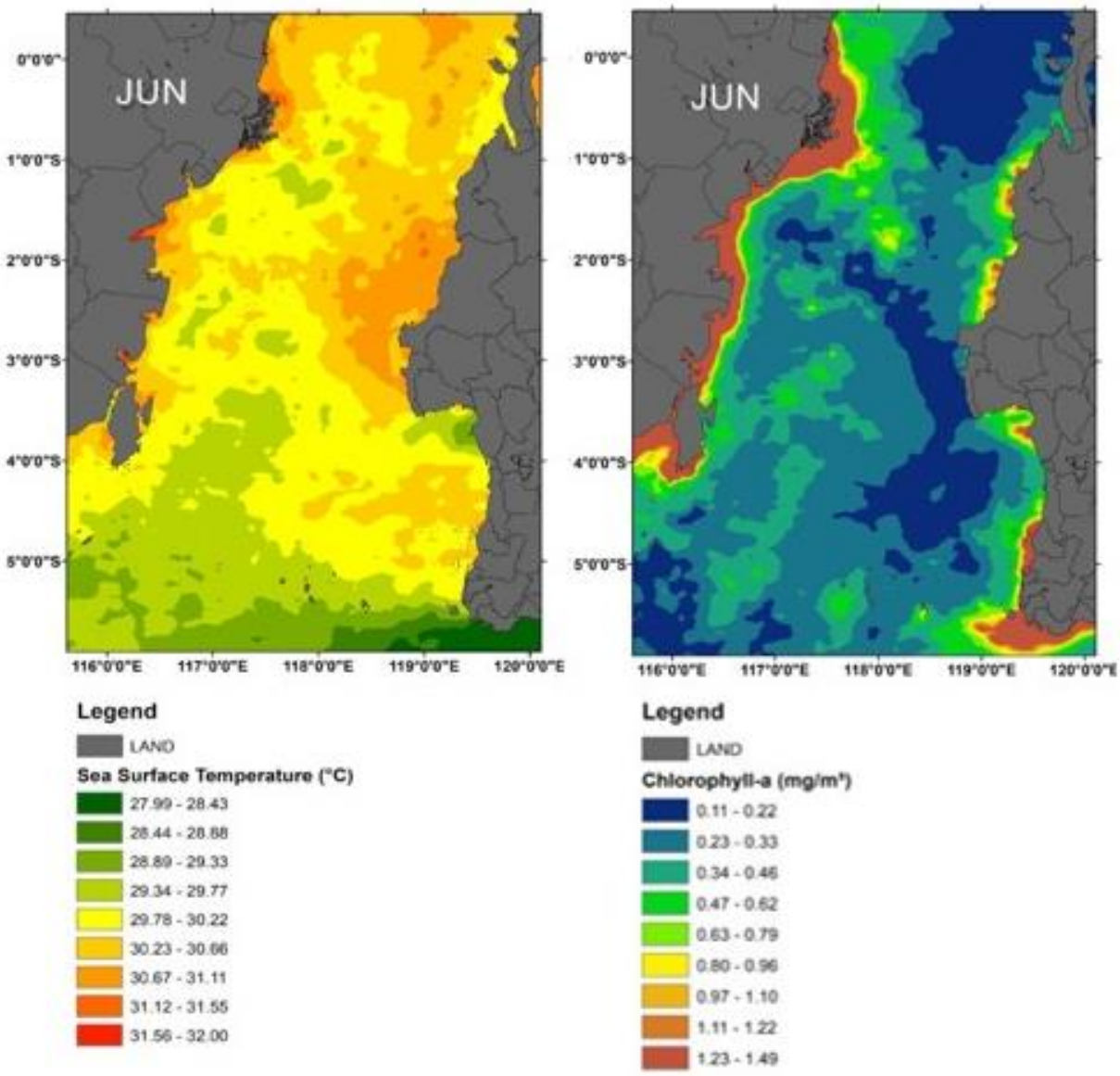

Figure 3. Environmental conditions of both MODIS SST (left) and chlorophyll-a concentration (right) in the peak season of scads.

According to Atmadja et al. (1986), changes in marine environmental conditions can affect certain types of fish to migrate and find food such as kite fish. With relatively warm sea surface temperatures, the food of scads becomes abundant and is characterized by a relatively high concentration of chlorophyll-a. The abundance of pelagic fish is strongly influenced by conditions and changes in the marine environment (BPPL, 2004).

Therefore, the efficiency of purse seine catching for catching scads can be increased if the catch is carried out during the fishing season. The intensity of fishing should be increased further in the peak season. The management of the fly-fishing business in Barru Waters really needs information on the pattern of the fishing season.

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CONCLUTION

Scads fishing season occurs from March to August and peaks in June. This is thought to be related to the abundance of fish food in that season. Therefore, a fishing effort strategy is needed by fishermen to increase the number of efforts in the fishing season, notably in the peak season and limit the number of efforts in non-seasonal months so that fishermen's profits can be obtained optimally.

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