

Suitability Analysis for Grouper Floating Net Cages

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Abstract

This study aims to analyze the physical and chemical quality of the waters and analyze the suitability of floating net cage (KJA) for grouper (*Ephinepelus* sp) aquaculture in the waters of Olele Village. The research method used is a survey method that is observing and determining the land of observation station points and the suitability matrix approach by measuring physical and chemical parameters. The results showed that Olele Village had the potential for the development of floating net cages (KJA) for grouper aquaculture and had two categories of suitability classes that were very suitable (S1) located at Station 1 and the appropriate category (S2) at Station 2 and Station 3.

Keywords: Suitability; grouper; *Ephinepelus* sp; aquaculture; floating net cage; KJA

Introduction

The development of a marine aquaculture system of floating net cages (KJA) is an alternative to overcome obstacles to increasing marine fisheries production (Directorate General of Aquaculture, 2005). Considerations are needed in suitability analysis are technical aspects which consist of physical, chemical, security and human resource parameters. Generally the suitability analysis for aquaculture is based more on feeling or trial and error, whereas data or information about site suitability is very necessary for coastal use as a marine aquaculture development (Milne, 1970; Pilly, 1990; Kangkan et al., 2007).

The floating net cage (KJA) cultivation activity carried out in the waters of Olele Village is not optimal and does not go through site suitability studies. Anggoro (2004) states that one thing that must be considered in the development of marine culture is the fluctuation in environmental parameters because it affects the area and site for cultivation development. Marine culture is also strongly influenced by the carrying capacity of the environment which is very dependent on the quality of the waters (Agusta, 2012).

Utilization and development potential of marine aquaculture in the waters of Olele Village is still low, the low utilization and development of marine culture maybe because of its in-optimal production. The unavailability of site suitability data for the development of marine aquaculture is one of the factors causing the non-optimal development of floating net cages (KJA).

This study aims to analyze the physical and chemical quality of the waters and analyze the suitability of floating net cage (KJA) grouper (*Ephinepelus* sp) aquaculture in the waters of Olele Village.

Research Methodology

This research was conducted from August-September 2016 in the village of Olele, Kabila Bone Sub-district, Bone Bolango Regency.

The research method used is a survey method that is observing and determining the land of observation station points and the suitability matrix approach by measuring physical and chemical parameters.

Determination of sampling points or observation stations is done by purposive sampling, which is a sampling technique based

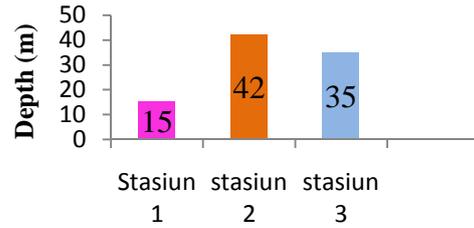
on certain considerations, which refers to the physiography of the land, so that it can represent the state of the land as much as possible. The observation station in this study was determined based on the location of the land that was considered to be able to represent the general condition of the research land and referred to the standard criteria for the standard living conditions of the grouper commodity. Observation of the sampling coordinates is recorded with the help of the Global Positioning System (GPS) in the latitude: longitude format.

Sampling of physical and chemical parameters of waters is done in the morning with in situ measurements and samples that need to be further analyzed.

Results and Discussion

Based on research results that the content of dissolved oxygen in water at least 4 ppm, while the optimum content is between 5-6 ppm. Dissolved oxygen is a type of gas dissolved in water in very large quantities. Oxygen is needed for fish to breathe in water and the growth of marine fish. For fish farming to be successful, the pH of water should be between 6.5 - 9.0 and the optimal growth of fish occurs at pH 7-8. Water pH affects the level of water fertility because it affects the life of microorganisms. Acidic waters will be less productive and can kill fish. While the optimal temperature for fish growth and survival ranges from 24 - 32 oC. While the salinity range for groupers is between 15-35 ppt.

Olele Village has waters that tend to be calm with relatively small current speeds and low levels of pollution. The potential for the development of marine culture is very possible to be developed because most of its territory is in the coastal region. Site suitability analysis is carried out to obtain the quality of physical conditions, chemical waters of the development of grouper aquaculture.

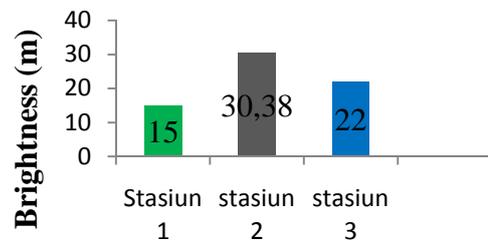


Research Stations

Figure 1 Depth of Olele Village waters

The depth of the waters based on the measurement results above shows the range of values that support for marine aquaculture activities, especially for floating net cages (KJA) of grouper aquaculture. The depth of the waters is an important factor that must be considered for marine aquaculture activities, according to Efendi (2004) the depth of water between 7 - 40 meters is ideal for floating net cages (KJA) of grouper cultivation.

Water brightness based on measurement results at station points in the waters of Olele Village ranged from 15 - 30.38m. The highest distribution of water brightness is at Station 2, while the lowest water brightness is at Station 1 (Figure 2). The difference in the level of water brightness at each station point is thought to be related to water depth. According to Hutabarat (2000) the light will decrease in intensity along with the greater depth. Based on the results of research observations of water brightness in Olele Village water is also influenced by low levels of pollution.



Research Stations

Figure 2 Brightness of waters in Olele Village

For grouper cultivation, the brightness of the waters will help the fish's vision in taking food. The range of water brightness values in the waters of the olele village is generally good for aquaculture, especially groupers.

Current velocity (Figure 3) at all station points has a range of 8.52 - 13.99 m / sec, which means that the current velocity in the waters of Olele Village is supportive for marine aquaculture activities that do not exceed the standard values for cultivation of 50 cm / sec. Current velocity is possible because the location of the relatively protected waters. Current velocity for marine aquaculture especially the floating net cage (KJA) grouper system is needed to facilitate the replacement and absorption of nutrients needed by groupers but does not damage the groupers.

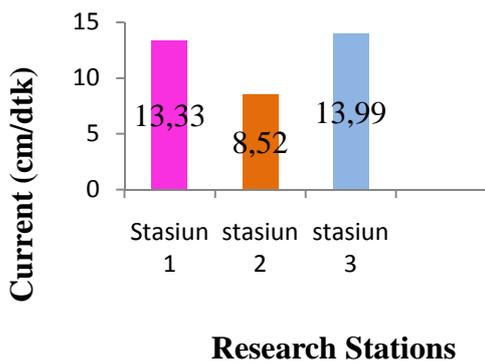
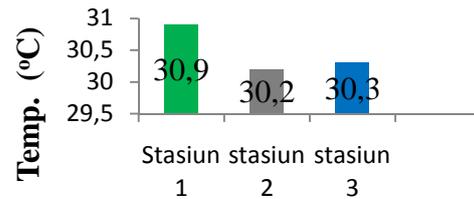


Figure 3 Current in Olele Village

Currents in addition to functioning to bring nutrients / nutrients to grouper culture are also needed to clean (KJA) of the attached biota. Flow velocity is also important in the cultivation of the floating net cage (KJA) grouper system in terms of cage anchoring and positioning systems, water circulation and transportation of leftovers. White-spot disease (ice-ice) in groupers is a disease that usually occurs when the sea is calm and the currents are weak (Serdiati & Widiastuti, 2010).

The results of water temperature measurements at each observation station point in the waters of Olele Village have a range

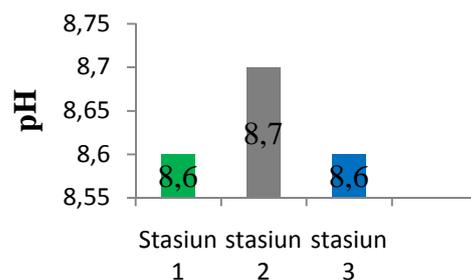
between 30.2 oC - 30.9 oC (Figure 4). The temperature difference at each station point does not differ greatly. The difference in temperature is thought to be due to the time difference in situ measurements of this variable. Effendi (2003) said that, the temperature of the waters associated with the ability to warm up by sunlight, night time and land.



Research Stations

Figure 4 Temperature of the waters

The results of the measurement of the pH variable at each station in the waters of Olele Village show a range value of 8.6-8.7. The lowest pH is found at Station 1 and 3, while the highest pH is at Station 2 (Figure 5). The difference in pH values in waters is thought to be caused by changes in pH concentrations in waters having a daily cycle. This cycle is a function of carbon dioxide.

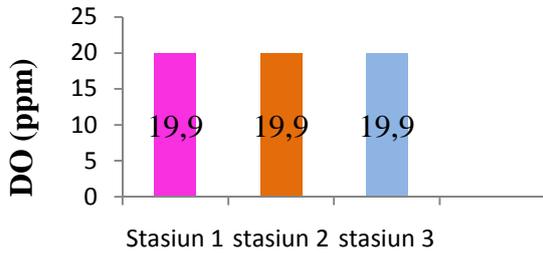


Research Stations

Figure 5 pH measurements

The content of dissolved oxygen that is good for grouper cultivation is 5-8 ppm (Hutabarat and Evans, 2006). The distribution of dissolved oxygen in the waters of Olele Village

strongly supports the grouper floating net cage (KJA) system.

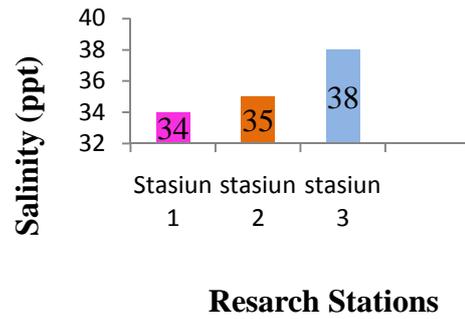


Research Stations

Figure 6 DO measurements

The water salinity content at each observation station in the waters of Olele Village shows a range of values between 34 ppt - 38 ppt. High salinity concentrations are at station 3 and the lowest concentration is at station 1. Low salinity at Station 1 is due to the land being affected by the Pentadu River flow.

Salinity tolerance range suitable for grouper culture is in the range of 31 - 34 ppt. Inadequate salinity will result in the production level of aquaculture activities not optimal, this is because the growth of fish will be disrupted and cause the balance of the grouper that is cultivated. Determination of marine cultivation areas is not recommended in areas close to the mainland because in those areas there is a lot of fresh water input which can cause salinity in the area is not suitable.



Research Stations

Figure 7 Salinity measurements

Determination of site suitability for grouper marine aquaculture floating net cage (KJA) system refers to the water suitability matrix that has been prepared based on the measurement of various water quality parameters consisting of physical, chemical parameters, and then analyzed based on weighting and scoring determination.

Conclusion and Suggestion

Olele Village has the potential for the development of floating net cages (KJA) for grouper (*Ephinepelus* sp) cultivation.

Site suitability for the development of floating net cage (KJA) grouper cultivation in Olele Village consists of two categories of suitability classes that are very suitable (S1) located at Station 1 and corresponding categories (S2) at Station 2 and Station 3.

Research needs to be done on the analysis of land suitability with methods and other marine aquaculture commodities, in order to obtain more diverse data for the development of marine culture in the waters of Olele Village.

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