



Turbidity Characteristics of The Waters on The Padelegan Beach, Pademawu District, Pamekasan Regency, East Java

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ABSTRACT

Padelegan Beach is one of the beaches used for tourism and seaweed cultivation activities, which is located in Pademawu District, Pamekasan Regency. The distribution of water turbidity plays an important role in the success of seaweed cultivation activities and salt ponds along the Jumiang coast. The purpose of this research is to know the condition of turbidities distribution in Jumiang waters. The sampling method used the purposive sampling method with the location of nine sampling stations. The location of the turbidity measurement is based on there are near the coast (points 1, 2, 3), beaches (points 4, 5, 6), and the high seas (7, 8, 9). Turbidity was measured using the Lutron TU-2016 Turbidity Meter. The results show that the turbidity distribution at station points near the coast is higher in value than at high sea station points. The highest turbidity value is 29,82 NTU in the coastal area, while the lowest is 4,35 NTU the offshore. The turbidity value in Jumiang coastal waters shows a value below the threshold for turbidity that is intended for cultivation activities.

Keywords: characteristics, turbidity, The Padelegan Beach

ABSTRAK

Pantai Padelegan salah satu pantai yang dimanfaatkan untuk pariwisata dan kegiatan budidaya rumput laut yang terletak di Kecamatan Pademawu, Kabupaten Pamekasan. Sebaran turbiditas perairan berperan penting dalam keberhasilan kegiatan budidaya rumput laut dan tambak garam di sepanjang pantai Jumiang. Tujuan dari penelitian yaitu mengetahui kondisi sebaran turbiditas di perairan Jumiang. Metode pengambilan sampel menggunakan metode purposive sampling dengan lokasi sembilan titik stasiun sampling. Lokasi pengukuran turbiditas berdasarkan jarak terdekat dari daratan yaitu pantai (titik 1,2,3), laut (titik 4,5,6) dan laut lepas (titik 7,8,9). Turbiditas diukur menggunakan Turbidity Meter Lutron TU-2016. Hasil penelitian menunjukkan sebaran turbiditas pada titik stasiun yang dekat pantai lebih tinggi nilainya dibandingkan dengan titik stasiun laut lepas. Nilai turbiditas tertinggi sebesar 29,82 NTU di wilayah pesisir, sedangkan terendah sebesar 4,35 NTU di lepas pantai. Dengan nilai turbiditas di perairan pantai Jumiang menunjukkan nilai di bawah ambang batas untuk turbiditas yang diperuntukkan kegiatan budidaya.

Kata kunci: karakteristik, turbiditas, Pantai Padelegan

1. Introduction

The diverse potential of coastal areas can be utilized by the community and increase the level of community income. Padelegan Beach is one of the beaches that have the potential as a coastal tourism area, fishing area, seaweed cultivation area, and salt pond (Wong, et al., 2014). Environmental carrying capacity affects

the success of activities in coastal areas. Seawater quality is influenced by natural factors and interactions with the terrestrial environment. One of the causes of the decline in water quality is the entry of polluted waste from land activities including household waste, salt pond cultivation activities, fishing boat shipping lanes, and so on. (Ducrotoy, et al., 2020).

One of the important physical parameters for environmental carrying capacity is turbidity. Turbidity is a state of water mixed with solids in the form of sand, mud, and clay or suspended particles in water. (Martubongs, 2015). Turbidity will result in reduced penetration of sunlight into the waters. When water has a high turbidity value, it will cause several problems including affecting the growth of phytoplankton and causing changes in aquatic fertility that affect aquaculture activities. In addition, turbidity also needs to be considered in taking water sources for the production of salt ponds. Turbidity can affect the quality of salt production both physically and chemically (Bahagia, et al, 2019). Factors that affect the presence of turbid waters are the entry of domestic waste to the beach, tourism activities, fishing shipping lanes and marine hydrodynamic conditions. The purpose of this study was to determine the distribution of turbidity on Padelegan Beach, Pamekasan as the basis for seaweed cultivation activities and salt pond water sources.

2. Material and Method

The research was conducted in September 2021 located on Padelegan beach, Pamekasan. The research method uses descriptive methods to describe the distribution of turbidity at the research site (Sugiyono, 2009). Determination of the sampling point by considering the surrounding conditions close to Padelegan Beach tourism, river estuaries as ship traffic as

well as water sources and seaweed cultivation activities. There are 9 sampling points with locations near the coast (points 1, 2, 3), the coast (points 4, 5, 6) and the high seas (points 7, 8, 9). The measurement of turbidity water quality uses the purposive sampling method, namely taking samples by taking into account various considerations of the circumstances and conditions of the observation area (Effendi, 2003). The turbidity measuring device uses a Turbidity Meter Lutron TU-2016 with accuracy 0,5 NTU and 0,01 NTU resolution. Then record the results of the turbidity values obtained and analyze the results. The turbidity value is then analyzed with statistics to determine the distribution of the turbidity of the Padelengan beach.

3. Result and Discussion

Determination of water sample measurement points by considering the location conditions of Padelegan Beach which consists of 9 points, there are near the coast (points 1, 2, 3), beaches (points 4, 5, 6), and the high seas (7, 8, 9). The condition of the measurement point can be seen in Figure 1 where the hue of color change appears to describe the condition of the depth of the waters from the 9 points of measurement of sea water turbidity. The determination of the distance to the near point of the coast is 500 m, then to the coast is 1000 m, and the offshore direction is 1000 m (according to changes in the color of the waters).

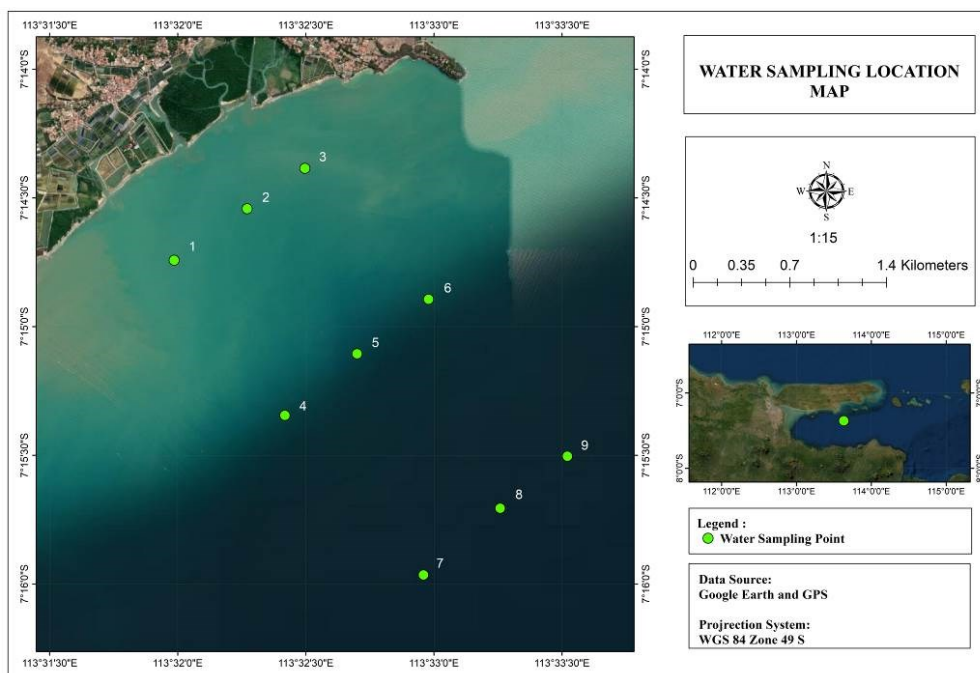


Figure 1. Seawater Sample Measurement Points

Table 1. Distribution of Turbidity Value (NTU) for Each Sampling Points

Sampling Points	Longitude	Latitude	Turbidity (NTU)
1	113.533278°	-7.244881°	29.82
2	113.536764°	-7.242078°	21.73
3	113.540306°	-7.239186°	20.77
4	113.539431°	-7.251719°	9.36
5	113.542844°	-7.248706°	9.36
6	113.546417°	-7.246008°	11.54
7	113.545428°	-7.258419°	4.89
8	113.548875°	-7.255492°	4.08
9	113.552400°	-7.252703°	4.35

The condition of Padelegan coastal waters is utilized by various human activities including marine tourism on Padelegan Beach, access to fishing boat traffic, seaweed cultivation and along the coast there are salt ponds whose water sources come from Jumiang coastal waters. The distribution of turbidity values from observation points close to the coast to high seas observation points can be seen in Table 1.

Table 1 shows the highest turbidity value at point 1 near the coast, which is 29.8 NTU, while the lowest value is 4.1 NTU at point 8 in the high seas. The distribution of turbidity values at points 1, 2, 3 which is a coastal area dominates the highest turbidity value. Coastal areas are dynamic areas where they interact directly with activities on land and sea. Turbidity is influenced by the entry of land waste from both residential and agricultural or aquaculture ponds which contributes to the amount of sludge and suspended solids in the water. Turbidity can affect the penetration of sunlight into the water column. In many coastal areas, suspended solids are found which affect the penetration of sunlight, thus affecting the productivity of coastal waters (Yingying, et al, 2014). The highest value is obtained in the area of point 1 where the area is directly adjacent to the marine tourism activities of Padelegan Beach and is a fishing boat traffic lane. The stirring of suspended material and mud that affects the turbidity value will result in inhibiting the penetration of sunlight into the waters so that the photosynthesis process of organisms will be disrupted (Makmur, 2003). The turbidity value in coastal areas is close to the maximum turbidity threshold value, which is 30 NTU seawater quality standard for aquaculture (Peraturan Gubernur DIY, 2010). The level of turbidity in coastal areas tends to be higher than the high seas (Framinan, et al, 1993). Seaweed cultivation activities and sources of salt ponds should not be carried out in locations close to the coast with a distance of 500 m from the shoreline. Lloyd (1985) in Effendi (2003), stated that an increase in the turbidity

value of 25 NTU can reduce 13-50% of the primary productivity of waters so that it interferes with seaweed cultivation activities and salt pond production.

The value of turbidity at points 4, 5, and 6 which is the beach has a value on the turbidity threshold of sea water quality standards for cultivation so that seaweed cultivation activities using floating rafts can be carried out at a distance of \pm 1500 m from the shoreline. The source of salt pond water can also be taken at this location because the turbidity value that affects the production and quality of salt is still far from the threshold. On the high seas (points 7, 8, 9) it has the lowest turbidity value of 4.1 NTU where this value is far below the threshold for sea water quality standards for aquaculture (Peraturan Gubernur DIY, 2010). The value of turbidity in the high seas is influenced by the location far from the entry of land waste and the influence of marine hydrodynamics which results in stirring and dilution of turbidity.

4. Conclusion

The highest turbidity value is at point 1 near the coast and the lowest turbidity value is at point 8 offshore. The highest value is obtained in the area of point 1 where the area is directly adjacent to the marine tourism activities of Padelegan Beach and is a fishing boat traffic lane. The value of turbidity in the high seas is influenced by the location far from the entry of land waste and the influence of marine hydrodynamics. The turbidity value on Padelegan beach is below the seawater quality standard for aquaculture.

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