

I. INTRODUCTION

1.1 Background

A river is an area that includes Water Resources Management in one or several River Basins (Daerah Aliran Sungai DAS) or/and small islands with an area of approximately 2,000 km² (Government Regulation of 2019 about river). Rivers are natural resources, flow from upstream to downstream, and are freshwater (Zulianti *et al.*, 2022). Upstream river water is usually faster than downstream and is usually located in mountainous areas and is often winding due to deposition processes or erosion processes along the riverbanks (Permadi, 2015). Rivers that have flowing water are a source of human needs such as daily needs, industry, and ecosystems in the form of clean water (Egbueri, 2018). River conditions will experience pressure as the number of human activities increases and will disrupt the surrounding ecosystem (Agustira *et al.*, 2013).

Processes in river areas include river flows, which carry a permanent supply of fresh water, and the physical properties of seawater, such as tides, ocean currents, and waves, as well as other biological and chemical processes (Dahuri *et al.*, 1996). Plankton float or hover in water and play an important role in aquatic ecosystems. The movement of plankton is relatively passive, so water currents always carry it. Plankton consists of phytoplankton and zooplankton. Phytoplankton are primary producers that can form organic substances from inorganic substances in photosynthesis

(Nontji, 2005). Zooplankton have an important role in the food chain as primary consumers in aquatic ecosystems.

Sea tides are a phenomenon of rising and falling sea level movements. Tidal events occur periodically which are caused by a combination of gravitational force and the attractive force of astronomical objects, especially the sun, earth, and moon (Surbakti, 2007). When seawater conditions are high, salinity in the river area will increase. This is because the water at the river's mouth mixes with seawater. Likewise, when seawater conditions recede, the salinity of the river will be low; this is because the water at the river is dominated by fresh water. The occurrence of sea tides greatly influences the abundance and distribution of plankton in river. Apart from tidal factors, various activities that take place along river can also result in changes to water physic-chemical factors that have an impact on plankton communities.

Waters that are influenced by tides are called tidal waters. The influence of tides on waters can have a significant impact on plankton populations and the aquatic ecosystem (Munirma, 2020). Nutrient Mixing, where tides influence air movement in tidal waters, which can result in the decomposition of nutrients that are important for plankton growth (Purwanti, 2011). Tides affect air circulation in tidal waters. This can affect the supply of nutrients and oxygen in the air, which in turn affects environmental conditions suitable for plankton growth.

Morosari River is a river located in Sayung District, Demak Regency. The waters of the Morosari River are used for various kinds of resident activities, such as the disposal of domestic and industrial waste, fishing boat traffic lanes, tourist areas, and fishery activities (cultivation and capture). Plankton are living organisms that float in water, with limited swimming ability and their movements are strongly influenced by water currents. Phytoplankton and zooplankton are important in maintaining the survival of aquatic ecosystems and the food chain in waters. This research aims to determine the dynamics of plankton populations and the relationship between quality based on tides, knowing the diversity, similarities, and dominance of plankton in the waters of Morosari River.

1.2 Research Question

Based on the description of the background above, several problems can be formulated as follows:

1. What types of plankton are found in the Morosari River, Sayung Village, Demak Regency, Central Java?
2. How are plankton populations affected by the tidal level in the Morosari River, Sayung Village, Demak Regency, Central Java?
3. What water quality results could be found in the Morosari River, Sayung Village, Demak Regency, and Central Java?

1.3 Research Purpose

1. Identifying types of plankton based on tides in the Moroosari river, Sayung Village, Demak Regency, Central Java
2. Analyzing the dynamics population plankton based on tides in the Moroosari river, Sayung Village, Demak Regency, Central Java
3. Analyzing the Saprobic Index as one of the water quality parameters to know the condition in Morosari River, Sayung Village, Demak Regency, Central Java

1.4 Benefits

The results obtained from this study are expected to provide information about water quality and plankton as bioindicators in the Morosari River, Sayung Village, Demak Regency, Central Java.