

Estimation of Nutrient Fluxes over 2 Tidal Cycles in Tidal Flat

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ABSTRACT

In this paper, we describe the function of the self-clarification of water quality by the tidal flat in the Tokyo Port Wild Bird Park. In this tidal flat, we carried out the samplings of benthos and bottom sediments, and estimated the nutrient flux over 2 tidal cycles in summer in 2006 and 2007. From this study, we found following results. (1) The dominant species of the benthos is benthic polychaeta and biodiversity is low. (2) Function of this flat is net sink for nitrogen and chlorophyll-a and net source for phosphorus in summer.

KEY WORDS: Tidal flat; nutrient flux; nitrogen; phosphorus; chlorophyll-a; self-clarification; Tokyo Bay.

INTRODUCTION

Tidal flats are important areas for coastal environments. Tidal flat is extensive low-slope areas to experience immersion and emersion by tidal actions. It is said that the flat is one of the most productive area on the Earth. In addition, tidal flat could have an ability of water clarification and it is very important for water quality of the eutrophied enclosed bay around large cities, such as Tokyo Bay.

In Japan, reclamation works in coastal areas have been taking place throughout the country progressively along with industrialization since the 1860s (Fig.1). It is said that 88.4% of the area of tidal flats in Tokyo Bay has disappeared as a result of this reclamation (Kouhara, 1999). As a result of this, total ability of the self-clarification in the Tokyo Bay had fallen down, and the red tide and hypoxia chronically came to occur during summer. In recent years, the importance of tidal flats has been recognized, and the creation of artificial flats has been conducted around the country. It is necessary to estimate the self-clarification by tidal flats, and there are many studies to know this function. However, there is little report to estimate the nutrient fluxes between flat and adjacent sea.

In this study, we focused on the function of the self-clarification by tidal flats, and carried out the investigation of water, sediment and macro-benthos in tidal flat in the Tokyo Port Wild Bird Park. And we estimate nutrient fluxes between flat and adjacent sea from the observation.

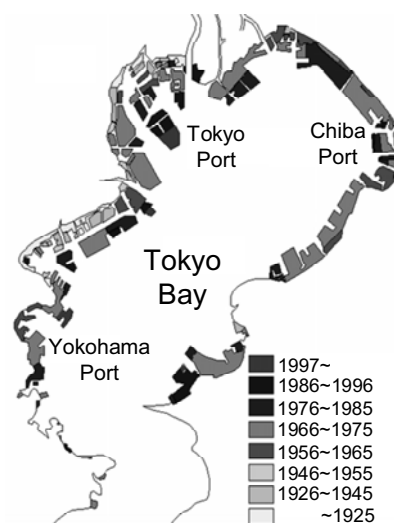


Fig. 1 State of reclaimed land in Tokyo Bay

STUDY FIELD

The Wild Bird Park in Tokyo Port is located in the north coast of Tokyo Bay in Japan. Figure 2 shows the location of this park. This park was established in 1989 in order to maintain and restore the water environment and to offer the water area. Then, the park was selected as a wet land of the Shorebird Site Network (snipe & plover) in 2000. This park is one of the few areas that we could watch wild birds in Tokyo.