

Possibility of Creating Habitats Utilizing Shallows Existing in Port and Harbor Areas

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1. Introduction

In recent years, coast areas around ports and harbors have been expected to provide a high level of ecosystem services to residents and others by redevelopment of housing, etc., beginning with high-rise condominiums. If canals and harbor basins are observed in detail, shallows (water depth $\leq 3\text{m}$) created by natural accumulation of sand can be found in various places where they do not impede ship navigation and berthing, and these shallows are functioning effectively as habitats for aquatic life. Therefore, the purpose of this research was to measure the detailed topography from the land areas, including tidal zones, to water areas and determine the abundance and spatial distribution features of shallows.

2. Method

Data acquisition was carried out at canal in the Port of Tokyo.¹⁾ In underwater measurements, a wide swath bathymetry system (interferometric echo sounder; C3D, manufactured by Benthos; depth measurement resolution: 5.5cm) was used. In measurements on land, a ground laser (LMS-Z420, manufactured by RIEGL; heading, pitch and roll accuracy: $\pm 0.01^\circ$) installed on shipboard was used. The measurement results were arranged as 3-dimensional information, enabling calculation of the area of arbitrary water depth zones (Fig.-1).

3. Results

In canals in the Port of Tokyo, which were the object of this investigation, shallow waters with depths of 3m or less occupied about 18.0% of the total water area. Their area was approximately $7.1 \times 10^5 \text{ m}^2$, which was equivalent to about 70% of the Tamagawa river mouth

tidal flats and about 50% of the Sanbanze tidal flats in Chiba Prefecture. While this area may be small in comparison with Tokyo Bay as a whole, considering the fact that it is equivalent to 4% of the $16.4 \times 10^6 \text{ m}^2$ area of the existing tide flats around Tokyo Bay, these can be considered valuable shallow areas.

Furthermore, these shallow areas are not distributed disproportionately in only some locations, but existed widely (Fig.-2). This suggests the possibility that an ecosystem network can be created efficiently and is considered to contribute to effective restoration of nature.

4. Conclusion

Shallows with an area of approximately $7.1 \times 10^5 \text{ m}^2$ existed in canals in the Port of Tokyo. These shallows are distributed widely, suggesting the possibility of creating habitat spaces where the ecosystem network functions efficiently. However, as shallows where the bottom sediments have become sludgy also exist, study of appropriate measures, such as sediment remediation, etc., is considered necessary for these shallows to demonstrate their full functions.

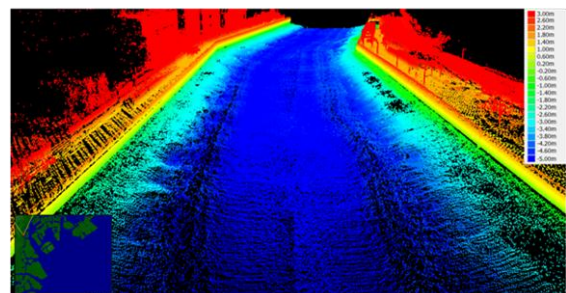


Fig.-1 Display of detailed topographical measurement data

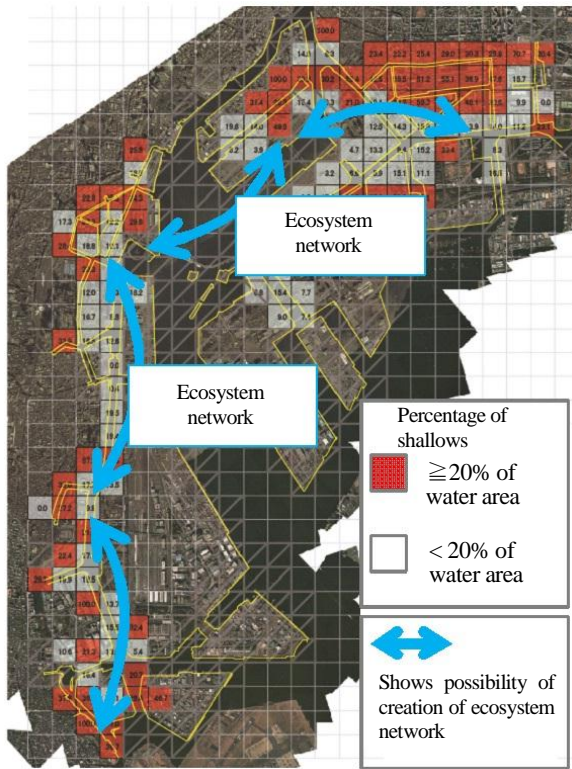


Fig.-2 Distribution of shallows

【Reference】

- 1) Tomonari Okada, 3 others (2014), Effective utilization of shallow water habitats in Port and Harbor Regions, Journal of Coastal Zone Studies, 27, 1, 61-69.