

## Diminished Water Purification Capacity of Tidal Areas Covered by *Ulva* sp.

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### ABSTRACT

Yatsu Higata is one of the most significant remaining tidal flats in Japan. The site is located in the inner region of Tokyo Bay and was registered as a Ramsar Convention site in 1993. Tokyo is one of the world's most densely populated cities and the water within the bay is eutrophic. In recent years, there has been an extraordinary increase in the growth of *Ulva* sp. within the tidal flat, which has resulted in numerous benthic organisms, such as clams and lugworm, becoming almost locally extinct. Furthermore, the area colonized by *Ulva* sp. continues to expand each year, raising the prospect that the algae will eventually blanket the entire tidal flat.

This paper explores the environmental characteristics of a tidal flat area covered with *Ulva* sp. through field studies and a genetic analysis.

### KEYWORDS:

Tideland, lake-tidal flat, *Ulva* sp., Tokyo Bay

### INTRODUCTION

In addition to contributing to purification of seawater and functioning as waterfront buffers, tidal flats and wetlands serve as habitats for supporting a wide range of aquatic organisms. Since the loss of tidal flats and wetlands often results in considerable damage to aquatic environments, their preservation and restoration is an important global environmental issue. Numerous tidal flats in recent years have become sites of extraordinary proliferation of *Ulva* sp. (green laver), a seaweed taxa which covers tidal flats in rubbery sheets, creating anoxic conditions and resulting in the death of a wide range of benthic fauna. The Yatsu Higata, one of Japan's most significant remaining tidal flats and is registered under the 1993 Ramsar Convention, is located in the inner reaches of Tokyo Bay, a nutrient-rich body of water in one of the world's most densely populated urban areas (Figure 1). The growth of this alga has resulted in benthic organisms, such as clams and sandworms becoming at risk from local extinction. Since the area occupied by *Ulva* sp. continues to increase annually, the likelihood that the alga will eventually cover the entire tidal flat area is considered likely. However, relatively little research has been conducted on the area and environmental data for the area is lacking.

This paper explores the diminished water purification capacity of tidal areas covered with *Ulva* sp. by nutrient dynamics based on field studies. Further, genetic analysis was conducted to estimate whether *Ulva* sp. wintered without dieback.

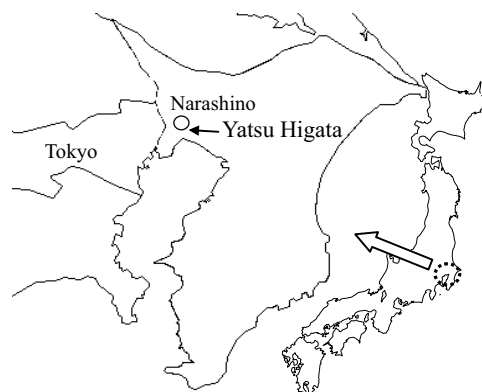


Figure 1 Location of Yatsu Higata



Figure 2 Aerial view and Measuring points