Possibility of restoring eelgrass (*Zostera marina*) beds in Miyako Bay damaged by the Great East Japan Earthquake

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1. Introduction

The tsunami triggered by the Great East Japan Earthquake of March 11, 2011 destroyed a lot of eelgrass (*Zostera marina*) (Photo) growing in sand. Eelgrass beds, which are called the cradles of the sea, are one of the foundations of coastal ecosystems, as they function as spawning grounds for fish and habitats for fry, and their destruction severely impacts coastal ecosystems. This research was conducted in the head of Miyako Bay, where eelgrass beds had formed before the earthquake, to clarify the state of eelgrass and sediments, and to learn if it will be possible to restore the eelgrass beds in the future.

2. Method

A survey was done focusing on grain size, which is a condition for the breeding and growth of eelgrass that can be greatly changed by a tsunami. In October 2012, the state of distribution of eelgrass was clarified and sediments were sampled at 120 points in the head of Miyako Bay. And to learn the transport routes of eelgrass seedlings, a three-dimensional model was used to calculate the currents inside the bay.

3. Results

There were places behind the breakwater at Takahama and at the inlet behind the peninsula on the east side where eelgrass was found in dense or open communities (see Figure). This is assumed to be a result of the shadow of port structures or the peninsula preventing their destruction by the tsunami.

The sediment at these locations was evaluated for its suitability as the habitat of eelgrass based on its particle-size distribution. The sediment between Kobori, and Horiuchi, at Takahama, at Kamagasawa, and Akamae, where either dense or open communities of eelgrass was confirmed, had particle-size distribution suitable for the breeding and growth of eelgrass.

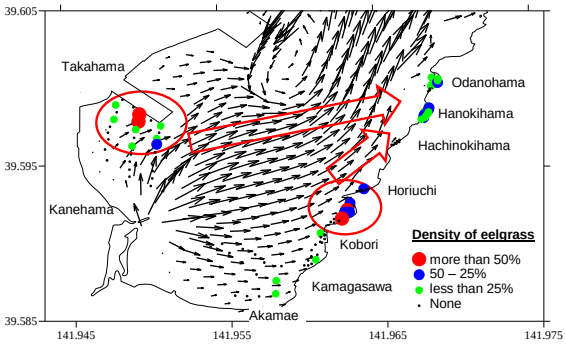
And the figure is an example of a map prepared by superimposing the distribution of eelgrass which survives on the results of calculating the tidal residual current of the surface layer in the head of the bay in the autumn. The eelgrass in Takahama and Kobori are upstream of the flow, which means that seeds can be counted on to move to Hachinokihama, Hanokihama, and Odanohama from Takahama, and Kobori. The direction of the flow is the same in every season, so similar advection currents can be counted on to occur in every season.

4. Perspectives of future monitoring

This survey reveals that many places with sediment conditions suitable for use as habitats by eelgrass remain. We wish to continue monitoring in anticipation of the small scale eelgrass beds which remain steadily expanding a little at a time into their surroundings and the eelgrass beds confirmed to be dense communities acting as supply sources restoring eelgrass beds over a wide area.

Photo. Eeelgrass in Miyako Bay

Figure. Residual Current (Autumn) and Eelgrass Distribution



[Sources]

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