

INFLUENCE OF SAND MINING ON THE POPULATION DENSITY OF EELGRASS IN THE SETO INLAND SEA, JAPAN

SATORU TAKAHASHI¹, ICHIRO YUASA¹ AND KAZUO MURAKAMI²

¹Marine Resources and Environment Research Institute, National Institute of Advanced Industrial Science and Technology, Kure, Hiroshima 737-0197, Japan

²Faculty of Engineering, Musashi Institute of Technology, Setagaya, Tokyo 158-8557, Japan

A huge amount of sea sand has been mined from numerous sandbanks in the Seto Inland Sea to be used as the construction materials. The suspended matter is diffused from sand mining ships and the effects of the suspended matter on the population density of eelgrass has been concerned. Montani and Hari (2000) suggested that the decrease of transparency by suspended matter and sedimentation of suspended matter on the eelgrass leaves inhibits to the growth of the eelgrass.

Off-Tadanoumi was one of the biggest sand mining areas in the Seto Inland Sea. In this area, sand mining started in the 1960's and ended in 1998. The transparency increased by about 2m after 1998 at the observation point located near the sand mining area, and there is no relationship between transparency and COD. Therefore, we can consider that the suspended matter diffused from the ships, decreased the transparency in off-Tadanoumi.

On the other hand, we have no quantitative information on how and to where the suspended matter is transported from the sand mining area. Then numerical model experiment for diffusion of suspended matter was carried out to calculate the distribution of the transparency in off-Tadanoumi. We reproduced tidal currents and deal with sinking velocity, sedimentation and re-suspension of the suspended matter in this model. The calculated distribution of the transparency was compared with result of the observation for the population density of eelgrass in off-Tadanoumi. The observation result shows that the population density of the eelgrass is low near sand mining area and some eelgrass beds completely disappear. Decrease of the calculated transparency in this area is large. On the other hand, another eelgrass beds that are located far from sand mining area are in various states. Decrease of the transparency in this area is expected to be small. Relationship between transparency, population density of eelgrass and habitat depth of eelgrass is investigated. This result shows that the population density of the eelgrass is high when the decrease of the transparency is small. In this case, the population density of the eelgrass is independent of the habitat depth. When the decrease of the transparency is large, the population density of the eelgrass with shallow habitat depth (around 3m) is not as low as that with the deep habitat depth (around 6m). When the decrease of the transparency is over 3m, the population density of the eelgrass is low, even with the shallow habitat depth.