

IMPACTS BY THE *NAKHODKA* HEAVY-OIL SPILL ON THE INTER-TIDAL ECOSYSTEM

(2): Recovery of macro-algal vegetation

Kawai Hiroshi¹, Kamiya Mitsunobu¹, Komatsu Teruhisa², Nakaoka Masahiro², Yamamoto Tomoko³, Marine Life Research Group of Takeno⁴, and Ohwada Kouichi⁵

1. Kobe University Research Center for Inland Seas, Kobe, Japan, 2. Ocean Research Institute, The University of Tokyo 3. Faculty of Fisheries, Kagoshima University, 4. Takeno Snorkel Center, 5. Prefectural University of Kumamoto

In order to clarify the impacts of the heavy-oil pollution by the 1997 *Nakhodka* oil spill on the intertidal macro-algal vegetation, four years of quantitative analyses have been done at Imago-Ura Cove, Kasumi, in Hyogo Prefecture. The percent cover of macro-algae (seaweeds) in a 1x1m quadrates along the shoreline (intertidal zone) using 70 m transects (autumn) or 450 m transects (spring) were assessed and recorded by photographic imaging.

In the areas within the investigation site where the oil pollution was most severe, dense populations of tuft-forming benthic diatoms were observed in the spring of 1997 (3-4 months after the oil spill), which were replaced by macro-algal vegetation (e.g. *Gelidium* spp., *Chondracanthus intermedius*, *Dictyota dichotoma*) in the following years. The number of species recorded in each quadrat was generally 3-6 in the spring of 1998 (one year after the oil spill), but increased to 5-9 species in the spring of 1999 and 2000, indicating recovery of the vegetation. One remarkable phenomenon noticed in the monitoring was the considerable reduction of some common winter-spring annual brown algae such as *Scytosiphon lomentaria*, *Leathesia difformis* and *Colpomenia sinuosa* in 1998 and 1999. They were recorded in 1997, and were also observed in the areas where the pollution was not severe even in 1998 and 1999. Therefore, their reduction might have been caused by cryptic damage from the pollution to the microscopic gaetophytic generations of those species.