

Environmental Improvement of water Quality and Sediment in Mikawa Bay by Employing Sand Dredged for Waterways to be Developed and Preserved

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[Background and Objective]

A project for improving the environment of Mikawa Bay is under way by using sand (6.20 million m³ of fine sand) dredged for the Nakayama Waterway Project to be developed and preserved (for which the water depth is increased from 10 m to 14 m over a 3 km long and 700 m wide area). For the project, (1) fundamental policy, (2) selection of the sites where the dredged sand is to be used, (3) effects of the project, and (4) execution procedures were studied to improve the environment of the seabed and create a new underwater environment.

[Description]

Using the dredged sand, we made three types of formations; sand capping works (one site with an area of 18.9 ha), creating two shoals (with a total area of 6.3 ha), and two tidal flats (with a total area of 14.1 ha) to investigate and monitor the formations from the standpoints of (1) restoration of biota, (2) contribution to promotion of the marine products industry, (3) enhancement of water purification capabilities, and (4) stabilization of geographical features and creation of a living environment for fishes and marine organisms.

[The Results]

I . The fundamental policy of the project was to reduce the potential risk of seawater contamination by covering the seabed with sand, to strengthen the self-purification capabilities of the seabed by providing shoals and tidal flats, and to contribute to the furtherance of the marine products industry.

II . Regarding the selection of sites where the dredged sand is to be used, we set the selection criteria from the viewpoints of achieving large effects, achieving them quickly, and for a long duration of time. As a result, we selected sites to be prioritized for covering with sand, for creating shoals, and for creating tidal flats.

III. The following principal results were obtained from the investigation and from monitoring the formations for two years:

(1) In and around the shoals with water depths of approximately 2 to 3 m, compared to surrounding waters with depths of more than 5 m, upward movement of water blocks with anoxic water is deterred, allowing short-necked clams to live, revealing that raising the seabed level is an effective means to achieve the objective.

(2) Repopulation of such biota as shells and lugworms has been actively maintained in each season, showing that these sites have been functioning as places for reproduction of shellfish.

(3) Results of a study on nitrogen cycle clarified that seawater is purified due to organic substances being eaten by shellfish and filtered until they reach the bottom mud.

(4) The geometric features in the upper and middle zones of tidal flats (height of foundation and area) remain stable.