The new breakwater of the Port of Genoa: monitoring and reuse of the dredged sediments

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Introduction: The Port System Authority of Genoa has planned the construction of a new breakwater (Fig. 1) to allow the entry and maneuvering of the latest generation of vessels (longer than 400 m). To achieve this, the Port Authority has also planned a new capital dredging (the first one carried out from 2009 to 2014) to further increase the depth of the port basin. In the initial phase of the dredging, the sediments are discharged into the channel protecting the Genoa airport; in the second phase of the project, the dredged sediments will be placed inside the caissons that will form the structure of the new breakwater.
The Italian Ministry of Ecological Transition has requested the creation of an Environmental Monitoring Plan (EMP) to ensure the protection of the marine-maritime environment outside the port basin, which boasts valuable sites such as protected marine environments and activities of high tourist interest. The University of Genoa therefore drafted the PMA in full compliance with the European Marine Strategy Framework Directive (MSFD) and formed the multidisciplinary team of researchers to implement the monitoring activities.

Fig. 1: Rendering of the new breakwater of the Port of Genoa.

Methods: In the *ante-operam* phase, the working group checked the health state of the port environment and surrounding areas by studying all the MSFD descriptors to follow their evolution during all phases of the breakwater works.
To provide continuous coverage and optimize the work of the researchers, a fixed automatic monitoring system was created for the sediment dredging and discharge phases consisting of instrumentation for the continuous measurement of turbidity and marine dynamics (Fig. 2). In order to follow the evolution of the system "environment" in detail during the different work phases, an additional on-site mobile monitoring is carried out weekly by boat.

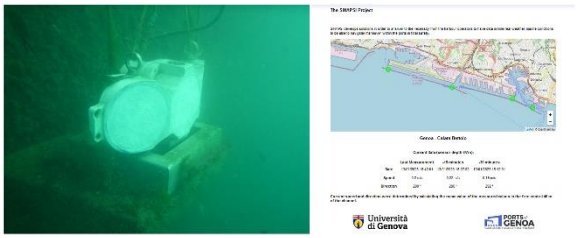

Fig. 2: Monitoring system of the current dredging.

Results: A first result of the monitoring can be seen on the dedicated S4SINAPSI internet page (https://s4sinapsi.it/Stazioni/en/#/adcp02) where an automatic value control system allows operators to check the status of the work at any time, even remotely.