Sediment reservoirs (deposits) in coastal areas and their use - GR

1. Policy Objective & Theme

 SUSTAINABLE USE OF RESOURCES: Sound use of resources and promotion of less resource intensive processes/products

2. Key Approaches

- Ecosystems based approach
- Technical

3. Experiences that can be exchanged

A methodology for (a) determining sand extraction sites and (b) assessing the potential of sub-marine sand deposits on the continental shelf and their subsequent use in beach nourishment projects. In addition, the effectiveness of the field activities (surveys to acquire geo-physical and sedimentary information) and the respective equipment used in these surveys are considered.

4. Overview of the case

A methodology for determining sand extraction sites and assessing the potential of sub-marine sand deposits (sediment reservoirs) has been developed and implemented in the coastal area of East-Macedonia and Thrace. Geo-physical and sedimentary field campaigns have identified a site which is capable for providing 42 million m3 sand for beach nourishment.

5. Context and Objectives

a) Context

The study area is the coastal region of East Macedonia and Thrace with water depths between 20 and 50m. Potential sites of sediment reservoirs were identified, geo-physical and geognostic tests were carried out for determining and estimating sand deposits and sand volumes for each reservoir. The activity was based on the EUROSION preliminary study about coastal erosion problems in Europe and the proposed strategy for identifying Sediment Reservoirs to be used in areas which suffer from coastal erosion.

b) Objectives

The identification of sediment reservoirs in coastal areas is essential for the combat against coastal erosion, and the implementation of beach nourishment strategy in areas suffering from coastal erosion. The availability of sub-marine sand deposits ,which are non renewable resources, is declining and hence the various geo-physical and sedimentary studies as well as the use of appropriate instrumentation have to follow a well established procedure for obtaining the desirable results. Initially sites with fine and coarse-grained sand are sought along the entire continental shelf using existing and accessible data. Potential sites are defined and an inventory of sedimentary and seismic data is created. Sand volumes for each deposit are estimated and sedimentary and lager aspects of known deposits are characterized with specific surveys. Geo-physical and geognostic tests are carried out on the shelf for determining the sand deposits. A 2D and 3D bathymetry is obtained for observing surface morphology of the seabed and establishing any continuities/discontinuities in the deposits. Side Scan Sonar

(SSS) surveys are carried out for observing surface sedimentary structures, existence of Posidonia grasslands and positive archaeological remains.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

The methodology and the case presented were developed by a research team of the laboratory of Ecological Engineering and Technology, Environmental Engineering Department of Democritus University of Thrace, Greece.

b) ICZM Tools

Intense bathymetric tests on the coastal sector of the river Nestos zone was carried out and a sand bank consisting of relict sand, suitable for the nourishment of the nearby beach was identified. The region was close to two drillings, already carried out to a depth of 20 m, that showed up a succession of clay-like sands, fine sands and layers of clay containing sand. In the sand bank sector, the depth from the surface to the sea-floor extended from 35 m to 24 m above the sand banks. After the bathymetric tests and using OLEX instrumentation a number of relief lines were carefully planned. The lines were then scanned using side scan sonar. Sediment samples were collected for granulometric analysis which indicated that the sea-floor consists mainly of thick biogenic sands. The type of seafloor is relatively uniform for all lines. No sand undulations were observed. The results obtained with the side scan method are in agreement with the sediment samples which show that the sand is thick and of biogenic origin.

7. Cost and resources

The total budget of the work was € 70,180.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

The methodology developed and the activities carried out not only in Greece but also in a Italy, Spain and France (Mediterranean Sea) were successful in finding out sediment reservoirs in Mediterranean coasts with a total exploitable material of 700 million m3 for the nourishment of beaches suffering from erosion phenomena.

9. Success and Fail factors

Appropriate technology for sea exploration and operating procedures are pre-requisites for a successful identification of submarine sand deposits.

10. Unforeseen outcomes

None

11. Prepared by

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12. Verified by

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13. Sources

- Beachmed-e: "Strategic management of beach protection for sustainable development of Mediterranean coastal zones"
- <u>www.beachmed.it</u>

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