

Protection and nourishment of Pontino Littoral – IT

1. Policy Objective & Theme

- ADAPTATION TO RISK: Preventing and managing natural hazards and technological (human-made) hazards
- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space

2. Key Approaches

- Knowledge-based
- Technical

3. Experiences that can be exchanged

Protection against erosion using a combination of nourishment and groynes; a cost analysis system for continuous granulometry surveying, environmental monitoring, and granulometry correction techniques.

4. Overview of the case

The Pontino project was planned by Lazio Region to protect about 13 km of beaches. Works of defence and reconstruction of Pontino Littoral started in 2005 and concern 5 municipalities: a) S. Felice Circeo, on the hydraulic right of "Sisto" river; b) Terracina, on the hydraulic left of "Sisto" river and hydraulic left of "Badino" harbour; c) Fondi, on the area between "Foce Canneto" and "Foce Canale S. Anastasia"; d) Formia, on the area between "Torre Mola" and "Fosso dell'Acquafredda"; e) Minturno, between "il Porticciolo" and "Monte d'Argento". The work consists of beach nourishment with sand coming from a marine quarry and protected by perpendicular structures (groynes).

5. Context and Objectives

a) Context

Lazio Region (Italy) covers an area of about 17,228 km² and is located in the centre of Italy. The Lazio Region has a coast of about 300 km of which about 70% are beaches, very appreciated and strategic for the regional economy. The erosion phenomena occurs along about 70 km of the littoral where the annual loss of beach surface is about 200,000 m², only partially compensated with some accreting stretches.

b) Objectives

The objective of the project is to face the problem of erosion. Since 1999 the Lazio Region tackled erosion phenomena by using massive nourishment techniques, with sand dredged from the bottom of the sea. After several experiences, the Lazio Region designed the project PONTINO for the protection of about 13 km of beaches with groynes and 3 million m³ of sand dredged from very deep quarries.

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

a) Management

The works of defence and reconstruction of the PONTINO littoral started on September 2005 and finished on June 2007. Activities were subcontracted to the "S.I.D.R.A. spa" Company by Region Latium, the Administration of which supervised the work. The project had been developed by the planning group "Observatory of Lazio's littoral" (November 2004).

b) ICZM tools

The work consisted of beach nourishment with sand coming from a marine quarry and protected by perpendicular structures (groynes). A nourishment without groynes was provided for the "Formia" Municipality because of the existence of emerged barriers before this intervention. During the development phase, important and extensive studies were carried out. An Environmental Impact Assessment with an Incidence Assessment was provided with a specific study on Environmental Impact for the quarry exploitation. The analysis of grain size compatibility between native sand and quarry sand has been adopted for a comparison between original and settled beach profile. A morpho-dynamic study and the cost analysis of implementation and maintenance costs has been fundamental for the choice of the intervention typology.

There was an intense activity of monitoring carried out by the local administration during dredging and nourishment works through the presence of an on-board geologist. This was necessary due to the unusual characteristics of the quarry, with a depth of 100 m, and the bi-modal quality of sediment grain size (about 70 % sand and 30% gravel). The groynes made of natural rock are designed considering aspects linked to wave height, action of sand retention, and tourist satisfaction. Classic criteria were utilised for the wave height but innovative designs were adopted for sand retention i.e. part of the groyne is submerged, to guarantee the passing of longitudinal transport of sand, the final part of groynes have an Y-design to reduce the erosive effect at the bottom of the structure. Finally there was a progressive reduction in the length of the groynes in the direction of the last groyne underflow. This approach is a consequence of the hypothesis that groynes have a role in retaining new sediment coming from nourishment, and their function is to gradually release the sediments in the direction of the prevalent currents. The tourism aspect has been respected through the realisation of a concrete walkway on the top of the groyne:

7. Cost and resources

The project was founded by Regione Lazio. The total budget of the works has been €32.4 million for the reconstruction of 5 Municipalities of PONTINO's littoral for a total amount of 12.4 km of coast: a) S. Felice Circeo, on the hydraulic right of "Sisto" river; b) Terracina, on the hydraulic left of "Sisto" river and hydraulic left of "Badino" harbour; c) Fondi, on the area between "Foce Canneto" and "Foce Canale S. Anastasia"; d) Formia, on the area between "Torre Mola" and "Fosso dell'Acquafredda"; e) Minturno, between "il Porticciolo" and "Monte d'Argento".

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

The defence and reconstruction works of PONTINO littoral started on September 2005 and finished on June 2007. One year after the end of the works, two reliefs of shoreline with GPS technologies have been made. The result shows the overlap of the two shorelines obtained on October 2007 and March 2008. The vector elaborations have obtained a mean withdrawal of 8 m²/m during 6 months in 1,600 m length beach. A continuous monitoring of shoreline affected by the nourishment has been submitted to a webcam system, installed both in Terracina beach and Marina di Minturno beach.

9. Success and Fail factors

The Lazio Region met numerous difficulties tied to the typology of the intervention and to the extension of the work. It was only thanks to the intense work of control and monitoring that it has been possible to face the difficulties with full awareness of the actions undertaken to achieve the ambitious results of this work. Information for the public has been one of the greater problems that Lazio Region has had to face. Both planners and Administration have had difficulty to disseminate and make understandable the results of this project to beach users and media.

10. Unforeseen outcomes

None so far.

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13. Sources

- P.Lupino, P. Scaloni, “The Pontino Nourishment Work Along Region Latium’s Beach”, Proceedings of Littoral2008 Conference, Venice 25-28 November 2008
- www.beachmed.eu



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