

# PROTECTION AND IMPROVEMENT OF THE BARRIER BEACH OF FRONTIGNAN (HERAULT, FRANCE)

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## INTRODUCTION

Frontignan is located in south of France, along the Mediterranean coast at approximately 20km south of the city of Montpellier. The studied area is 7km long and is characterized by a sand barrier which separates the sea from a large lagoon well known for its ecological interest. In this area, the tourist traffic is significant and is vital for many economic and social activities.

The studied area is divided into two main areas:

- 1) The urbanized area of Frontignan, long of approx. 4.7km, starting from the fish harbor to the Tamaris camping. The marina of Frontignan is located in the middle of this area which is protected by many coastal structures (groynes). In this area the barrier is 100m to 500m wide.
- 2) The less urban area long of approx. 2.3km.

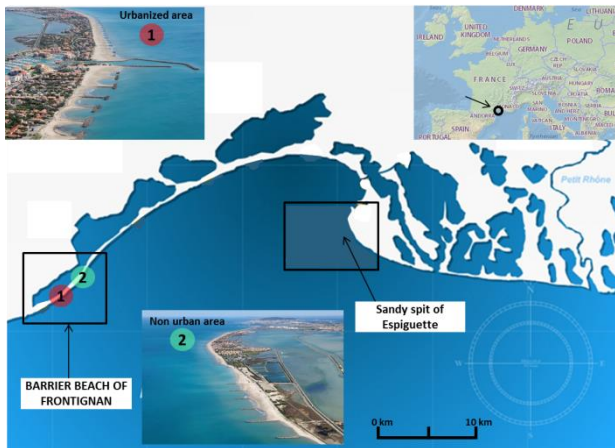


Figure 1 - Location of the studied area

The coastline is subject to significant retreat. The next picture shows a recent example of the coast destruction due to the storm of 28<sup>th</sup> of November to 1<sup>st</sup> of December 2014 ( $H_{1/3}=4.78$  m;  $T_p=8.3$  s; water level = +1.2 m IGN; wave set-up = 0.45 to 0.55 m).



Figure 2 - Breach of the sand barrier - 28/11/2014

In order to limit the risk of erosion and marine submersion, the French administration (Thau Agglo) has awarded ARTELIA:

- to propose and study appropriate solutions;
- to supervise the works.

## ASSESSMENT OF THE COASTAL HYDRODYNAMIC PROCESSES

The coastal hydrodynamic processes have been defined as follow:

- estimation of the littoral drift of about 30,000m<sup>3</sup> toward North-East;
- analysis of the shoreline evolution between 1986 to 2009 with a mean annual retreat varying between - 0.1m/year to -1.5m/year;
- assessment of the risk of marine submersion.

## CHOSEN SOLUTIONS OF PROTECTION

At the end of the feasibility studies, the following solutions of protection have been selected by the French administration:

- reinforcement of existing coastal structures;
- construction of additional coastal defence works;
- construction of a new reinforced sand dune in the back of the beach in order to reduce the risk of marine submersion over a length of 550m;
- beach nourishment of 200,500m<sup>3</sup>.



Figure 3 - Anticipated view of the studied area after the works

## SUPERVISION WORKS

The first phase of the works has been completed at the end of 2015. Due to many environmental constraints (in particular large area of *Posidonia oceanica* plant and petty spurge all along the shore), adapted construction processes have been required as well as a meticulous monitoring of the environment during the works. Including:

- dredge spoils decanted in a temporary sediment settling basin;
- preservation of the petty surge by nurseryman during the work period.

The article will present the coastal sediment processes analysis, the works supervision and the environmental monitoring.