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## THE BEACH-CLIFF SYSTEM OF VALE DO LOBO

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### **Abstract**

Vale do Lobo is a good example of the consequences of human heavy interventions over the coast. The cliff retreat is the result of: the beach narrowing by the lack of by-passing sediments after the built of jetties westward; the rill and gully erosion after heavy rainy episodes and the golf field irrigation of the tourist complex.

**Key words:** heavy structures, cliff retreat, rill and gully, golf field irrigation, endangered tourist complex.

### 1. THE HUMAN PRESSURE ON THE COAST

Vale do Lobo is located at central Algarve and it is a know beach with a luxury tourist complex.

In the 70's, the beach had about 100 m width and a 20 m high cliff cut into unconsolidated Plio- Pleistocene sandstones. The cottages were than built about 100 m from the top of the cliff. Only the swimming pool, the golf field and some tourist support structures were closer to the cliff.

Latter, two jwtties were built westward, to settle the outlet of the marina of Vilamoura (Fig. 1). The erosion rate incresead eastward because the sediment bypassing was interrupted. The first problems began at Quarteira, where heavy structures was build from 1970 to 1990, from West to Est, sucha as jetties and longshore structure, to protect the beach and the longshore road. The cliff retreat rate was of 7.5 m/year between 1976 and 1980, and 2.5-1.3 m/year between 1980 and 1991 (*Dias,1988; Marques, 1991*). In front of Quarteira there is no longer a beach in most of the year, but 10 jetties in about 2 km (Fig 1). The erosion progressed eastward reaching Vale do Lobo.

### 2. THE VALE DE LOBO PROBLEM

As erosion progress eatward began the narrowing of the beach at Vale de Lobo. It have endangered the swimming pool and a longshore defense structure was built backshore to protect it and the nourishment of the beach began.

In the last five years, even with the beach nourishment, the sea reached frequently the cliff's base and the retreat has put in danger cottage gardens and the golf field (Fig. 2 and 3).

At the end of 1995, the cottages once built about 100 m from the cliff top were in risk of failure. It was not only the consequence of marine erosion but specially the result of rill and gully erosion of the cliff. These erosion processes develop after heavy rainfalls, like in December 1995 and January 1996, but they promote the cliff retreat even in dry years. As a matter of fact, there is always water available from the garden's irrigation and maintenance of the golf field (where the hole 7 is already famous because it is in danger due to the cliff retreat). In places where the sandstone has clay layers, the saturation of the deposits provided by the irrigation is also responsible for some slides.

The owner of the tourist complex asked for aid to the governmental organism responsible for the coast. In fact this tourist complex was never approved by the organism responsible for the coast (Direcção Geral de Portos), but by the government after heavy political pressure during the 60's and 70's.

Now the owner intend to replanish the beach in 1 km length with 700 000 m<sup>3</sup> of sand, which will high up the beach by 4 m. This will cost about 700,000,000 PTE (3,600,000 ECU). It is a short-term solution, in the scenery of the present sea level rise.

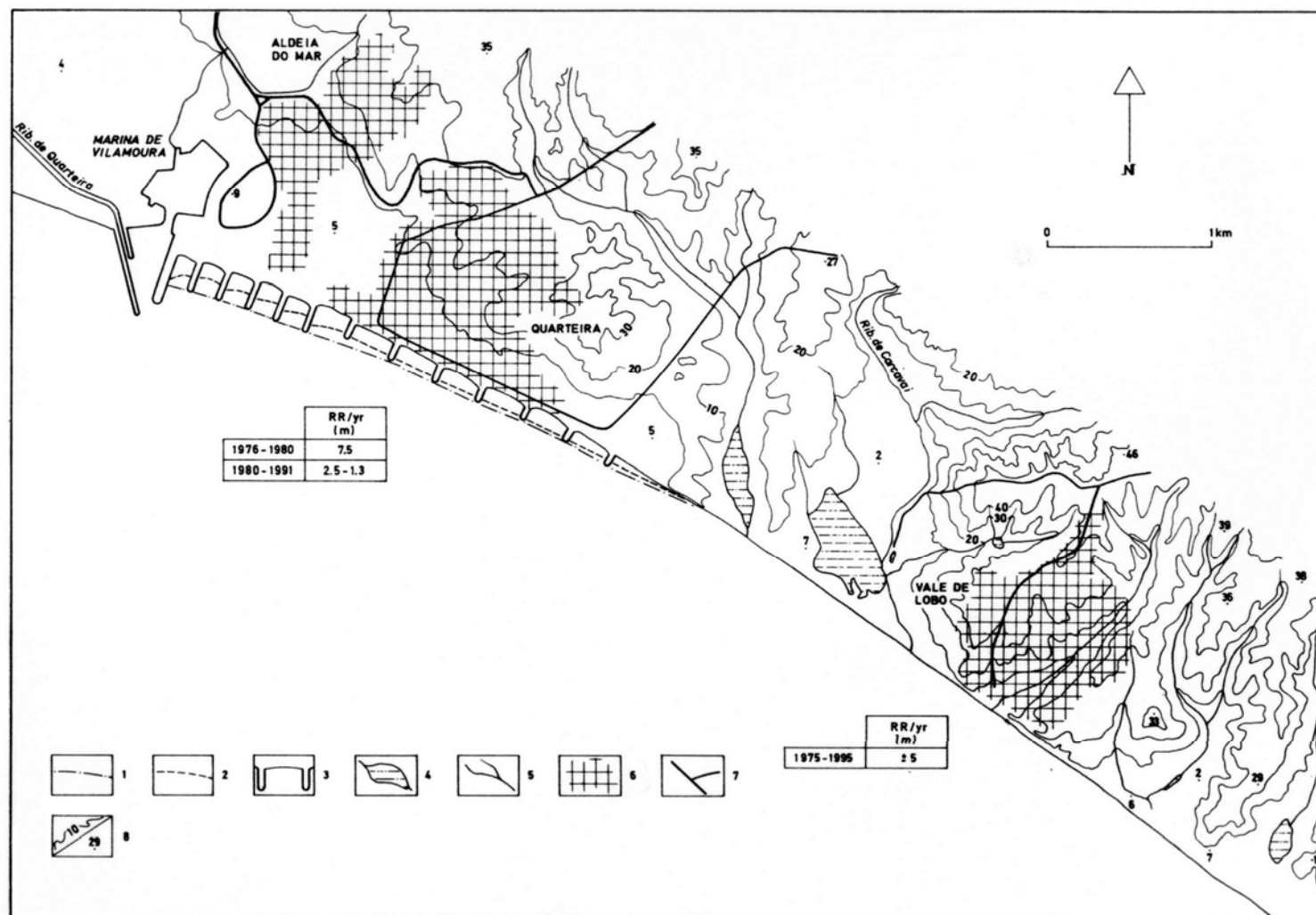


Fig. 1 – The coast between Vilamoura and Vale de Lobo. Legend: 1 – coastline in 1970; 2 – coastline in 1990; 3 – heavy structures built from 1970 to 1990, from West to East; 4 – swamp/marsh; 5 – stream; 6 – urban centre; 7 – road network; 8 – contour line; RR7yr – retreat rate/year.

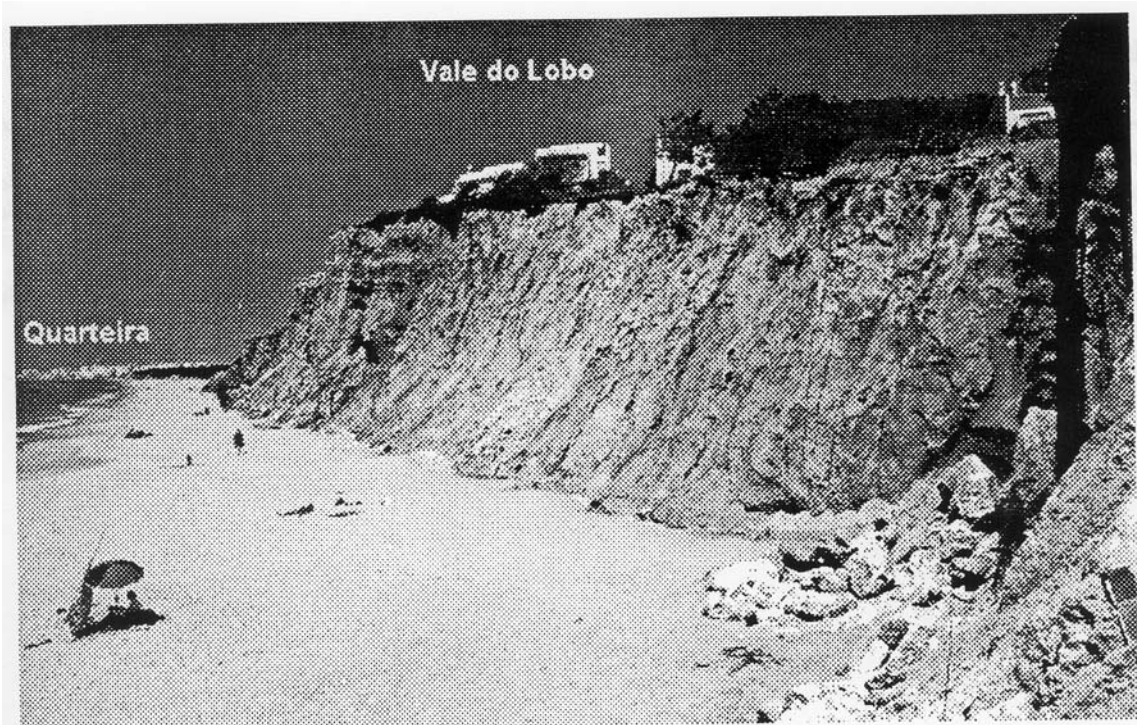


Fig. 2 – The cliff at vale do Lobo. View westward from the swimming pool longshore defense. (photo: L. Vieira).

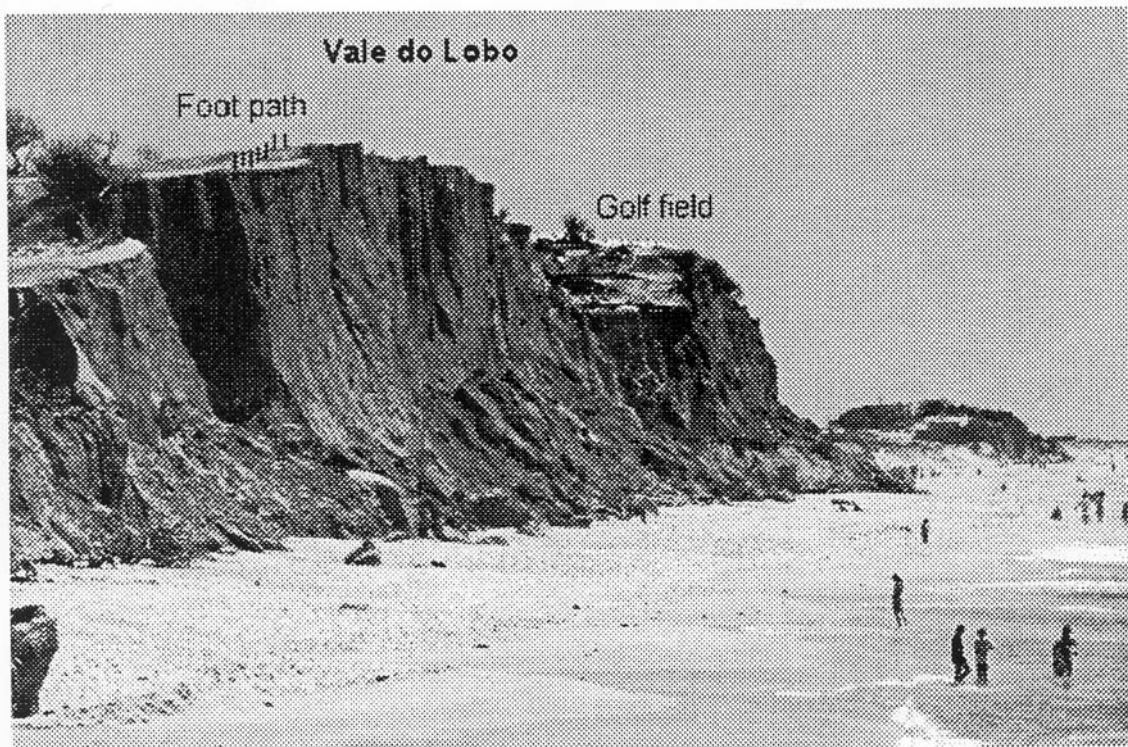


Fig. 3 – The cliff at vale do Lobo. View eastward from the swimming pool longshore defense. (photo: L. Vieira).

Vale do Lobo is only an example of the coastal erosion problems in Algarve. The present government intend to spend 2,000,000,000 PTE (10,250,000 ECU) to fight the coastal erosion in Algarve.

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