

## THE MAREMMA REGIONAL PARK - Analysis of the major impacts.

The Park offers a diverse array of landscape types. These include the Fiume Ombrone, which has an influence on coastal dynamics and sediment fluxes in the area (particularly on the beach and dunal systems); the coastal dunes and adjacent marshes; the rocky vegetated foothills of the Monti dell' Uccellina and associated outcrops; the anthropic land-cover, which comprises an expanse of low-lying land afforested by pines, mainly *Pinus pinea*; the canals whose prime purpose was to convey



freshwater across tracts of reclaimed territory; and, the flat open spaces on the coastal plain that serve as pasture grounds for the characteristic cattle and horses of the Maremma, as well as for cultivation. In addition, the Parco attracts a vast number of visitors during varying parts of the year, for recreational purposes, which include bathing, eco-tourism and trekking.

Analysing the evolution of the sandy beaches around the Ombrone River mouth, it is clear that since the second half of the last century a process of erosion has taken place. At that time, the river mouth was more advanced by about 1 km and from then on, there has been a constant erosion

rate ranging from 5 to 10 m/year.



The constant process of coastal erosion has progressively led to the entrance of salt water in inland areas. This process has also caused the increase in water salinity of the canals built during land reclamation and used to drain flatter areas. Consequently the coastal pinewood, the grazing and farming areas have been severely affected. Another phenomenon is the hydrological degradation of the area due to salt water intrusion in the water table that has lowered its level because of the continuous pumping for agricultural needs.



For this reason the Park has a project of beach nourishment aiming to reduce beach erosion at the river mouth, stabilise the beach of Marina d'Alberese and to protect the internal areas from salt water intrusion. The project is subdivided in two phases: a) construction of a hard structure "a breakwater" to protect the sea waves to reach the pinewood vegetation at the south of the river mouth and b) beach nourishment of an area of 1250 m delimited by groynes perpendicular to the shore every 250 m.

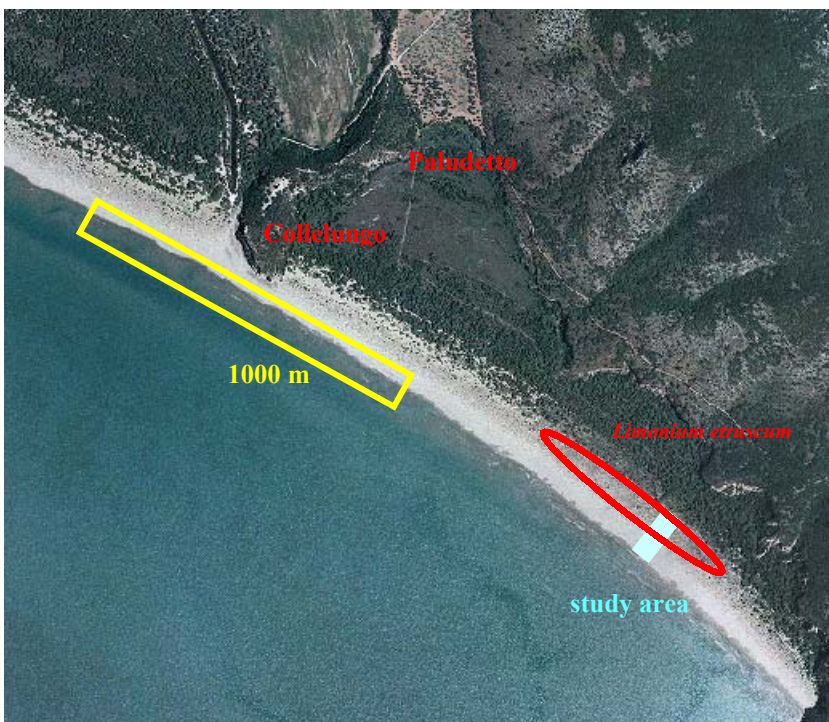
The construction of a "breakwater" to protect the sea waves to reach the pinewood vegetation will be 1200 m long and at 150 m landwards. The breakwater will have boulders seawards and a

soil covered with vegetation landwards with a pedestrian pathway.

Beach nourishment will consist in the construction of six wooden groynes and 100.000 m<sup>3</sup> of sand will be taken from Collelungo an area of the beach to the south of the eroded section. To extract this quantity of sand a 1000 m of beach in length at a 1 m depth and 100 m in width will be pumped to the groynes, the "target site". This will have a tremendous impact on the area of extraction for various reasons. First of all there will be a damage on the biotic components of the system such as the microphytobenthos (benthic microalgae), the marine zoobenthos, the vascular plants (both marine and terrestrial), the terrestrial arthropods (invertebrates inhabiting the strand line and the supralitoral, including typical wrack fauna that depend for their survival on stranded seaweeds or

other wrack-dependent organisms) and all the other species linked to the macroinvertebrates (avifauna depending on sandy beaches for nesting, foraging and/or resting or lizards and small rodents foraging on invertebrates).

During the construction of the beach nourishment at Collelungo the use of pumps, bulldozers, outlet pipes etc. will destroy the dune and its vegetation. These machines will also increase the degree of compaction of the beach sediment that will affect vascular plants and associated invertebrates. The use of many smaller vehicles will cause more damage than fewer but larger ones.

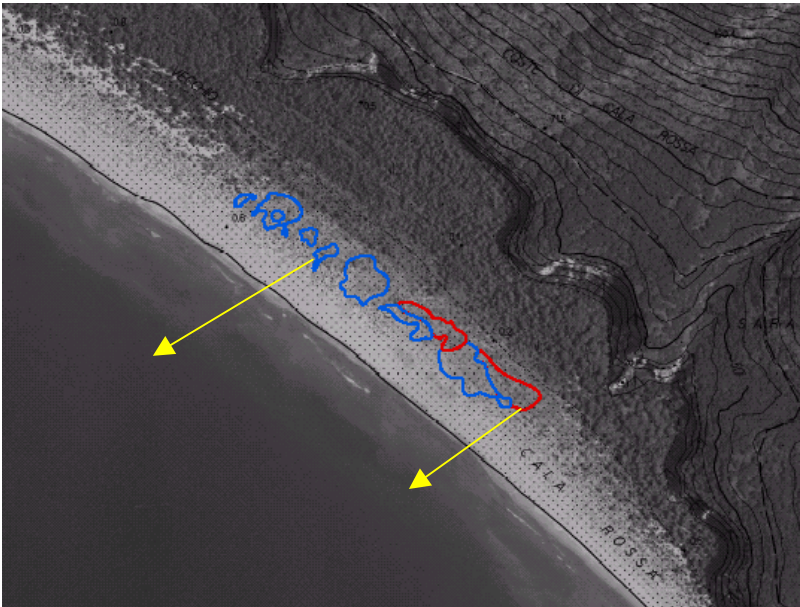


Nourishment with fine sand, as is planned to extract from the Collelungo area, will cause an increase in turbidity of both interstitial water and adjoining water masses. This will affect turbidity-sensitive plants and animals and oxygen deficit will consequently affect breathing and embryonic development. Breathing and feeding of polychaetes and bivalves will also be hampered. Turbid waters will also limit the penetration of light through the water decreasing phytoplanktonic and benthic algal productivity.



The enormous chasm that will be produced by this operation at Collelungo will also devastate the so called "Paludetto" a retrodunal marshland with the association *Juncetum acuti* close to the promontory. Seawater will be free to enter the retrodune because of the destruction of the dune and the freshwater water table, which is extremely superficial, will be saturated with salt water. This will destroy a very particular habitat of the Park where many mammals such as wild boars, red foxes, hedgehogs, fallow-deers find refuge and drinking grounds. Also

some plants such as the loose marsh orchid (*Orchis palustris*) will be at risk when the freshwater deposits will disappear.



However, the major damaged of the sand extraction will be for the *Limonium etruscum* an endemic plant present in the Park to the south of Collelungo at about 200 m from the area of extraction. In this portion of the coast the beach slope is very flat, the beach is wide, and the dune is very low. The presence of *Limonium etruscum* is determined by a very delicate equilibrium between marine saltwater and freshwater coming from rainfall and from the freshwater water table.

