



# POSIDUNE

*POSIDONIA OCEANICA AND SAND INTERACTIONS*

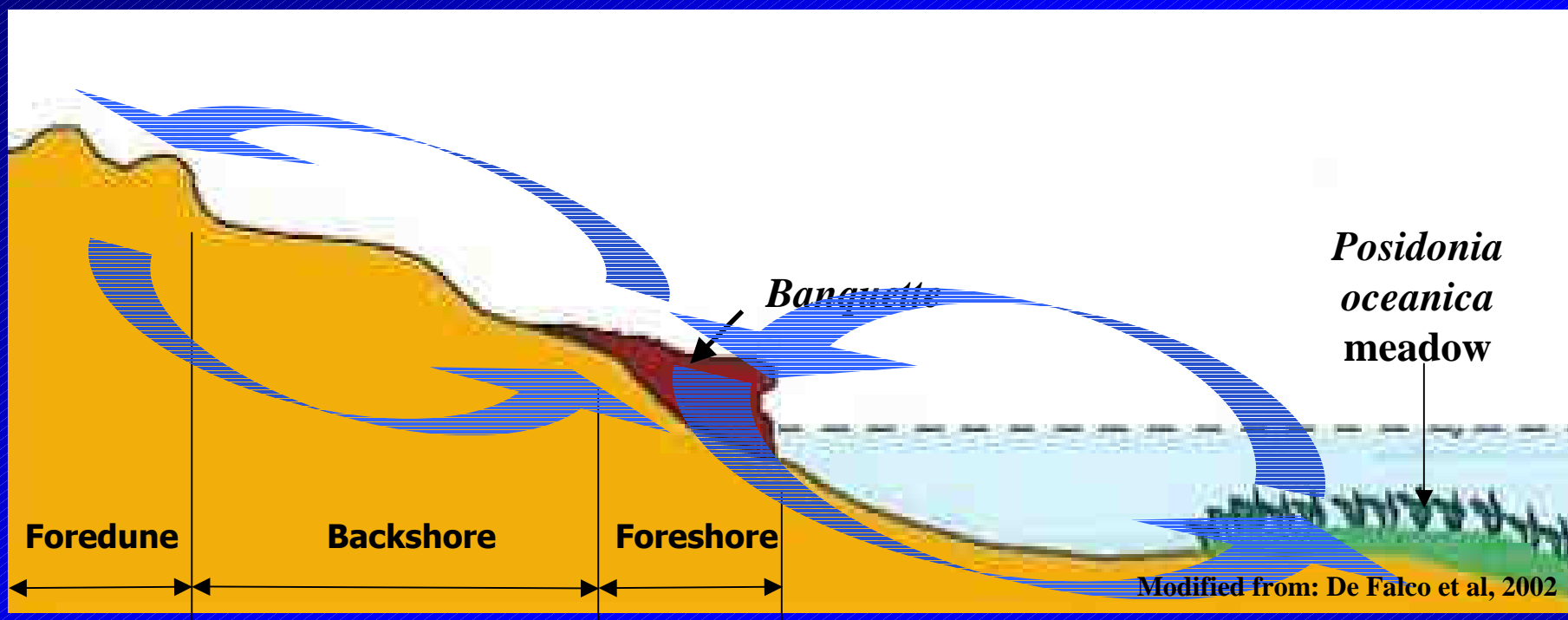
*WITH DUNE NATURAL ENVIRONMENT*

*S. Cappucci, E. Pallottini, G. Bovina, V. Venturini & M. Conti*

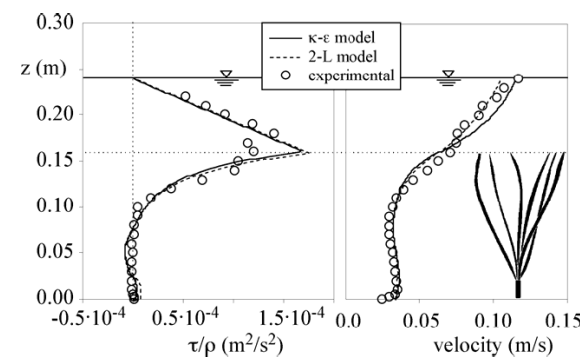




## Feedback mechanisms between *banquettes*, backshore and beach



Scheme of a *banquette* made up of dead leaves of *Posidonia oceanica* (from Boudouresque et Meinesz, 1982).



Model of the hydrodynamic effects caused by barene alophyte vegetation (from Defina et Bixio, 2005).



**The Article 7 of the D.L. 22/97 (Wastes classification) defines as urban wastes all the wastes lying on the beaches, but it doesn't define as waste all the materials lying on them!**







# ***The problem***

Due to tourism requirements, *Posidonia oceanica* remains are usually removed from beaches, thereby causing:

- (1) erosion increase
- (2) damages to coastal habitats
- (3) sediment subtraction
- (4) the need of large and expensive coastal protection schemes



# 17<sup>th</sup> March 2006 - Ministry of Environment

This “indication” outline there is not a unique rule or a unique model to follow for the correct management of “vegetal biomasses”!!!

*..... it is necessary to adopt flexible, site specific solutions, which must take into consideration the social and economic conditions of the area.*

So, the possible interventions were:

1. ***In situ* conservation**
2. **Deposits displacement**
3. **If deposits must be removed they must be treated as waste and transferred to the garbage dump**

(No improvement of existing beach cleansing and treatment technologies have been considered in this document)



# 1st Solution

## *IN SITU* CONSERVATION

(Based on the model of some French “ecological beaches”)

This solution:

- Is an optimum from an ecological point of view
- Should be applied whenever there is no conflict with tourism requirements or in the case of substantial beach erosion.
- Is the best for protection of marine areas and National Parks (zones A, B and C).

The effectiveness of this kind of strategy is improved through the realization of information and sensitivity programmes.

**From a health point of view, there is no scientific evidence of any possible hazards caused to humans by vegetal beached biomasses.**



## 2<sup>nd</sup> Solution

### DEPOSITS DISPLACEMENT

Beached biomasses can be:

- **Stocked in dry areas**
- **Displaced to the lee side of the same shore where they landed**
- **Displaced to isolated beaches or to shores where erosion is substantial**

The displacement may be seasonal (*Posidonia oceanica* remains may be removed during the summer and returned to the beach during the winter) or permanent.

Sites involved in the displacement operations and the displacement operations themselves should be the object of appropriate legal procedure that should be carried out by relevant park authorities or by the local government.

## 3<sup>rd</sup> Solution

### PERMANENT DEPOSITS REMOVAL AND TRANSFER TO THE GARBAGE DUMP.

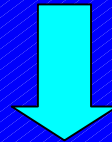
Where the beached biomasses and tourists requirement are incompatible, (rotting phenomena, mixing of vegetal beached biomasses with rubbish), the *banquettes* can be removed and treated as urban wastes, according to the relevant national normative in force.



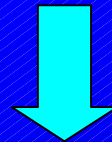


# The contribute of POSIDUNE

Use of vegetal beached biomasses for  
MORPHOLOGICAL RESTORATION OF COASTAL DUNES



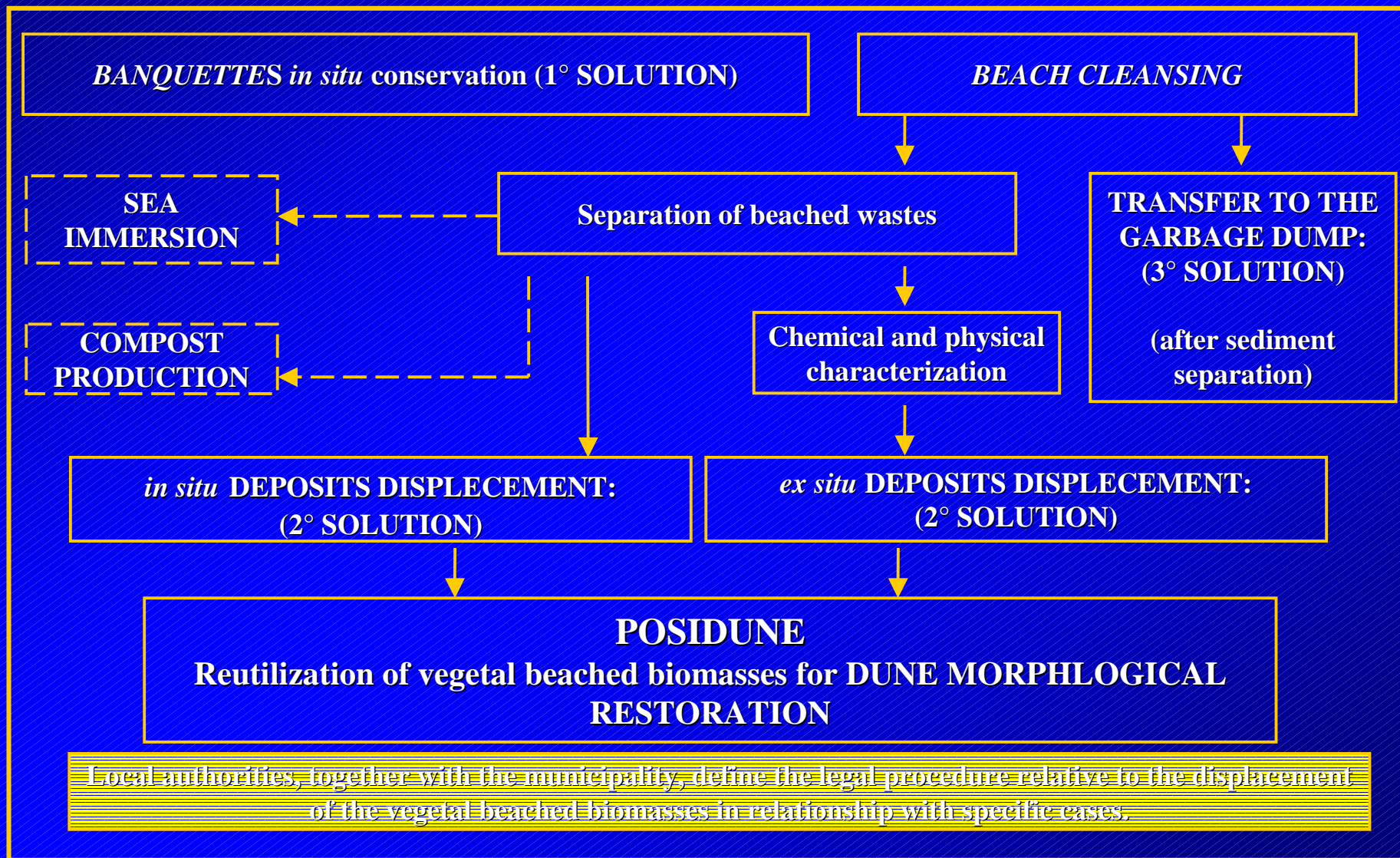
Both Dunes and *P. oceanica* are natural defense systems  
against coastal erosion



*Posidonia Oceanica and Sand Interactions  
with Dune Natural Environment*



# Vegetal beached biomasses management scheme





## Regional partners

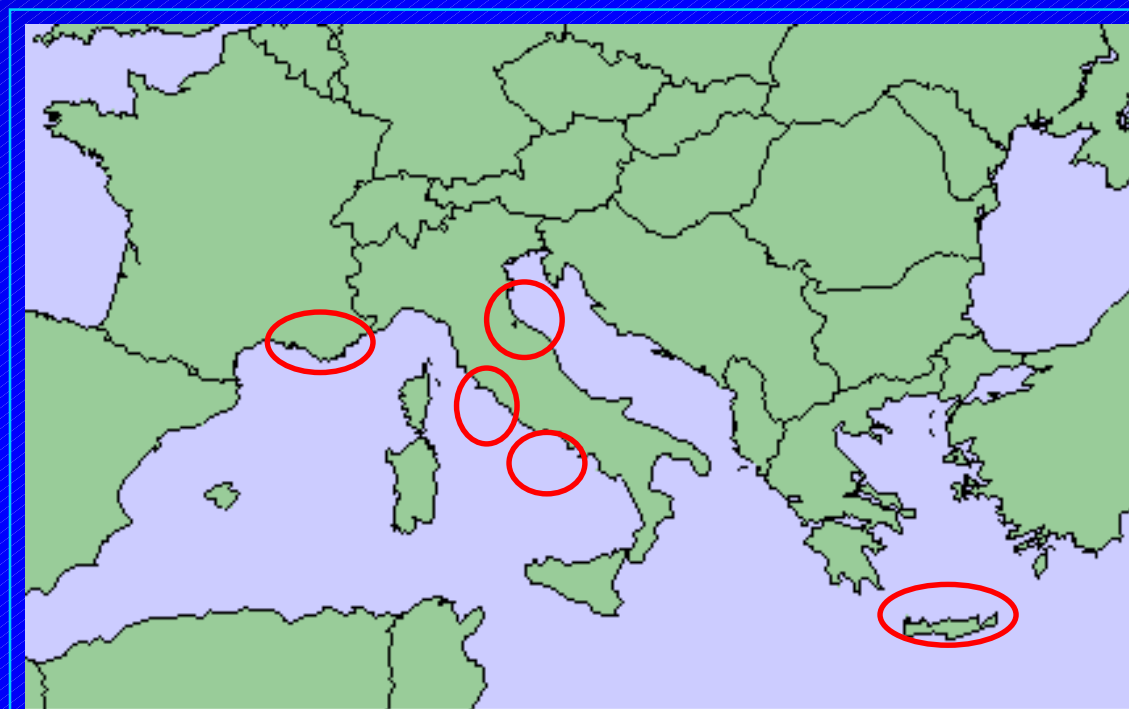
**RÉGION LAZIO**

**RÉGION TOSCANE**

**RÉGION EMILIA ROMAGNA**

**DÉPARTEMENT DE L'HERAULT**

**RÉGION DE CRETE**





# Local partners



ICRAM – *Central Institute of Marine Research*  
(Chef de file)



Provincia di Pisa



Dipartimento di Scienze della Terra, Università di Ferrara



CIRSA, DiSTA Università di Bologna



EID Méditerranée

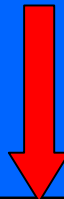


FORTH/IACM





# POSIDUNE activities

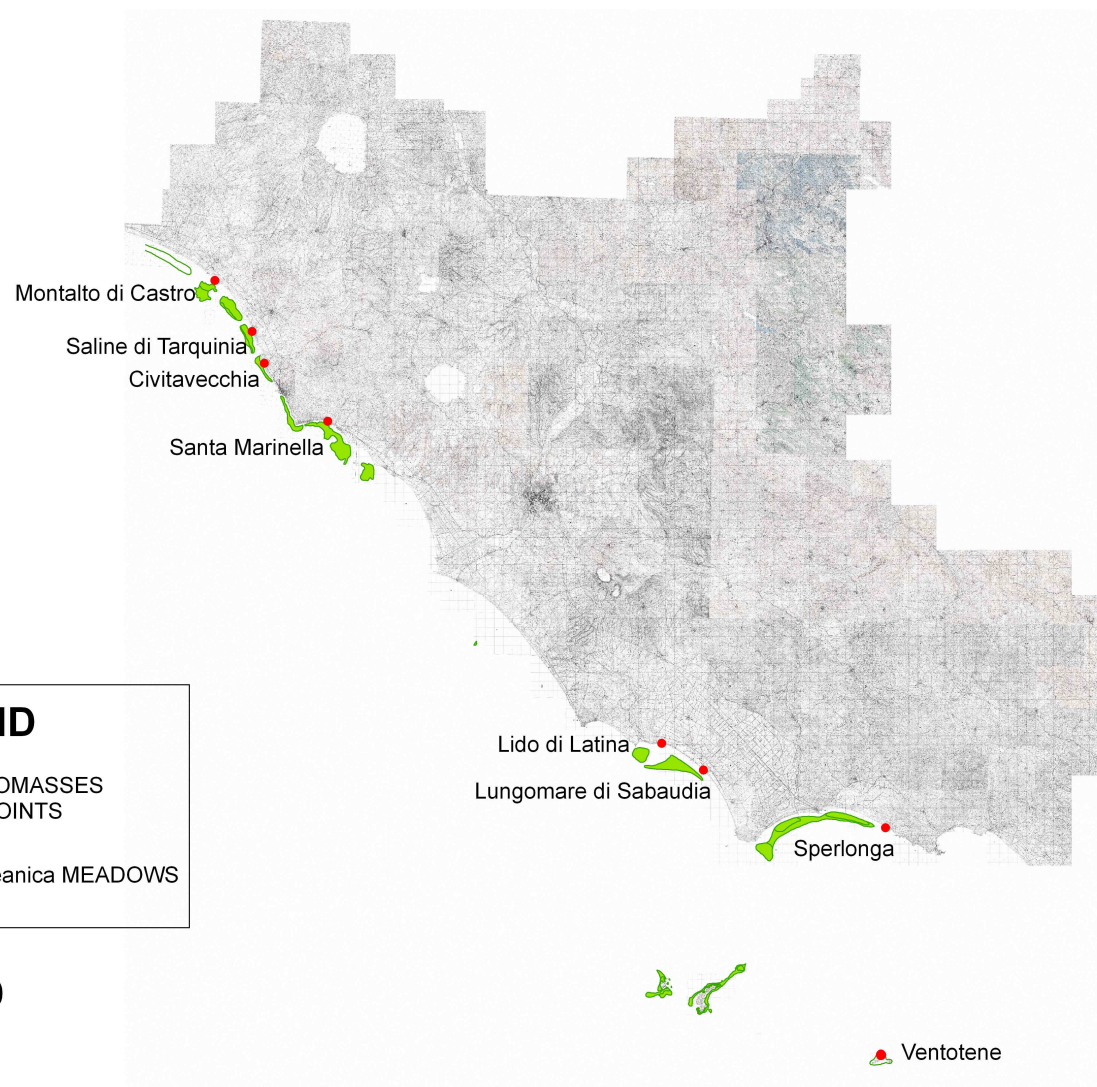
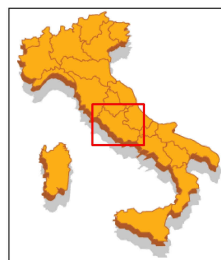
	JANUARY JUNE 2006	JULY DECEMBER 2006	JANUARY JUNE 2007	JULY DECEMBER 2007	JANUARY JUNE 2008	
PHASE A	Bibliography					
PHASE B	Guide lines					
PHASE C	Pilot Site					



## BEACHED *Posidonia oceanica* LOCALIZATION



### Posidonia oceanica meadows and beached phanerogams along Latium coast



#### LEGEND



BEACHED BIOMASSES  
SAMPLING POINTS



*Posidonia oceanica* MEADOWS

Scale 1:1.400.000







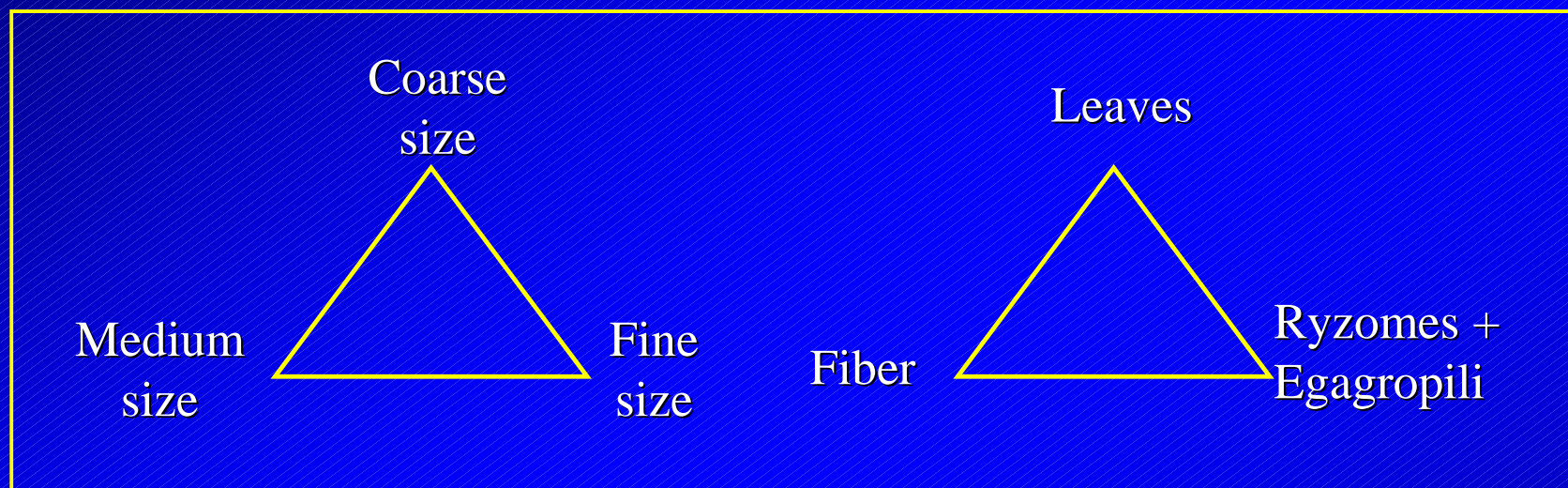
# Examples of marine phanerogams deposits along the coast of Latium...



... & Tuscany



## BEACHED *Posidonia oceanica* STRUCTURAL CHARACTERIZATION



$$I.F = \frac{\% coarse}{0,5\% medium + \% fine}$$

Fragmentation INDEX (BOVINA, 2002)





## BEACHED *Posidonia oceanica* CHEMICAL CHARACTERIZATION

### REFERENCE NORMATIVE

Law 367/03

*“Quality standards of coastal-marine water sediments”*

IPA

PCB

Heavy Metals

Vanadio (V)

Tallio (Tl)

Leaching Test  
(for waste  
characterisation)

Cr Cu Fe Mn  
Ni Pb Ba Zn  
As Cd Hg



## ***MEDITERRANEAN EXPERIENCES***

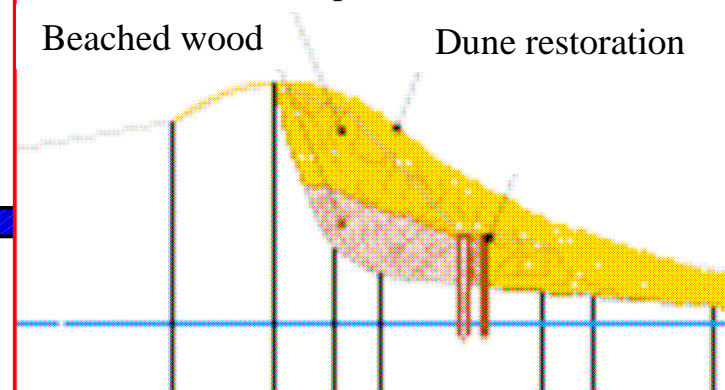
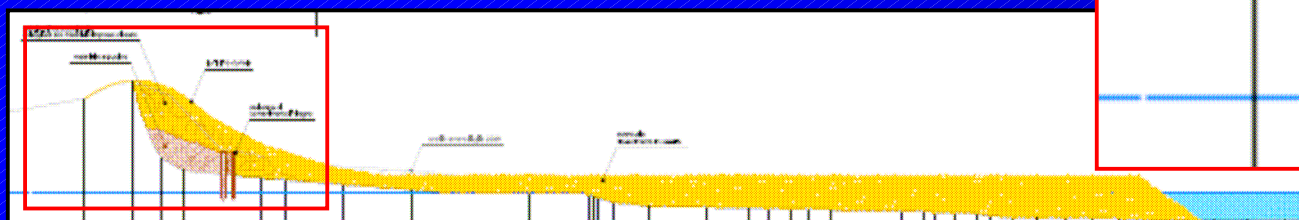
### ***PISA loc. GOMBO - ITALIA***



✓ Draft of the first Italian legal procedure for the seagrass displacement and reuse within morphological restoration interventions

✓ First Italian official project for morphological restoration interventions through the use of vegetal beached biomasses

Sand and beached posidonia  
Beached wood Dune restoration



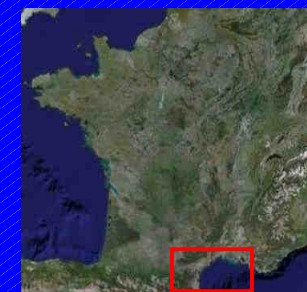




## ***TOMBOLO de GIENS***

### **FIRST TECHNIQUE:**

- ✓ Rebuilding of the dune with sand and beached *Posidonia oceanica*
- ✓ Planting of vegetal pioneer species
- ✓ Protection with fences







## ***TOMBOLO de GIENS***

### **SECOND TECHNIQUE:**

- ✓ The dune was built with pebbles.
- ✓ Then was placed sand.
- ✓ Finally, a mix of sand and beached *Posidonia oceanica* was placed.



No vegetalization intervention were carried out and the dune is still bare.





# CONCLUSIONS

- ✓ Deposits of *Posidonia oceanica* are not wastes and they are never mentioned in the Italian laws.
- ✓ The hypothetical presence of rubbish contaminates this natural resource.
- ✓ *Posidonia oceanica* remains have not yet concluded their ecological cycle when they are still lying on beaches.
- ✓ Within the SPAMI Protocol of the Barcelona Convention, marine phanerogams deposits and *banquettes* are considered as priority habitats and are included in the list of special protected habitats.



Thank you for your attention

Vielen Dank fürs Zuhören