

# Nature based solutions to tackle specific threats and pressures on the marine environment in Cyprus

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# Presentation structure



MARINE ENVIRONMENT IN CYPRUS:  
BENEFITS AND CHALLENGES



CASE STUDY 1:  
*CLADOCORA CAESPITOSA*  
BIOCONSTRUCTIONS



CASE STUDY 2:  
*POSIDONIA OCEANICA* MEADOWS  
AND BANQUETTES

# Marine environment in Cyprus

- **Important habitats** (Posidonia meadows, Reefs, Submerged caves)
- **Important (and vulnerable) species present** (Turtles, corals, monk seals, elasmobranchs)
- **Lower species richness** (than west)
- **Less intensive sampling effort** (than west)
- **Hot-spot of lessepsian migration** (>40 alien fish species)
- **Extensive disturbance**



# Benefits of marine and coastal ecosystems

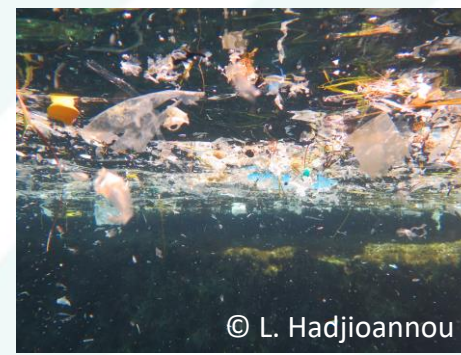
- Seafood
- Tourism - provide income to millions
- Shipping industry – trade
- Offshore drilling
- Ecological diversity and regulating climate
- Aesthetic value

*'Ocean services are worth US\$23 trillion a year'*  
Gesamp



# Challenges

- Climate change (increasing temperatures, severe storms)
- Fisheries (bycatch, overexploitation, illegal activities)
- Invasive species
- Pollution
- Eutrophication
- Marine litter
- Coastal development



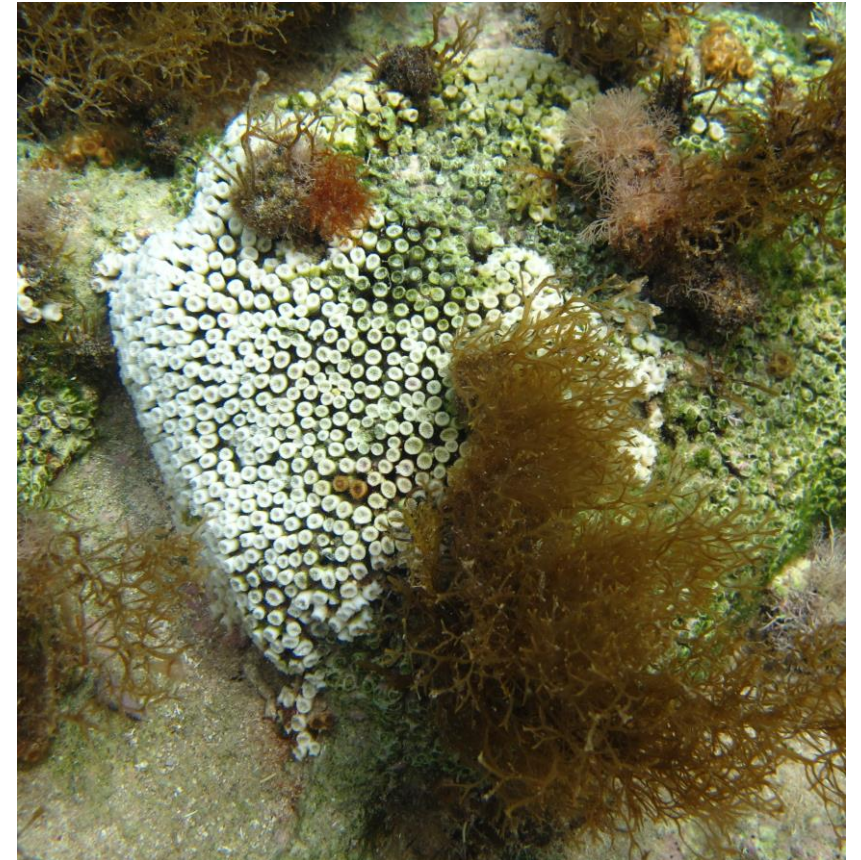
# Case study 1: *Cladocora caespitosa* bioconstructions

- Scleractinian coral
- Mediterranean endemic
- Endangered (IUCN Red list)
- Colonial, zooxanthellate
- Large reefs in Pleistocene (2.58-0.011 Ma)
- Currently patchy distribution
- Constructional
- Found <5m in Cyprus
- Host diversified faunal assemblages (>90 taxa) (Arvanitidis and Koukouras, 1994; Chintiroglou, 1996)
- Supports high biodiversity

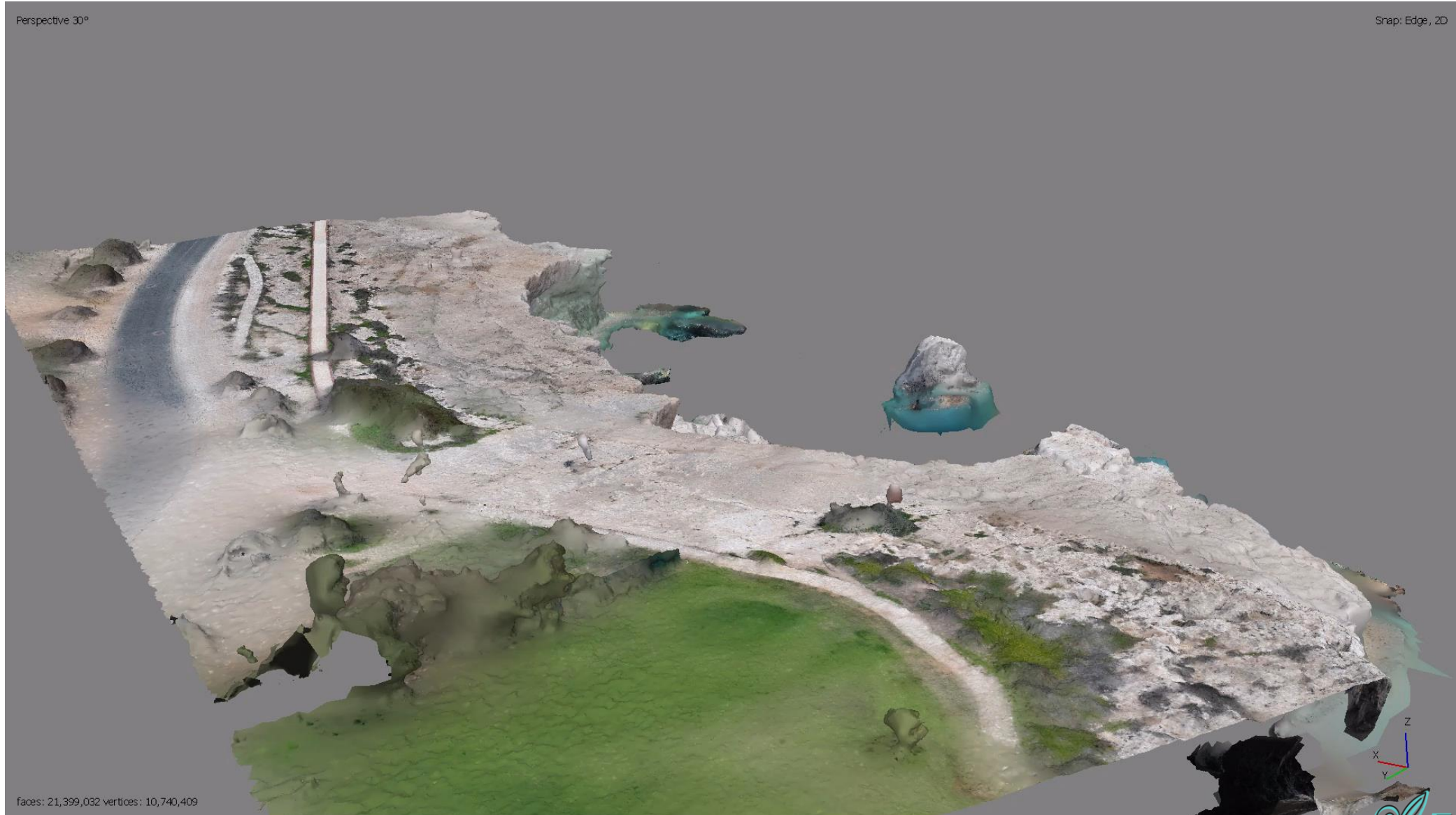
# *Cladocora caespitosa* threats in a rapidly changing environment

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- **Warming** - Increasing SST projections in the Med by end of century: 0.44 to 2.53 °C (Shaltout and Omstedt, 2014)
- **Windstorms** - Global trends show an increase in wind speed and wave height over the past 2 decades (Young et al. 2011)
- **Eutrophication** – effect on growth and skeletal strength
- **Other anthropogenic activities** (tourism, unsustainable development etc.)

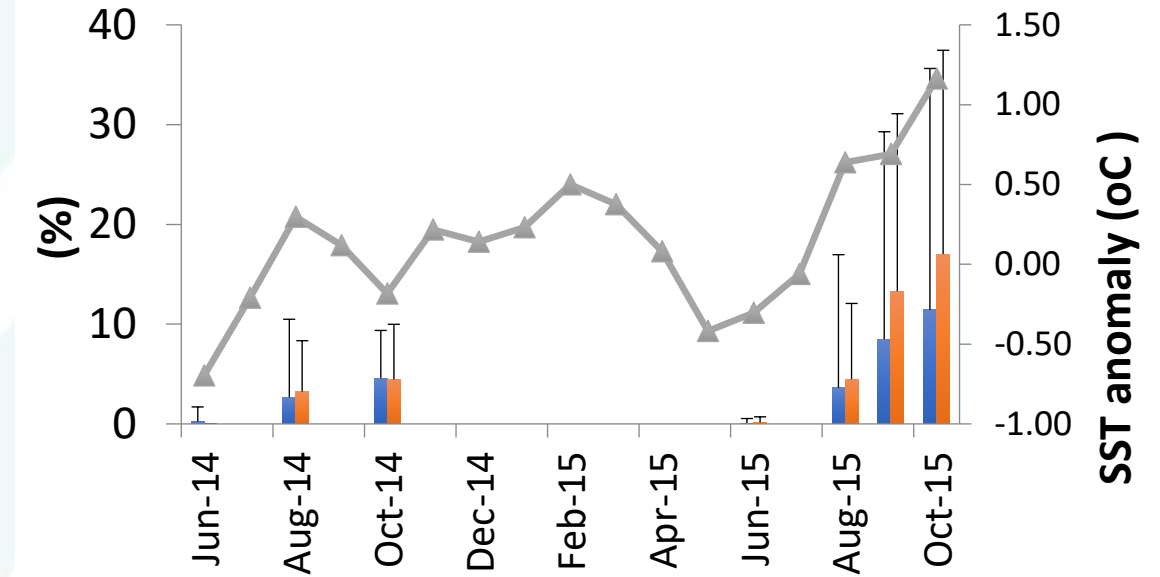


# Ayia Napa Sea Caves MPA:



# Effect of warming and Sea Surface Temperature (SST) anomalies

- Increasing SST trend in last 20 years
- Mortality observed every year in the summer period
- Up to 100% of colonies affected in Cyprus in 2015 (Hadjioannou, 2019)



August 2015



September 2015



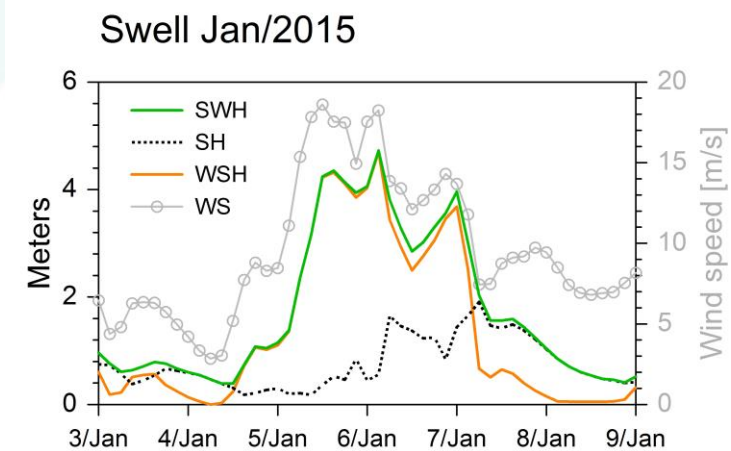
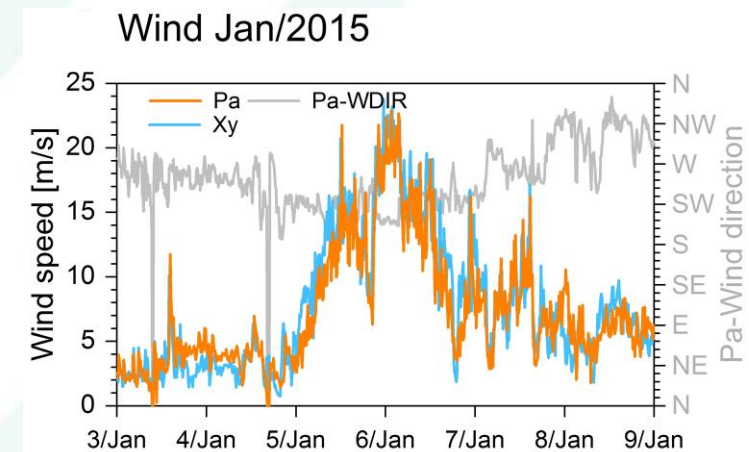
# Extreme wind-storm effect



During calm weather



During turbulent weather



# Wind-storm damage (Ayia Napa Sea Caves MPA)

Before storm



After storm



Boulder (>100 kg)



# NbS: Pilot restoration study using floating nurseries

Pilot study with floating nurseries at 'Cape Greco MPA' and 'Ayia Napa Sea Caves MPA' aiming to restore endangered coral populations.

Two phases:

- Collect detached fragments
- 1 year nursery phase on floating nursery
- Transplant and further monitor
- If successful – **SCALE UP**

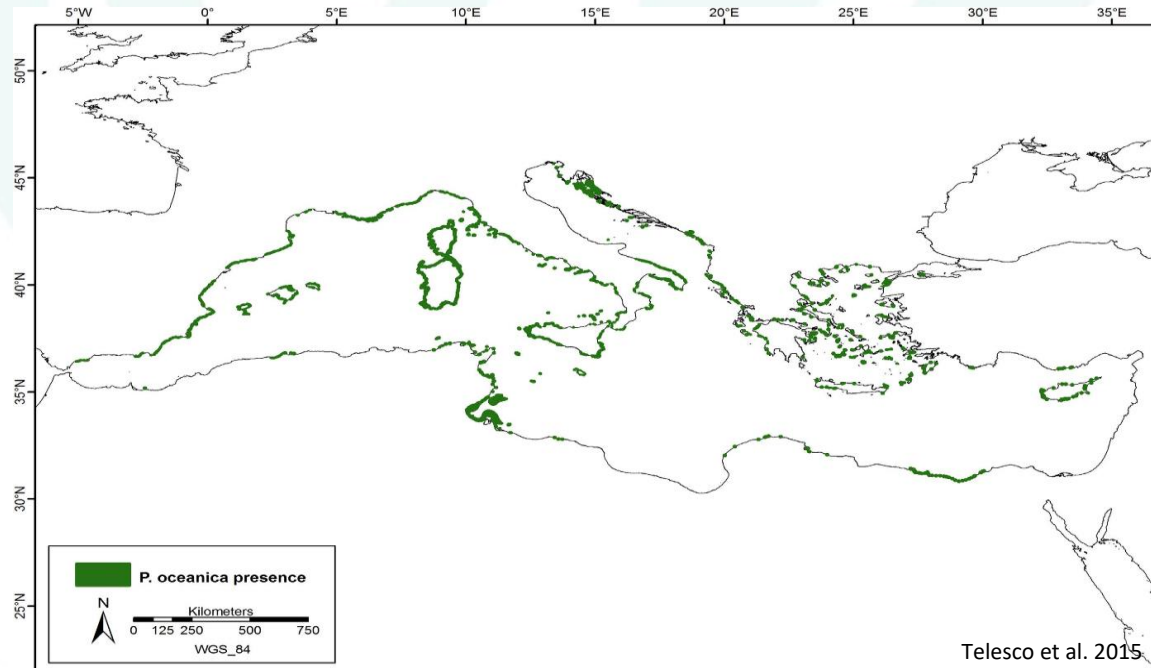


# Case study 2:

## *Posidonia oceanica* meadows/banquettes

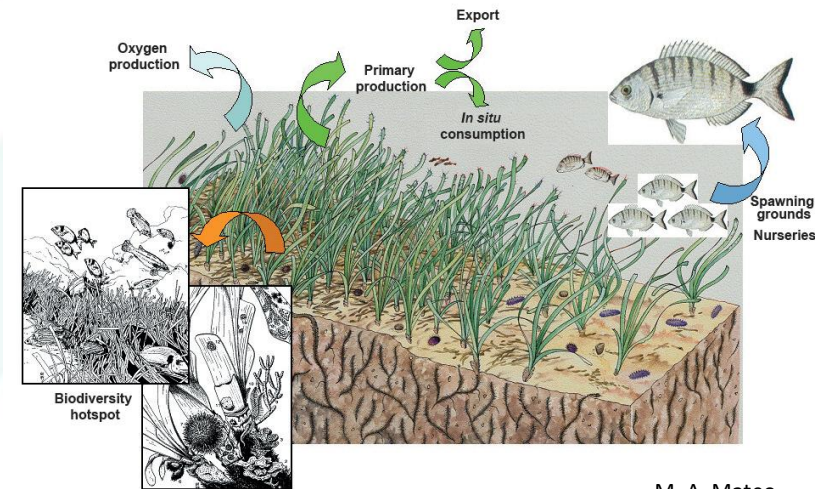
- Present almost throughout the Mediterranean
- Protected at the European level, as a priority habitat (Directive 92/43/EEC) and as a species (Bern Convention) as well as protected by law in many Mediterranean countries.

Fundamental for the quality of the coastal environment (Boudouresque and Meinesz, 1982; Videau and Merceron, 1992), basic to artisanal fishing and tourism development.

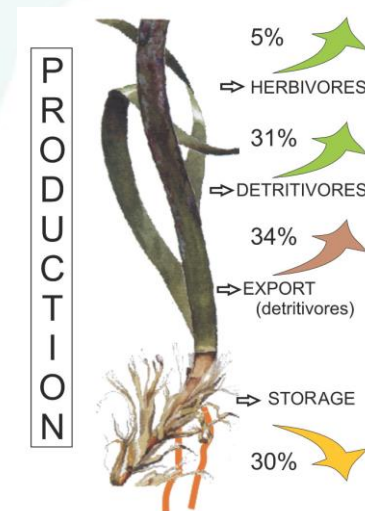


# Vital ecological and physical roles

- One of the planet's most productive ecosystems
- High production of oxygen
- Spawning ground/nursery/permanent habitat for many species
- Help increase the transparency of coastal waters.
- Act as barrier, effectively absorbing hydrodynamism, protecting from coastal erosion.
- Leaves piling-up on the shore forming banquettes also protect beaches from erosion.



M. A. Mateo



# Threats to Posidonia meadows

- Climate change
- Trawling
- Anchorage
- Aquaculture
- Waste waters from treatment plants
- Maritime constructions





# Posidonia banquettes

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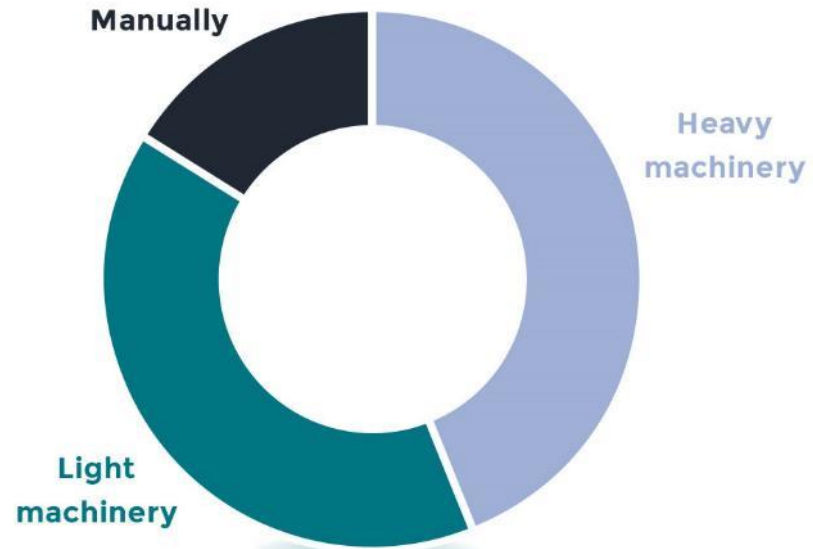
- Accumulation of dead leaves
- Habitat forming ecosystem engineers
- Buffer against erosion
- Important for formation of dunes



One of the major challenges faced today by Mediterranean countries is the tourism demand along its coast.

Banquettes are perceived as aesthetic problem (esp. in highly-frequented tourist zones) and are removed.

Results on type of method and machinery used in banquette removal operations by local Authorities in 5 EU Mediterranean countries.  
Source: Interreg Med Posbemed project



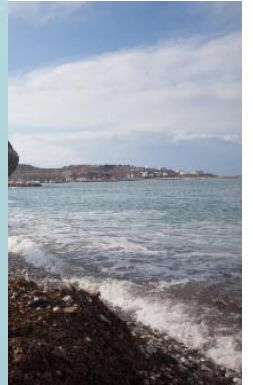
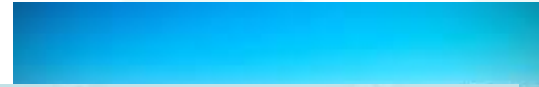
Percentage of type of method and machinery used in banquette removal operations by local Authorities in 5 EU Mediterranean countries.

	Heavy machinery	Light machinery	Manually
Greece	18	29	53
Italy	31	46	23
France	50	39	11
Spain	35	52	13
Cyprus	88	6	6





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# NbS: Preserving banquettes on beaches

## Steps to be followed

- Change public perceptions
- Create legislation
- Capacity building of beach cleaning personnel
- Use of less impacting machinery with rubber tyres
- Displacement options only when necessary (e.g. Temporary, on-site burial, return to sea, re-use)
- Increase awareness of stakeholders
- Identification of best potential coastal NbS practices and solutions (such as for example management of Posidonia, coral populations) that could be implemented in Cyprus - DesirMED





# THANK YOU



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ΤΜΗΜΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ. ΥΠΟΥΡΓΕΙΟ ΓΕΩΡΓΙΑΣ, ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΠΕΡΙΒΑΛΛΟΝΤΟΣ



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Με τη συγχρηματοδότηση του προγράμματος LIFE της Ευρωπαϊκής Ένωσης



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