COASTAL LAGOON RECOVERY BY SEAGRASS RESTORATION IN VENICE LAGOON

Concrete actions for seagrass transplantations and monitoring activities for the assessment of ecological status

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Project acronym: SERESTO Project number: LIFE12 NAT/IT/000331
Project title: Habitat 1150* (Coastal lagoon) recovery by SEagrass RESTOration.
A new strategic approach to meet HD & WFD objectives
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Partners: Italian National Institute for Environmental Protection and Research (ISPRA); Laguna Venexiana onlus, Venice Water Authority - Ministry of Infrastructure and Transport
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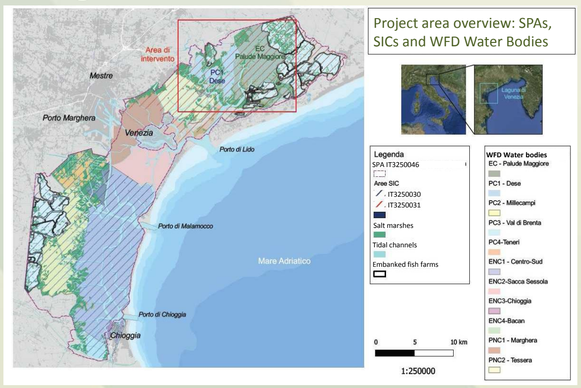
BACKGROUND

The ecosystem functions of seagrass meadows are multiple: they provide food to consumers, trap carbon and nutrient thanks to their physiological function; they have a structural role and are important habitats for other species contributing to maintain marine biodiversity. Seagrass loss by natural and human-induced disturbance has been recorded in the Northen Venice Lagoon and frequently throughout the word; their decline is now a worldwide problem.



The project will be implemented in the Venetian Lagoon, within the SIC IT3250031 (Northen Venice lagoon), where the priority habitat no. 1150* (Coastal lagoons) covers an area of around 3'660 ha.

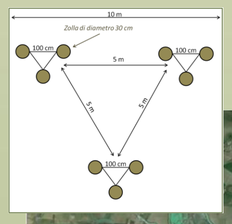
MAIN OBJECTIVES

The main objectives of SERESTO project are:

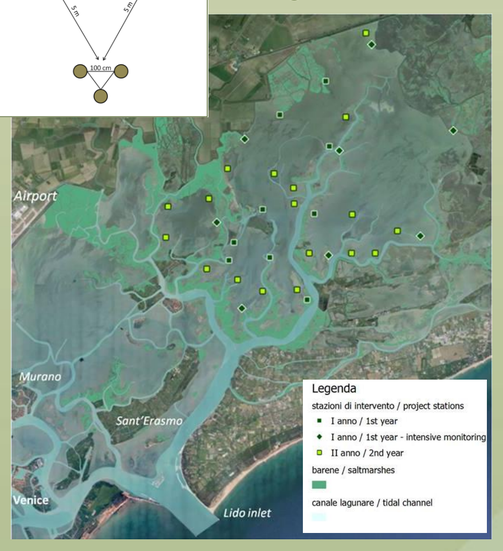
- ✓ Consolidating and restoring aquatic habitat 1150* *via* the transplantation of submerged aquatic angiosperms;
- ✓ Contributing to the achievement of good ecological status in transitional water bodies, demonstrating the effectiveness of the proposed measures in terms of meeting the objectives set by the WFD (Dir. 2000/60/EC Article 4);
- ✓ Quantifying and making good use of the ecosystem services provided by the lagoon environment and the aquatic angiosperms of habitat 1150* in particular.

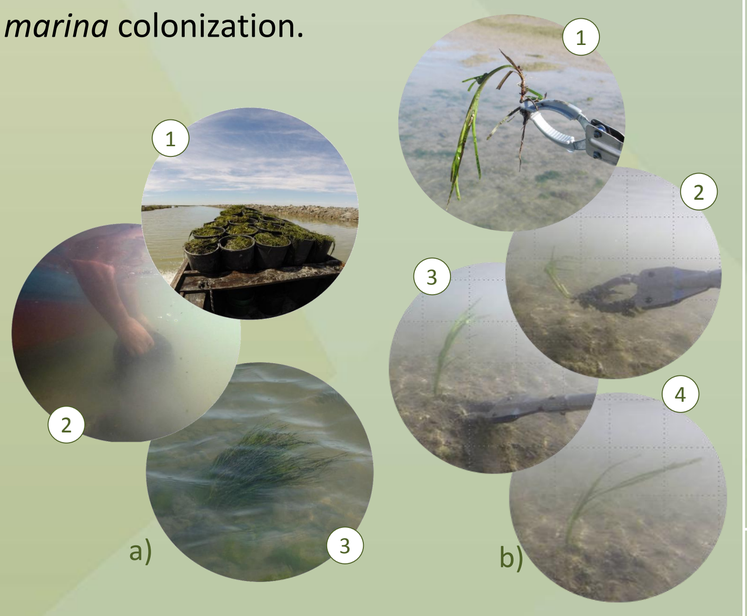
SEAGRASS RESTORATION STRATEGY

SeResto project aims at restoring the Habitats 1150* (Coastal lagoon) on large scale in Venice lagoon by supporting the self-rehabilitation capacity of aquatic seagrasses, where environmental conditions are going back to be suitable for *Nanozostera noltii* and/or *Zostera marina* colonization.



Selected sites for sods planting and rhizome drafting.



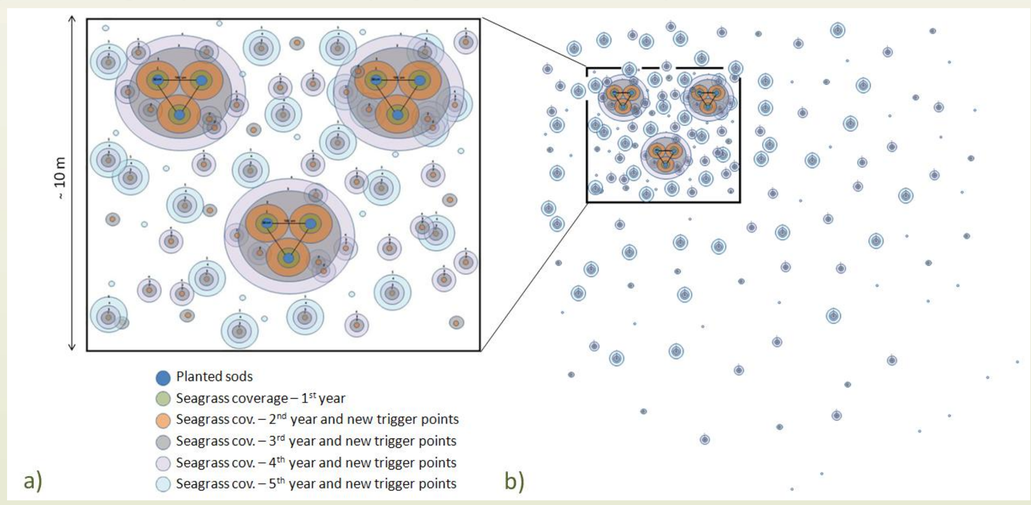


a) Transport of sods from donor site and manual planting operation. b) Graft of a rhizome by pliers.

In each site, 9 sods (diameter 30 cm) will be transplanted and fishermen's direct intervention will enhance the seeds and rhizomes dispersion in the surroundings (4 times/year; 400 rhizomes/site/year).

EXPECTED RESULTS

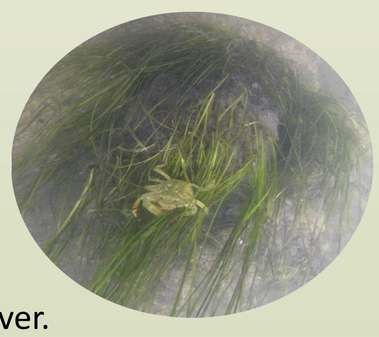
- ✓ Following transplantation: 3,500 m^2 of very sparse plant cover (only transplanted sods);
- ✓ 2 years after transplantation: 3,500 m^2 with ca. 20% plant cover and new growing points in an area of ca. 0.1 ha;
- ✓ 4 years after transplantation: 3,500 m^2 with ca. 80% plant cover and new growing points in an area of 4 ha;
- ✓ 10 years after transplantation: 25-30% of the intervention area colonized by aquatic angiosperms at varying levels of development.



a) Diagram showing the natural spread of meadows through seed dispersal and growth of rhizomes in the surroundings of the transplanted sods. b) Diagram showing the natural and induced spread of meadows through seed and rhizome dispersal on a larger scale.

MONITORING ACTIVITIES

The monitoring activity include 3 main lines of survey:



1. Monitoring of submerged aquatic angiosperms
   - survival of transplanted specimens;
   - rhizome rooting;
   - growth rate of transplanted specimens;
   - periodic assessment of new meadow cover.
2. Monitoring of ecological status (*sensu* WFD) and biodiversity
   - Biological quality element (BQEs): macroalgae, seagrasses, macrozoobenthos, fish fauna;
   - Abiotic supporting parameters in water (e.g. DIN, RP) and sediments (e.g. N, P, C).
3. Monitoring for assessing the ecosystem services provided by restored seagrasses (at 8 sites)
   - Commercial fish fauna for assessing the increase of productivity;
   - Total biomass for CO_2 sequestration assessment;
   - Turbidity and sedimentation rate for assessing the function of seabed stabilization and water trasparency regulation provided by seagrasses.

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CEMAS Centre for Estuarine and coastal MArine Sciences
ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale
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