

LIFE LAGOON REFERSH

Costal lagoon habitat (1150*) and species recovery in the Venice Lagoon by increasing the fresh water input and restoring the salt gradient

Andrea Bonometto

A. Feola, E. Ponis, F. Cacciatore, F. Oselladore, M. Cornello, R. Boscolo Brusà

**A NEW BEGINNING
FOR PEOPLE AND NATURE**

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ISPRA - ITALIAN NATIONAL INSTITUTE FOR ENVIRONMENTAL PROTECTION AND RESEARCH

Public body subject to the vigilance of the Ministry for Environment, Land and Sea.

- ✓ **research** and experimentation
- ✓ **control, monitoring** and **evaluation** activities
- ✓ strategic consulting and **technical-scientific assistance to the Ministry of the Environment**
- ✓ **reporting** obligations required by the Community legislation (Directives and Regulations) and participation in European working groups
- ✓ Since 2018 ISPRA coordinates the **National System of Environment Protection Agencies (SNPA)**, which is established in a federative framework of collaboration

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- 8 ISPRA Offices:
 1. Roma (Headquarters)
 2. Venezia
 3. Chioggia (Venezia)
 4. Ozzano (Bologna)
 5. Livorno
 6. Castelromano (Roma)
 7. Palermo
 8. Milazzo

The Research group leader of the LIFE LAGOON REFRESH projects belongs to the Office “Impact assessment on transitional waters”.

This groups works on the implementation of WFD at national and EU level.



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Coastal lagoon habitat (1150) and species recovery by restoring the salt gradient increasing fresh water input*

Budget info

Total amount: 3'315'130 Euro

% EC Co-funding: 74,13%

Duration

Start: 01/09/2017

End: 31/08/2022

Location

Venice Lagoon

ITALY

Coordinator

ISPRA – Italian National Institute for Environmental Protection and Research

Project leader

Rossella Boscolo (ISPRA)

Partners

Veneto Region - Environmental Protection Department

Interregional Superintendency for Public Works in Veneto, Trentino Alto Adige, Friuli Venezia Giulia

University Cà Foscari of Venice

IPROS Environmental Engineering s.r.l

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Università
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INGEGNERIA
AMBIENTALE





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Natura 2000 habitat
1140, 1150*
1310, 1410, 1420, 1510*

Surface: 550 km²
Mean depth: 1.5 m
Tidal excursion: 0.7 - 1.0 m
(>1 m during sturm surge event)



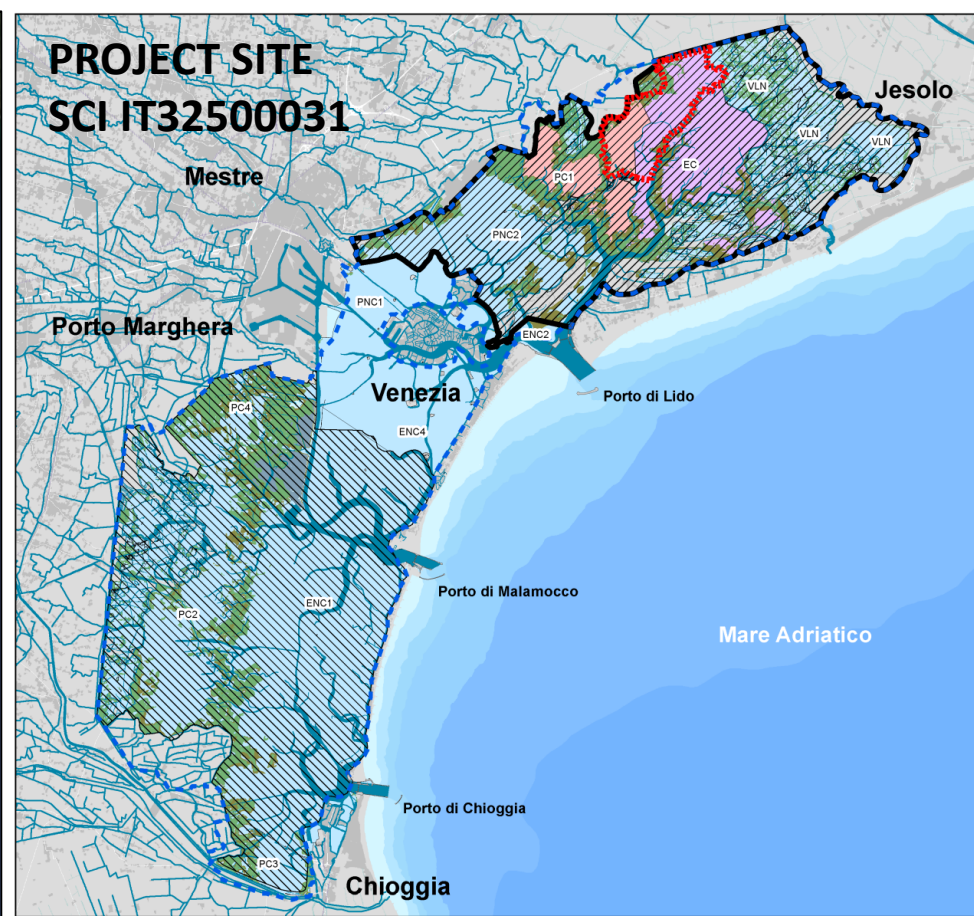


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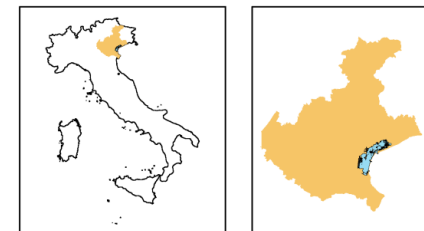
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VENICE LAGOON



Aree protette (SIC E ZPS) e Corpi idrici definiti ai sensi della Direttiva 2000/60/CE in Laguna di Venezia



-  Project Site
 - Natura 2000**
 -  Project Area - SIC IT3250031 - LAG. SUPERIORE
 -  SIC IT3250030 - LAG. MEDIO - INFERIORE
 -  ZPS IT325046 - LAGUNA DI VENEZIA
 - Corpi idrici 2000/60/CE**
 -  EC - Palude maggiore
 -  PC1 - Dese
 -  Altri corpi idrici
 -  Idrografia e canali lagunari
 -  Barene
 -  Velme
- 0 2.5 5 10 Km





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Environmental problem targeted

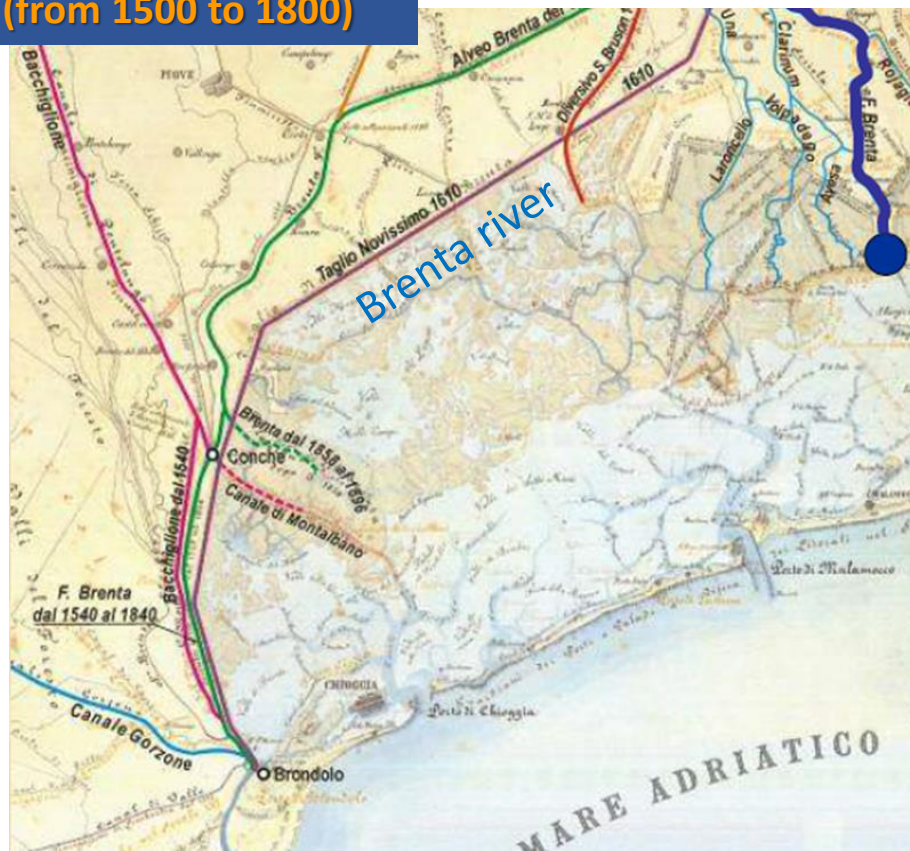


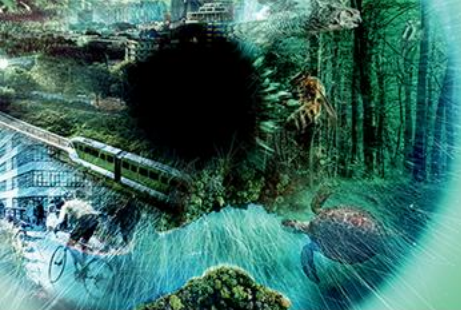


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RIVERS DIVERSION (from 1500 to 1800)





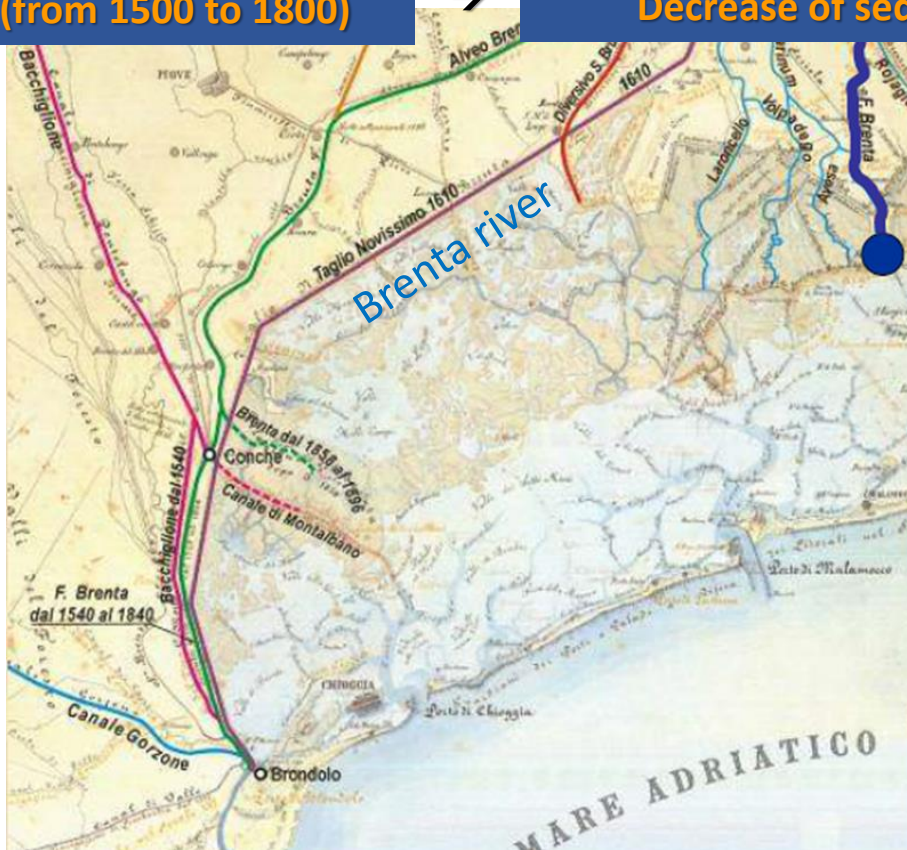
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**RIVERS DIVERSION
(from 1500 to 1800)**



**Decrease of fresh water input;
Decrease of sediment input**



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**RIVERS DIVERSION
(from 1500 to 1800)**



**Decrease of fresh water input;
Decrease of sediment input**



**INCREASE OF THE SALINITY
REED BED REDUCTION**

D'Alpaos, 2010. *Morphological evolution of the Venice Lagoon through historical and hydrographic maps*



First modern hydrographic map based on surveys of 1809 and 1811



Hydrographic map based on surveys of 2000

**SEVERE REDUCTION OF THE ECOTONAL ZONE BETWEEN LAND AND LAGOON,
CHARACTERIZED BY A MARKED SALINE GRADIENT**

SALT MARSHES SURFACE DECERASED from 170 Km² (1901) to 43 km² (2003)



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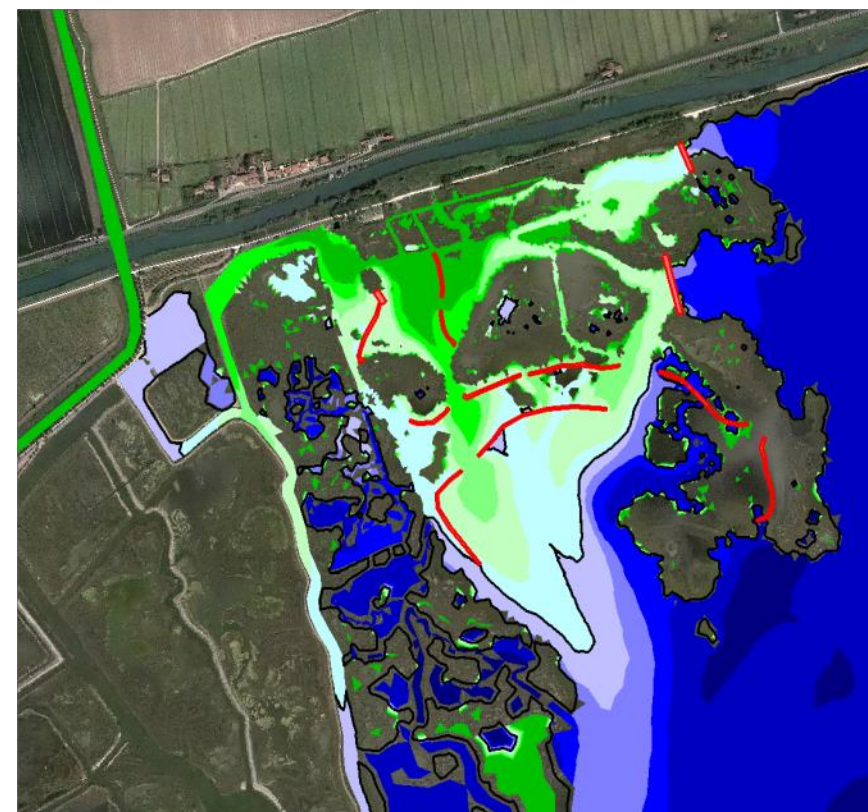
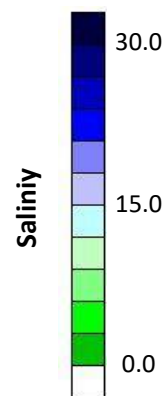
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The project aims at restoring this ecotonal ecosystem and their services

Aim, objectives and actions

The overall strategy of the project is the **recovery of hydrological processes** and patterns as a measure **to improve the conservation status of habitat and species** of conservation interest

1. diversion of a freshwater flow (1.000 l/s) from the river Sile into the lagoon;
2. restoration of the **intertidal morphology** to sustain the reed development;
3. planting of *Phragmites australis*
4. transplantation of *Ruppia cirrhosa* and *Zostera noltei*;





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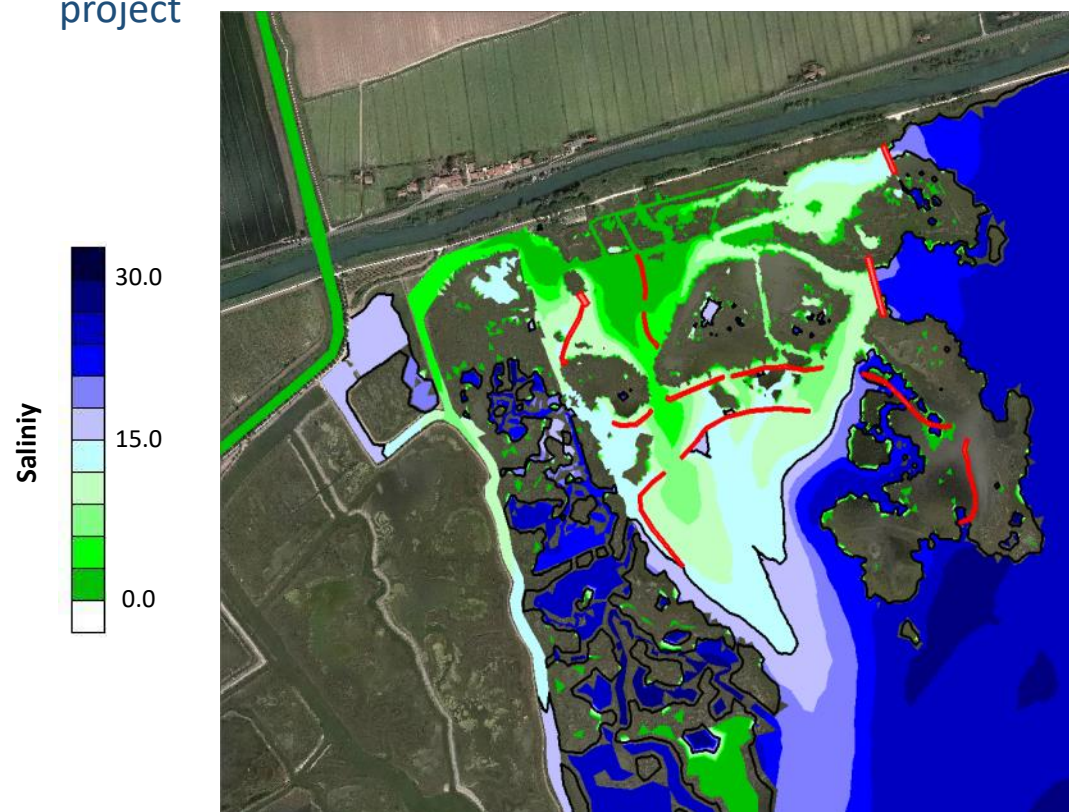
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Recovery of the salinity gradient

- water salinity: from >30 (annual mean) to <5 (5 ha); <15 (25 ha); <25 (70 ha);
- Reed bed restoration (20 ha): at SCI scale from 30 to 50 ha at the end of the project





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Restoration of ecosystem services provided by these habitat in order to:

- I) improve the Degree of Conservation of habitat 1150* Coastal lagoons;
- II) improve the status of bird species of conservation interest (*Microcarbo pygmeus**, *Botaurus stellaris**, *Ardea purpurea*, *Ixobrychus minutus*, *Circus aeruginosus*, *C. cyaneus*, *Alcedo atthis*);
- III) increase the presence of the fish species of conservation (*Pomatoschistus canestrinii*) and commercial interest.



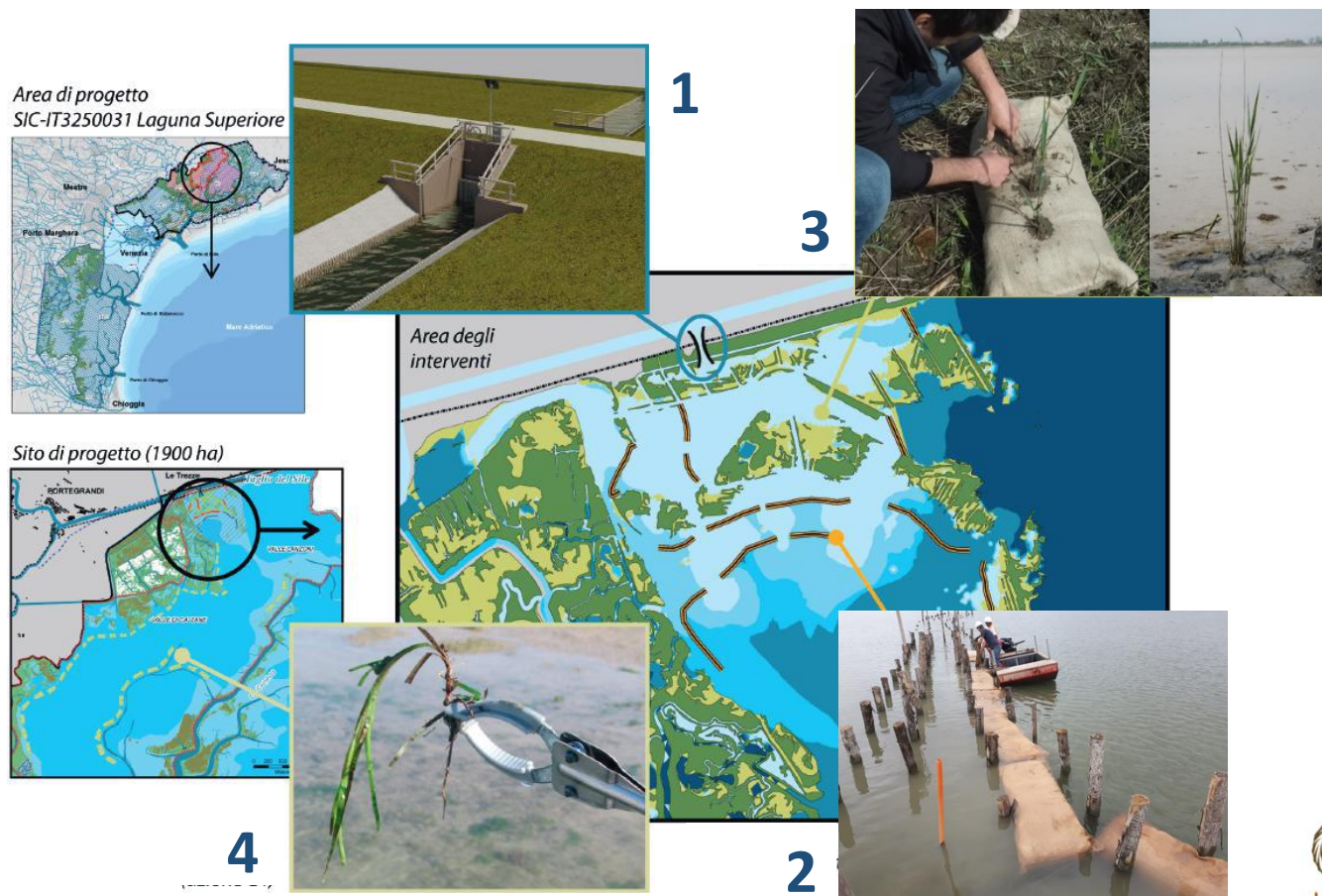
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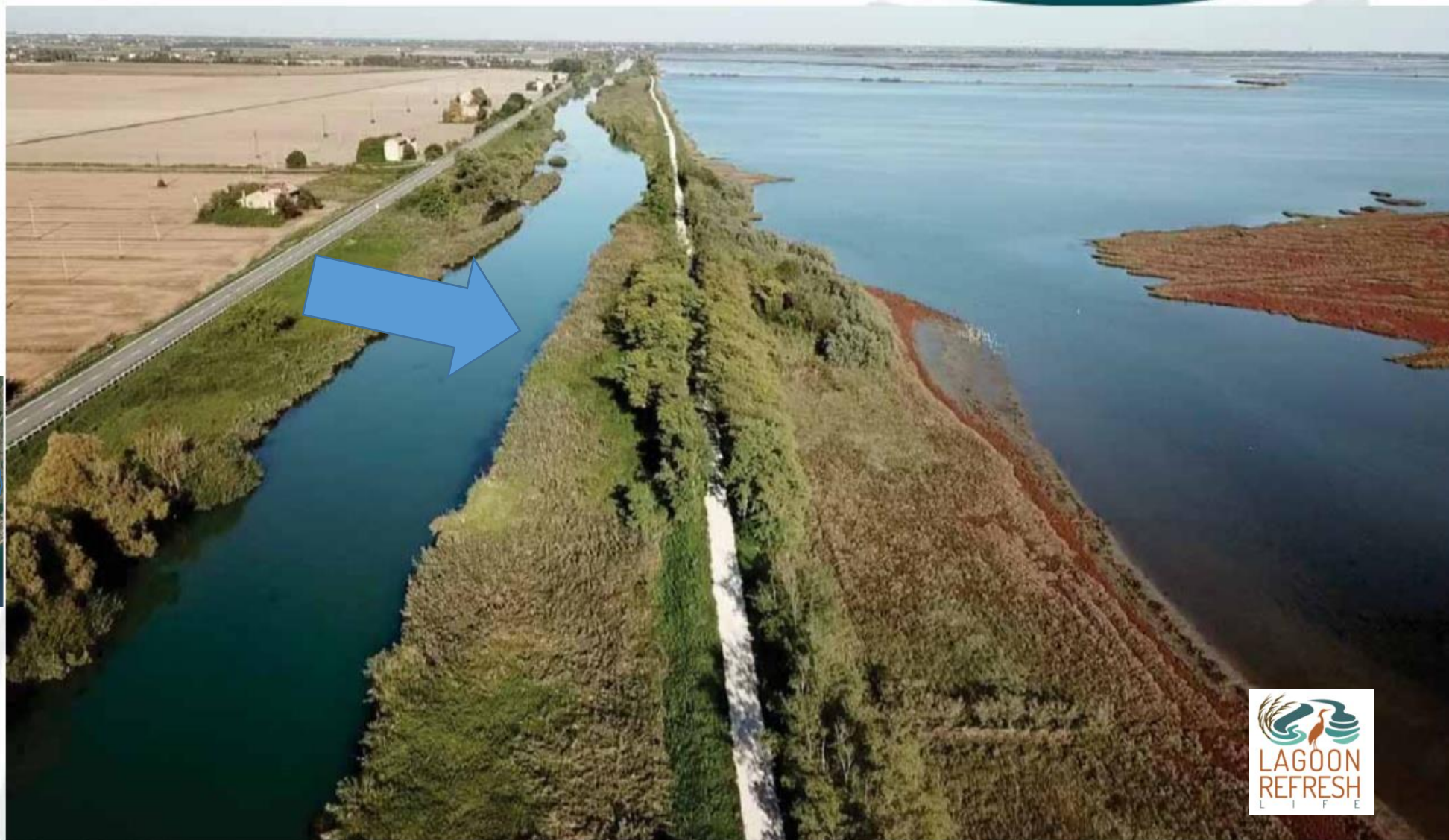
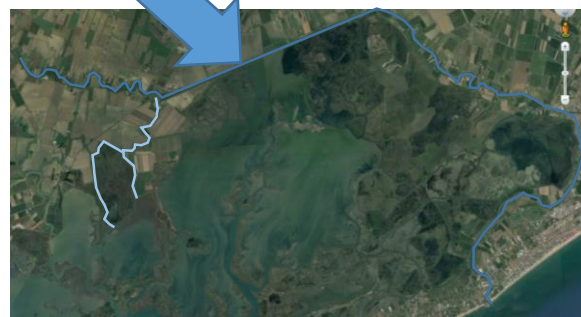
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Conservation action: hydraulic work

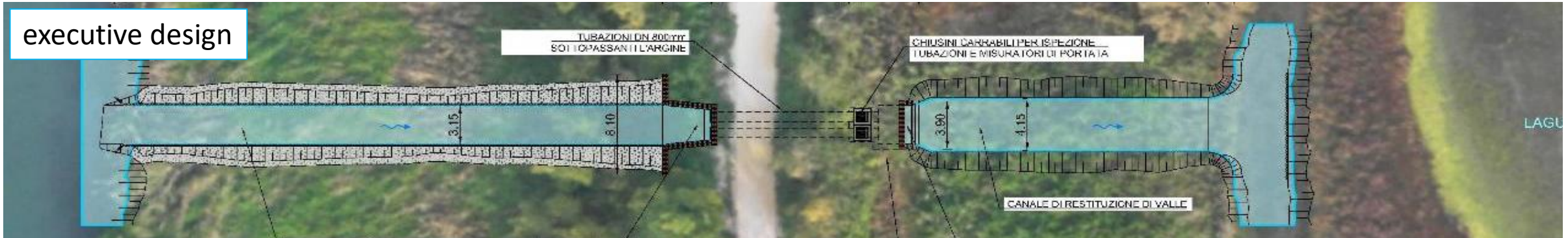


- ✓ Artificial channels cutting the floodplains (river and lagoon sides);
- ✓ 2 pipes (diameter 800 mm);
- ✓ Sluice gates to regulate the discharge from the river to the lagoon;
- ✓ Daily mean fresh water input 1 m³/s (0.3 m³/s during the first year).
- ✓ No electromechanical machine – the flow depend on the different water level between river and lagoon
- ✓ Real time monitoring of the discharge

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executive design



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river side

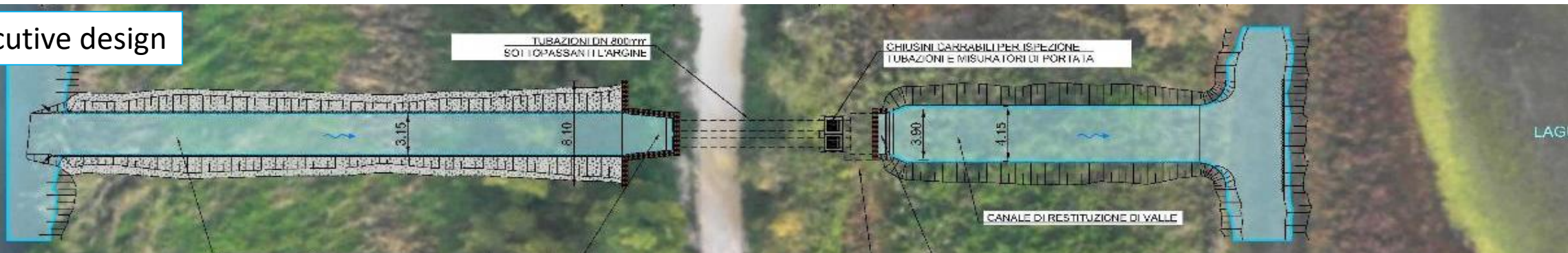
lagoon side



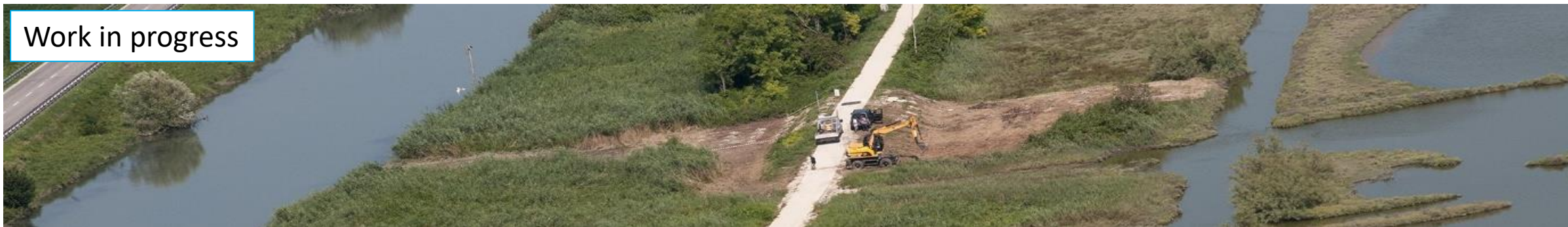
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Work in progress



Hydraulic work completed



river side

lagoon side



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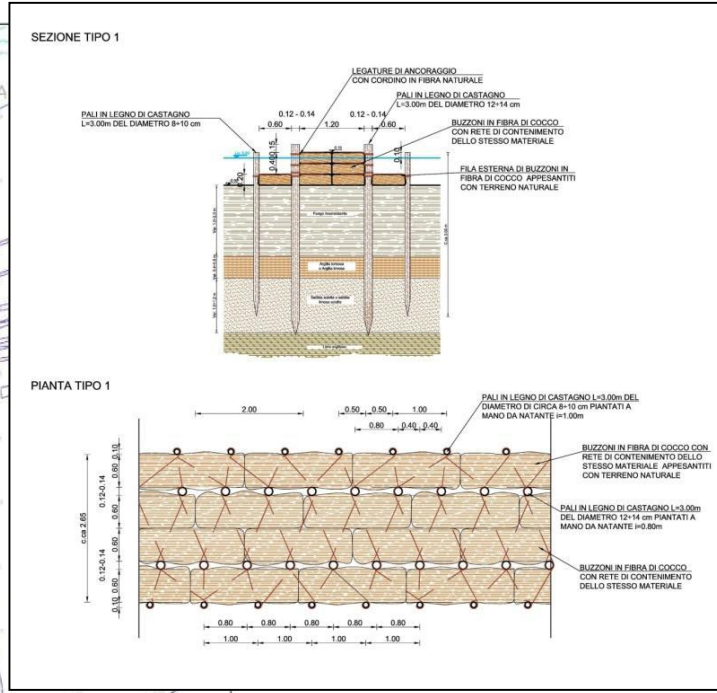
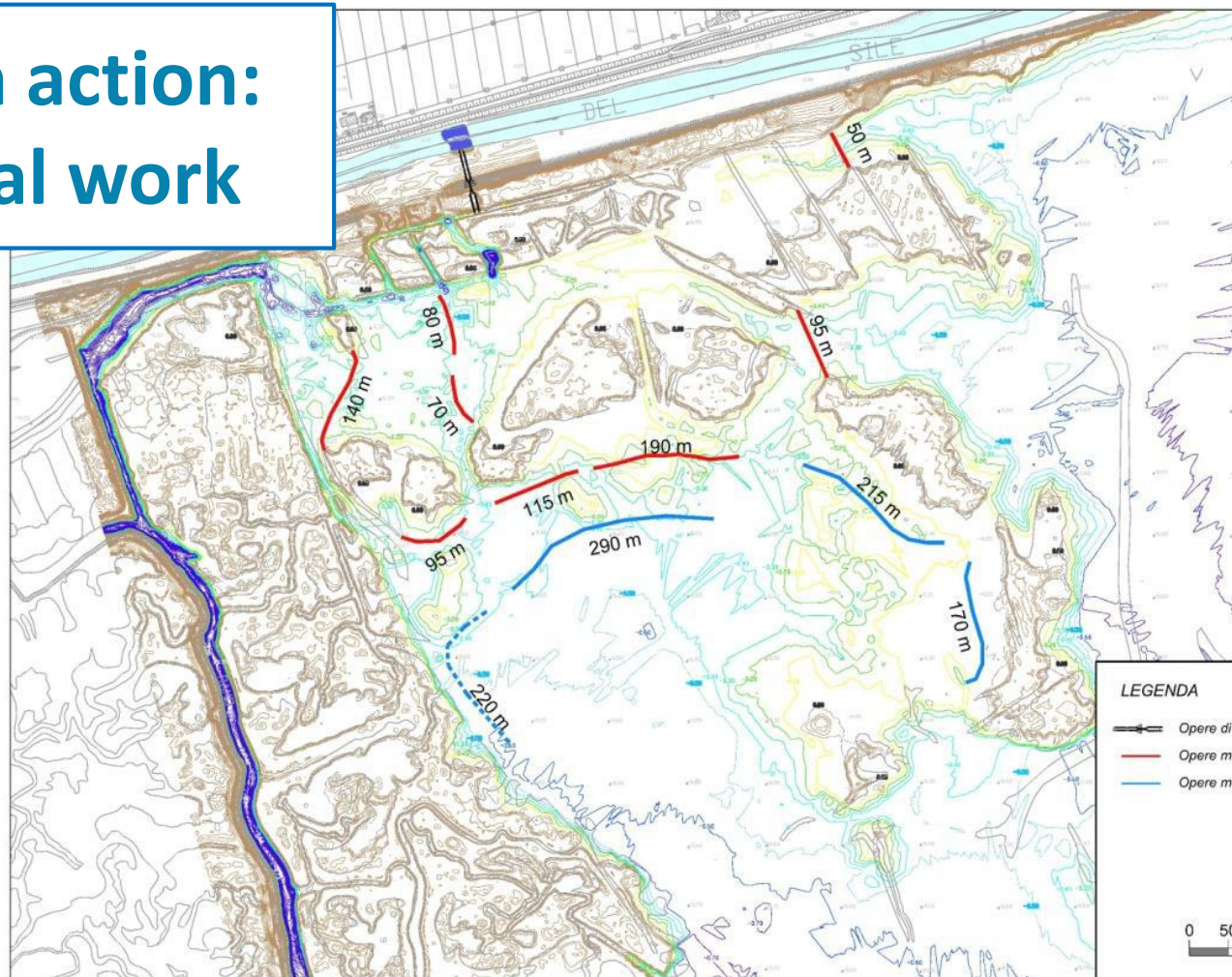
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Conservation action:
morphological work



LEGENDA

- Opere di presa Azione A3
- Opere morfologiche in progetto - 1° stralcio
- Opere morfologiche in progetto - 2° stralcio



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**Conservation action:
reed and seagrass
transplantation**

...ongoing...
waiting for the next
spring/summer for
the first results!



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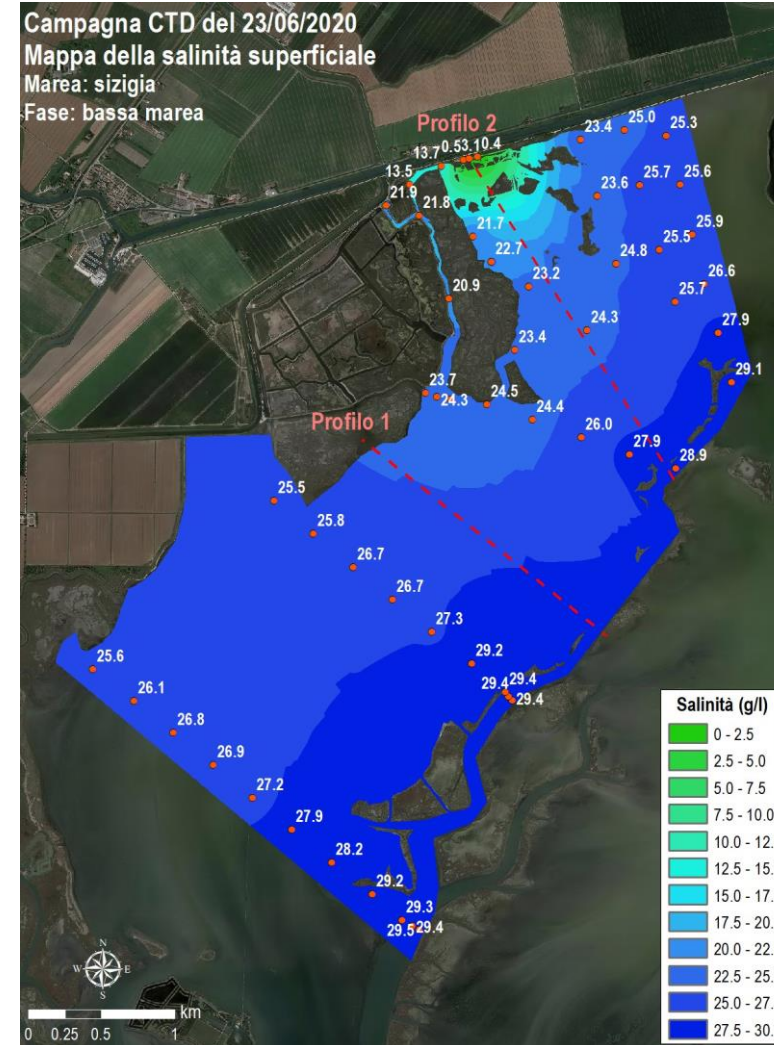
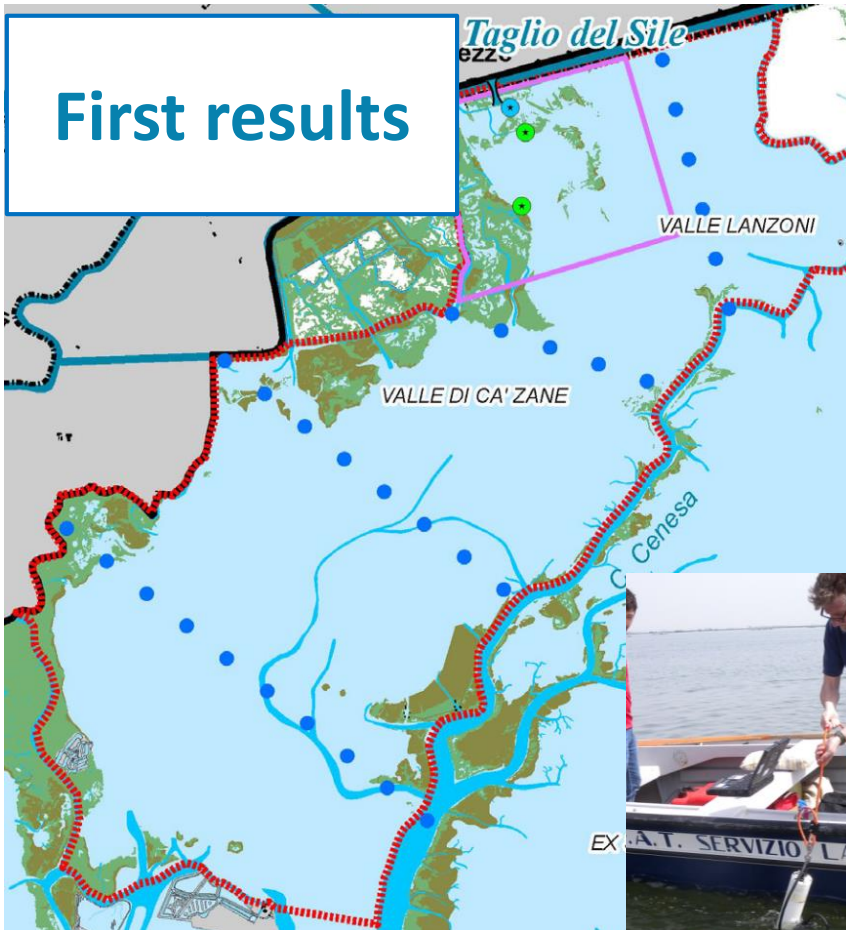
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First results



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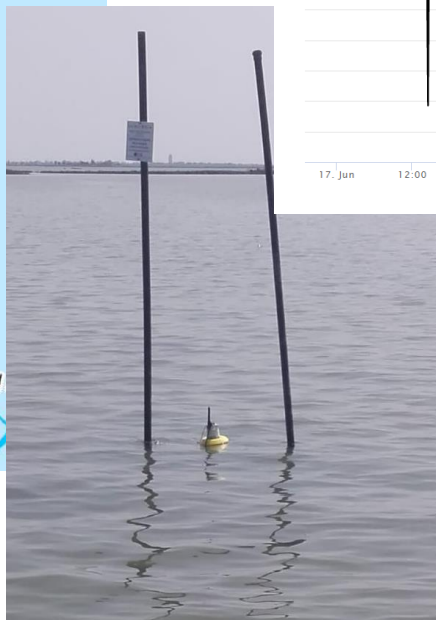
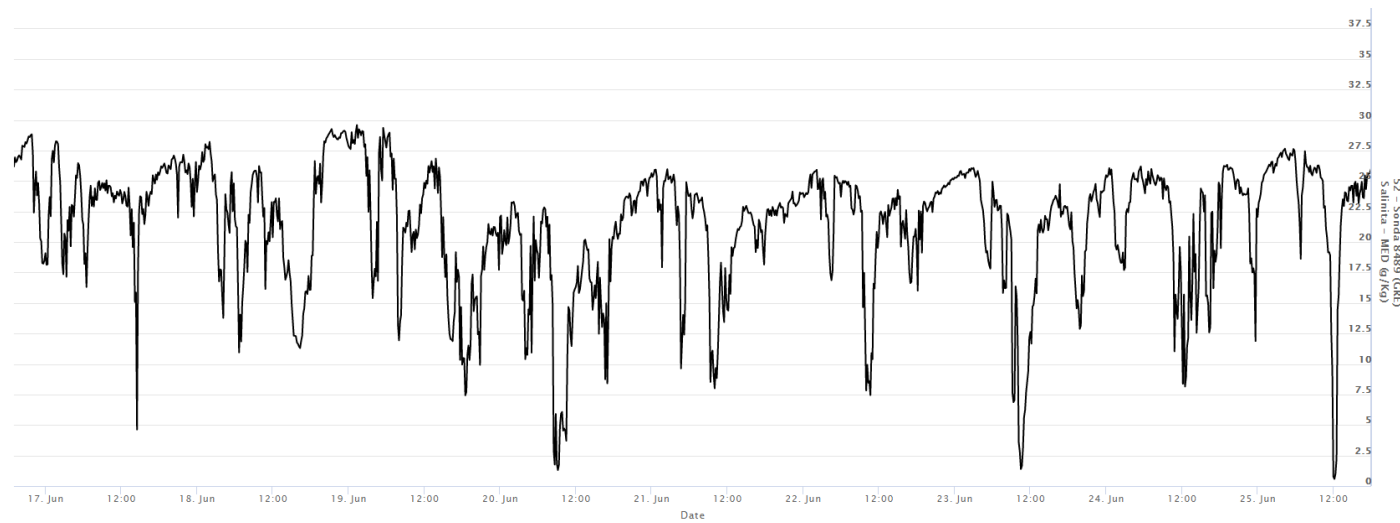
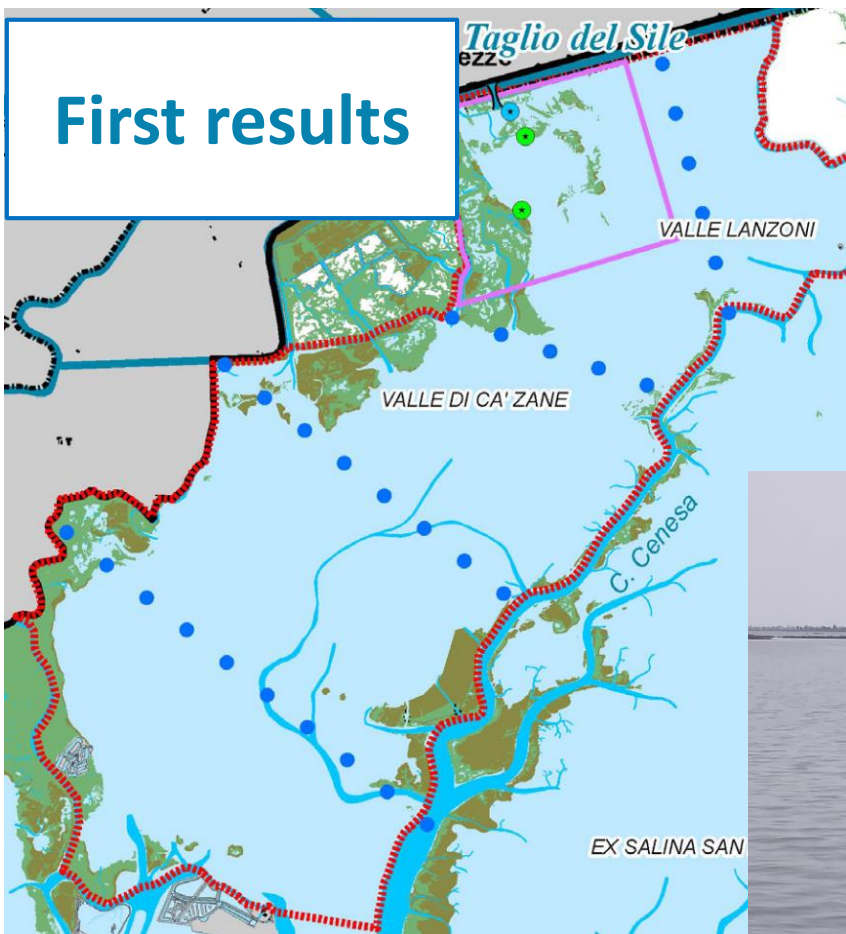




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First results



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THANK YOY

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