

An integrated approach for the effective management of water pollution risks from emerging contaminants



Perfluorinated compounds  
HOlistic ENvironmental  
Interinstitutional eXperience

# Phytodepuration as a nature-based solution for PFAS mitigation

10 March 2021

Preventing, Ensuring, Promoting

COORDINATOR



REGIONE DEL VENETO

PARTNERS



REGIONE DEL VENETO  
AZIENDA  
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UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

## LIFE PHOENIX Project

[lifephoenix.eu](http://lifephoenix.eu)



WITH THE CONTRIBUTION OF THE LIFE FINANCIAL  
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LIFE16ENV/IT/000488 - LIFE PHOENIX

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# Action B3

- Technological innovation and development
  - Irrigation Water
  - Phytodepuration



# Action B3

- B3.1 - Realization of pilot plant for irrigation water for setting vegetable organism and techniques as tools for PFASs concentration mitigation
- B3.3 - Demonstration on a full-scale plant(wetland system)of PFASs concentration mitigation for irrigation water



# Phytodepuration

Phytodepuration is a natural treatment technique that reproduces natural purification processes in a controlled environment. They are artificial little deep basins, often filled with inert material and fed with aquatic plants (macrophytes). These plants reproduce the natural purification processes typical of humid areas. (*Borin 2003*)



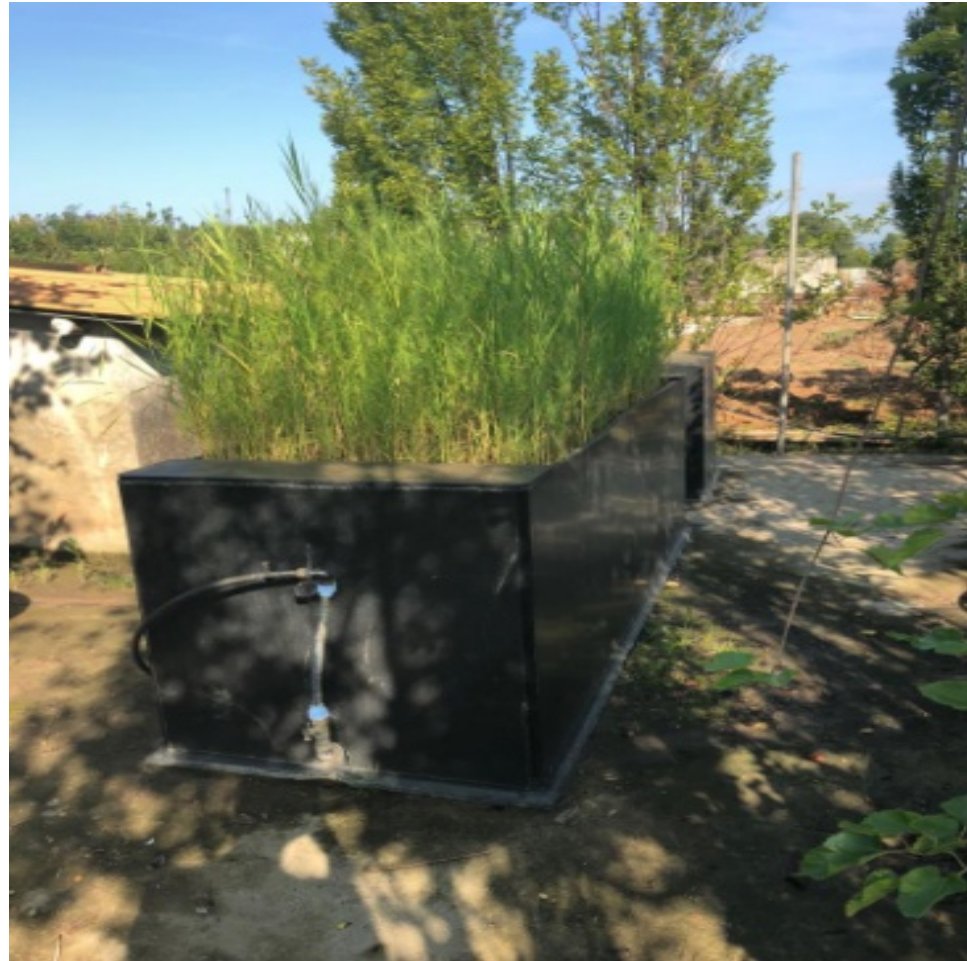


# Phytodepuration Pilot wetland system

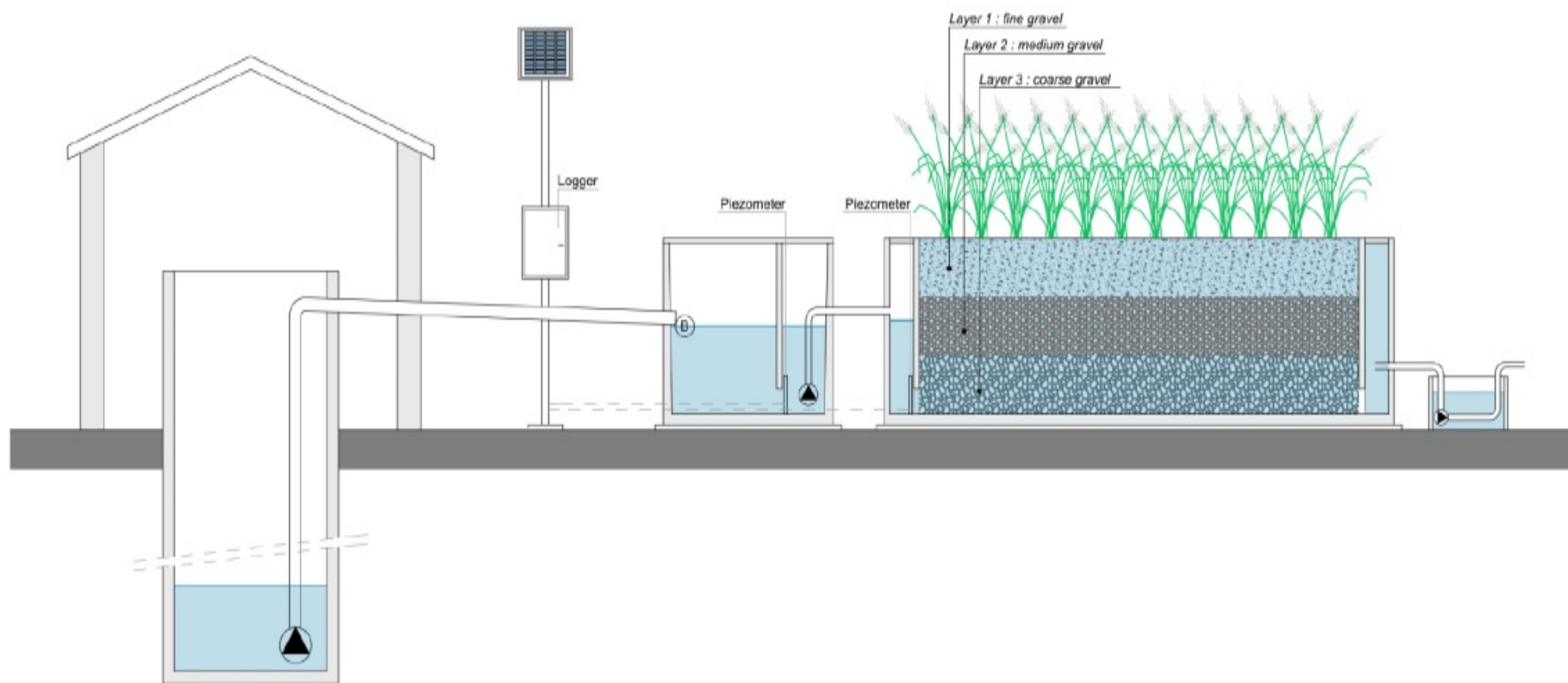


# Phytodepuration Pilot wetland system

- Irrigation Water
  - B3.1 - Realization of pilot plant for irrigation water for setting vegetable organism and techniques as tools for PFASs concentration mitigation



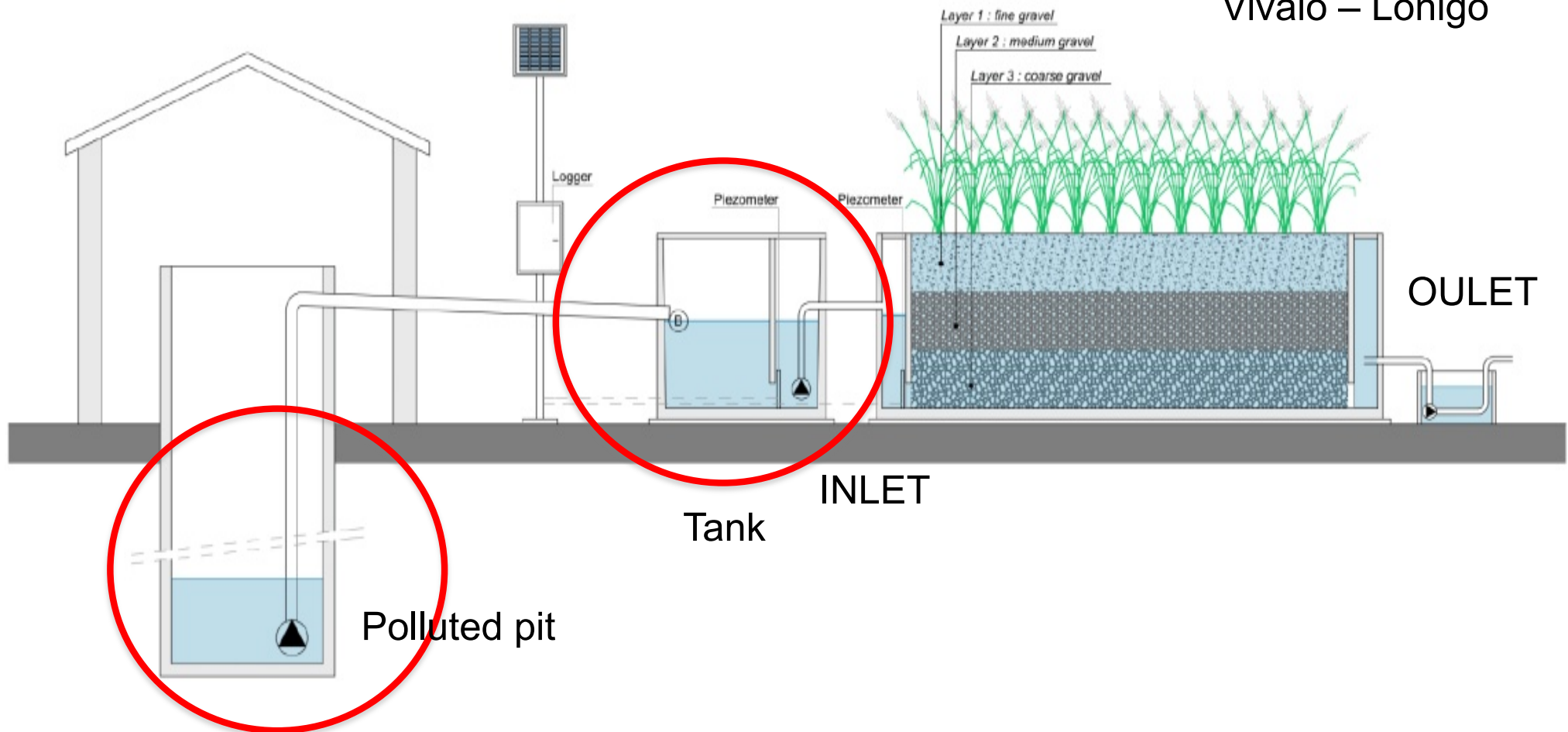
# Phytodepuration Pilot wetland system



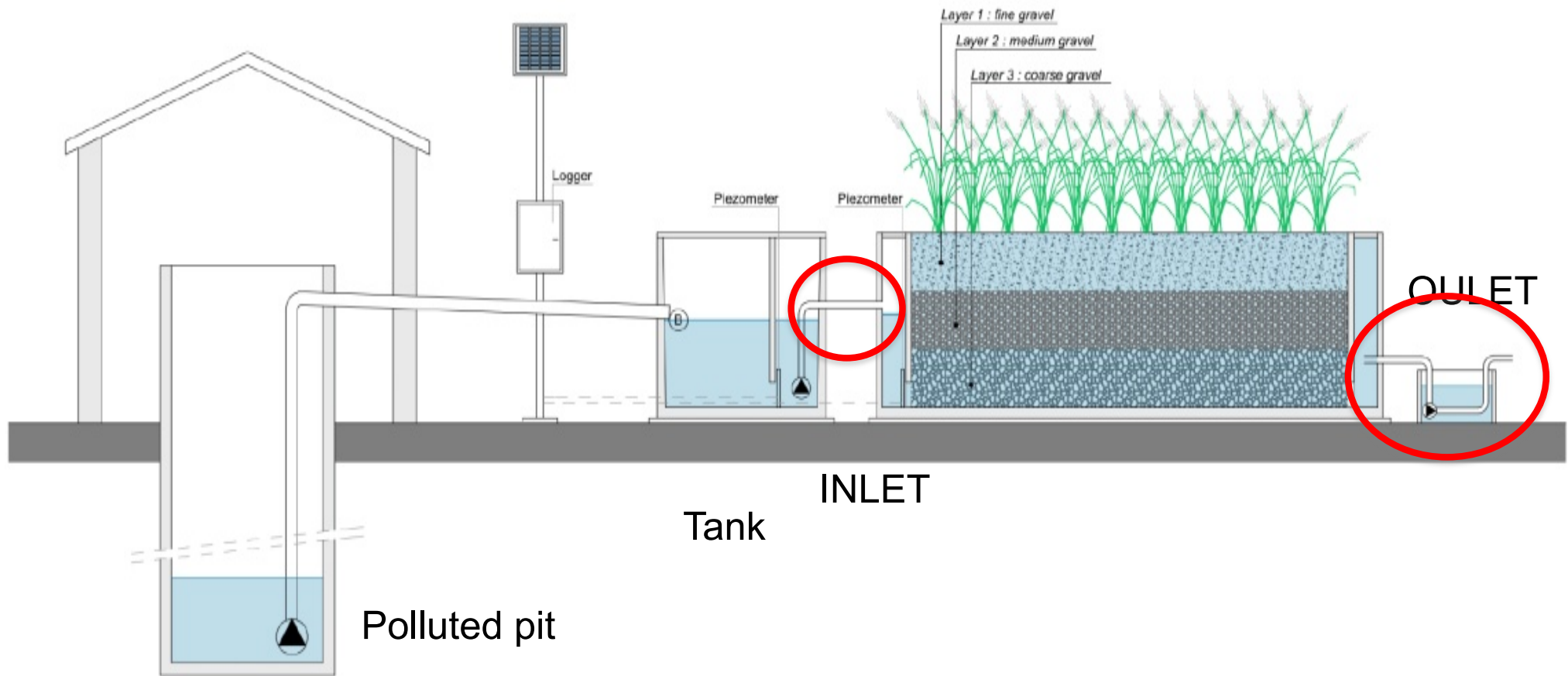


# Phytodepuration Pilot wetland system

Vivaio – Lonigo



# Phytodepuration Pilot wetland system



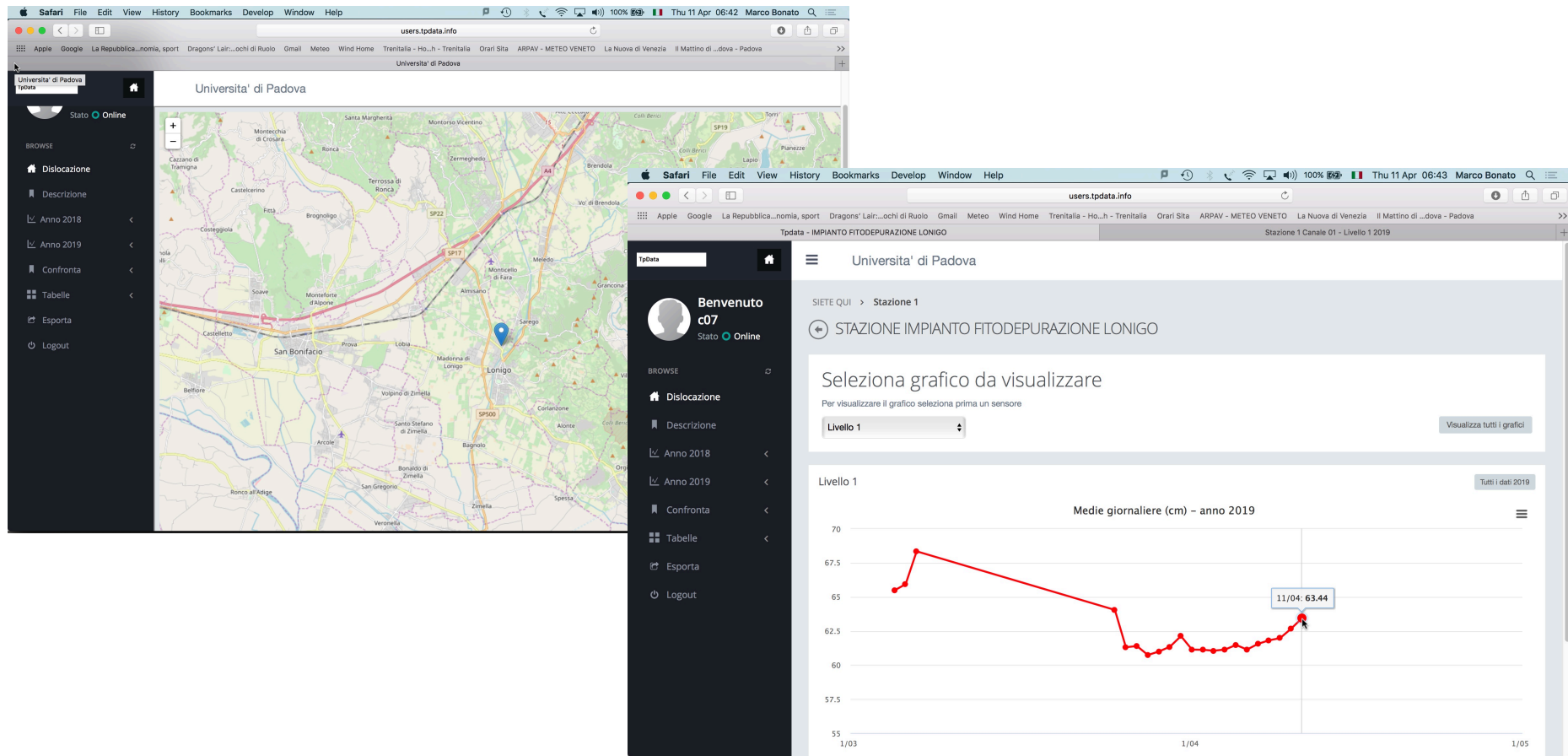
# Phytodepuration Pilot wetland system





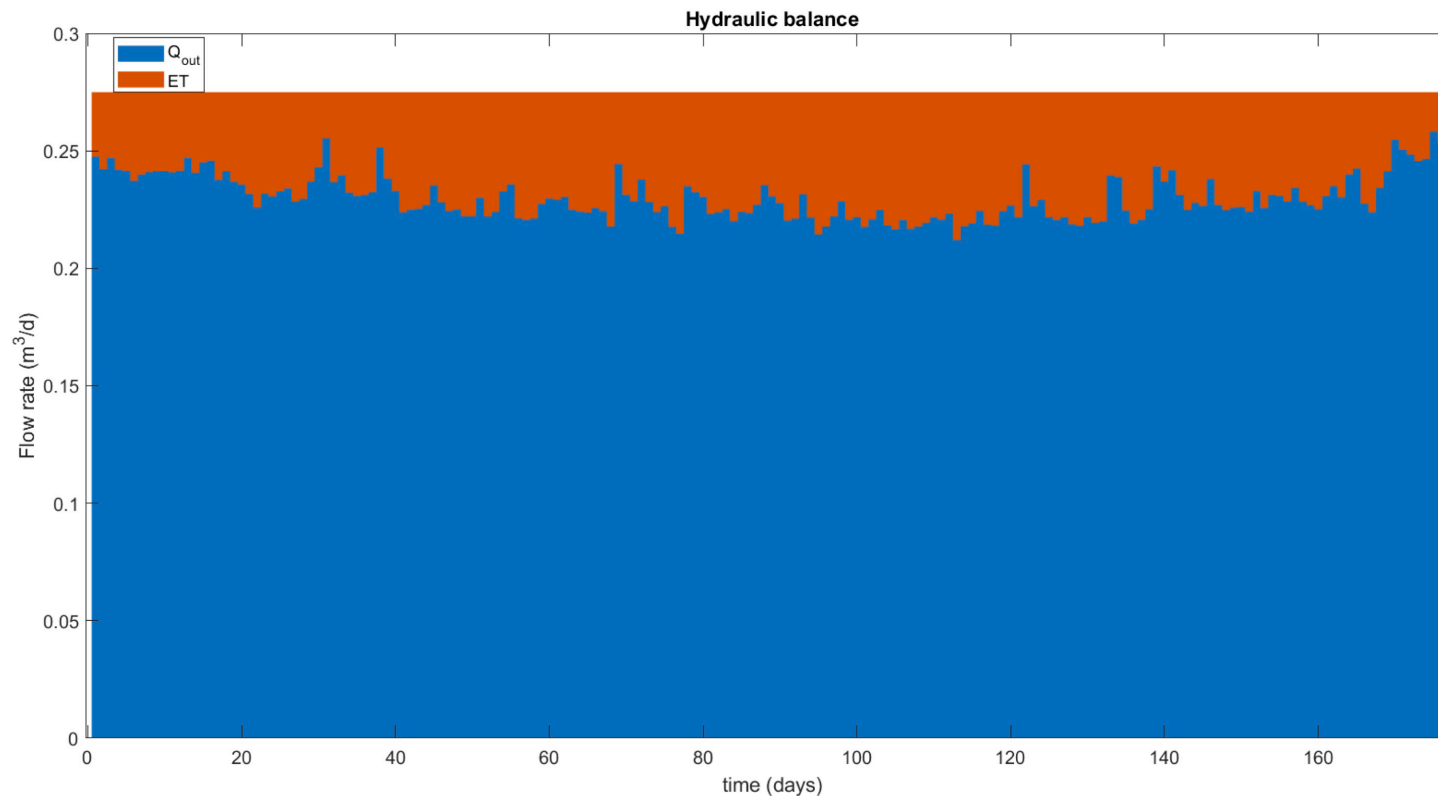
# Phytodepuration Pilot wetland system

## ● Real time control





# Phytodepuration test results



	Inlet	Outlet
<b>Water Flows (l/d)</b>	275	242
<b>PFAS Load (ng/l)</b>	1413500	1243880

	Daily (ng)	Season (mg)
<b>PFAS adsorbed</b>	169,620	30.53

Phytodepuration  
Capacity

12%

# Phytodepuration Pilot wetland system

- B3.3 - Demonstration on a full-scale plant(wetland system)of PFASs concentration mitigation for irrigation water
- First possible mitigation strategy



**Monastiero**  
(Bevilacqua (VR))



**Monselice**  
(PD)

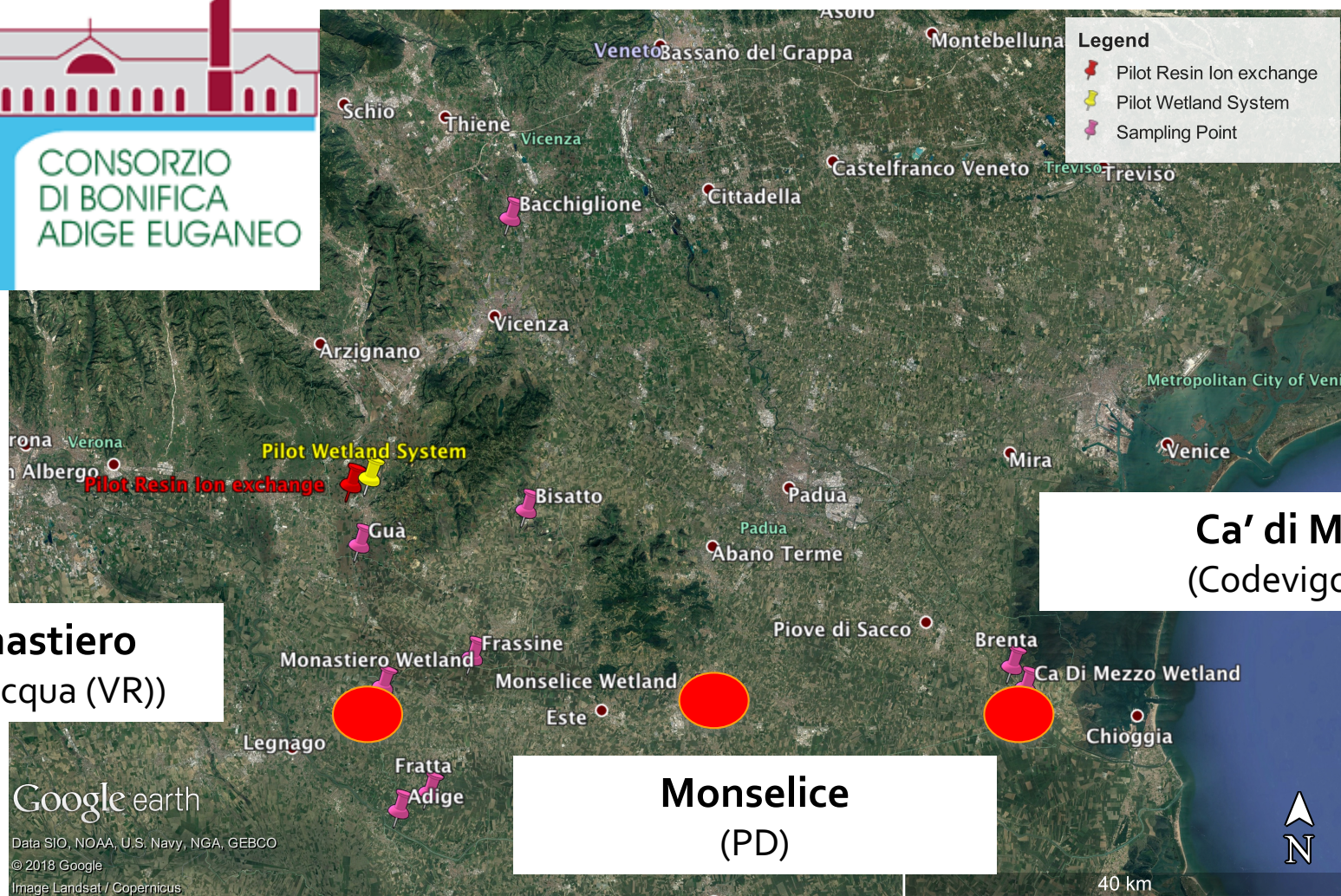


**Ca' di Mezzo**  
(Codevigo (PD))



# Phytodepuration

## Upscale real size wetland area





# Phytodepuration Wetland area test results



**Monastiero**  
(Bevilacqua (VR))



**Monselice**  
(PD)



**Ca' di Mezzo**  
(Codevigo (PD))

	V in (m <sup>3</sup> )	V out (m <sup>3</sup> )	PFAS g IN	PFAS g OUT	PFAS Within wetland area (g)
<b>Wetland Areas</b>	5083344	4132194	697.1	143.3	553.8

**Mean  
Abatement %**

**59.8**

# Future Perspective for Phytoremediation

- Irrigation Water

- First possible mitigation for irrigation water
- Application on wetland area and/or small channels nets
- Veneto Region has one of the biggest capacity of phytodepuration in Italy (over 300 wetland area)
- We need new policy for mowing and waste management related to common reed mowing

# Thank you for your attention



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