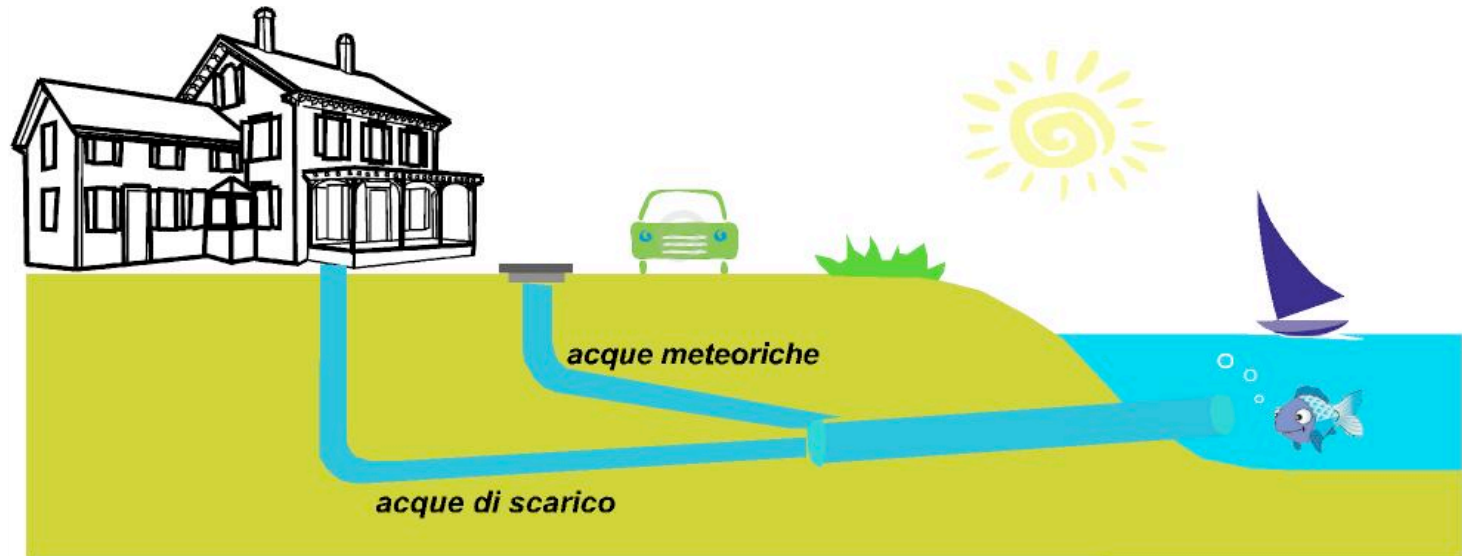


Combined Sewer Overflow on-site treatment by extensive systems

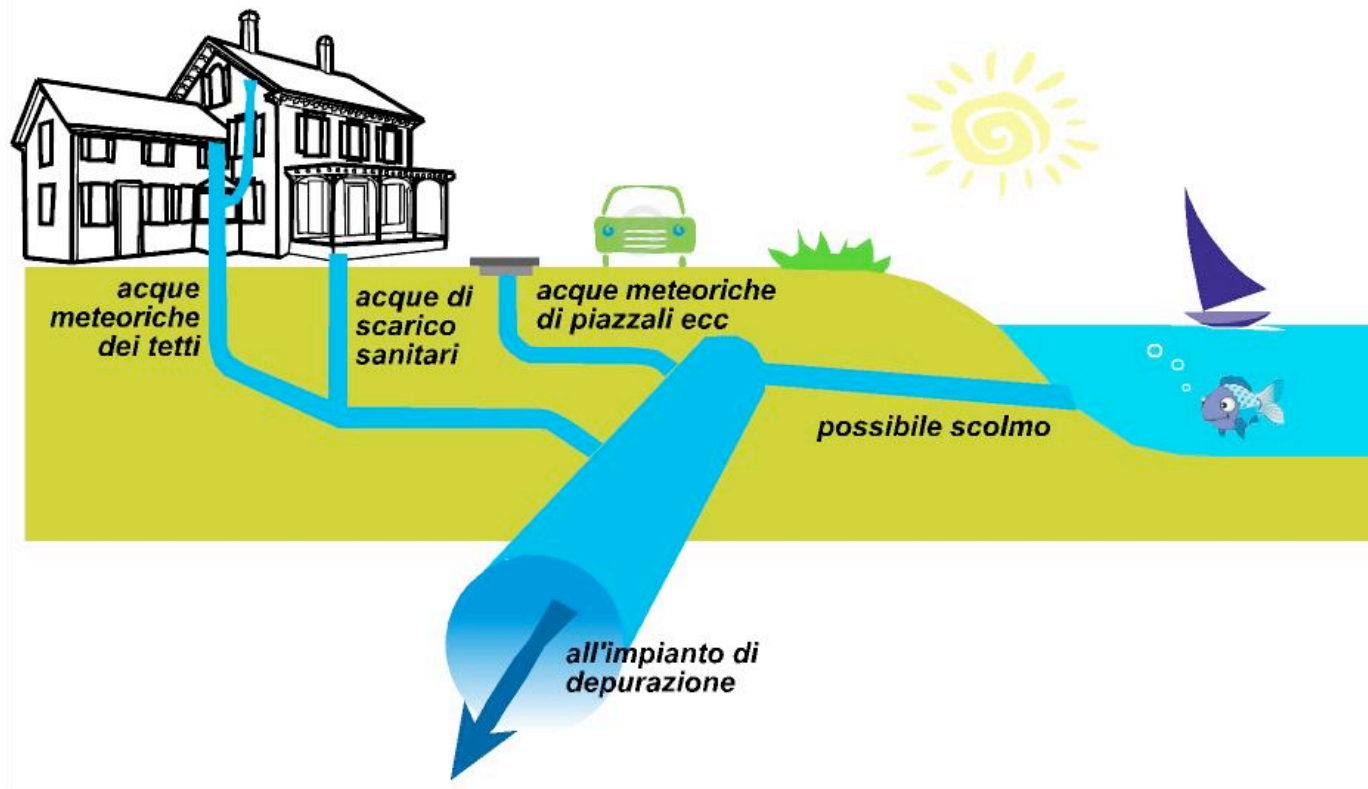
**Dr. Fabio Masi, PhD
R&D Manager - IRIDRA**





Mixed sewers represent the most adopted solution for the collection of untreated wastewater: the high flux of water permits the transport of solids and the wash-out of the sediments at every rain event.

THE PROBLEM



... but this solution generates side-effects whenever the sewer is connected to a treatment plant;

It's in fact necessary to realise CSOs for eliminating the overloads to the WWTP.

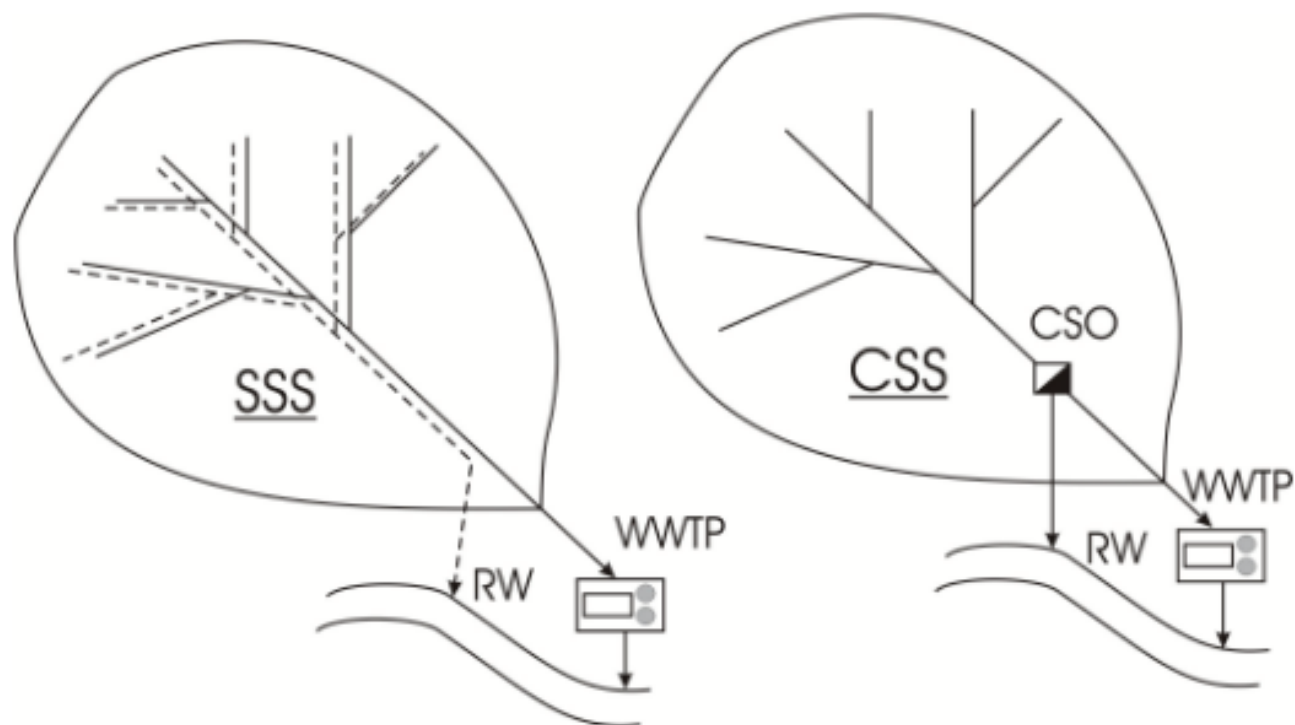
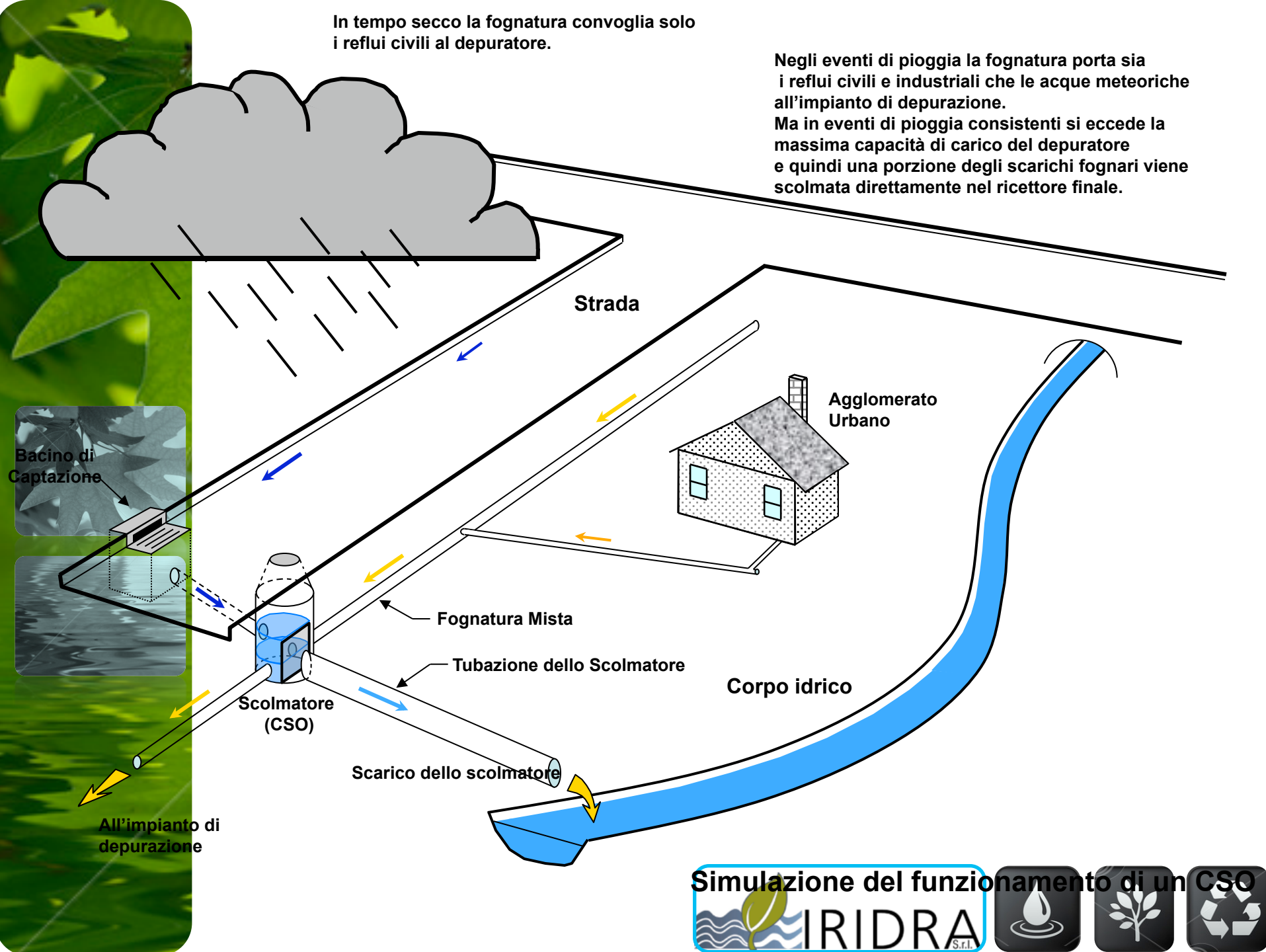


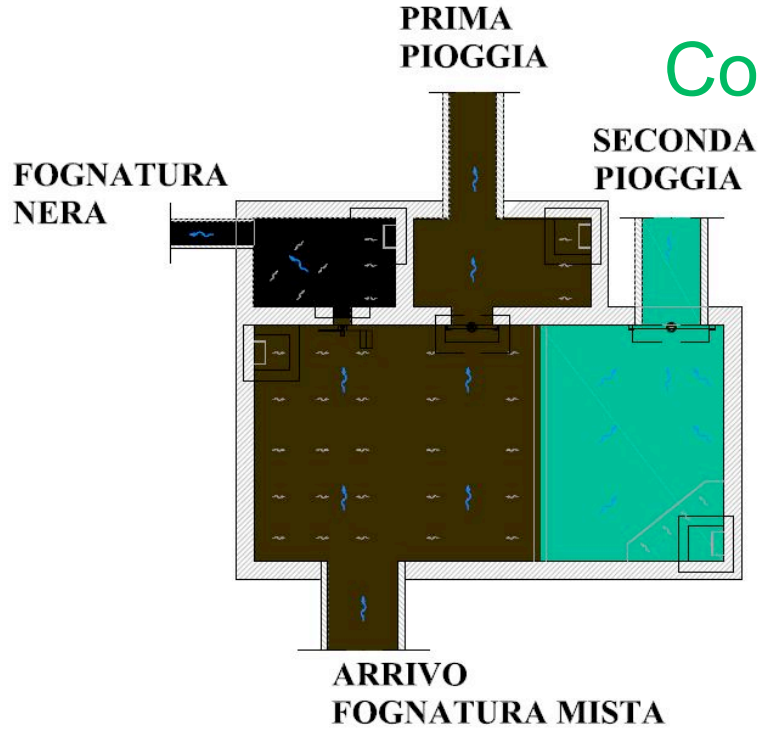
Figure 1-2. Schemes of the separate sewer system (SSS) (left) and combined sewer system (CSS) (right). RW = receiving water, WWTP = wastewater treatment plant, CSO = combined sewer system.

In tempo secco la fognatura convoglia solo i reflui civili al depuratore.

Negli eventi di pioggia la fognatura porta sia i reflui civili e industriali che le acque meteoriche all'impianto di depurazione. Ma in eventi di pioggia consistenti si eccede la massima capacità di carico del depuratore e quindi una porzione degli scarichi fognari viene scolmata direttamente nel ricettore finale.



Combined Sewer Overflow

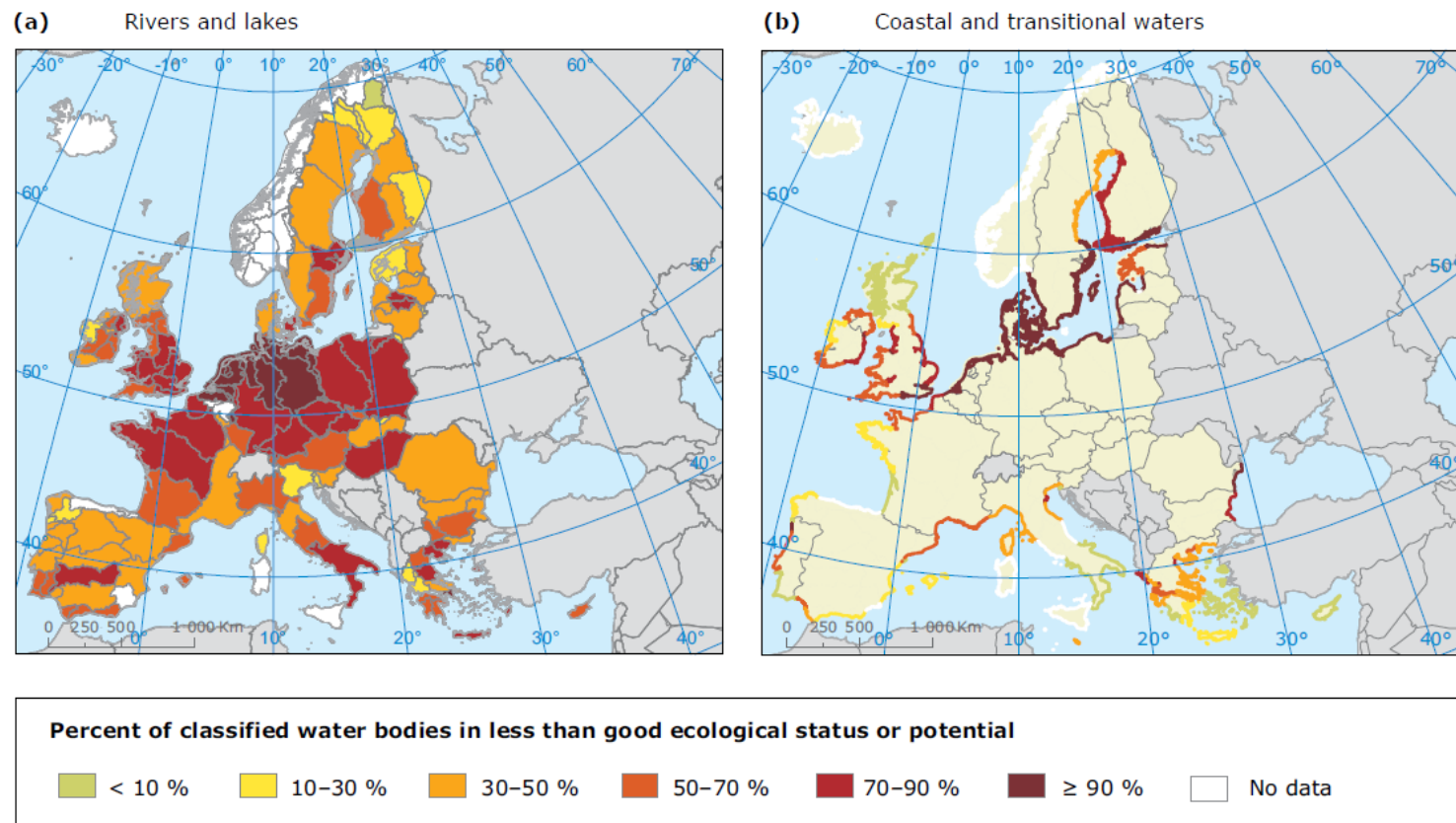


CSOs SIDE-EFFECTS

- **Decrease of water quality in the receiving water bodies**
- **Higienic-sanitary problems**
- **Increase of the flooding risk**



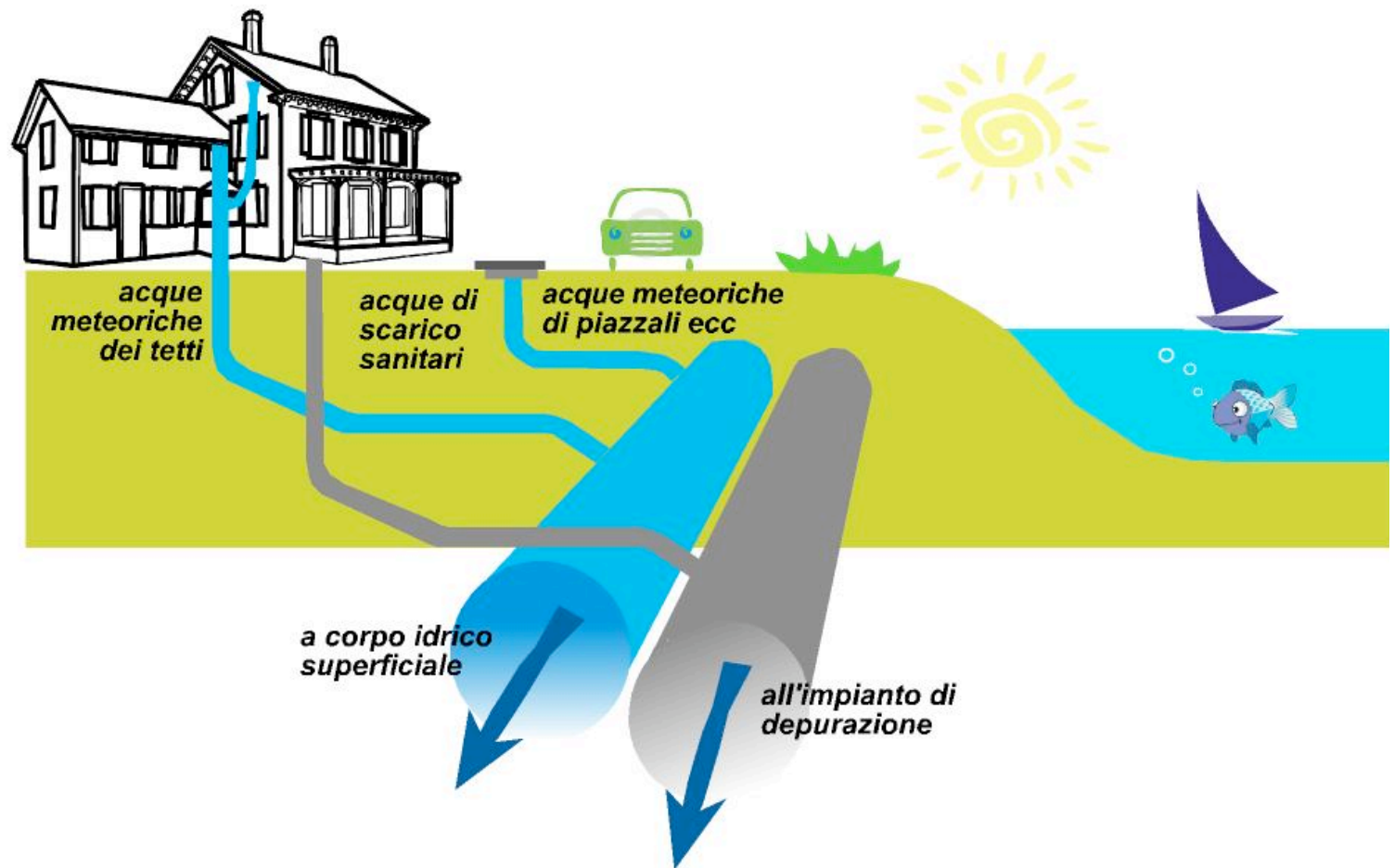
Map 2.1 Proportion of classified surface water bodies in different RBDs holding less than good ecological status or potential, for rivers and lakes (a) and for coastal and transitional waters (b)



EEA Report No 9/2012

2.2 million km of existing sewerage systems in Europe

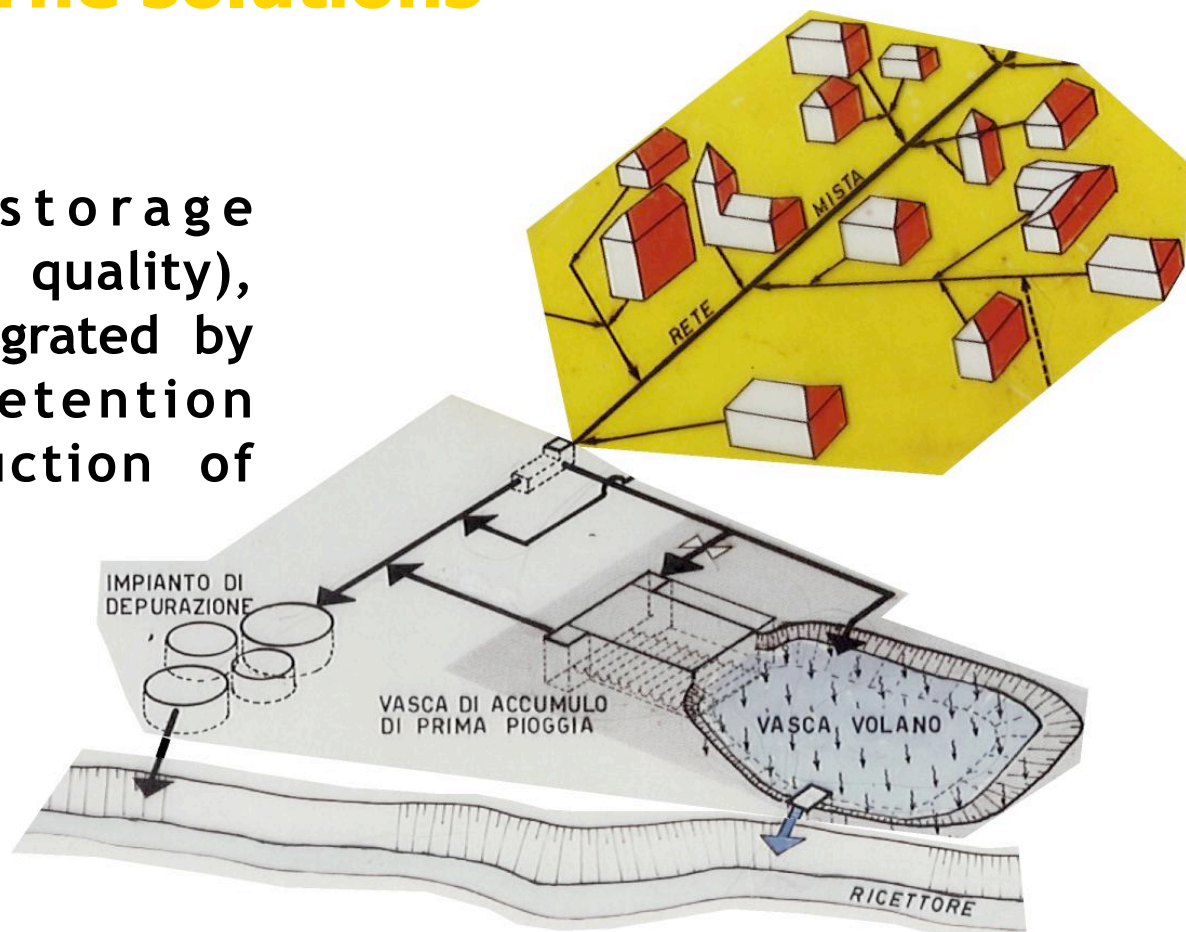




Segregation of fluxes: high investments and long realisation time

The solutions

“1° flush storage tanks” (water quality),
eventually integrated by
“extended retention basins” (reduction of
flood risk)



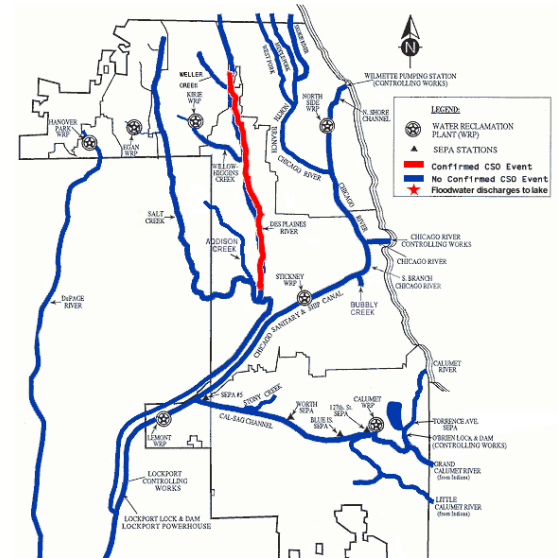
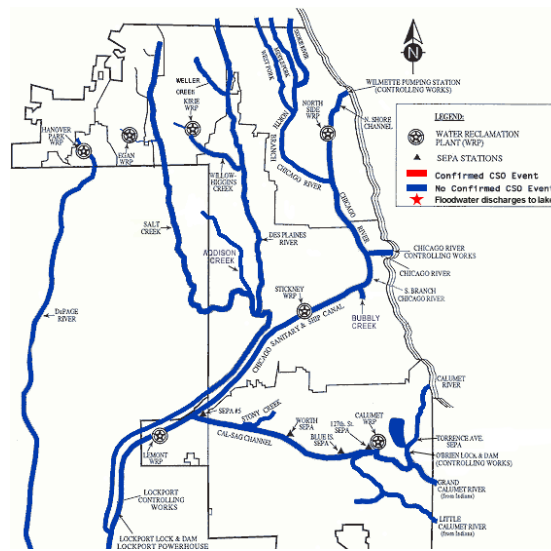
UK: 31000 CSOs

USA: above 100000

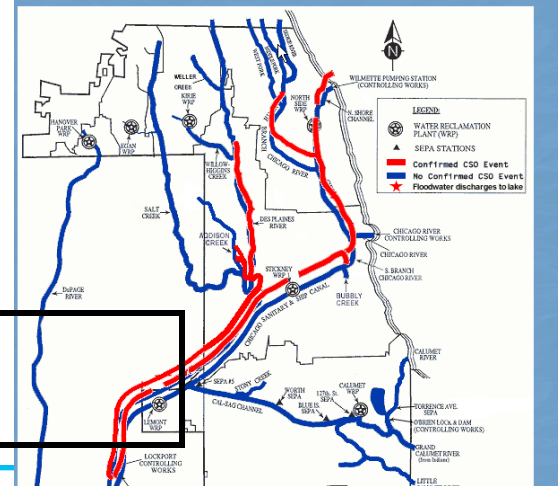
ITALY: above 50000



Chicago:	TARP Tunnel And Reservoir Plan 180 km of underground tunnel
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Combined Sewer Overflow/ Diversion Activity in the Chicagoland Area Waterways as of 3/1/2007





Wien:

Wien River Relief Sewer

2600 m of underground tunnel
below the Danube

Total cost: 82.7 M €

Diameter: about 9 m

Excavated Volume: 190.000 m³

Concrete: 60.000 m³

Steel: 10.000 ton



Natural systems for CSO treatment

Country

Modified FWS, often inserted in flood protection basins, vegetated extended retention basins

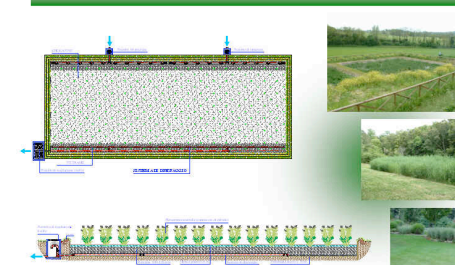
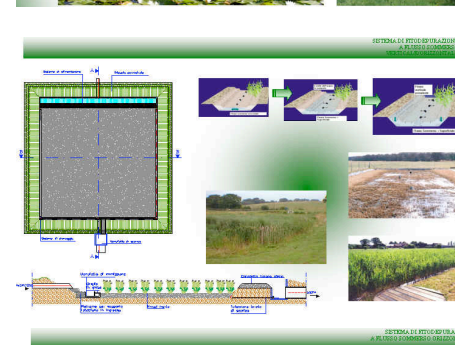
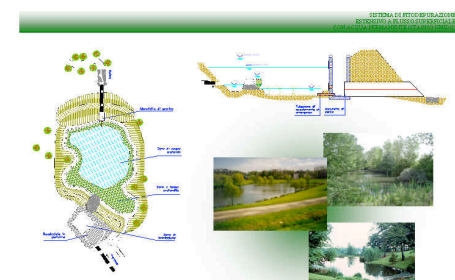
**U S A ,
Australia,
UK**

Modified VF CWs, often located after a 1st flush tank

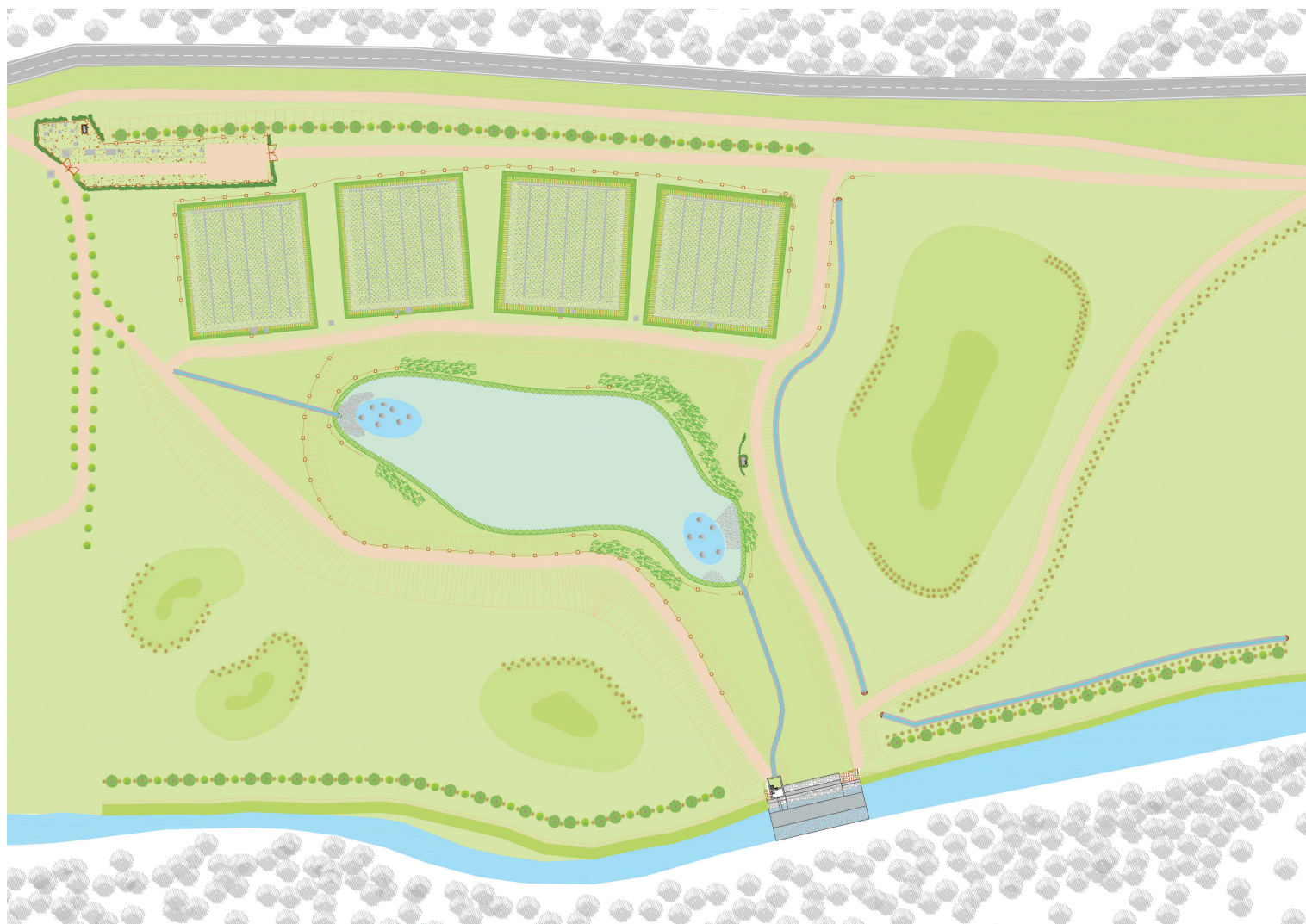
**Germania,
Austria**

HF CWs, often located after rainwater filters (i.e. copasack) or 1st flush tanks

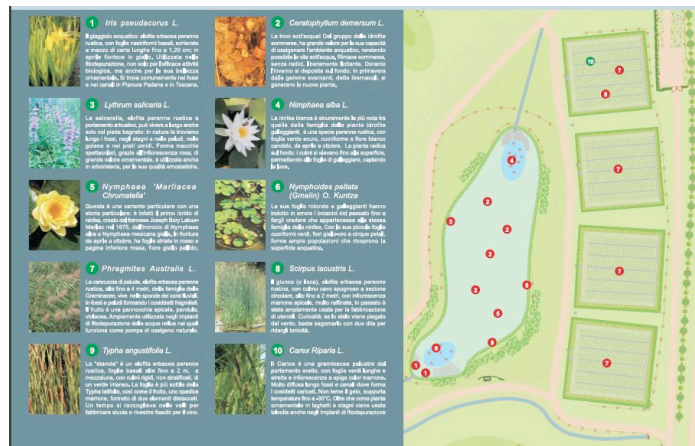
UK



GORLA MAGGIORE



Not only treatment: ES Ecosystem Service



Reconstitute the lost NC
(Natural Capitals)





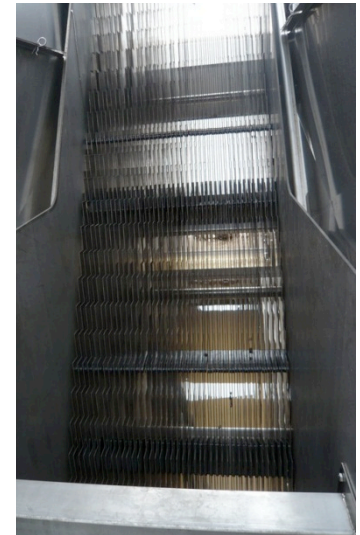
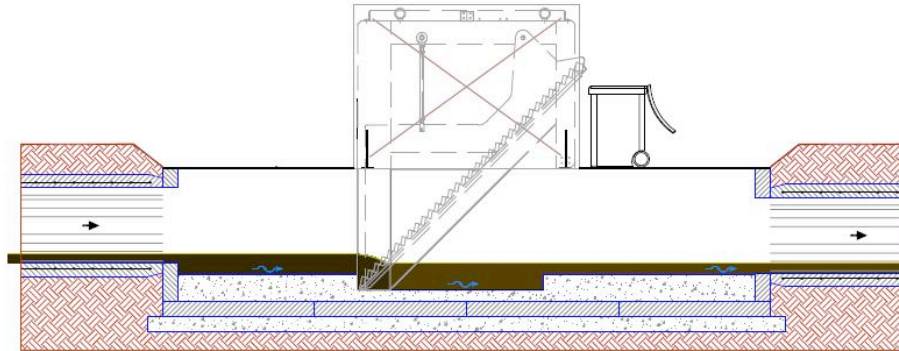


GORLA MAGGIORE





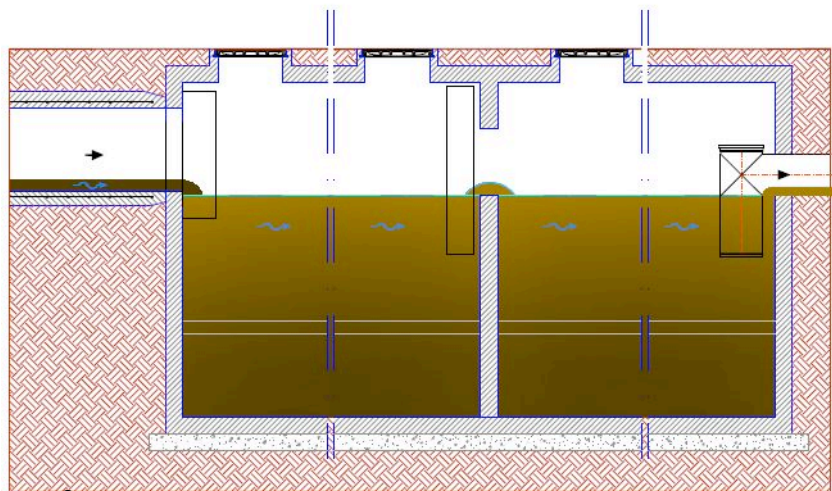
Grid



Consumption: less than 1 KW per day...



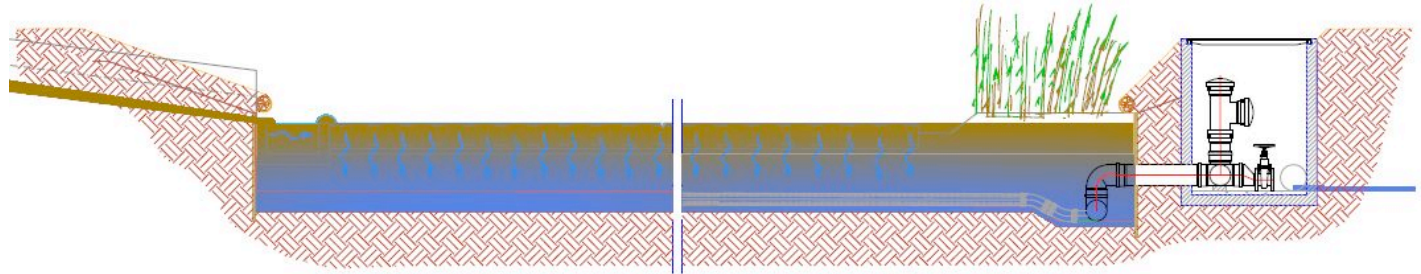
Settler



Volume 150 m³

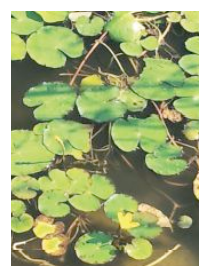
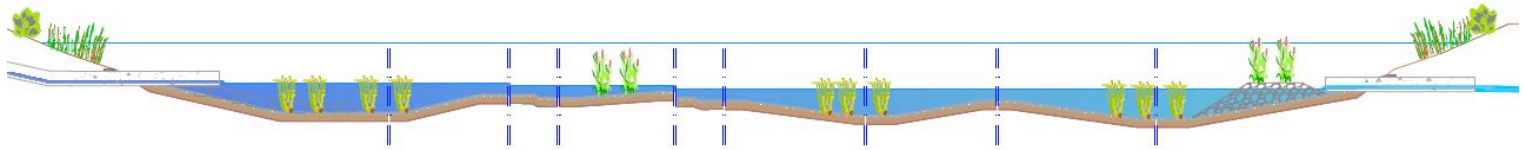


VF CWs





FWS CW – Extended retention basin



$A = 3200 \text{ m}^2$



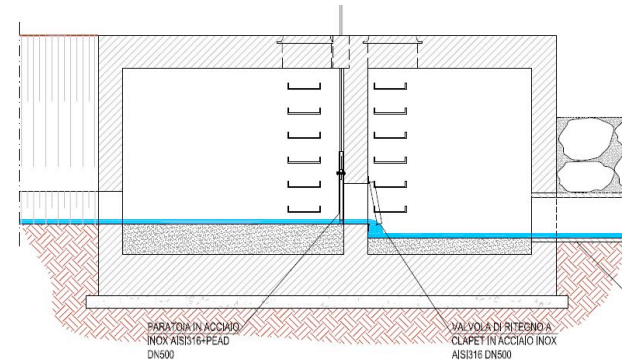
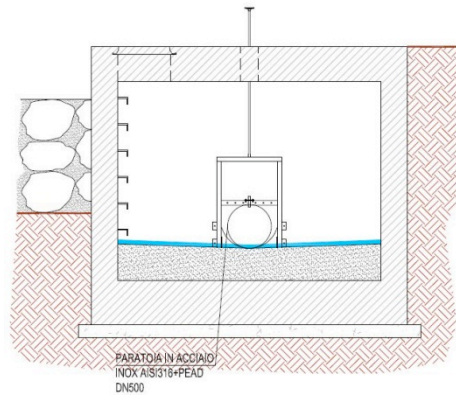
Extended Retention Basin – Outlet device



$$V = 7700 \text{ m}^3$$



Outlet





CSOs are diffused everywhere urbanisation took place
with consequent loss of NC

They represent a great occasion for recovering this
loss by the creation of new ESs

For the EC this could generate a flux of green
economy /green jobs in the order of 50-100 billions of
euro



Flood protection

$V_{lam} = 7.700 \text{ mc}$

Condizione di valle:

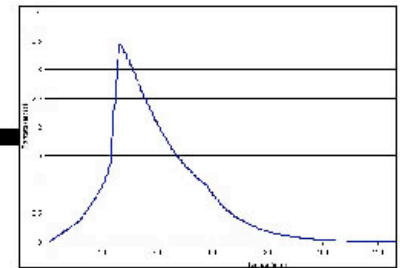
Livello Olona in due assetti -

- 1) 217.50 m s.l.m. condizioni di magra (funzionamento vasca non rigurgitato)
- 2) 218.49 m s.l.m. evento T=10 anni

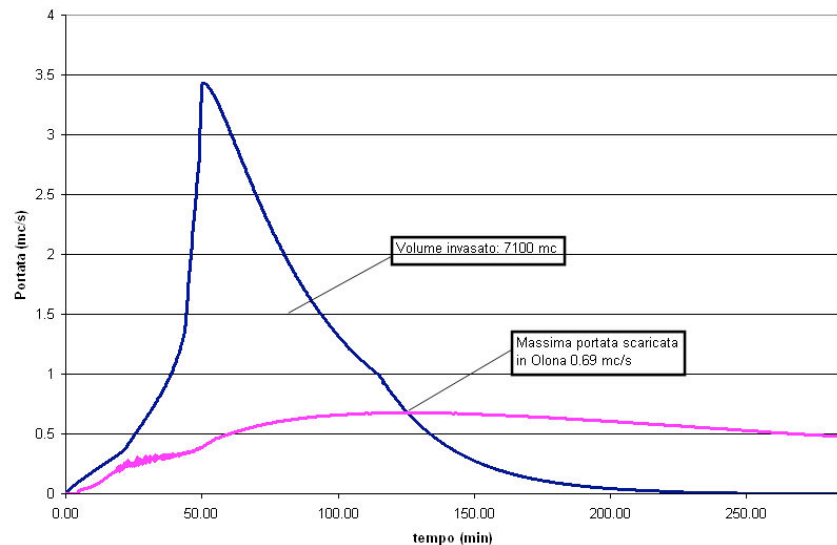
FIUME OLONA

VASCA VOLANO

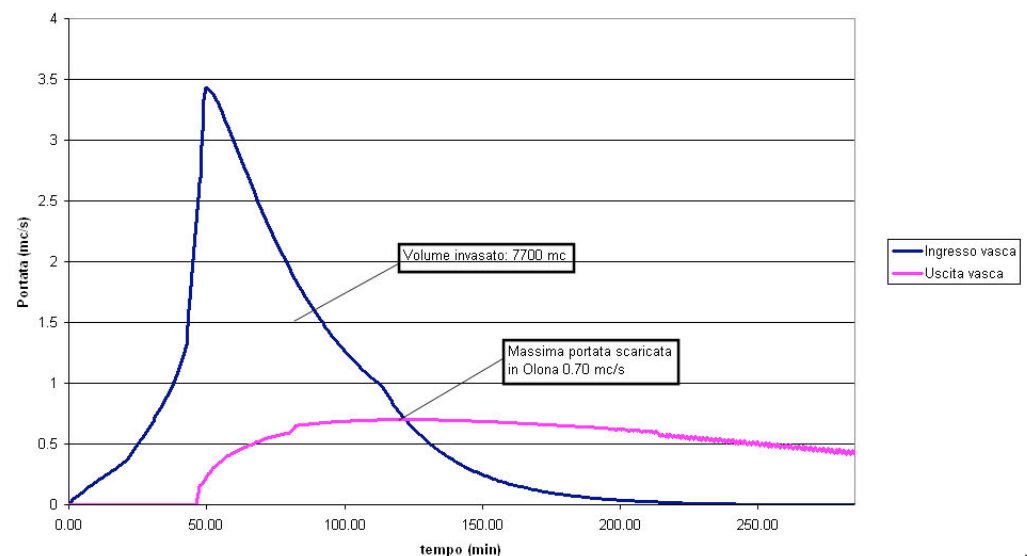
Condizione di monte:
IDROGRAMMA T=10 Anni
($Q_{max}=3.4 \text{ mc/s}$)



Idrogrammi scenario 1 (funzionamento non rigurgitato)



Idrogrammi scenario 2 (funzionamento rigurgitato)



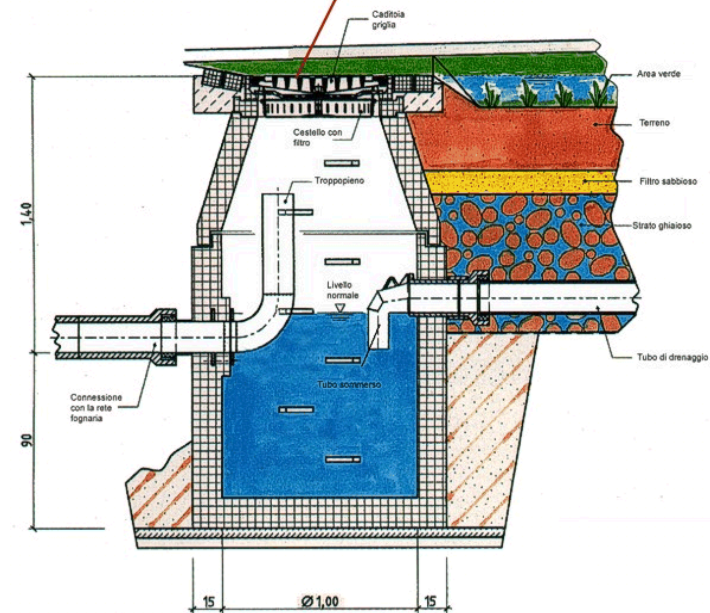
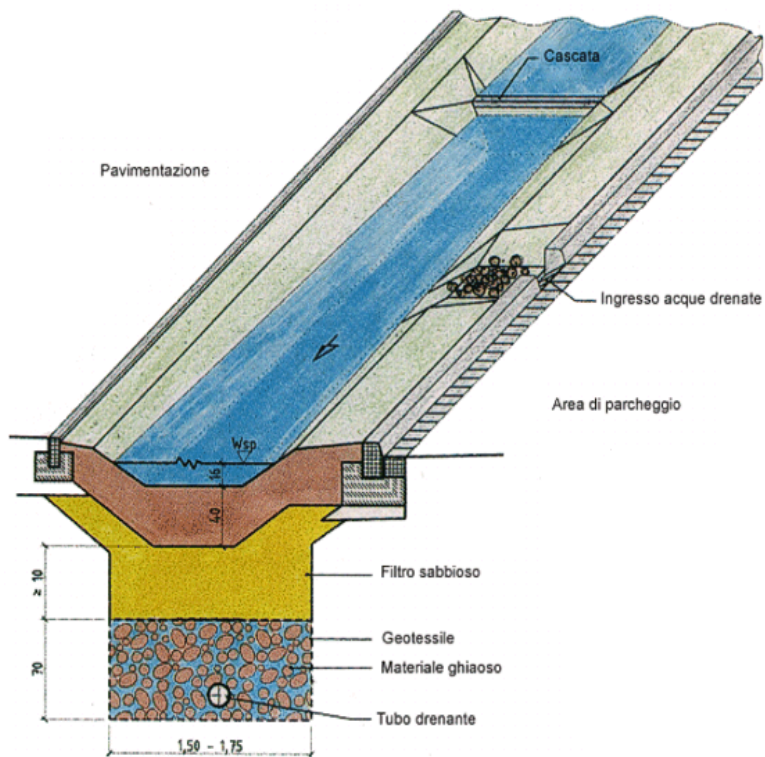
AUTORITA' DI BACINO DEL FIUME PO



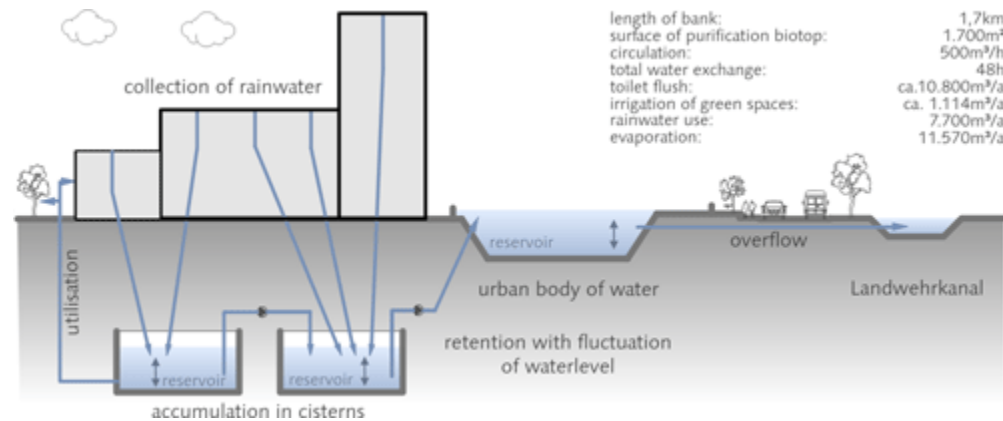
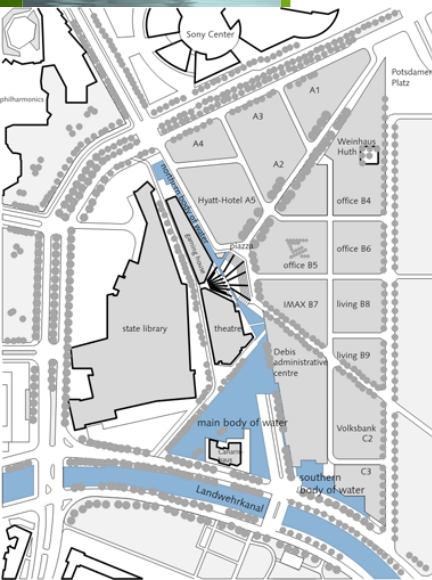
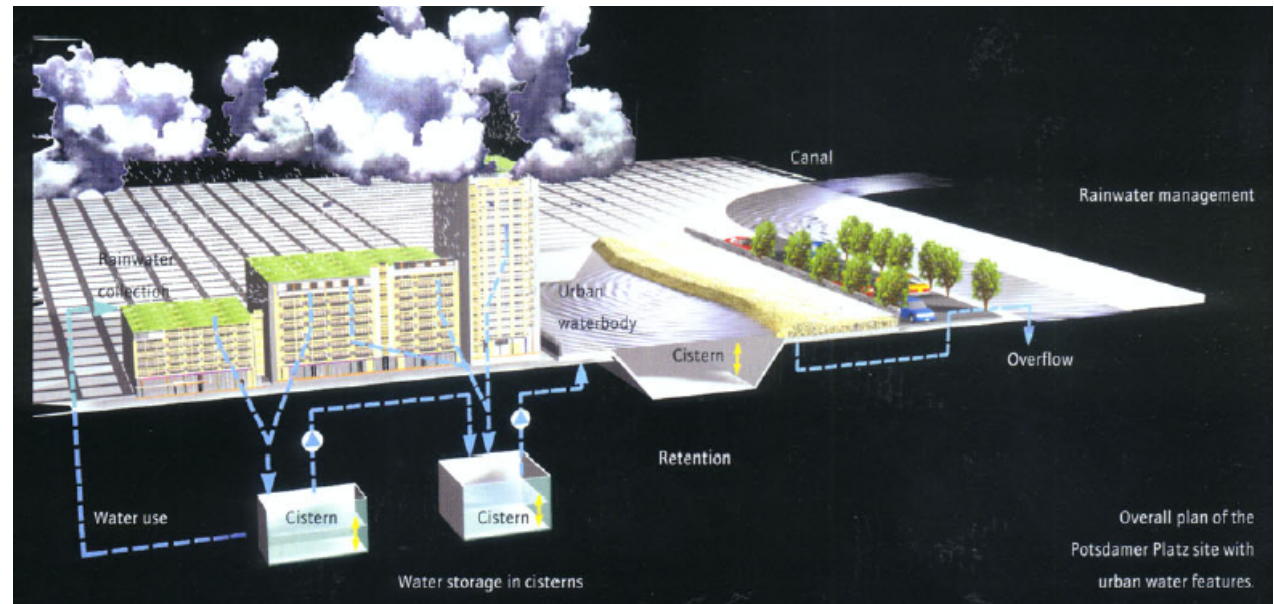
NO SUDS?



SUDS - Hannover



SUDS - Berlin





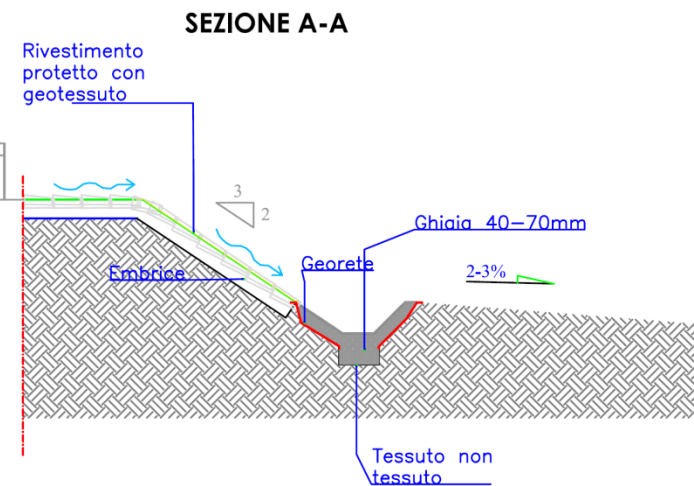
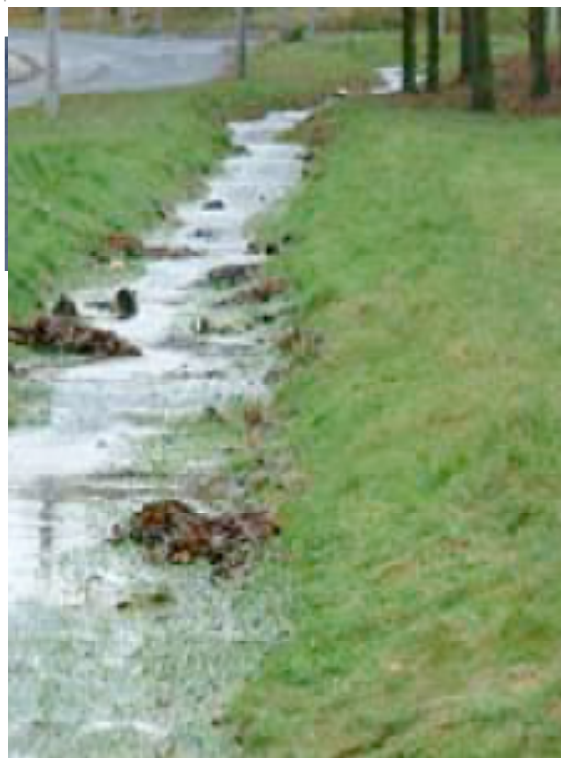
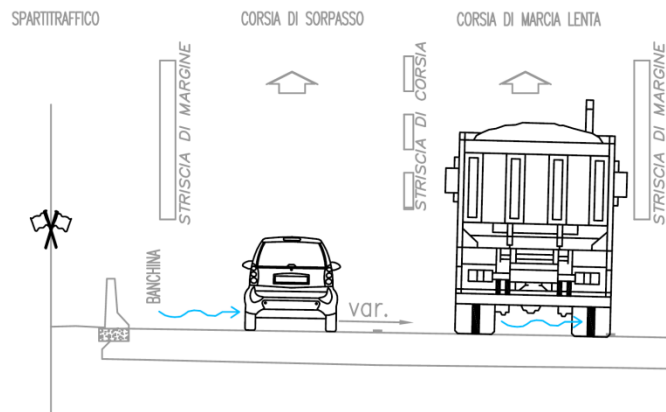
Berlin – Postdamer Platz

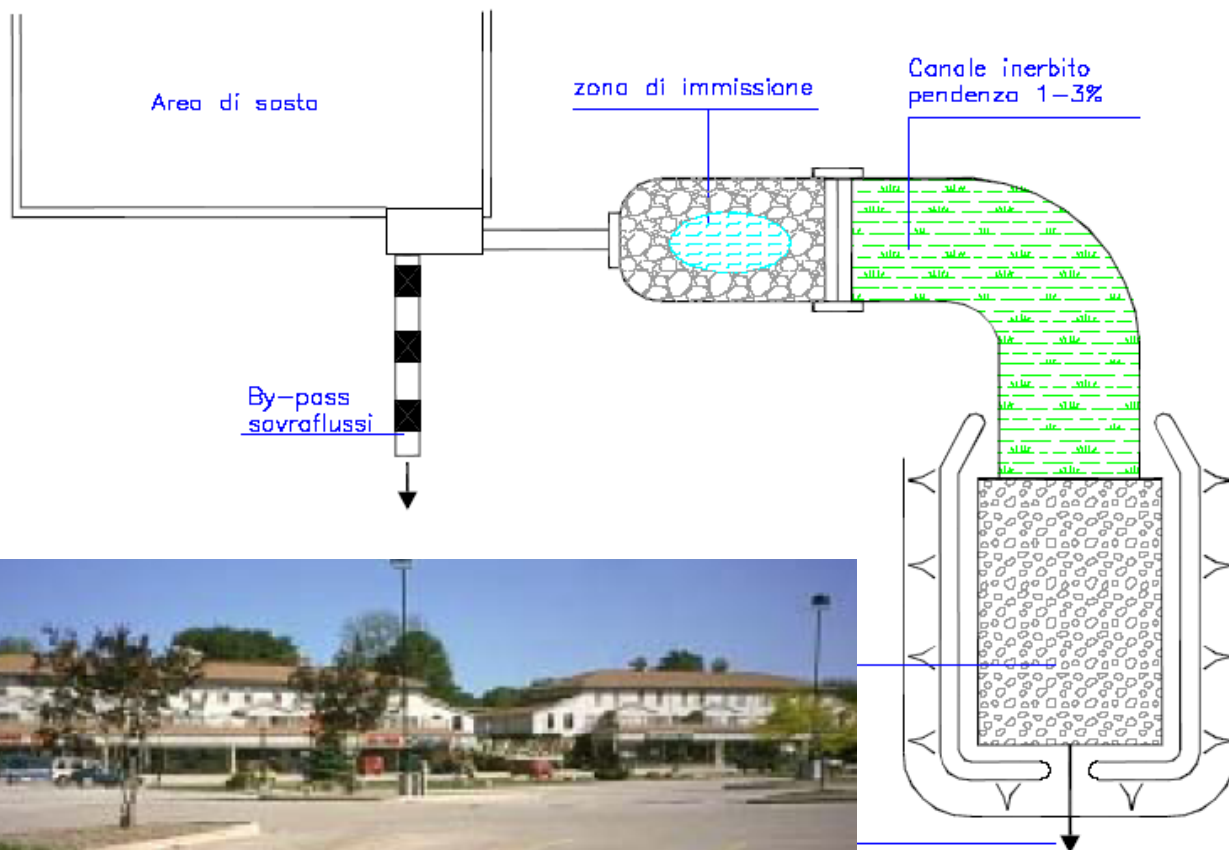


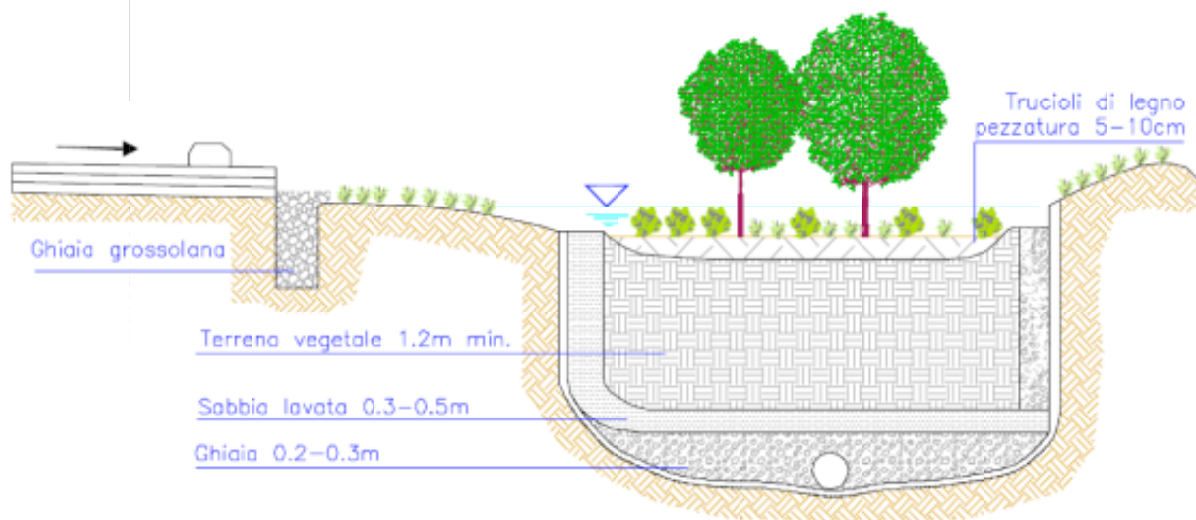
SUDS – USA – Rain Gardens





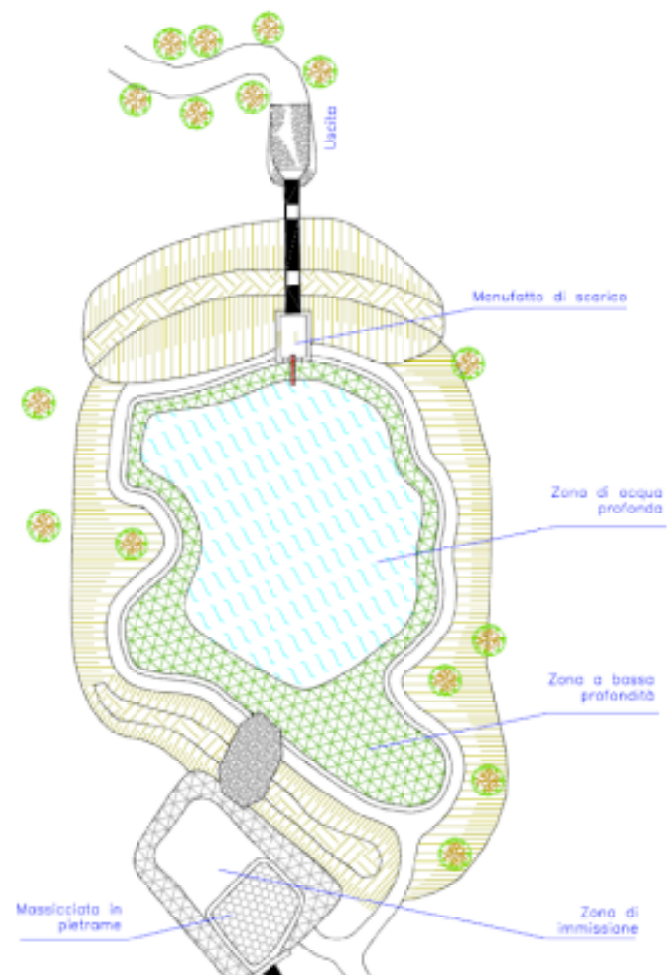


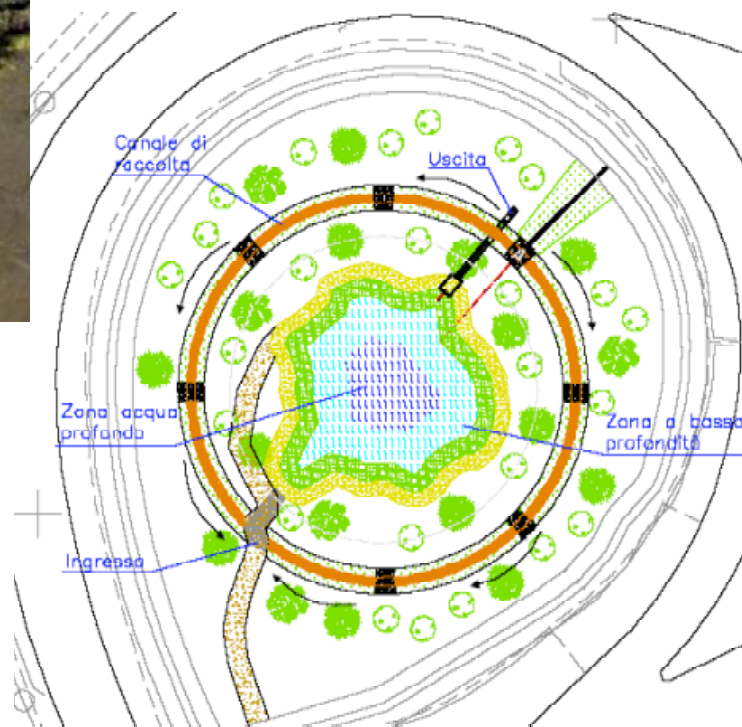






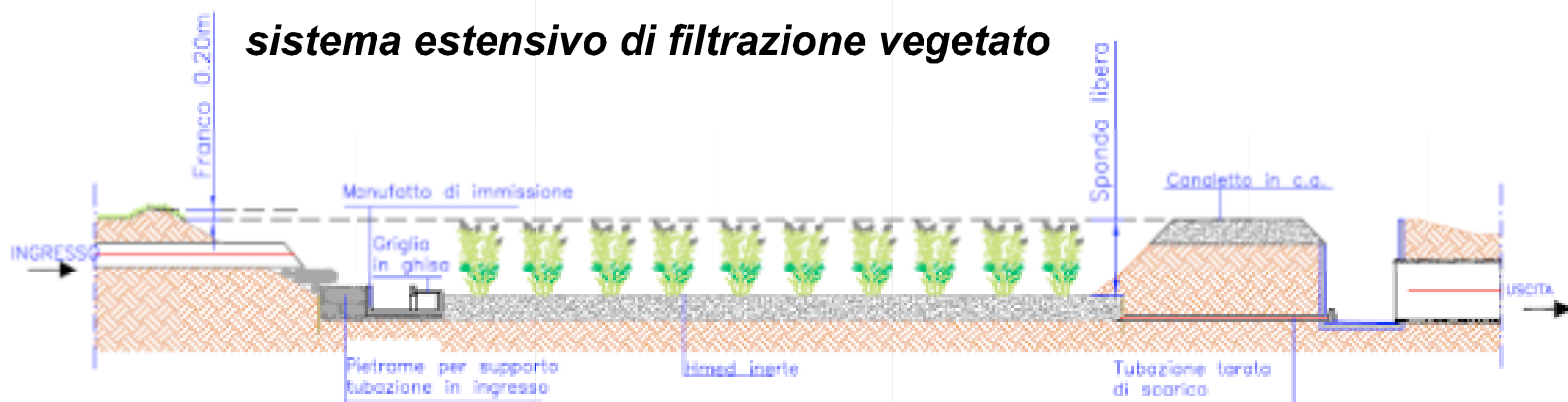
stagno umido







sistema estensivo di filtrazione vegetato



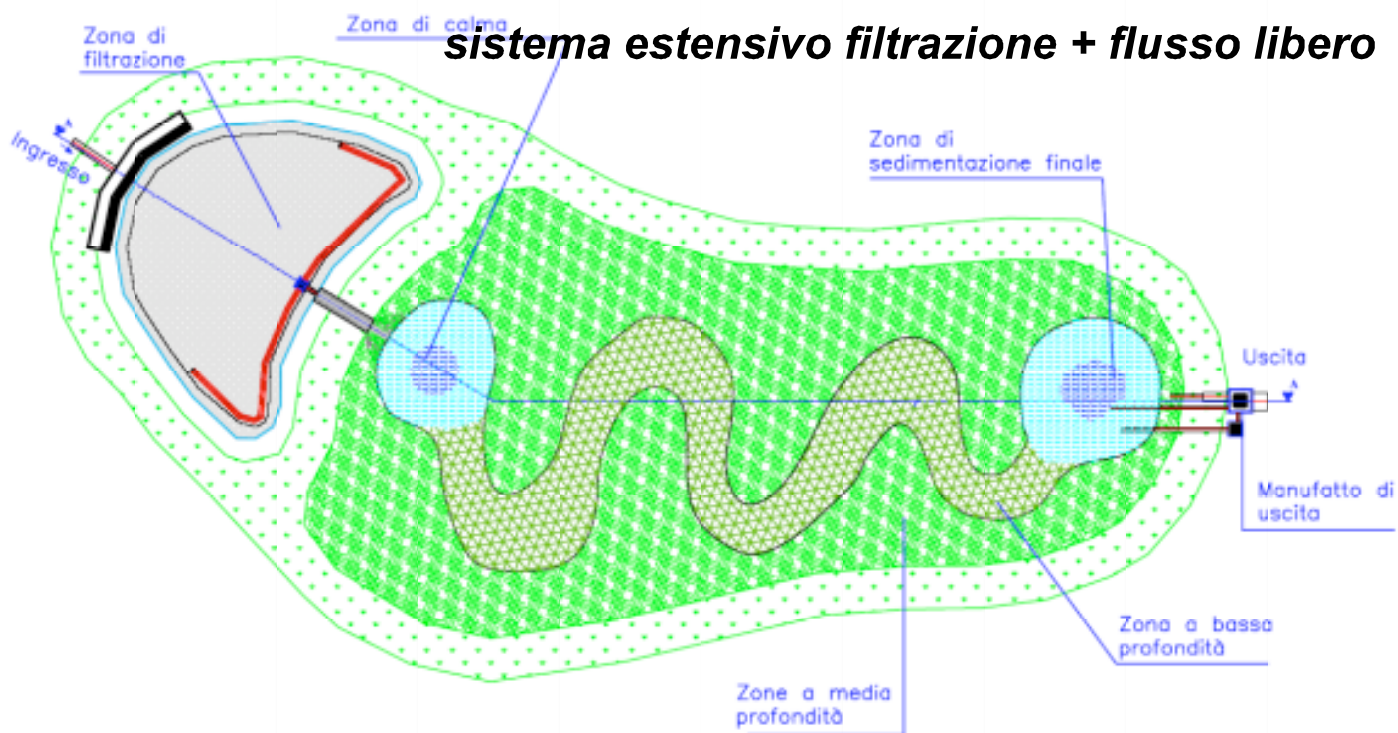


sistema estensivo a flusso libero





sistema estensivo filtrazione + flusso libero





PROJECT CALENDAR

20 JANUARY 2014

OpenNESS Steering Committee meeting

22 JANUARY 2014

OpenNESS workshop on 'Mainstreaming ecosystem services into EU regulatory frameworks' in Brussels

25-27 MARCH 2014

1st OpenNESS Annual Meeting in Budapest, Hungary



OPERATIONALISATION OF NATURAL CAPITAL AND ECOSYSTEM SERVICES

OpenNESS aims to translate the concepts of Natural Capital (NC) and Ecosystem Services (ES) into operational frameworks that provide tested, practical and tailored solutions for integrating ES into land, water and urban management and decision-making. It examines how the concepts link to, and support, wider EU economic, social and environmental policy initiatives and scrutinizes the potential and limitations of the concepts of ES and NC.

LATEST NEWS

Please subscribe to our news feed via the RSS button on the left.

OPENNESS FLYER PUBLISHED

12 THU, 19/12/2013 - 15:19

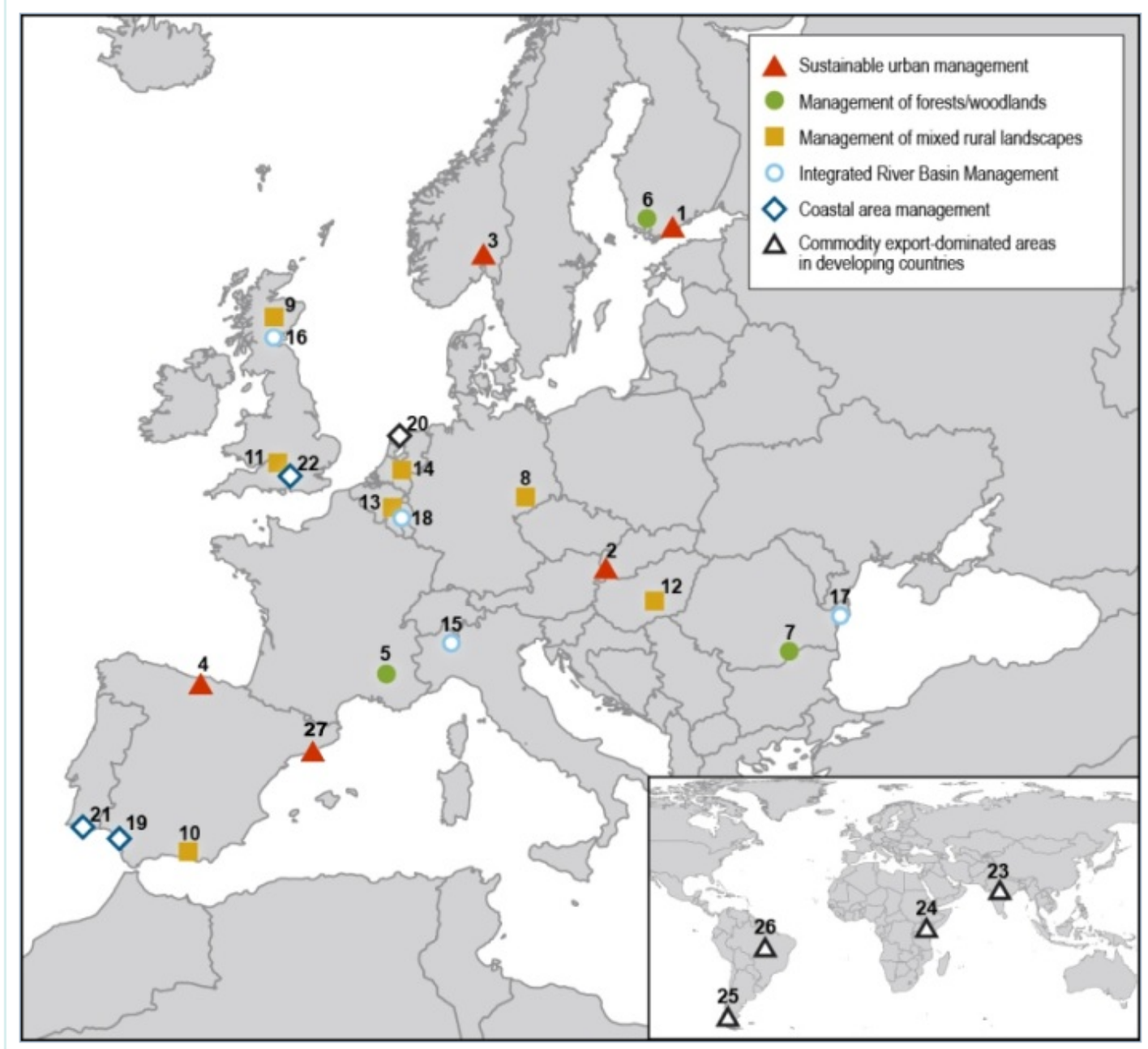
The OpenNESS flyer has been designed and printed! It includes a brief overview of what OpenNESS is, does and will achieve. Next to that the work packages diagram has been redesigned and there's a clear and good looking map showing our case studies.

All partners receive a box with 75 flyers for dissemination purposes. To order (more) copies of the flyer, please send your request to the new OpenNESS e-mail address:



<http://www.openness-project.eu>







Thanks for your attention
Contact: masi@iridra.com