Pollutants removal by two different constructed wetland treating eutrophic water.

LIFE12 ENV/ES/000685

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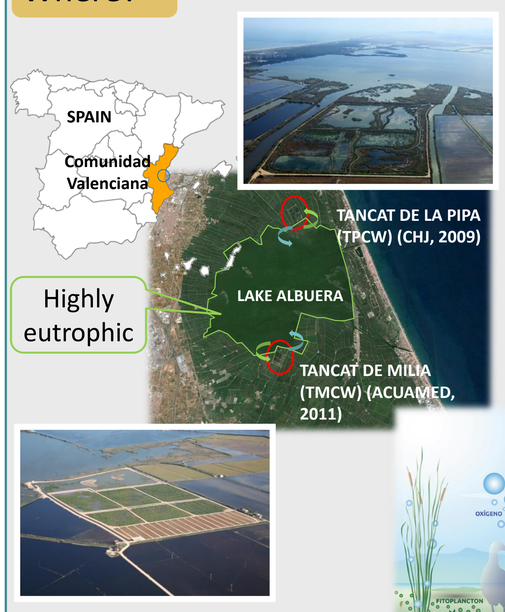
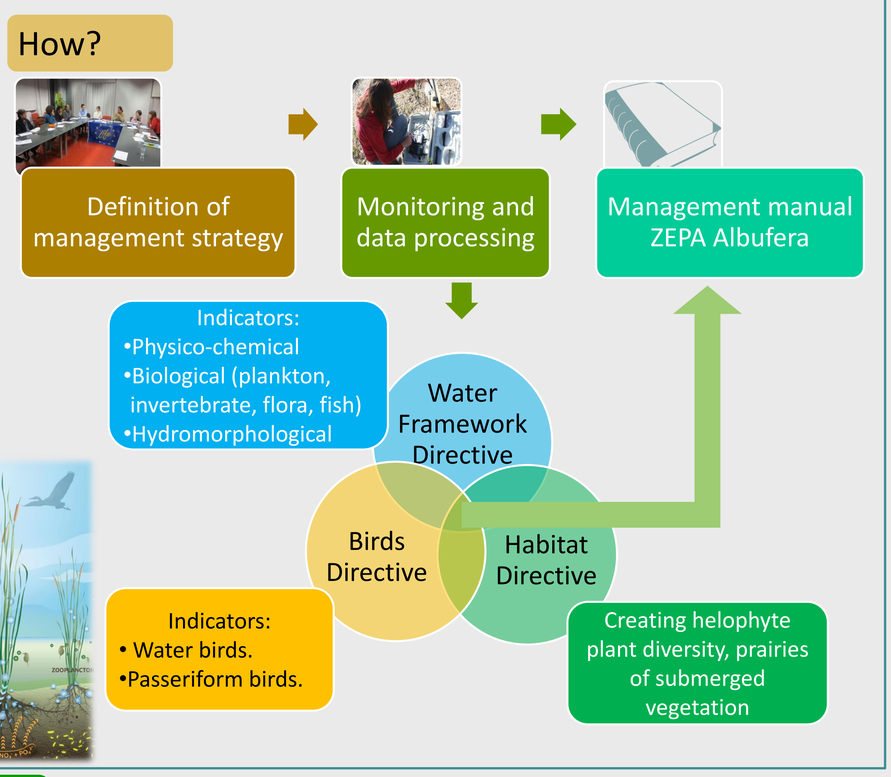
Background

LIFE+12 ALBUFERA project (October 2013 – September 2016):
The main goal is to design an integrated management of CW to jointly enhance water quality and biodiversity, thus accomplishing the objectives of three European Directives: Water Framework Directive, Habitats and Birds.

Where?



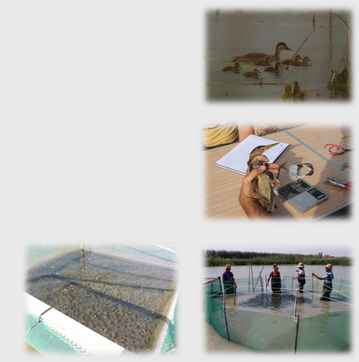
How?



Technical project Actions

Hydraulic monitoring.
Water Quality (WQ) monitoring:
- Physico-chemical variables.
- Phytoplankton: Chl a, species identification.
- Water and benthic macroinvertebrates.

Wildlife surveys.
Vegetation management.



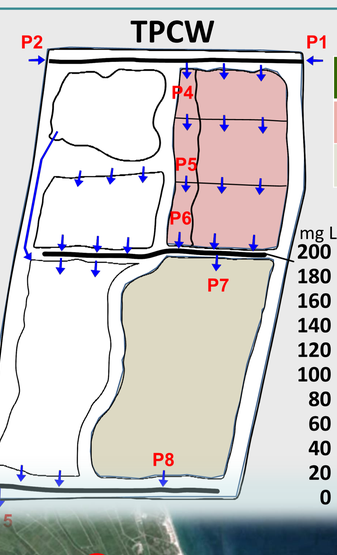
Materials & Methods in WQ

Flow measurements:
- Mini current meter.
- Sharp-crested weirs.
- Level probes.
- Flowmeters.

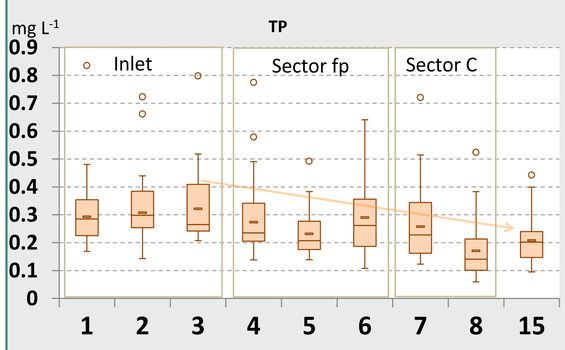
Physico-chemical measurements: DO, T, Conductivity, COD, TSS, TP, PO_4^{3-}, TN, NH_4^+, NO_2^-, NO_3^-, Turb, Alcalinity, Si.
Frequency: every 3 weeks, from January 2014-April 2015

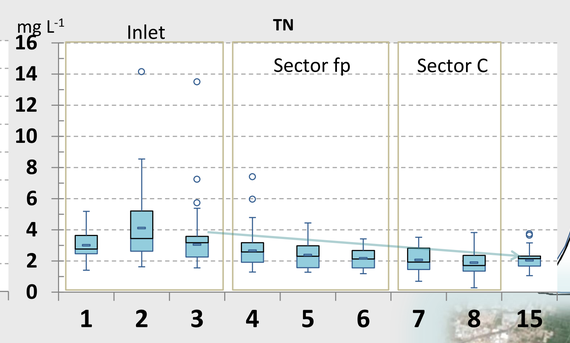
Results & discussion

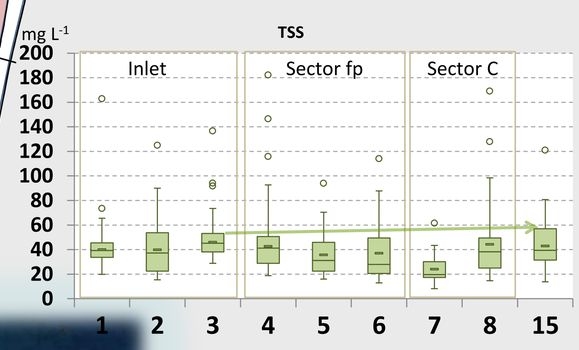
Results of water quality data are reported from January 2014 to April 2015.

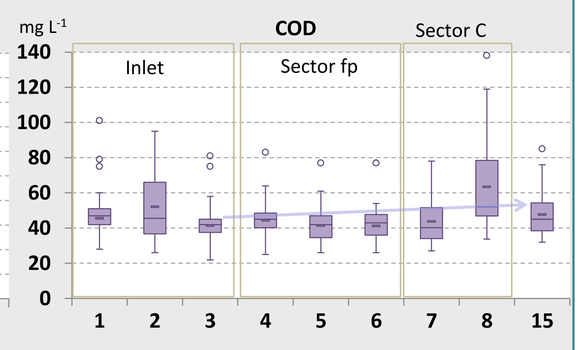


Sector	Type of CW	Surface (m²)	Hydraulic load ($m^3 \cdot m^{-2} \cdot d^{-1}$)	Depth (m)	HRT (d)
B	Surface flow	14632	0.080	0.16	2.3
C	Lagoon	80000	0.013	0.31	35.0









TP $load_{in}$ = 3.7 $mg \cdot m^{-2} \cdot d^{-1}$

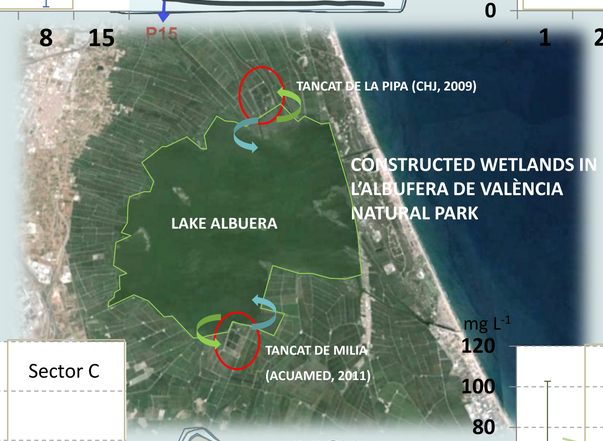
TN $load_{in}$ = 46.2 $mg \cdot m^{-2} \cdot d^{-1}$

TSS $load_{in}$ = 558 $mg \cdot m^{-2} \cdot d^{-1}$

COD $load_{in}$ = 468 $mg \cdot m^{-2} \cdot d^{-1}$

Concentrations of TP and TN are reduced to a greater extent in TMCW.

Concentrations of TSS and COD are significantly reduced in TMCW, but not in TPCW.

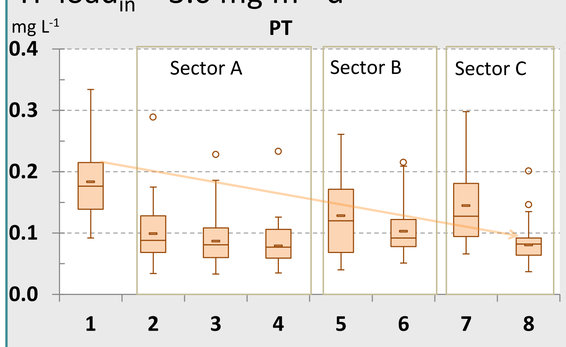


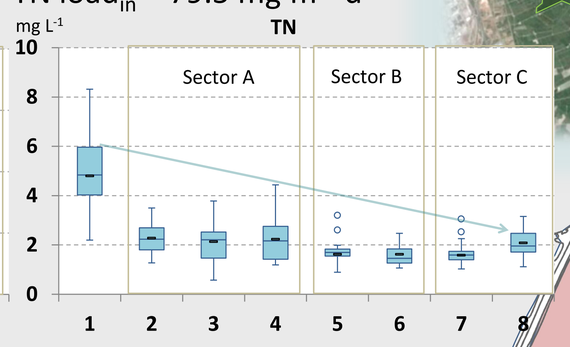
TP $load_{in}$ = 3.0 $mg \cdot m^{-2} \cdot d^{-1}$

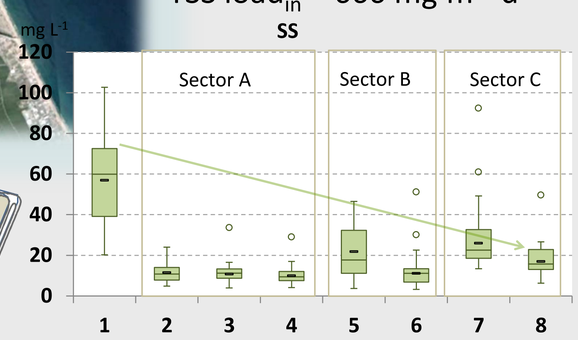
TN $load_{in}$ = 79.5 $mg \cdot m^{-2} \cdot d^{-1}$

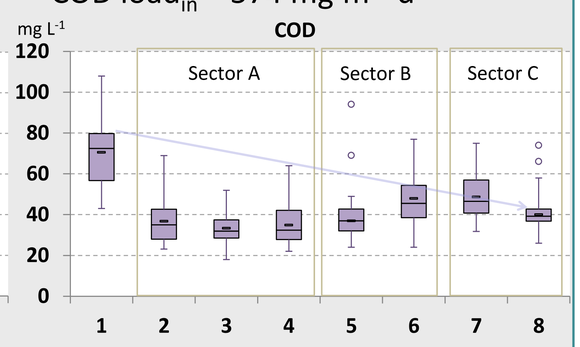
TSS $load_{in}$ = 666 $mg \cdot m^{-2} \cdot d^{-1}$

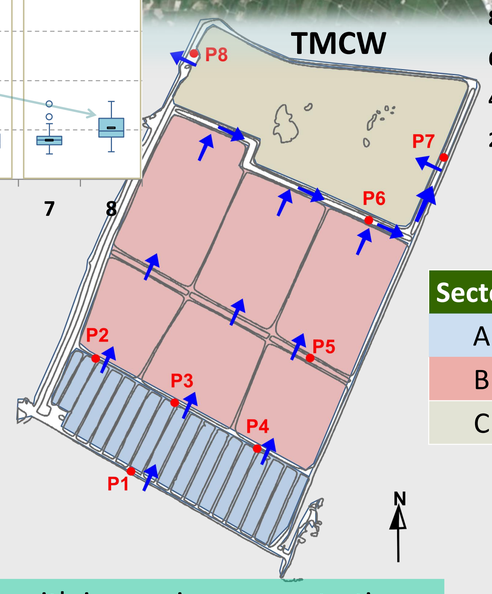
COD $load_{in}$ = 574 $mg \cdot m^{-2} \cdot d^{-1}$



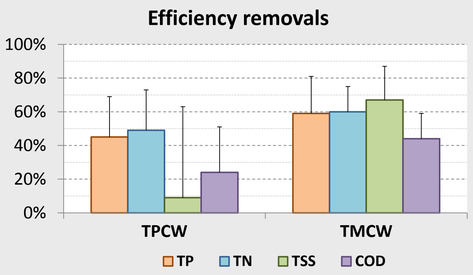








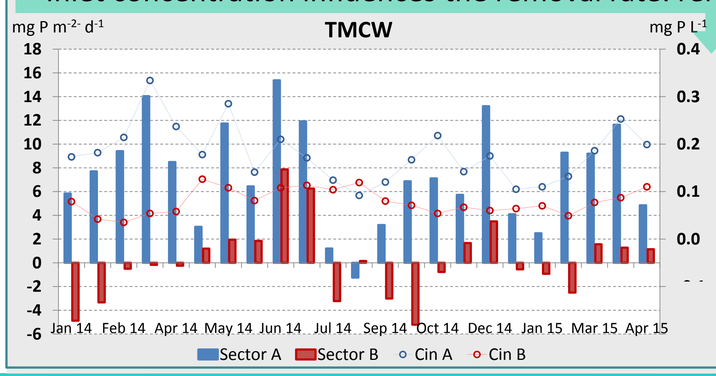
Sector	Type of CW	Surface (m²)	Hydraulic load ($m^3 \cdot m^{-2} \cdot d^{-1}$)	Depth (m)	HRT (d)
A	Subsurface flow	41270	0.072	0.41	2.8
B	Surface flow	48050	0.044	0.33	8.0
C	Lagoon	85580	0.032	0.33	11.0

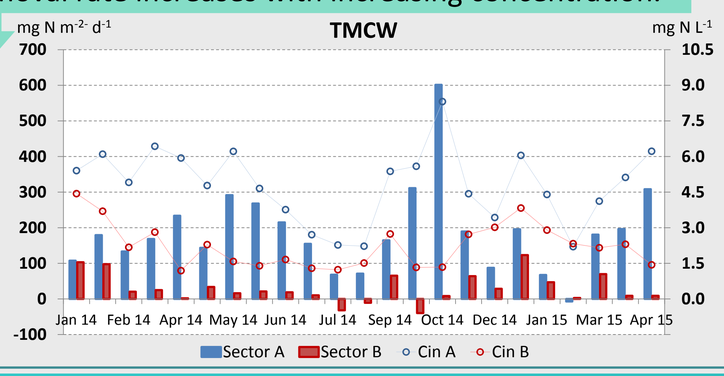


Higher removal efficiencies are achieved in TMCW.

The presence of a subsurface sector enhances the efficiency of global CW.

Inlet concentration influences the removal rate: removal rate increases with increasing concentration.





Summary - conclusions

- TMCW and TPCW are able to remove nutrients from eutrophic water.
- The different configuration and the presence of a subsurface flow CW make that higher removal efficiencies are achieved in TMCW.
- Focus on TP (limiting nutrient in Albufera Lake) a CW formed by a sector A, sector B and sector C presents the highest efficiencies in removing nutrients from a eutrophic water.

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