



# Integrated management of three constructed wetlands in compliance with Water Framework, Birds and Habitats Directives

## LIFE12 ENV/ES/000685 ALBUFERA

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GOBIERNO  
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MINISTERIO  
DE AGRICULTURA, ALIMENTACION  
Y MEDIO AMBIENTE

CONFEDERACIÓN  
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DEL JUCAR





## LIFE12 ALBUFERA: Basic data

- Proposal presented in september 2012.
- Environment Policy and Governance
- Total Budget: 1 446 234.00 €
- EU cofinance: 50%
- Starting date: 01/10/2013
- Ending date: 30/09/2016
- Sites: Constructed Wetlands in L'Albufera Natural Park

## Beneficiaries:



- Technical University in Valencia Region.
- Research Institutes: Instituto de Ingeniería del Agua y del Medioambiente (IIAMA, 2001).

- Non Profit Organizations

## Cofinancers:



- Public administration

- Public company

- Albufera lake was originally a coastal lagoon of 30000 ha that was isolated and subsequently, naturally (eroded soils) and artificially, filled.
- The natural fiilling processes were accelerated mainly in XIX-XX centuries to create rice fields.
- The closest rice fields to Albufera lake are below it water level: Tancats.
- Tancats surface: 5200 ha (37% total rice fields)





## Background. Previous studies.

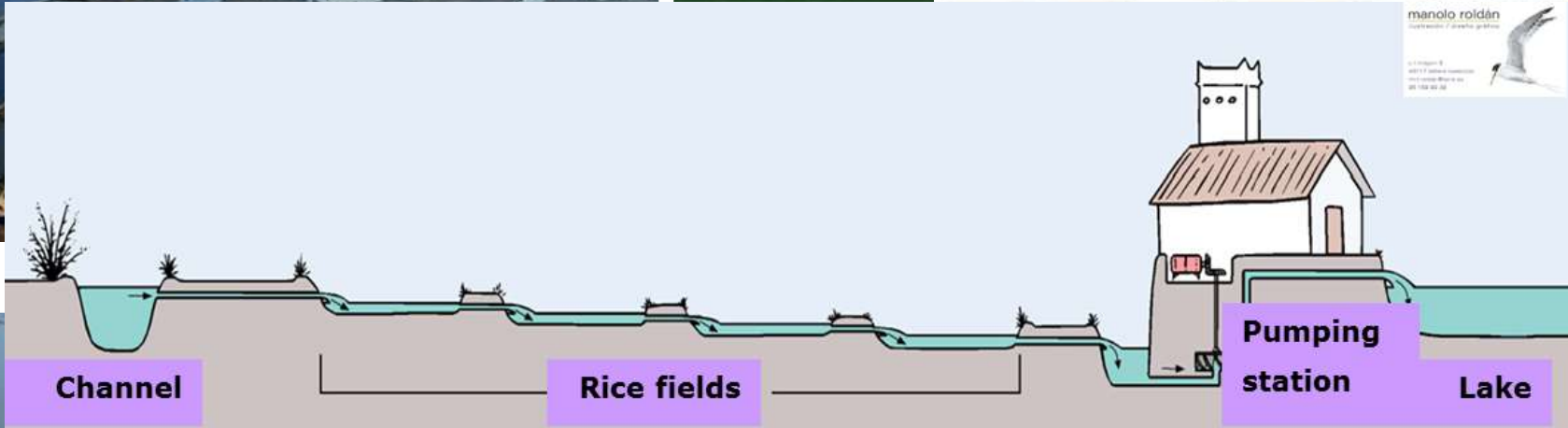
- Previous studies in *CW Tancat de la Pipa* 2009-12 (Martin et al., 2013; Rodrigo et al., 2013).
- Key points:
  1. Water quality is improved: nitrogen, phosphorus, total suspended solids are reduced.
  2. Phytoplankton and zooplankton enhances its biodiversity.
  3. Submerged vegetation in shallow lagoons could be recovered.
  4. Birds population is increased: the Tancat is a refuge.
- **But...how affect the water quality to wildlife development and how affect the wildlife over the water quality?**
- In other words – translation to Environmental Engineering: **How design and operate a CW to maximize simultaneously the water treatment efficiency and the habitats restoration.**

Fortunately, we had:

- Three CWs in L'Albufera (but without-little relationship among them).
- Two public authorities interested in that CWs work.
- Social and environmental organizations also interested.
- Research centers (universities) interested in increase the knowledge.



TANCAT DE LA PIPA (CHJ, 2009)

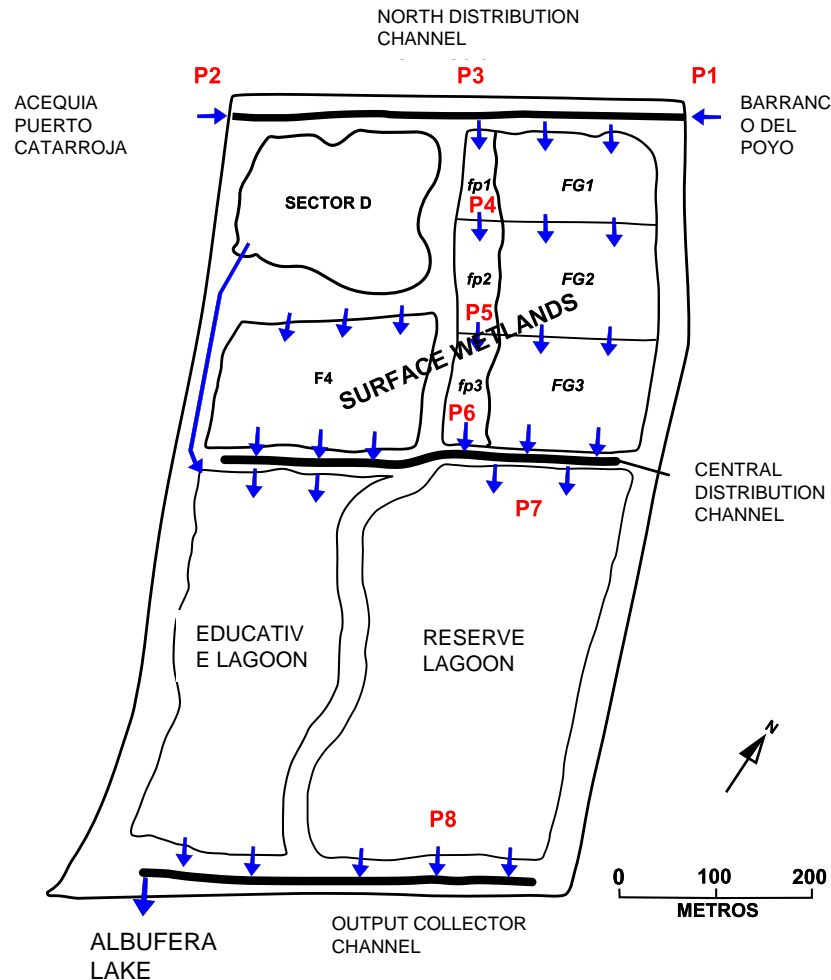


TANCAT DE L'ILLA (ACUAMED, 2011)

Tertiary Treatment from WWTP



## TANCAT DE LA PIPA



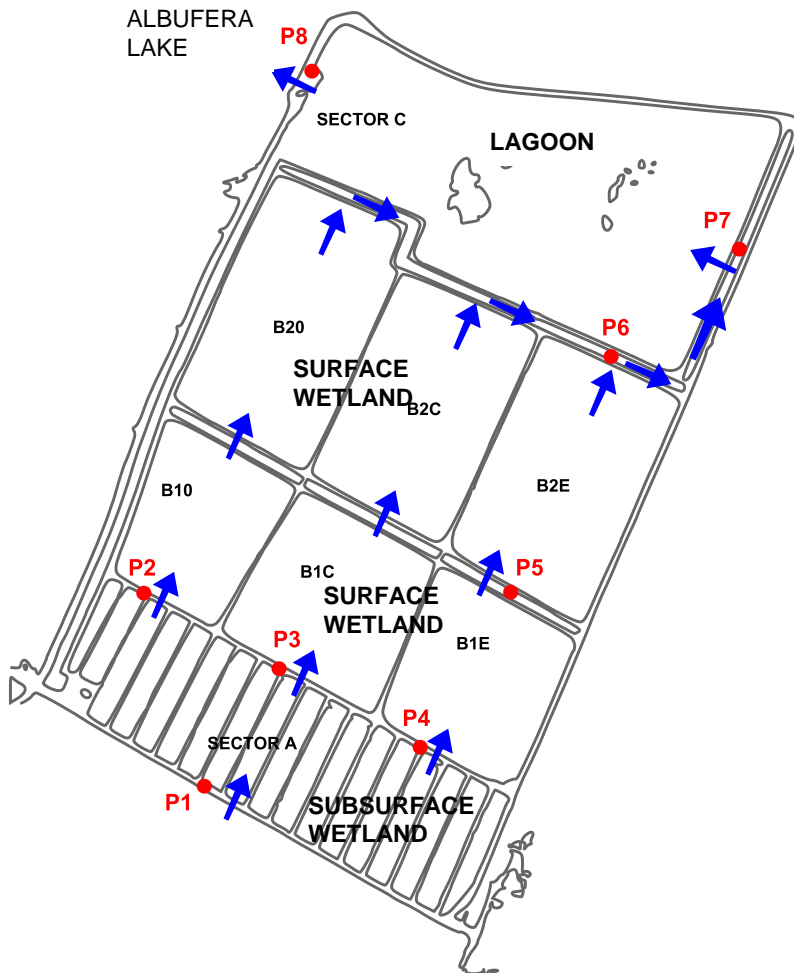
- 40 Ha surface.

- Continuous input flow by gravity from:

- l'Albufera lake. Eutrophic waters.

- Intermittent output flow by pumping.

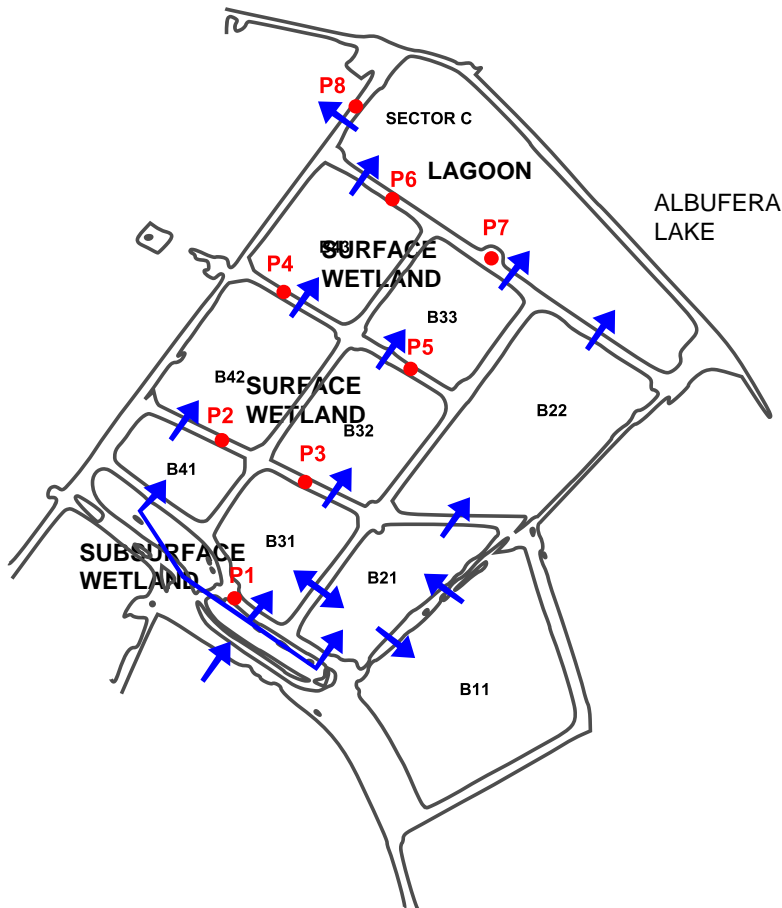
## TANCAT DE MILIA



- 33.4 Ha surface.
- Intermittent (daily basis) input flow by pumping from:
  - l'Albufera lake. Eutrophic waters.
  - Albufera-Sur WWTP. Tertiary treatment.
- Intermittent (daily basis) output flow by pumping.



## TANCAT ILLA



- 16 Ha surface.
- Intermittent (daily basis) inflow by pumping from:
  - l'Albufera lake. Eutrophic waters.
  - Sueca WWTP. Tertiary treatment.
- Intermittent (daily basis) output flow by gravity.



# LIFE12 ALBUFERA Project Objectives

- Establishing the most adequate management rules in constructed wetlands in order to jointly optimise water quality and habitat and biodiversity improvement.
- Establishing a methodology to determine good status indicators for bird conservation to apply in other RN 2000 wetlands.
- Providing recommendations addressed to the administrations to set a basis in the development of management plans for RN 2000 areas and hydrological management plans.

## A1 Action. Preparatory Action

- CWs Management strategy:
  - To establish the same Hydraulic Loading Rate for the three Tancats:  $0.06 \text{ m}^3/\text{m}^2\text{d}$ .
  - To establish different Hydraulic Retention Time (nominal):
    - Tancat de la Pipa: 3.3 days.
    - Tancat de Milia: 5.0 days.
    - Tancat de l'Illa: 6.7 days.
  - To establish the pumping frequency.
  - To establish the water quality sampling points.
  - The vegetation management (planting, harvesting, etc.)
  - The birdlife survey.
  - The ictioph fauna management.

- Improving water quality and biodiversity simultaneously.
  - Biodiversity includes: plankton, aquatic macroinvertebrates, amphibians, non-invasive fishes, birds.
- To define common indicators WQ-biodiversity related with hydraulic and vegetation management in CWs.
- Technical manuals: hydraulics, vegetation, water quality, wildlife...

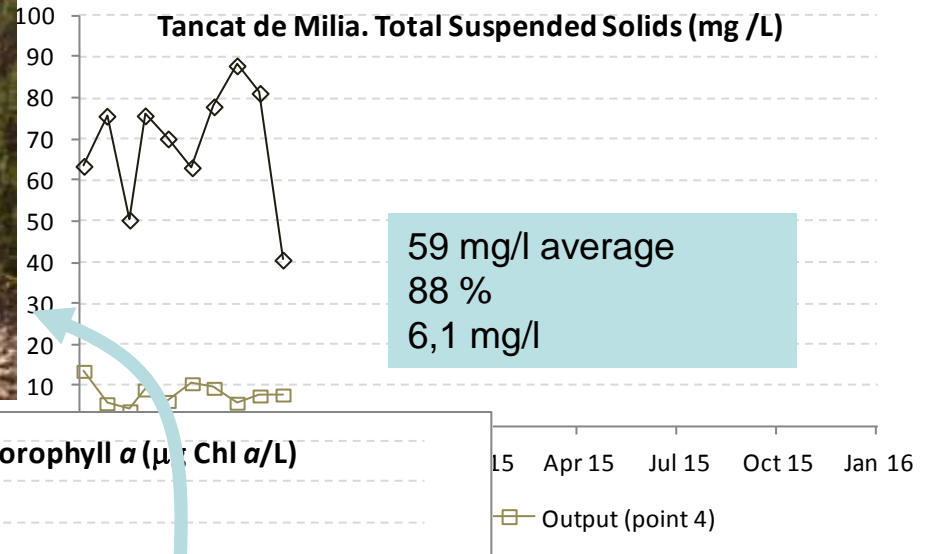
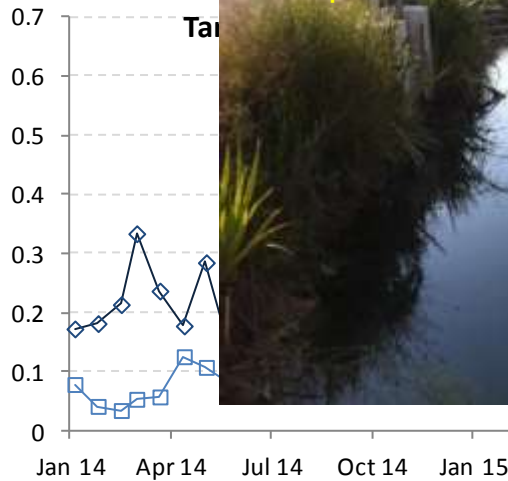
**How to achieve them?**

- V

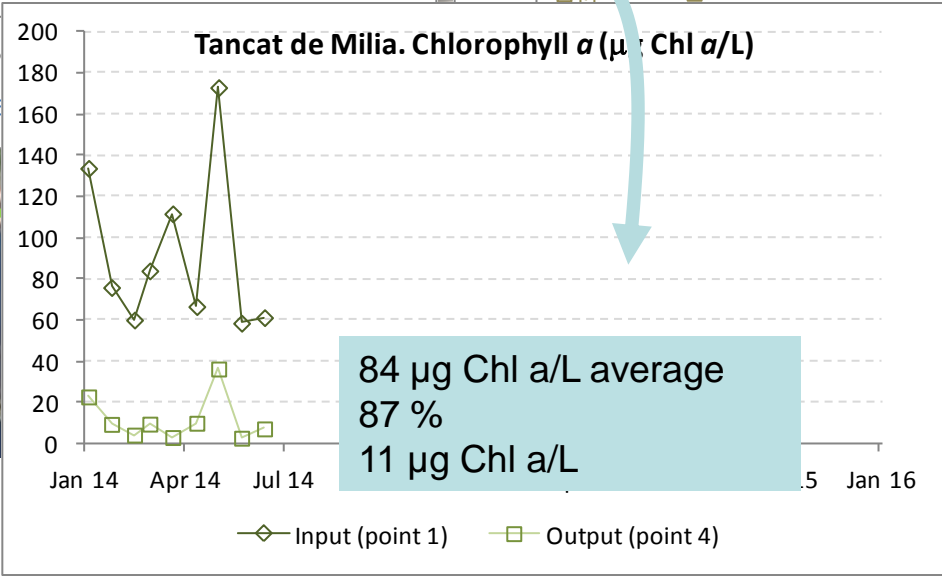
Output channel Sector A (points 2-3-4)



## em in CW Tancat de Milia



Total Inflow Jan-May 14:  
 370477 m<sup>3</sup>  
 74095 m<sup>3</sup>/month



HLR: 0.06 m<sup>3</sup>/m<sup>2</sup> d  
 HRT (nom): 4 days

# Enhancement Biodiversity





- We finished the first year of our LIFE project. It is early to make a deep analysis of EU LIFE program.
  - EU LIFE bring the opportunity to deep in technical aspects of wetlands but 50% cofinancing is low (in our case without the cofinancers the project would not have been possible)

## Technical problems:

- Three different control flows and hydraulic operation.
- Interactions revegetation and flows (need to dry one sector maintaining the flow in others).
- Estimation of water leakage from sectors (they are unlined).





**THANK YOU SO MUCH FOR YOUR ATENTION!!!**

**SEE YOU SOON IN CW's OF L'ALBUFERA DE VALENCIA**