



# SUBMERGED AQUATIC VEGETATION MANAGEMENT

Acció Ecologista-Agró  
Fundación Global Nature

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GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE AGRICULTURA, ALIMENTACIÓN  
Y MEDIO AMBIENTE

CONFERENCI  
HIDROGRÁFICA  
DEL JUCAR



Con el apoyo de:



GOBIERNO  
DE ESPAÑA



MINISTERIO  
DE AGRICULTURA, ALIMENTACIÓN  
Y MEDIO AMBIENTE



## B2. Vegetation management

### Submerged vegetation

#### BACKGROUND AND EXPECTED RESULTS



BOLETÍN DIGITAL Nº1 PRIMAVERA 2014



"Asprella", es el nombre que recibe en l'Albufera la vegetación acuática sumergida, prácticamente desaparecida en los años 70 de las aguas del humedal por la crisis de contaminación. Recuperar esta vegetación es paso imprescindible para la recuperación del humedal. Hemos querido darle este nombre al boletín como reconocimiento a su importancia ecológica y valor cultural. Trabajaremos por tener la "asprella" de vuelta en l'Albufera.

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#### Design strategy:

- Technical group meeting (December 2013):
- CIP El Palmar (GVA)
- Devesa-Albufera Service (Valencia City Council)
- PN Albufera
- University of Valencia

#### Conclusions:

- protection of predation
- treatment substrate
- selection of species

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Restoration of two small Mediterranean lagoons: The dynamics of submerged macrophytes and factors that affect the success of revegetation

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#### ABSTRACT

Two small, shallow lagoons newly created from former rice fields in the Mediterranean coast (Albufera de Valencia Natural Park, Spain) were restored by planting several species of submerged macrophytes (*Myriophyllum spicatum*, *Ceratophyllum demersum*, *Potamogeton* spp., *Zannichellia palustris* and *Ranunculus peltatus*) in 2008. Charophytes also appeared spontaneously. *M. spicatum* was the species that dominated both lagoons and almost completely covered their surface. *M. spicatum* reached a high biomass and displayed a unusual pattern: declining during the cold season and reappearing in the spring. No submerged



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2014-2015-2016

HATP= 4 Has  
Drying and Tilled land of ME  
Fish removal: 300 kg biomass

HATI=4 Has  
Drying and Tilled land of Sector C  
Fish removal: X + X

HATM=3Has  
Drying and Tilled land of S. B2C  
Fish removal : X



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2014-2015-2016

**MAY 2014**

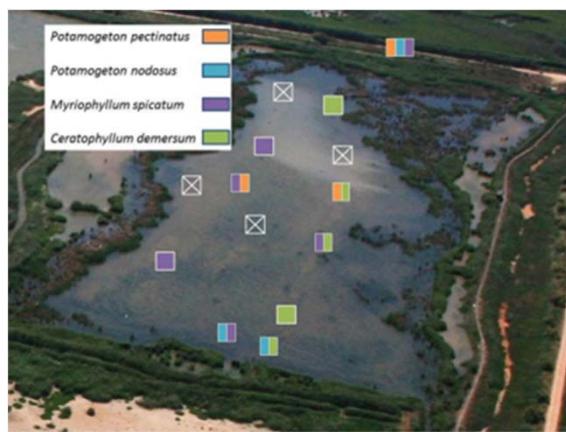
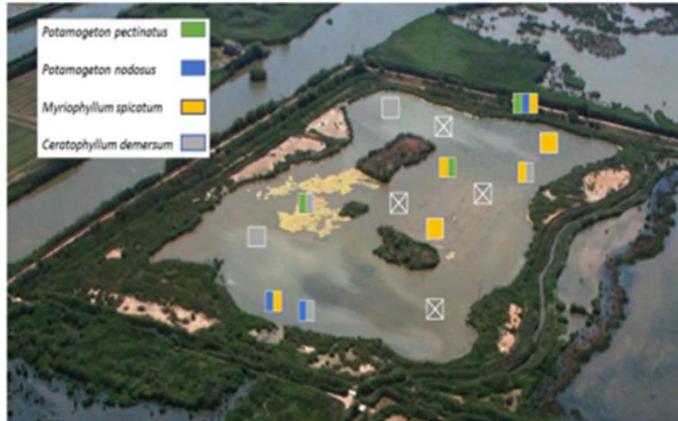
**65 cages placed in the 3 AW**  
Size 2x2 m



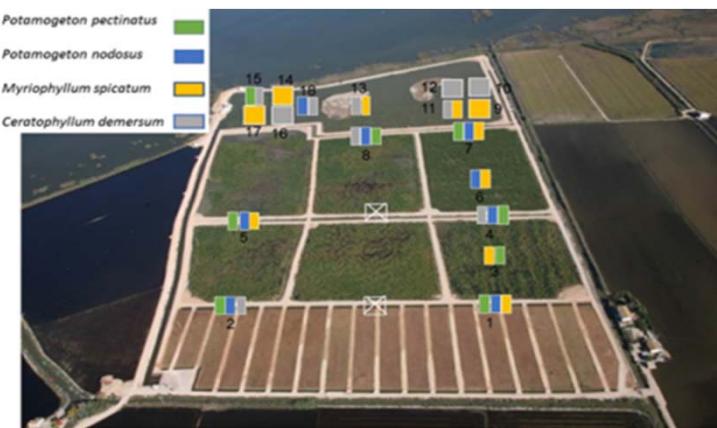
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HATP (28): 13 in both AW and 2 in output channels



HATM(20): 10 S.C, 4 HA, 6 in output channels



HATI(17):12 S.C , 5 HA



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4 species:

***Myriophyllum spicatum***

***Potamogeton nodosus***

***Potamogeton pectinatus***

***Ceratophyllum demersum***

- monoculture
- polyculture
- control



En el marc del projecte LIFE+Albufera, vos convidem a una **PLANTACIÓ DE VEGETACIÓ AQUÀTICA**, el dilluns **26 de Maig** a les **11:30.**  
**Tancat de la Pipa.**

PROGRAMA  
-Explicació del Projecte LIFE+Albufera i del Tancat de la Pipa  
-La importància ecològica de la vegetació aquàtica "asprella"  
-Voluntariat de plantació a les llacunes del Tancat



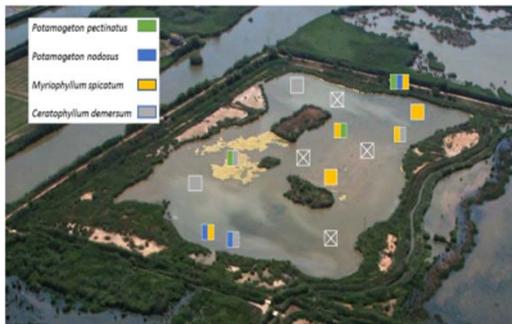
## B2. Vegetation management

### Submerged vegetation

2014-2015-2016

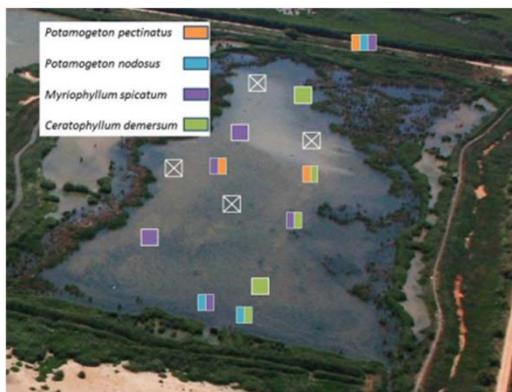
### MONITORING: May 2014-April 2015

MR HATP



número	Especie	MAYO	JUNIO	JULIO	AGOSTO	OCTUBRE	DICIEMBRE	FEBRERO	ABRIL
3 Cd	Cd	Cd	Cd	Cd				ROTA	ROTA
3 Cd	Cd	Cd	Cd	Cd				ROTA	ROTA
4 Cd	Cd	Cd	Cd	Cd	Cd	Cd	ROTA	ROTA	
4 Cd	Cd	Cd	Cd	Cd	Cd	Cd	ROTA	ROTA	
6 Cd	Cd	Cd	Cd	Cd					
9 Cd	Cd	Cd	Cd	Cd	Cd	Cd	ROTA	ROTA	
13 Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd	
1 Ms	Ms	Ms	Ms						
1 Ms	Ms	Ms							
5 Ms	Ms	Ms							
8 Ms	Ms	Ms	Ms	Ms			Ms	Ms	
8 Ms	Ms	Ms	Ms	Ms			Ms	Ms	
11 Ms	Ms	Ms	Ms	Ms			Cd		
13 Ms	Ms	Ms	Ms	Ms	Cd	Cd	Cd	Cd	
14 Ms	Ms								
9 Pp	Pp	Pp	Pp	Pp	Ms	Ms	Cd	ROTA	ROTA
11 Pp	Pp	Pp	Pp						
14 Pp	Pp								
5 Pn	Pn	Pn	Pn						
6 Pn	Pn	Pn	Pn						
14 Pn	Pn	Pn	Pn						
CONTROL									
2									
7									
10									
12									

ME HATP



número	Especie	MAYO14	JUNIO14	JULIO14	AGOSTO14	OCTUBRE14	DICIEMBRE15	FEBRERO15	ABRIL15
1 Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd		
1 Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd+ENEA	Cd+ENEA	
5 Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd	
7 Cd	Cd	Cd	Cd	Cd	Cd	Cd	ROTA	ROTA	
10 Cd	Cd	Cd	Cd	Cd	Cd	Cd	ROTA	ROTA	
10 Cd	Cd	Cd	Cd	Cd	Cd	Cd	ROTA	ROTA	
12 Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd	Cd	
4 Ms	Ms	Ms	Ms	Ms	Ms				
4 Ms	Ms	Ms	Ms	Ms					
6 Ms	Ms	Ms	Ms	Cd	Cd	Cd	ROTA	ROTA	
7 Ms	Ms	Ms	Ms	Cd	Cd	Cd	Cd	Cd	
11 Ms	Ms	Ms	Ms	Ms+Cd	Cd	Cd	Cd	Cd	
11 Ms	Ms	Ms	Ms	Ms+Ce	Cd	Cd	Cd	Cd	
13 Ms	Ms	Ms	Ms	Ms	Ms+ENEA	Ms+ENEA	Ms+ENEA	Ms+ENEA	
14 Ms	Ms								
5 Pp	Pp	Pp	Pp	Pp	Cd	Cd	Cd+ENEA	Cd+ENEA	Cd+ENEA
6 Pp	Pp	Pp	Pp	Pp	Cd	Cd	Cd	ROTA	ROTA
14 Pp	Pp	Pp	Pp	Pp	Cd	Cd	Cd	Cd	Cd
12 Pn	Pn	Pn	Pn	Pn	Cd	Cd	Cd	Cd	Cd
13 Pn	Pn	Pn	Pn	Pn	Pn		Ms+ENEA	Ms+ENEA	
14 Pn	Pn	Pn	Pn	Pn	Pn		Ms+ENEA	Ms+ENEA	
CONTROL									
2					ENEA	ENEA	ENEA	ENEA	ENEA
3			C+ENEA		ENEA	ENEA	ENEA	ENEA	ENEA
8					ENEA	ENEA	ENEA	ENEA	ENEA
9					ENEA	ENEA	ENEA	ENEA	ENEA

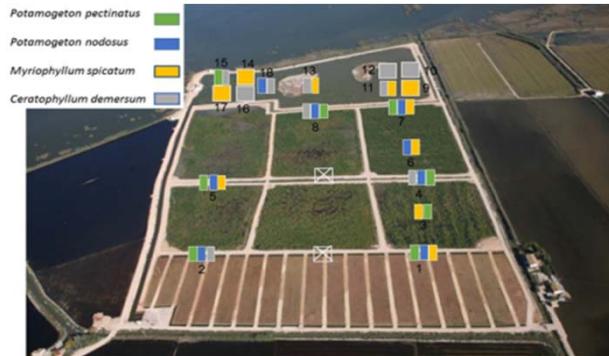
## B2. Vegetation management

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#### MONITORING:

##### HATM



##### HATI



Cercado	Especie	JULIO14	JULIO14	AGOSTO14	SEPTIEMBRE14	OCTUBRE14
1	Pp+Pm+Ms	15	15			
2	Pp+Pn+Cd	10	10			
3	Pp+Ms	15				
4	Pp+Pn+Cd	15				
5	Pp+Pn+Ms	10				
6	Pn+Ms	30	30	30	30	0
7	Pp+Pn+Ms	15	15	10	10	10
8	Cd	15	0			
9	Ms	0				
10	Cd	0				
11	Ms+Cd	0				
12	Cd	0				
13	Ms+Cd	0				
14	Ms	0				
15	Pp+Cd	-				
16	Cd	-				
17	Ms	-				
18	Pn+Cd	0				

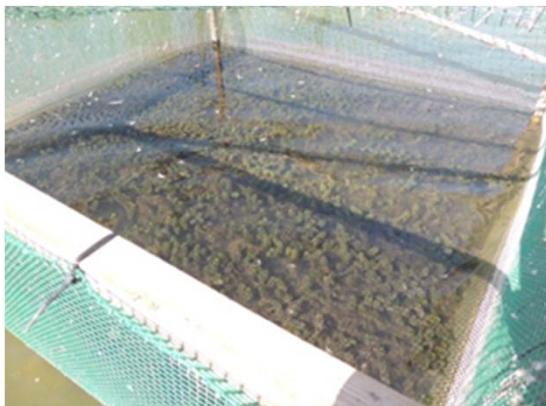
Cercado	Especie	JULIO14	AGOSTO14	SEPTIEMBRE14	OCTUBRE14	NOVIEMBRE14	DICIEMBRE14	ENERO15	FEBRERO15	MARZO15	ABRIL15
1	Pp+Pn+Ms	25	0								
2	Pp+Pn+Cd	25	25	25	20						
3	Pp+Pn+Ms	50	30	0							
4	Ms	0	0								
5	Ms+Cd	0	0								
6	Pn	0	0								
7	Ms+Pp	0	0								
8	Cd	0	0								
9	Cd+Pn	40	30	0							
10	Cd	40	40	0							
11	Cd+Pp	0	0	0							
12	Ms+Pn	50	30	30	30	20	35	35	50	30	

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2014-2015-2016

#### MONITORING



ME *Ceratophyllum demersum* 100% cobertura



ME *Chara vulgaris* (Control)  
Agosto'14



ME *Myriophyllum spicatum*  
Abril'15



MR *Potamogeton pectinatus* Junio'14



ME *Typha domingensis* (Control)  
Agosto-Octubre 2014



MR *Cyprinus carpio*  
Agosto`14



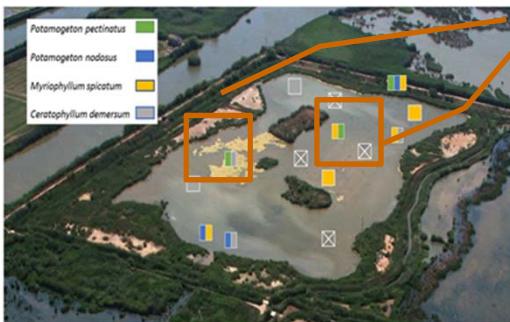
MR Algas filamentosas  
Abril`15

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2014-**2015**-2016

#### JUNE HATP EXPANDING CAGES (*Ceratophyllum demersum*)



Detection spontaneous natural growth MR

*Potamogeton pectinatus*

*Zannichelia peltata*

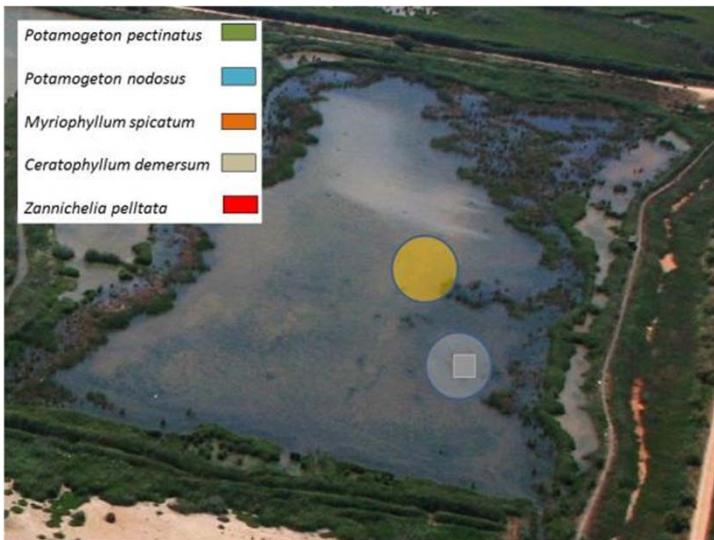
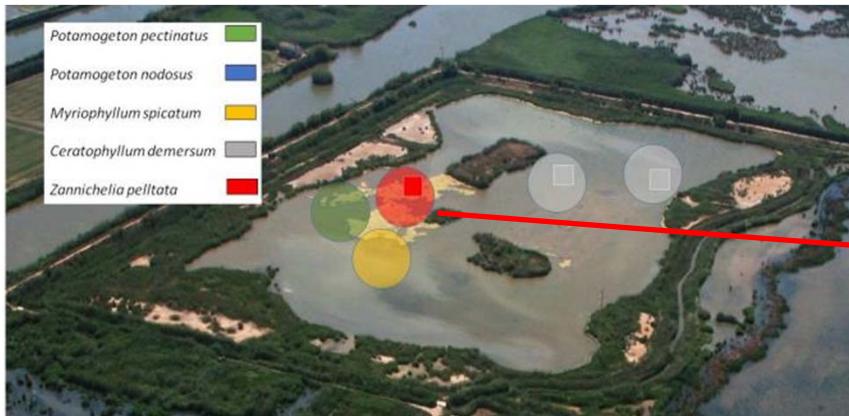
TRANSLOCATION CAGE 2X2-EXPANDING CAGES

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2014-**2015**-2016

#### MONITORING HATP



Laguna	Cercado	Especie	Cobertura							
			Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre	Enero
MR	13B	CD	Colocación	30%	20%	50%	70%	70%	65%	100%
MR	11B	CD		Colocación	70%	85%	60%	60%	70%	80%
MR	2B	ZP		Colocación	40%	60%	60%	60%	-	-
MR	14B	MS			Colocación	5%	7%	7%	-	-
MR	4B	PP				Colocación	40%	40%	10%	-
ME	7B	CD		Colocación	60%	70%	Rota	Rota		
ME	10B	MS			Colocación	10% (carófitos)	Rota	Rota		

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2014-**2015**-2016

#### MONITORING HATI

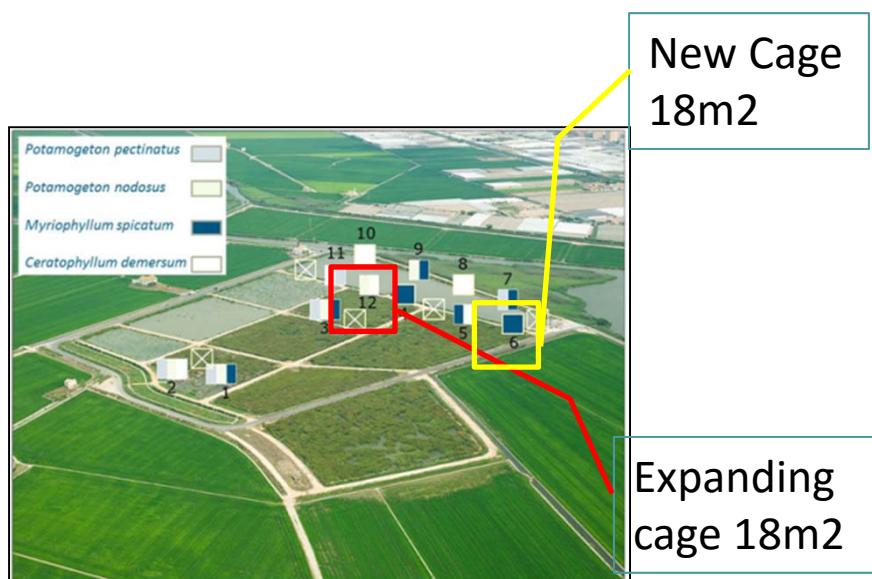
MARCH

Down level and removal of fish

Detection and monitoring spontaneous  
natural growth in Sector C

JUNE

Enlarge cage (*Myriophyllum spicatum*)



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2014-2015-**2016**

HATI  
Expanding cage



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2014-2015-**2016**

**HATP**  
**Expanding cage**



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#### CONCLUSIONS

- More time is need to obtain more accurate conclusions
- Water quality is not the only factor that affects the developement of a submerged vegetation praire at the Artificial Wetlands in LIFE+Albufera, it is very important the fish and birds predation pressure.
- During the LIFE+Albufera project the main species for each artificial wetland has been selected, and high survival rate has been achived in cages, increasing the surface, promoting colonisation and seed bank enrichment.
- In HATI a spontaneus praire of *Myriophyllum spicatum* has been installed. This is the place were fish have been removed twice.
- Due to the lack of this habitat at Albufera's wetland, pressure is high, and intense management has to be done (fish removal and substrate treatment), preserving the protection cages as dispersal sites.

THANKS A LOT FOR YOUR ATENTION!!!

