



LIFE Potamo Fauna

(LIFE 12 NAT/ES/001091)

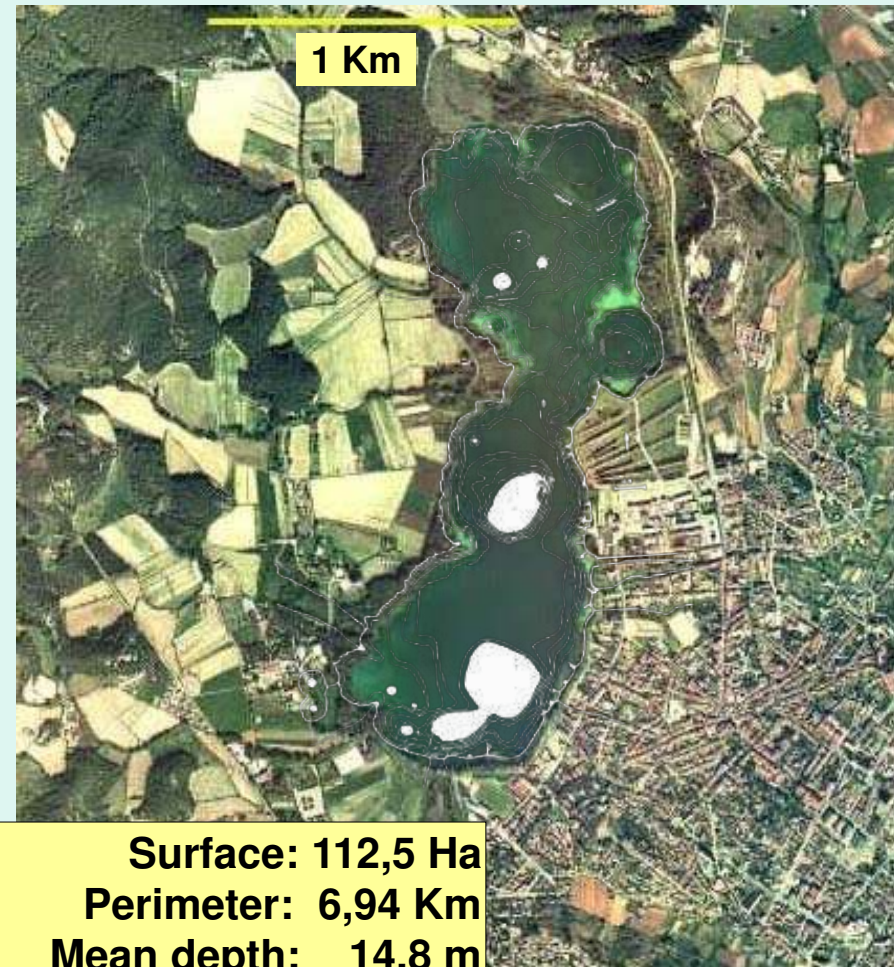
- The fight against aquatic invasive species -

Quim Pou i Rovira



LAKE BANYOLES

Situation and description



Surface: 112,5 Ha
Perimeter: 6,94 Km
Mean depth: 14,8 m
Maximum depth: 46,4 m

LAKE BANYOLES

Hidrology and limnology

- Karstic system of Banyoles - Sant Miquel de Campmajor
- Subterranean water surgency, with relatively high renovation (0,8 years).
- Water has a high dissolved salts content, mainly sulphates and carbonates: high conductivity (0.8-1.9 mS/cm).
- The lake is considered oligo-mesotrophic (chl a: 1-15 mg l⁻¹).
- There is a complex stratification of the water column: the most superficial layer (mixolimnion) tends to separate in two during the summer (epilimnion and hipolimnion).
- Due to the bathymetric profile of the lake and the high stability of the water level, vegetal communities are configured in clearly defined concentric belts.

PROTECTION OF THE NATURAL SITE



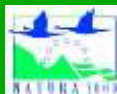
Natura 2000 Webwork



RAMSAR list



11 habitats of Community interest





15 species included in Habitats Directive
28 species included in Birds Directive
Many other species threatened and/or protected at national level

"Projecte Estany" a LIFE+ Nature project

The second of three LIFE projects in this site !

Duration: 2010-1013

Budget: 1.020.352 €

Coordination: Consorci de l'Estany

www.estanyespainatural.net

Projecte Estany

Main objective:

To design and implement a large scale intervention to combat, slow down and revert the decline in species and habitats of Community interest in the Natura 2000 Network space "Lake Banyoles", through the control of invasive exotic species and the population strengthening of seriously threatened native species.



Projecte Estany

Main strategies of action:

1. **Control of invasive acuatic fauna**
2. Population strengthening of 3 species of Community interest: *Unio elongatulus*, *Emys orbicularis*, and *Barbus meridionalis*.



3. Control of invasive flora in banks of the lake and some streams around.
4. Strategic restoration of highly modified bank habitats.



LIFE Potamo Fauna

Conservation of fluvial fauna fluvial of community interest in rivers Ter, Fluvià and Muga

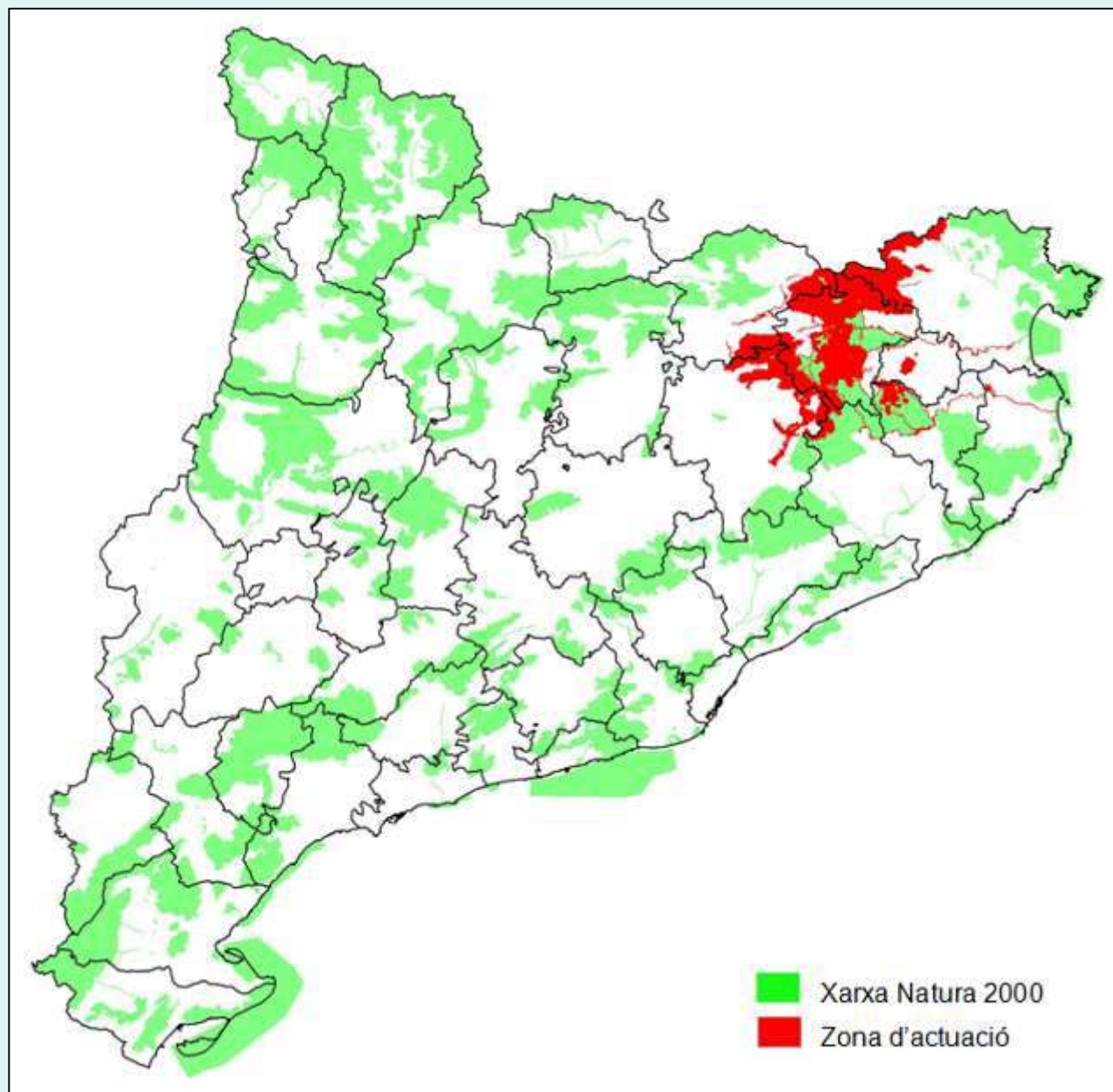
The third of three LIFE projects in this site !

Duration: 2014-1017

Budget: 1.800.524 €

Coordination: Consorci de l'Estany

Area of action



Target species

Espècie	Directiva Hàbitats		
	Annex II	Annex IV	Annex V
<i>Unio elongatulus</i>			X
<i>Vertigo moulinsiana</i>	X		
<i>Vertigo angustior</i>	X		
<i>Austropotamobius pallipes</i>	X		X
<i>Barbus meridionalis</i>	X		X
<i>Emys orbicularis</i>	X	X	
<i>Mauremys leprosa</i>	X	X	
<i>Triturus marmoratus</i>		X	
<i>Alytes obstetricans</i>		X	
<i>Pelobates cultripes</i>		X	
<i>Bufo calamita</i>		X	
<i>Hyla meridionalis</i>		X	

Target species



Unio mancus
Unio ravoisieri
(*Unio elongatulus*)



Austropotamobius pallipes



Emys orbicularis

ESTRATEGY: Strengthening populations through release of individuals coming from *ex situ* reproduction

Target species



Vertigo moulinsiana



Vertigo angustior



Barbus meridionalis

ESTRATEGY: Strengthening populations through release of individuals coming from other healthy populations

Target species



Mauremys leprosa



Alytes obstetricans



Hyla arborea



Pelobates cultripes



Bufo calamita



Triturus marmoratus

ESTRATEGY: indirect, through strategic habitat recovery

Fight against alien species (IAS)



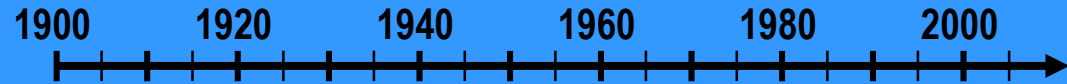
Why the “Projecte Estany” ?

“Festa del Peix” 1910



CHANGES ON THE FISH COMMUNITY OF THE LAKE

Native species:



Eel

Anguilla anguilla



Tench (Native?)

Tinca tinca



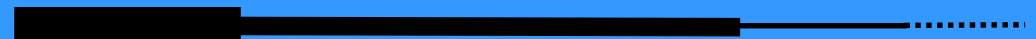
Medit. Barbel

Barbus meridionalis



Catalan Chub

Squalius laietanus



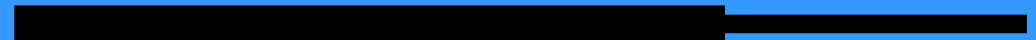
Three. Stickleback

Gasterosteus aculeatus



Freshw. Blenny

Salaria fluviatilis



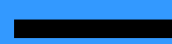
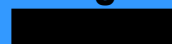
Relative abundance:

High

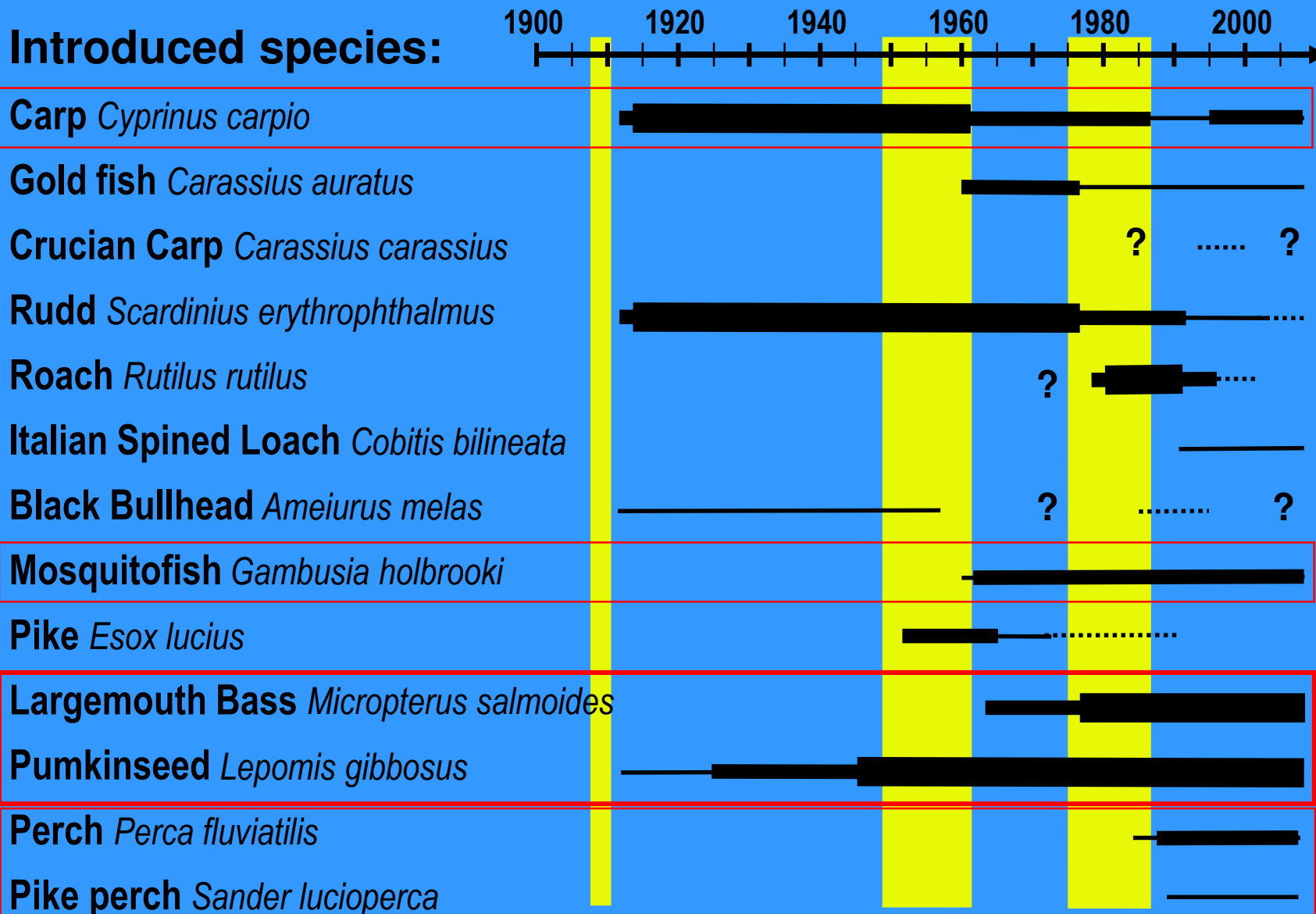
Medium

Low

Ocasional



CHANGES ON THE FISH COMMUNITY OF THE LAKE



Fonts: Moreno-Amich et al. 1992; Garcia-Berthou 1994; Zamora y Pou-Rovira 2003; Pou-Rovira 2004; Zamora y Feo 2007

OTHER INVASIVE ALIEN SPECIES IN LAKE BANYOLES



Procambarus clarkii



Neovison vison



Discoglossus pictus



Trachemys scripta

Present status of the unionoids

- Presence of 4 native species !!

Unio mancus



5 cm

Potomida littoralis



Anodonta anatina



Anodonta woodiana



Unio ravoisieri

**Invasive alien species
present in the
hidrological basin, but
not yet in the lake ...**

**So,
nowadays, introduction and proliferation of IAS is
the main threat for native species of Lake
Banyoles, and also for some of their habitats ...**



Projecte Estany

Previous analysis of alternatives

~~Erradication ?~~

THEORETIC OPTIONS:

- Complet drying of the lake
- Use of biocides (e.g. rotenone)

X

X

- Intensive and sustained demographic control of main IAS



Main challenges:

- 1) To achieve a significant reduction of stocks of IAS, sufficient to some extent for the recovery of native endangered species.
- 2) To obtain feasible methods for long term keeping of this reduction.

Projecte Estany

Control of exotic fish



Projecte Estany

Control of exotic fish

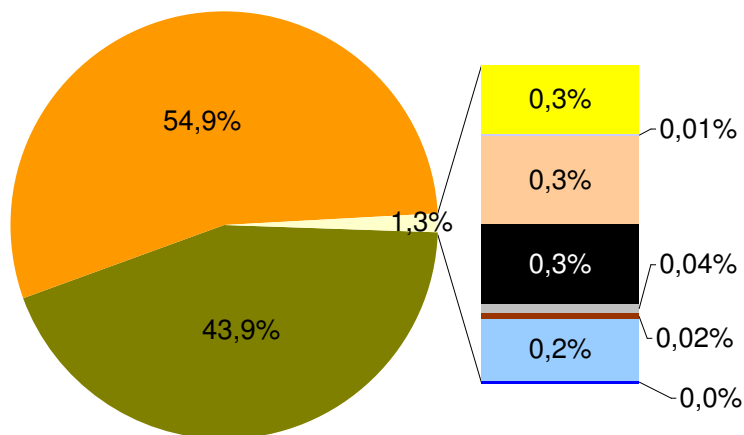


Projecte Estany

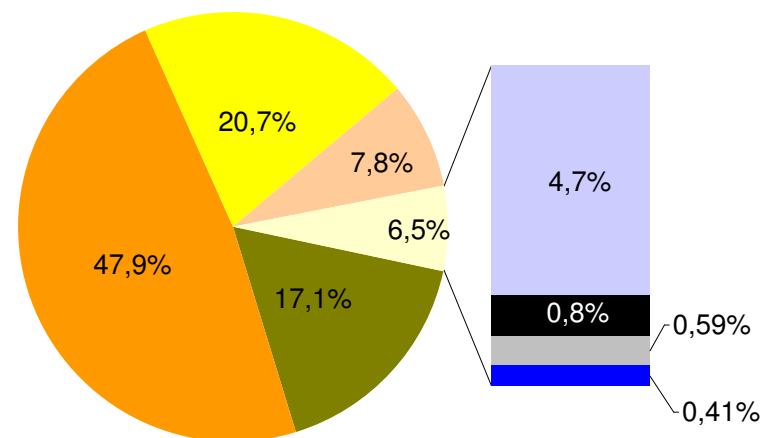
Control of exotic fish: selected results

Captures:	IND.
ELECTROFISHING	112 300
OTHER TECHNIQUES	5 072
TOTAL	117 372

ELECTROFISHING



OTHER TECHNIQUES



Micropterus salmoides

Lepomis gibbosus

Perca fluviatilis

Sander lucioperca

Cyprinus carpio

Anguilla anguilla

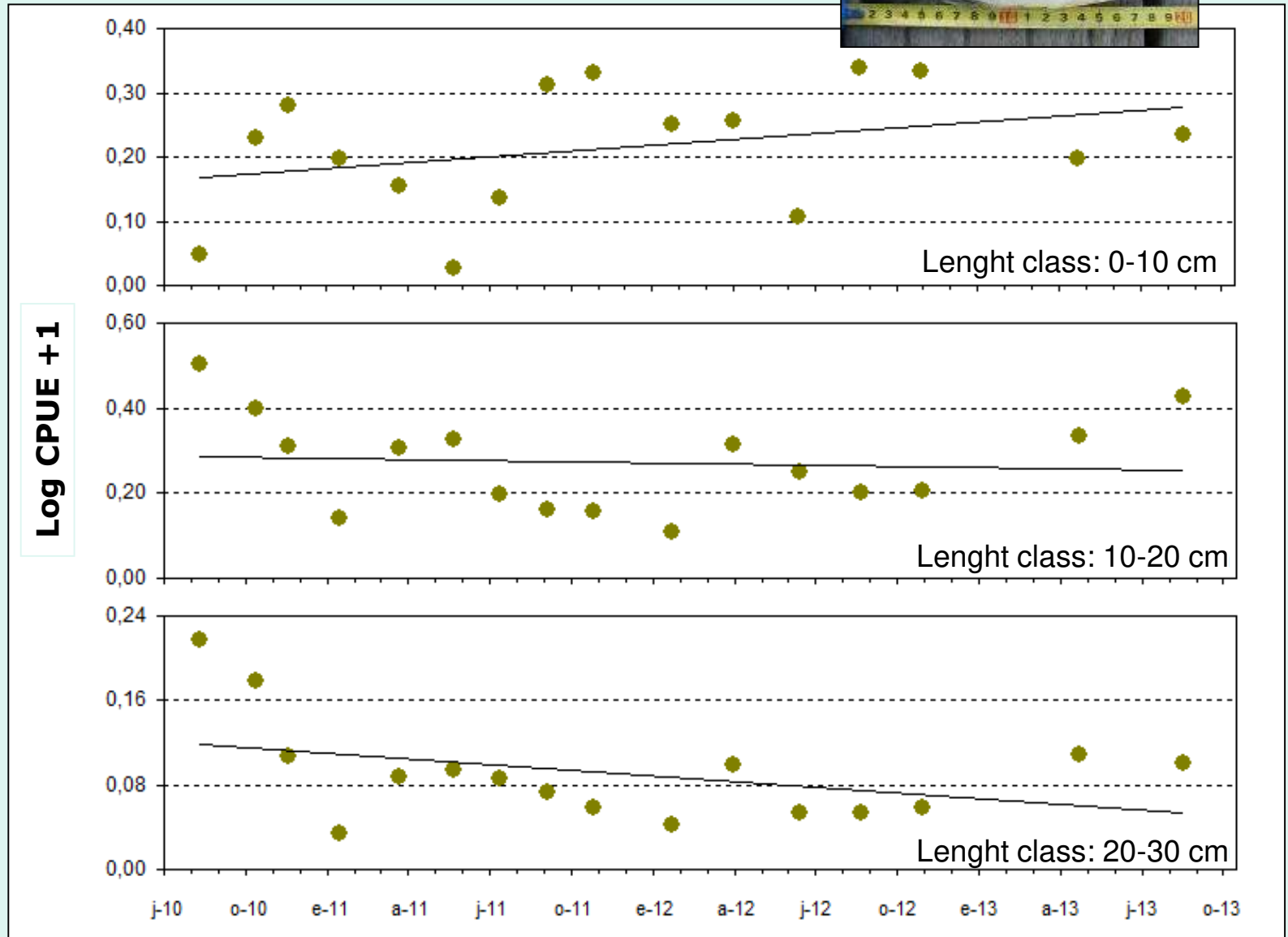
Squalius laietanus

Barbus meridionalis

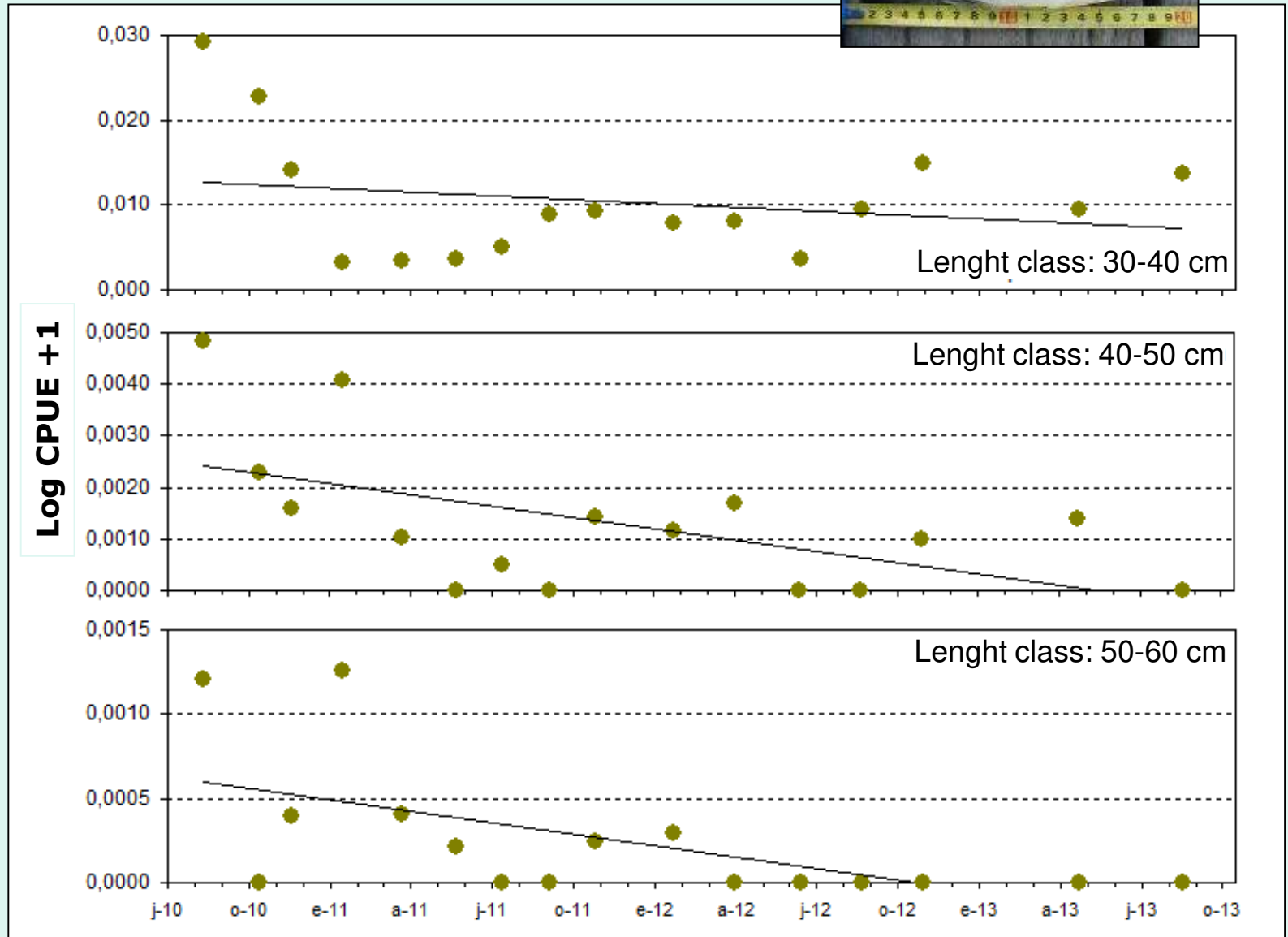
Salapia fluviatilis

Other fish

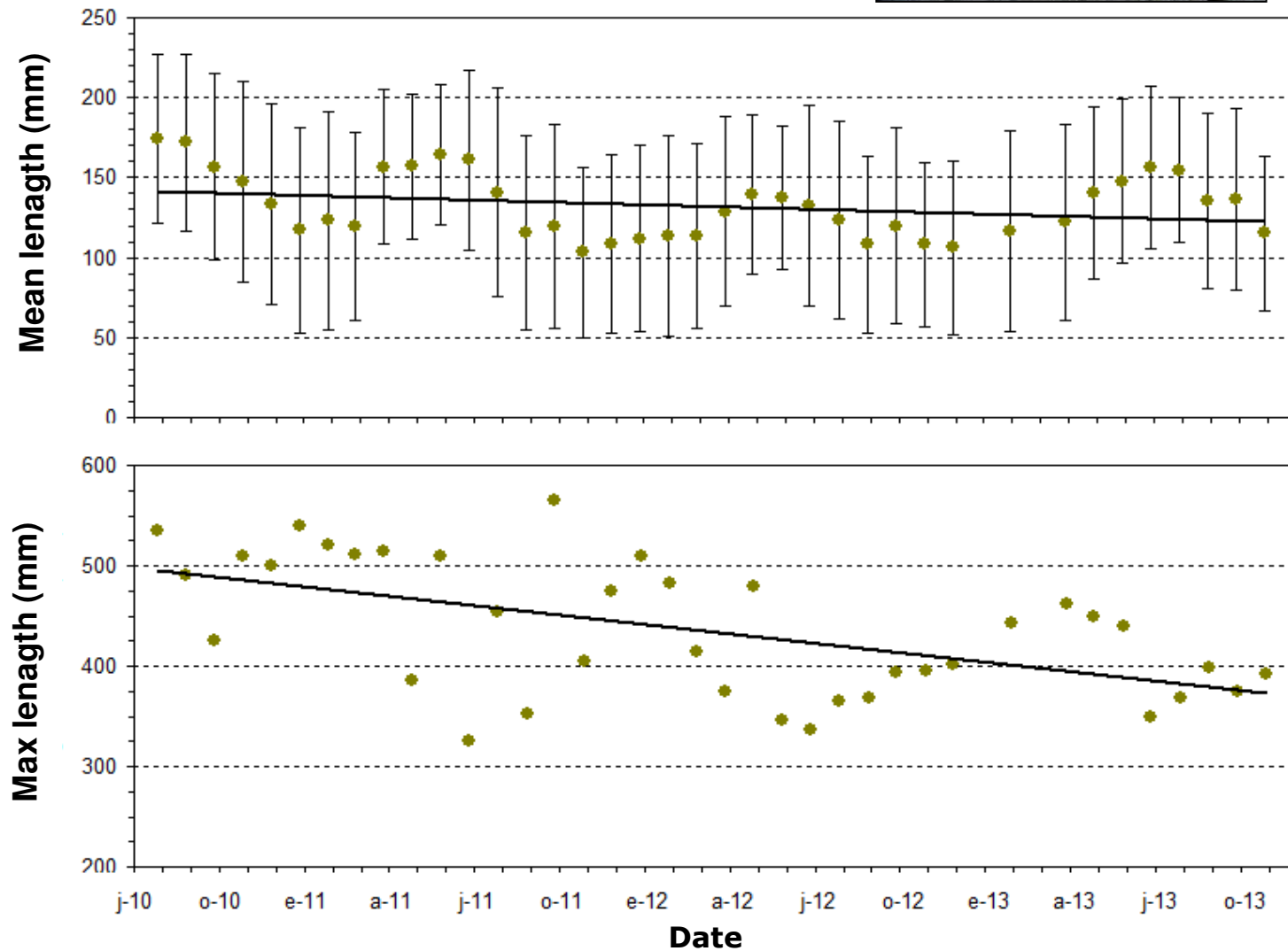
Largemouthbass: Captures – Electrofishing

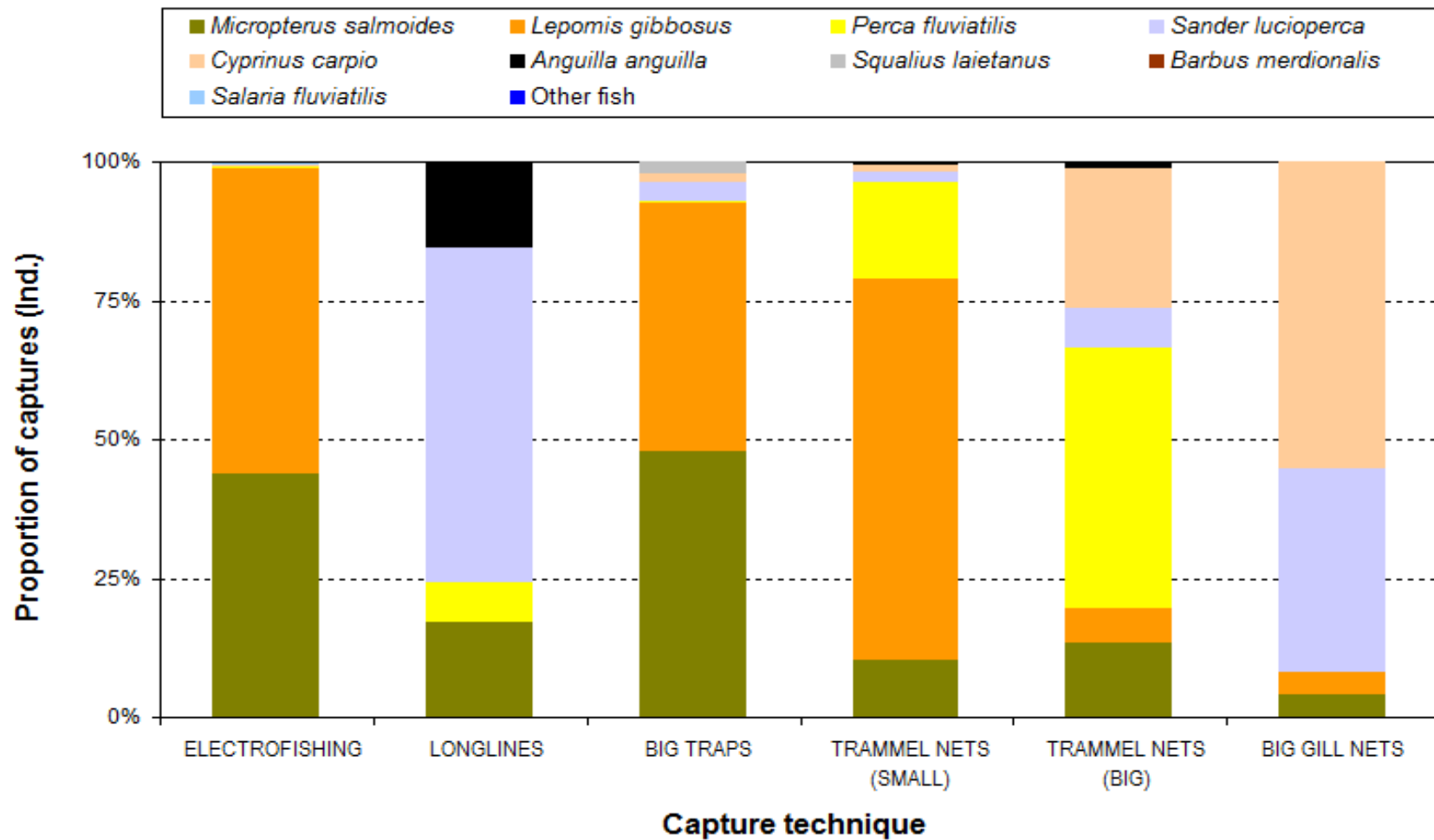


Largemouthbass: Captures – Electrofishing

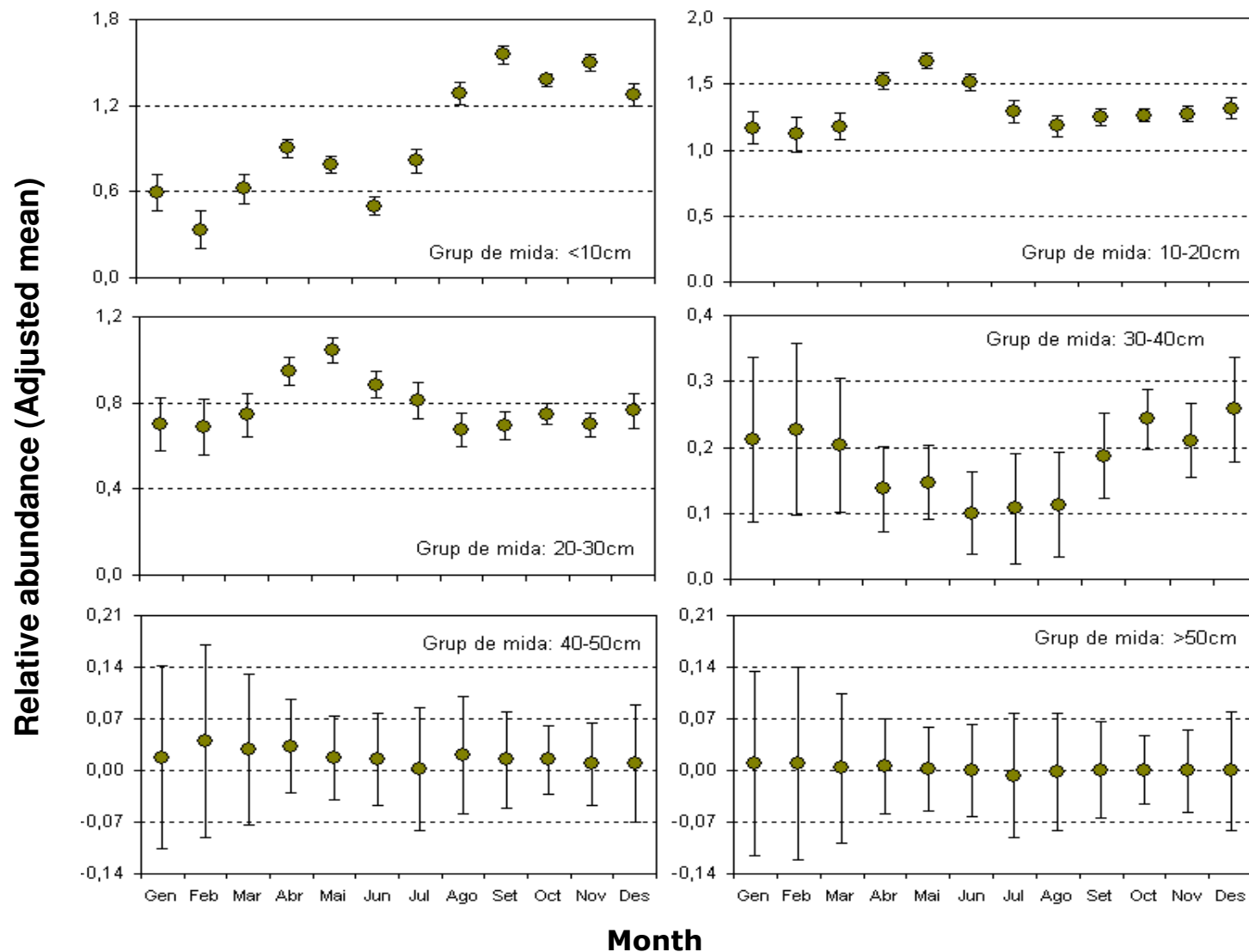


Largemouthbass: Captures – Electrofishing

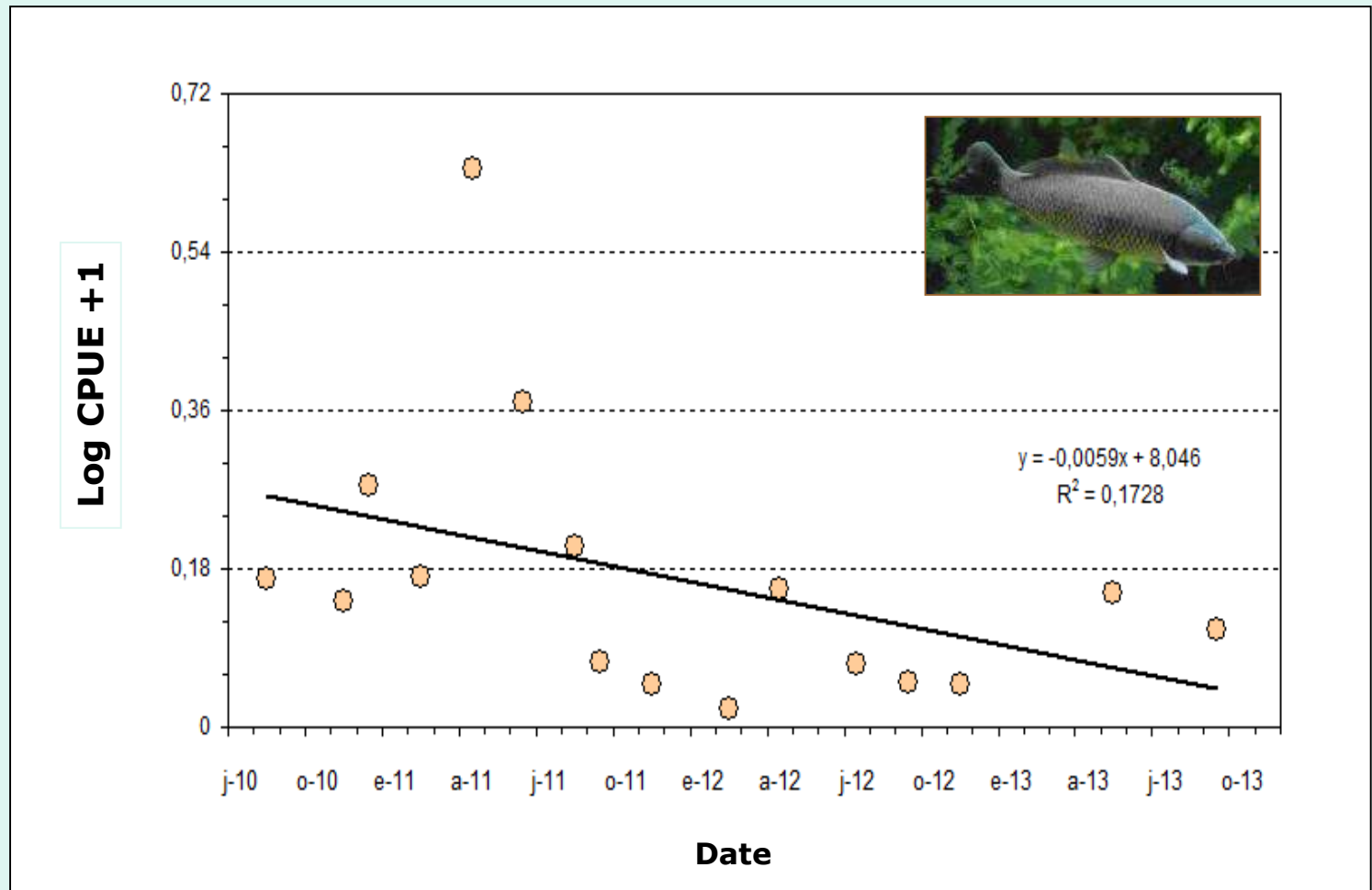




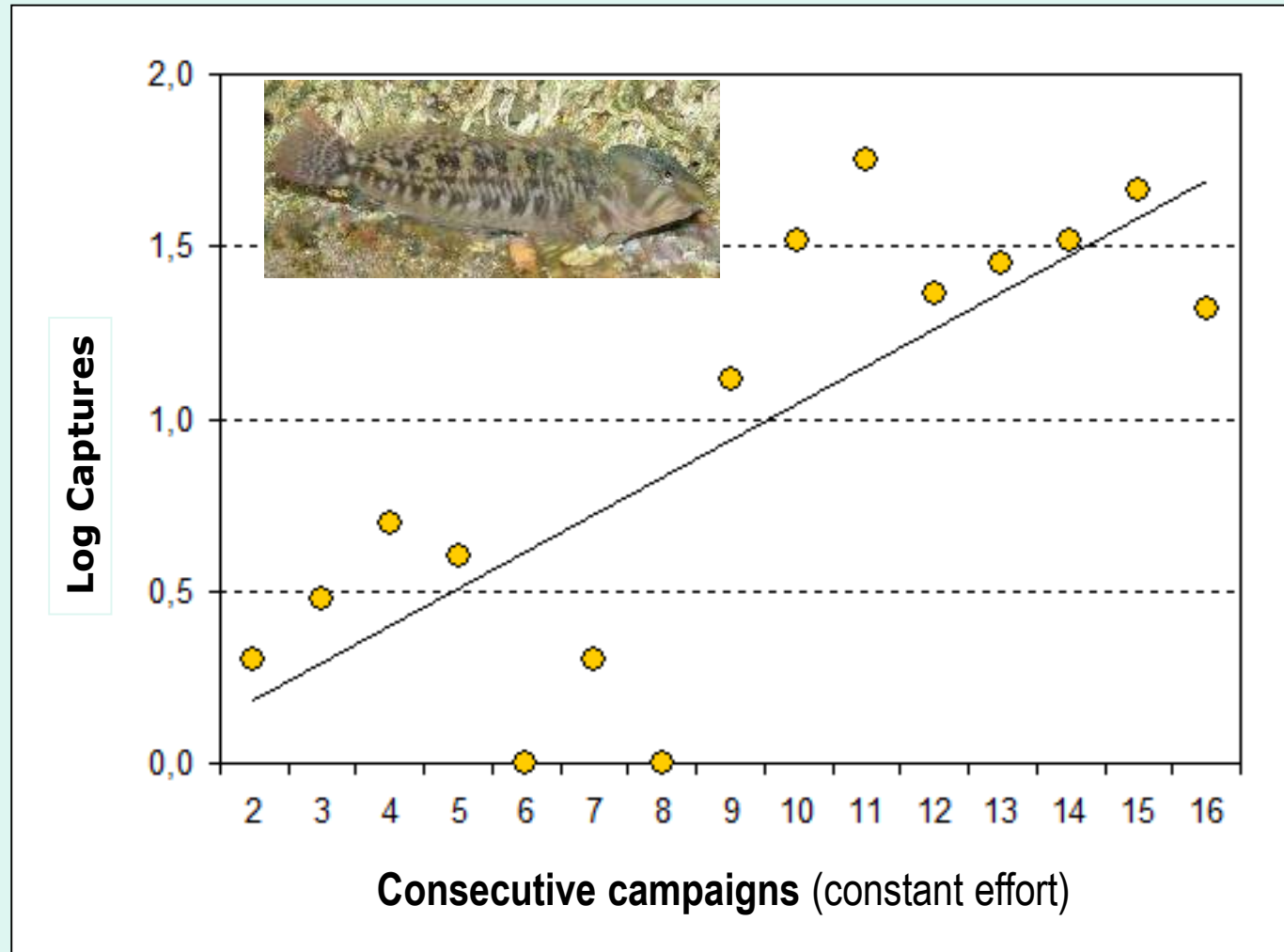
Largemouthbass: Efficiency – Electrofishing MLG



Carp: Captures – Electrofishing

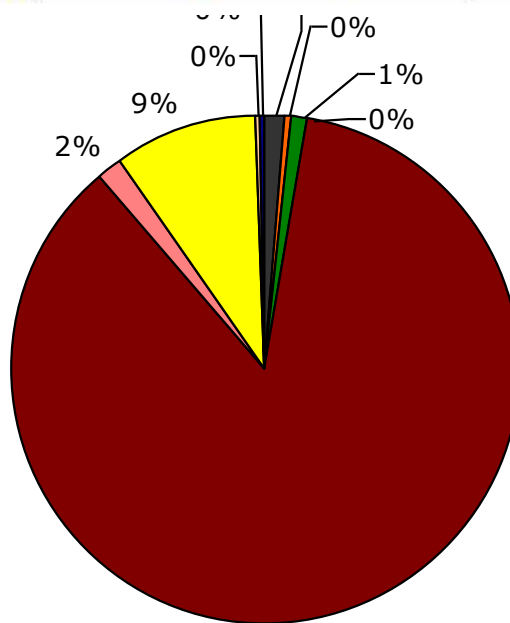


Freshwater Blenny: Captures – Electrofishing

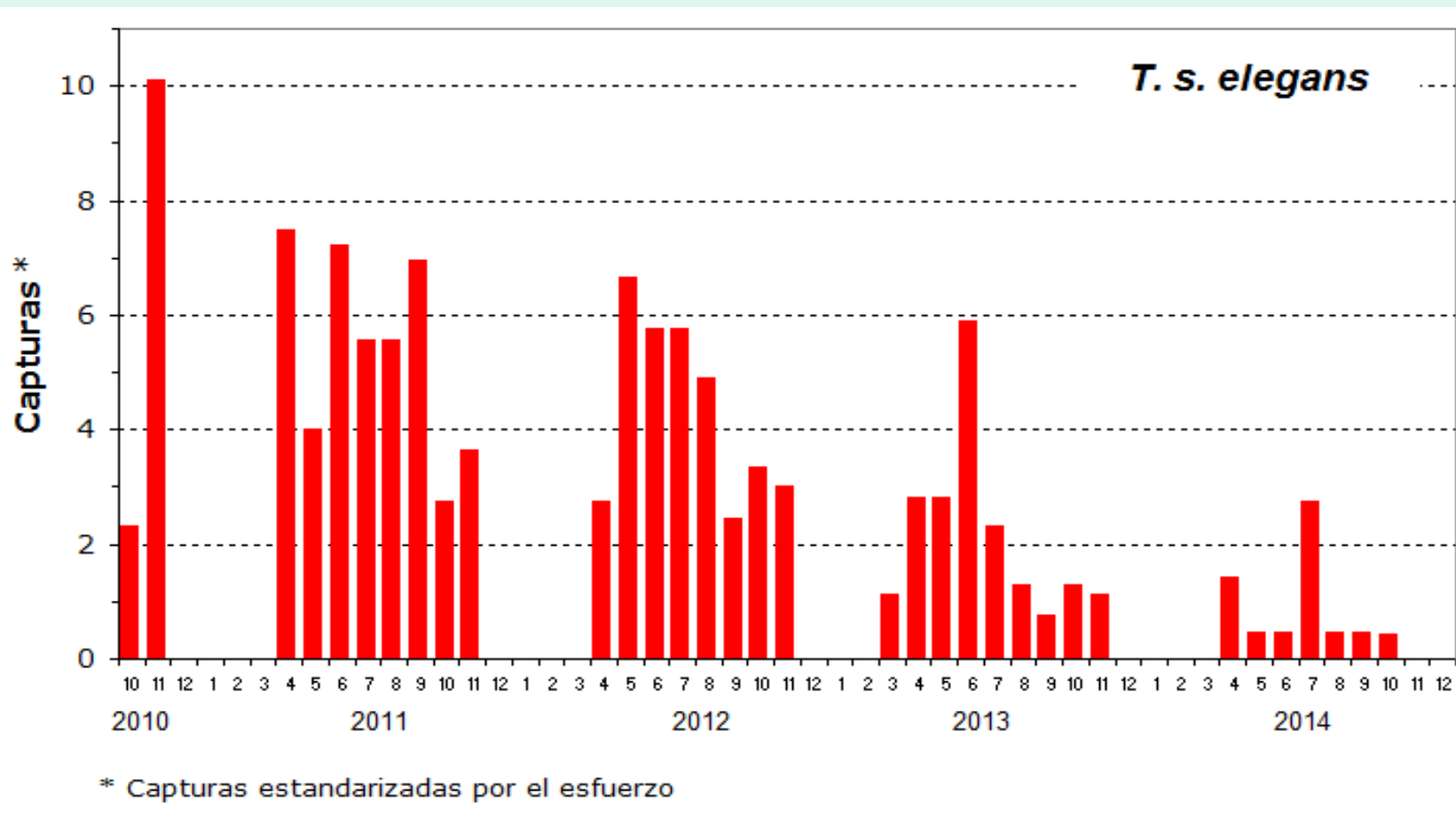




Especie / tàxon	2010	2011	2012	2013	Total
<i>Trachemys scripta ssp. elegans</i>	30	204	185	82	501
<i>Trachemys scripta ssp. hibrida</i>		4	4	1	9
<i>Trachemys scripta ssp. scripta</i>	21	9	14	10	54
<i>Trachemys scripta ssp.</i>		1	1		2
<i>Trachemys emolli</i>			1		1
<i>Graptemys pseudogeographica</i>	2	4	2		8
<i>Chrysemys picta</i>		1			1
<i>Pseudemys concinna</i>	1		5	1	7
<i>Pseudemys nelsoni</i>			1		1
Total	54	223	213	94	584



- *Graptemys pseudogeographica*
- *Chrysemys picta*
- *Pseudemys concinna*
- *Pseudemys nelsoni*
- *Trachemys scripta ssp. elegans*
- *Trachemys scripta ssp. hibrida*
- *Trachemys scripta ssp. scripta*
- *Trachemys emolli*
- *Trachemys scripta ssp.*



Some final considerations

- **IAS in Mediterranean freshwater systems: a huge and increasing threat, being often the main factor explaining biodiversity lost**
- **PREVENTION should be the first and main strategy, but prevention is not only public awareness**
- **Early warning, is arriving late so often...**
- **Better to invest only in some selected strategic programs of IAS control or eradication**
- **Anyway, in some key habitats or sites control efforts should be maintained even without initial satisfactory results**
- **Unsuccessful experiences, at all levels, are also welcome!**
- **More founding is needed for applied research to face IAS management**



Grazie!