

THE LABORATORY BREEDING NAIADS

In 2010 a laboratory for naiad recovery was developed by the Consorci de l'Estany (LIFE Project Estany - LIFE08 NAT/E/000078). In this facility we successfully reproduced three species (*Unio mancus*, *Unio ravoisieri* and *Potomida littoralis*) to repopulate Lake Banyoles, part of the Natura Web 2000 from the European Union. In 2014 we have initiated the project LIFE Fauna Potamo (LIFE12 NAT/ES/0001091) whose main aim is the recovery and long-term preservation of several endangered species of river fauna of European interest (Habitats Directive).



Unio mancus Lamarck, 1819

Unio ravoisieri Deshayes, 1847

The construction of the laboratory began between 2010 and 2013 as well as the breeding techniques (getting young and fattening of seeds). Efforts were focused on work mainly *Unio mancus* and *Unio ravoisieri*. Also only worked with the populations of Lake Banyoles.

In this new period 2014-2017 we are working with six different stocks of two species *U. mancus* (4 populations) and *U. ravoisieri* (2 populations). We are also innovating in production techniques and fattening youth, especially during the first year of life.

LIFE Projects



LIFE Project Estany [LIFE08 NAT/E/000078]

<http://www.consorcidelespany.org>

Project title: Improving the habitats and species of Banyoles Natura 2000: a demonstrative project

Duration: 2010/01/01 to 2013/12/31

TOTAL budget: 1,020,352.00 € (Co-financed 50% European Union)

TOTAL budget for naiads: 99,000.00 €

Description:

It is a project aimed at large-scale intervention to combat, slow and reverse the decline in species and habitats of community interest in the Natura 2000 Network site by controlling invasive species and strengthening populations of native species such as *Emys orbicularis*, *Mauremys leprosa*, *Barbus meridionalis* and *Unio elongatulus*.

The specific aims is based implementation of a set of actions designed to combat efficiently and sustainably the spread of invasive alien species in the following animal and plant groups: fish, reptiles and plants. Also the direct recovery of the populations of four species of community interest: *Emys orbicularis*, *Barbus meridionalis* and *Unio elongatulus* (*U. mancus* + *U. ravoisieri*), through captive breeding and/or restocking with stock from other nearby healthy populations is planned.

Location area:

1 natural sites of Natura 2000 network: Estany de Banyoles.

LIFE Potamo Fauna [LIFE12 NAT/ES/001091]

<http://www.lifepotamofauna.org>

Project title: Conservation of river fauna of community interest in Natura 2000 network of the basins of rivers Ter, Fluvià and Muga

Duration: 2014/01/01 to 2017/12/31

TOTAL budget: 1,900,262.00 € (Co-financed 50% European Union)

TOTAL Budget for naiads: 180,164.00 €

Description:

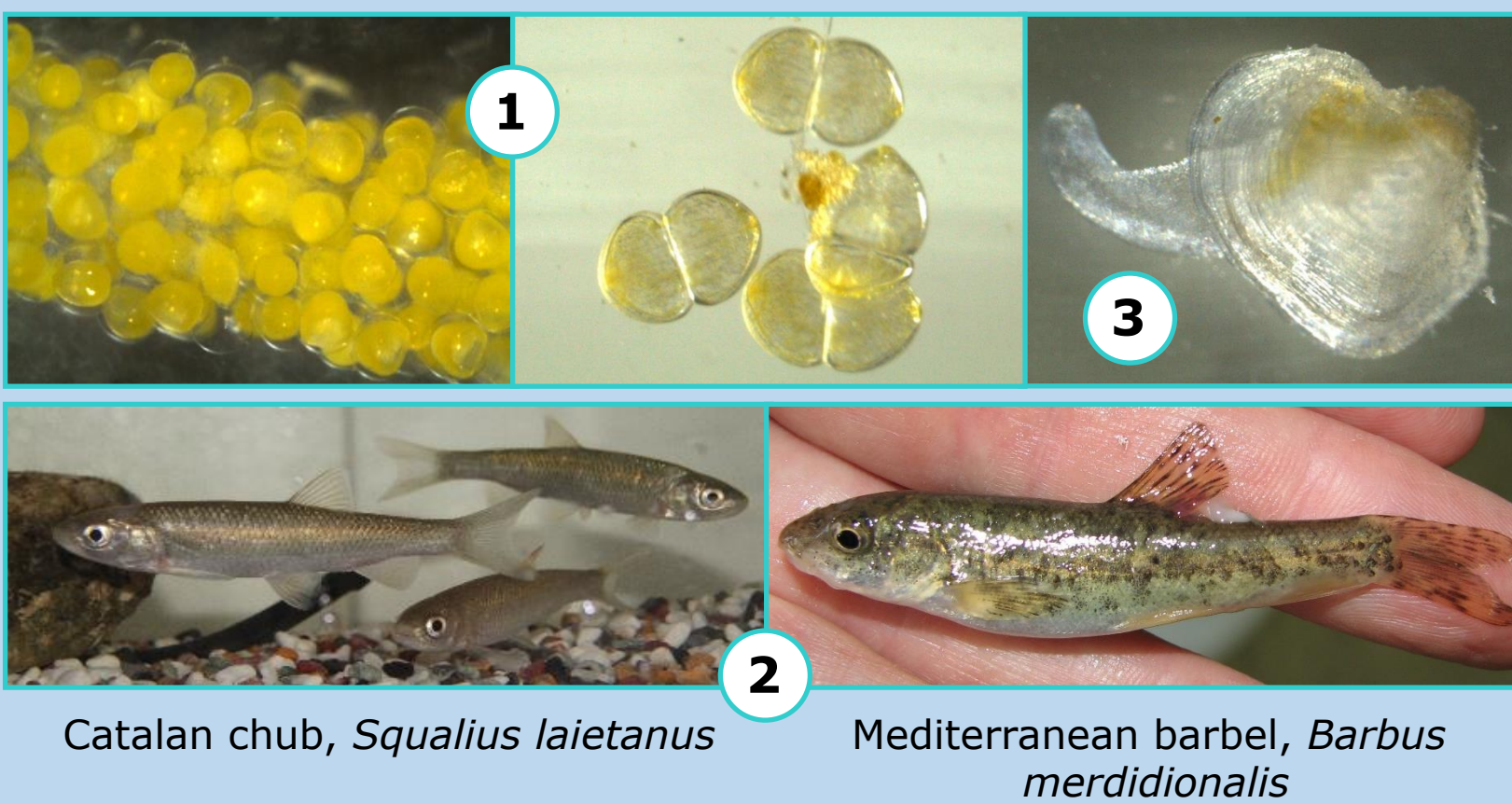
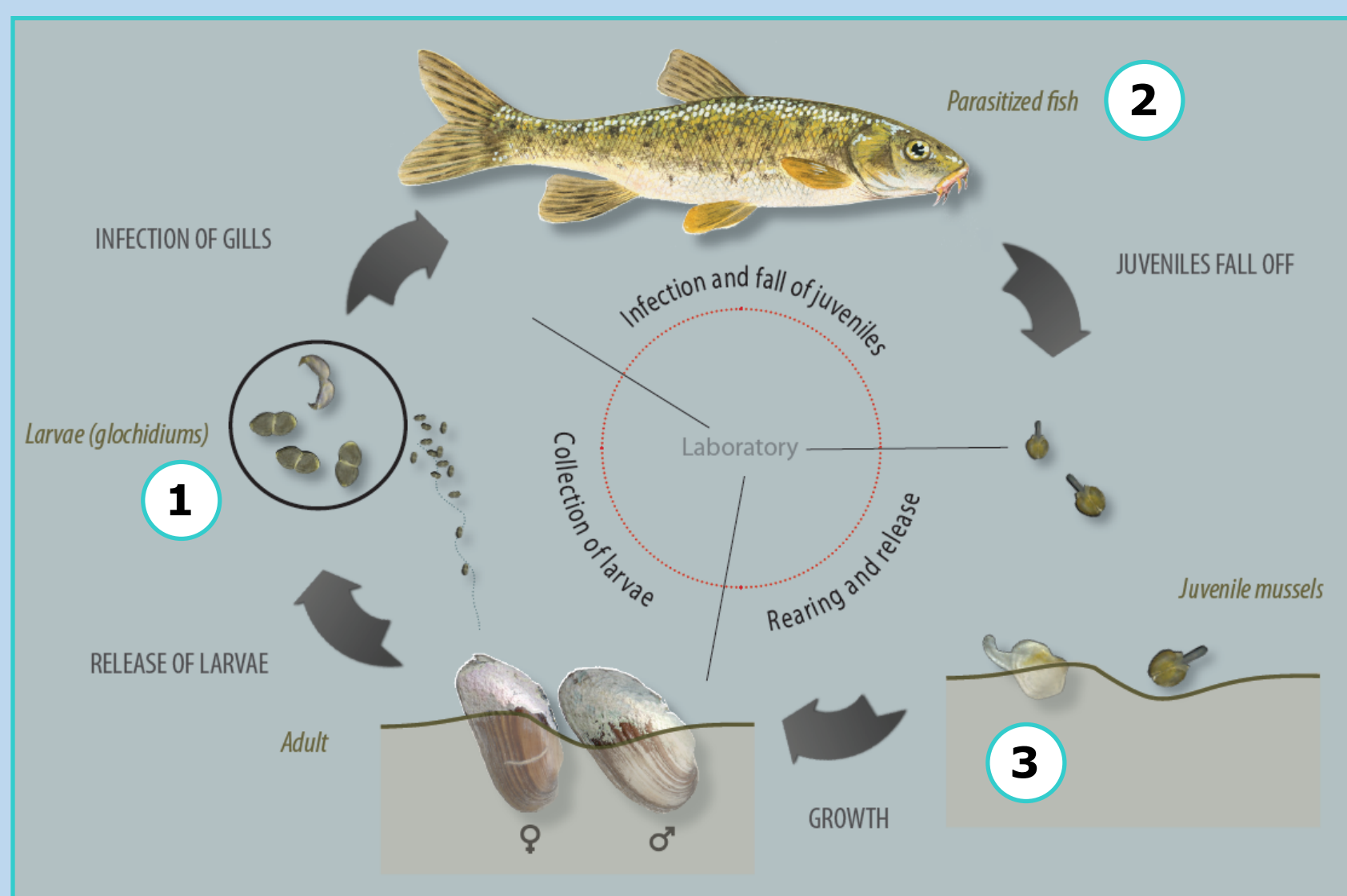
It is a project aimed at recovering and long-term conservation of several endangered species of river fauna of European interest. It will carry out habitat improvements and restocking population of species such as white-footed crayfish, naiads and several fish, amphibians and aquatic tortoises. There will also be some actions to combat invasive alien species. The actions are placed in natural community interest basins of the rivers Ter and Muga (Girona, SPAIN).

One of the main objectives of the project is the direct recovery of the main locations of Naiad (*Unio elongatulus* = *U. mancus* and *U. ravoisieri*) in Natura 2000 areas of the basins of the rivers Ter and Muga reinforced by juveniles bred in captivity. The production processes of individuals of these species will be optimized and improved in the captive breeding center the Banyoles lake.

Location area:

11 natural sites of Natura 2000 network in north-east of Spain.

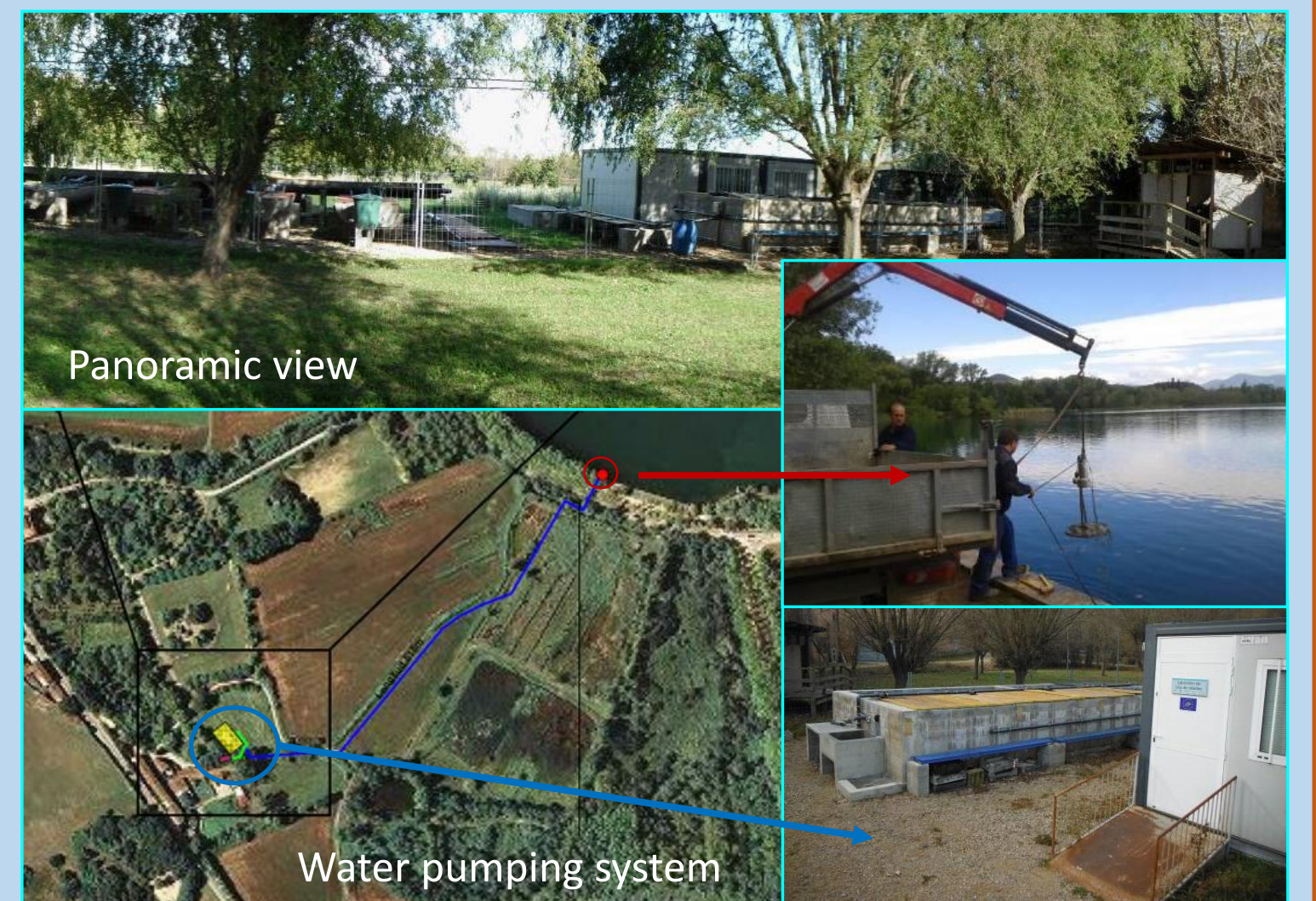
Life cycle



Catalan chub, *Squalius laietanus* Mediterranean barbel, *Barbus meridionalis*

Host fish
Several fish species have been tested as host for glochidia. A part of *Barbus meridionalis*, other native species that are viable host for *Unio* are *Squalius laietanus* and *Salaria fluviatilis*. Recently introduced on the lake, *Luciobarbus graellsii* also has demonstrated its capacity to be a useful host.

Location



• Semi-natural breeding system, using lake water

METHODOLOGY: A breeding Laboratory for the production of Unionid juveniles

This laboratory is composed by two units: internal and external. The internal is focused on the first phase of intensive production of unionid juveniles: obtention of glochidia (larvae), fish infection, infection period and collection of juveniles. Essays tests to improve the production methodology have been done indoor, too. On the other hand, the external unit is focused on extensive breeding and on the growing of juveniles, before sowing them on the lake.

In this laboratory, there's a continuous water circulation lake incoming, without no treatment except an automatic temperature control to avoid the incoming of excessively warm water in summer. Thanks to this system, in the external unit no alimentantion is supplied for mussels, but in the internal unit, several food supplements have been tested (algae, crushed leaves and others).



Internal laboratory with aquaria for infected fish monitoring, and young sowing stack

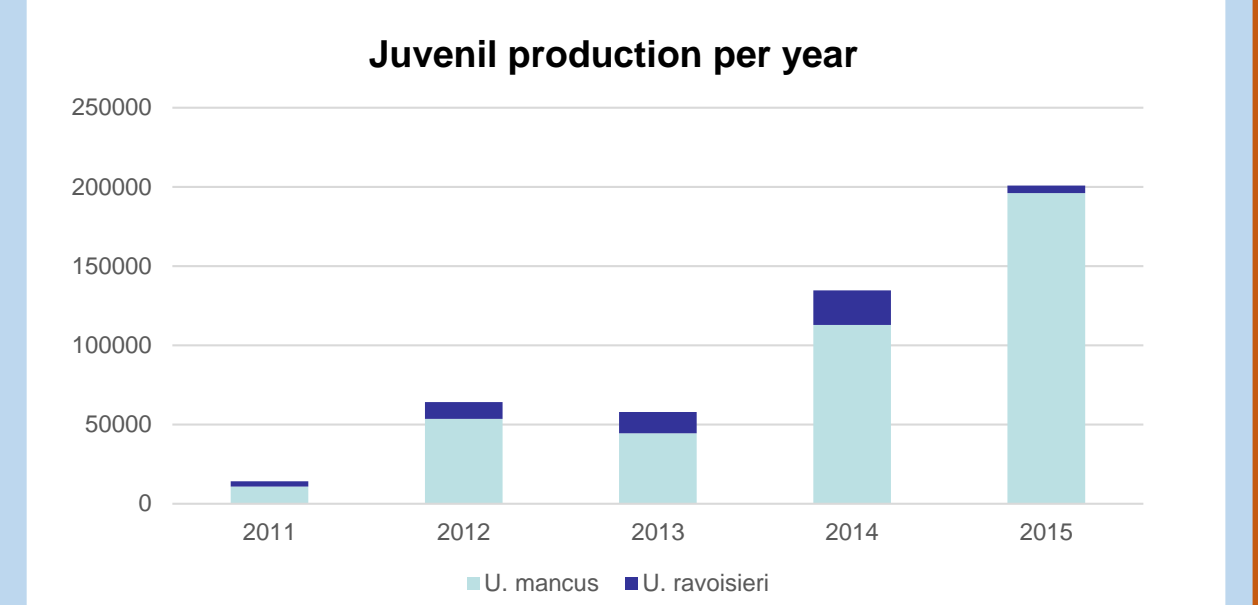


Dry sector of internal laboratory with optics for glochidia monitoring and census of young



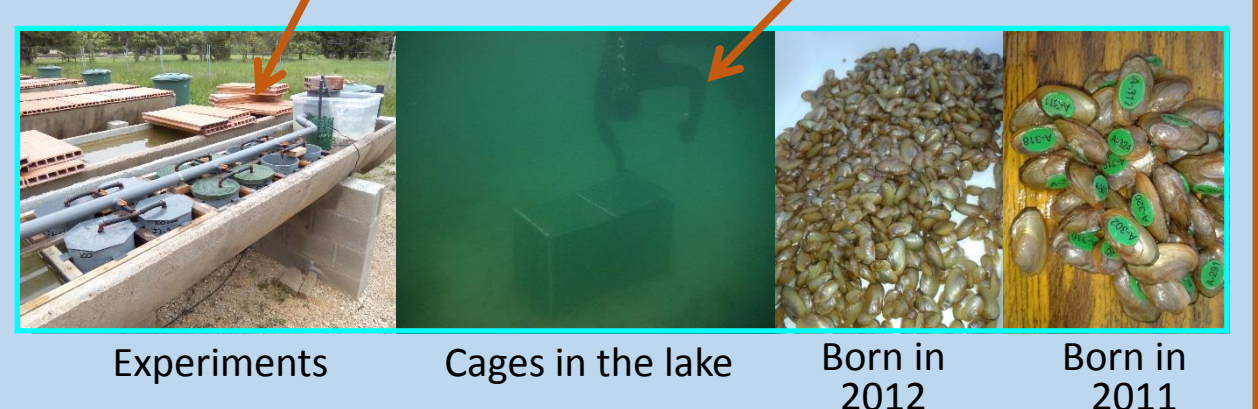
- 1 Fish maintenance tanks for infection
- 2 Aquariums with gravid naiads
- 3 *Unio mancus* with the release of glochidia
- 4 Infection in tupperware vessel for the fish with glochidia
- 5 & 6 Tanks for the maintenance of fish infected with glochidia.
- 7 Conical tanks for young collection from infected fish.
- 8 Pick the juvenile up from the filter mesh

RESULTS

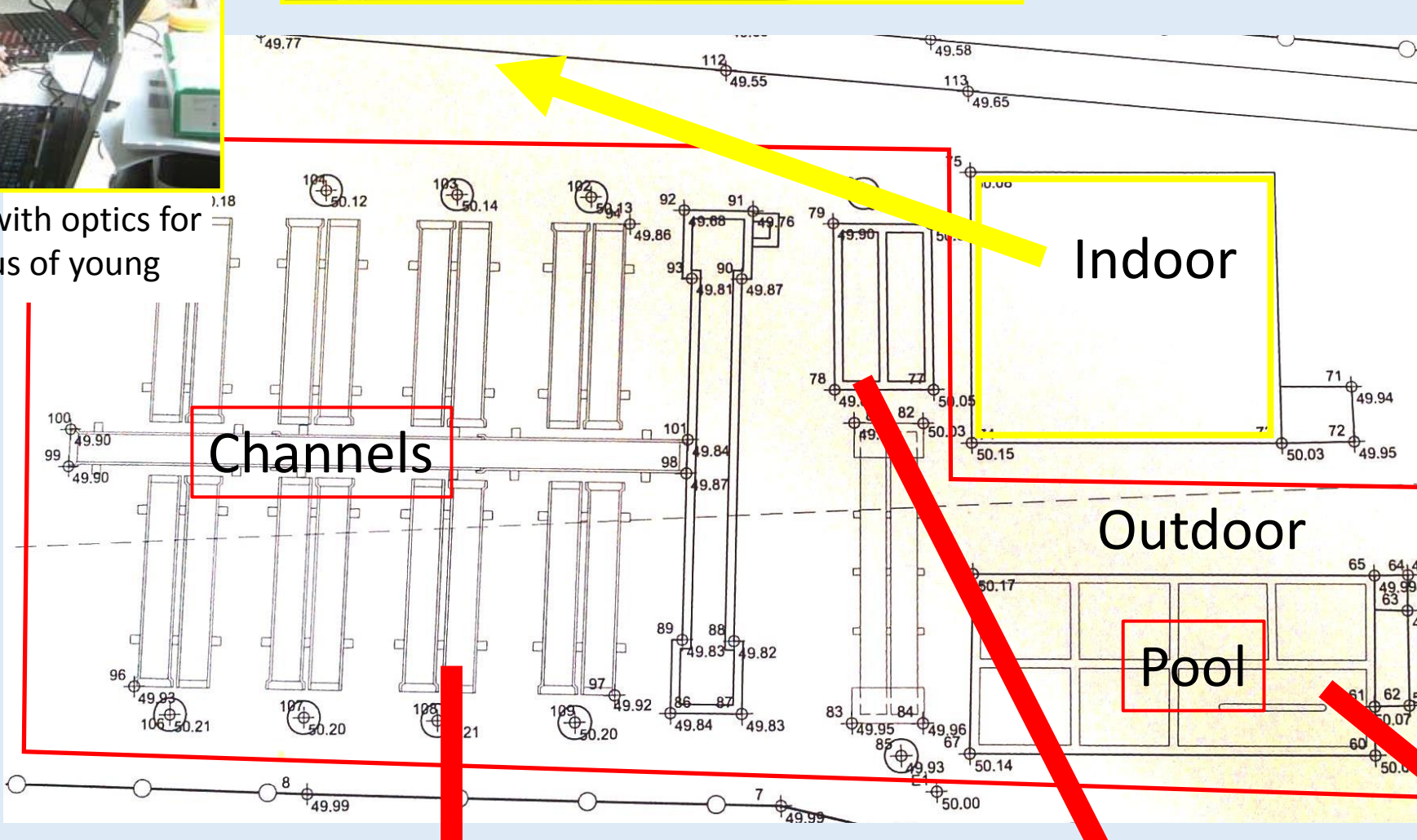
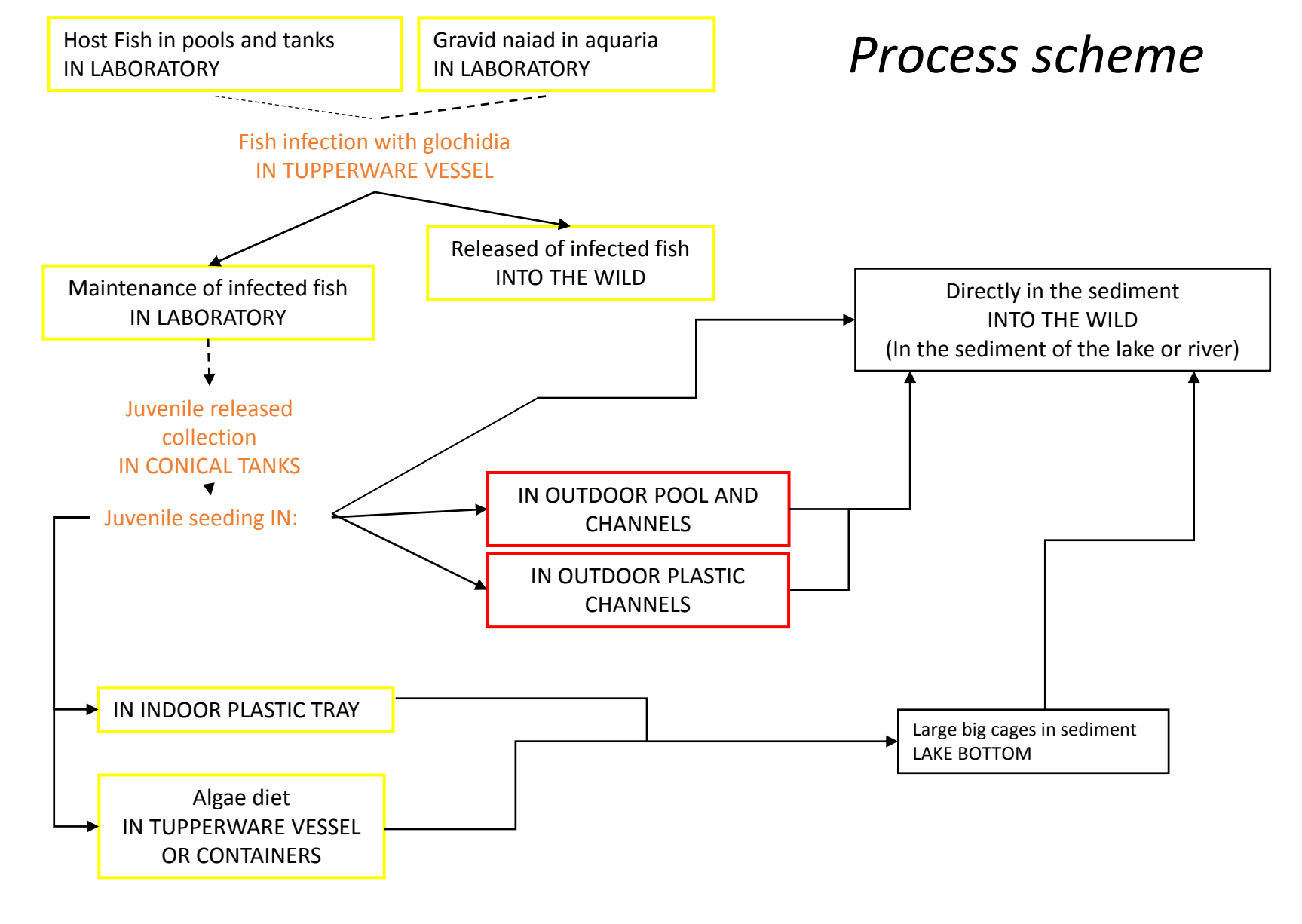


Host fishes used: *Barbus meridionalis*, *Squalius laietanus*, *Barbus graellsii*
Fish length: 10-15 cm
Juveniles/fish: 302,9 (107 – 729)

		Captive stock					
Taxa	Year	2015	2014	2013	2012	2011	Total
UMA	Banyoles	6,192	5,400	429	1,009	72	13,102
UMA	Brugent	85,254	89				85,343
UMA	Fluvià	32,742	24				32,766
UMA	Lièmena	29,032	12				29,044
UMA/URA	Banyoles				498		498
URA	Banyoles	627	476	51	83	97	1,334
URA	Ser		5				5
UMA	Several	2,958					2,958
Total juveniles		156,805	6,006	480	1,580	169	165,950



Process scheme



Channels for growing up of juveniles

Pools for growing up of juveniles