LIFE+ RIPISILVANATURA:
an ecological engineering adaptive approach to the recovery of Southern Mediterranean riparian habitats of European Community importance through the control of Exotic Invasive Species

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BACKGROUND

In Southeastern Spain, the control of Exotic Invasive Species (EIS) invading riparian habitats has been based mostly on short lived, intensive and cost-uneffective eradication campaigns.

Project **LIFE 13 BIO/ES/001407 RIPISILVANATURA** (2014-2019), co-funded by the European Commission, adopts a new approach which combines low-intensity restoration and ecological engineering techniques, taking advantage of the native species' capacity to recover and outcompete EIS.
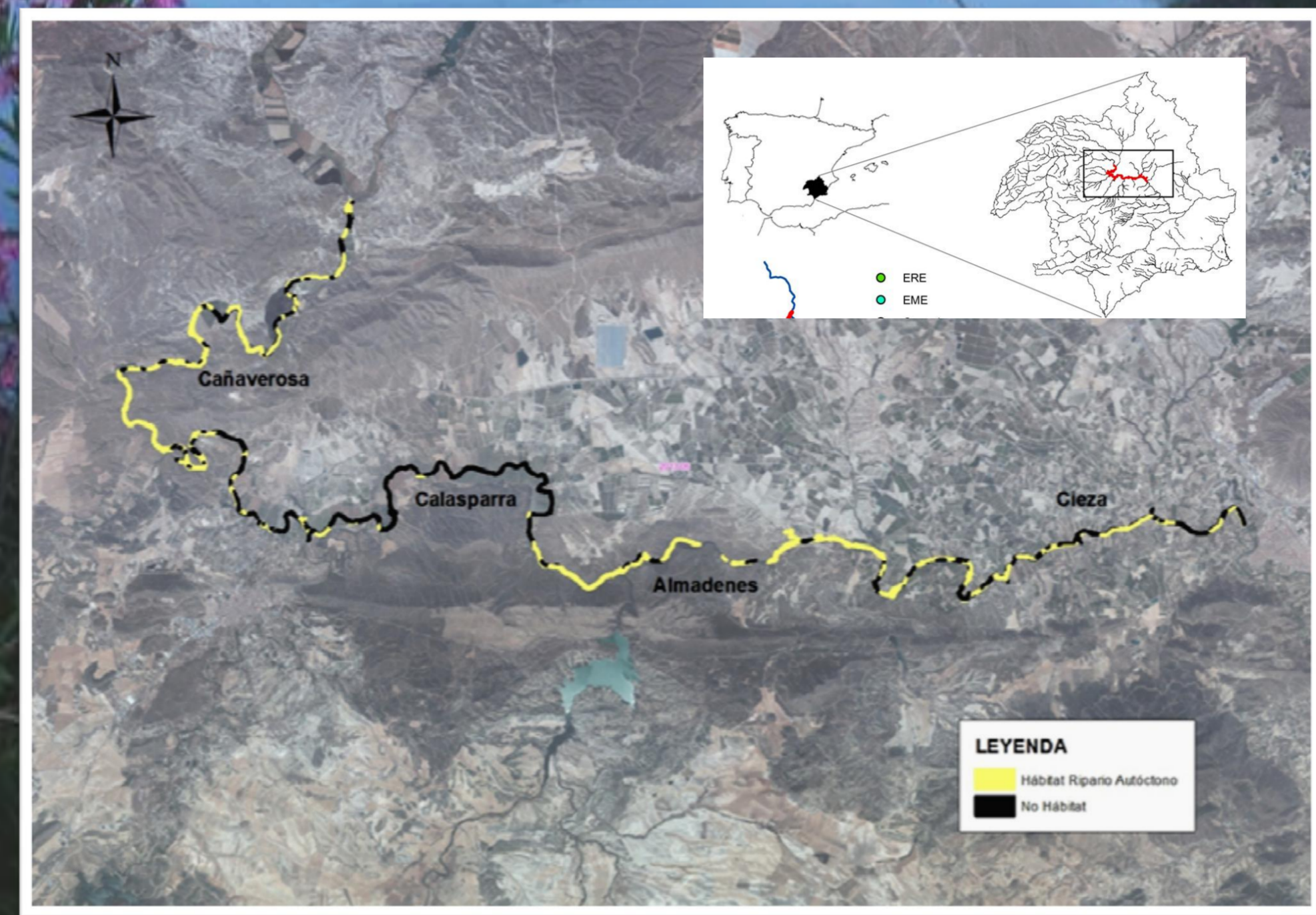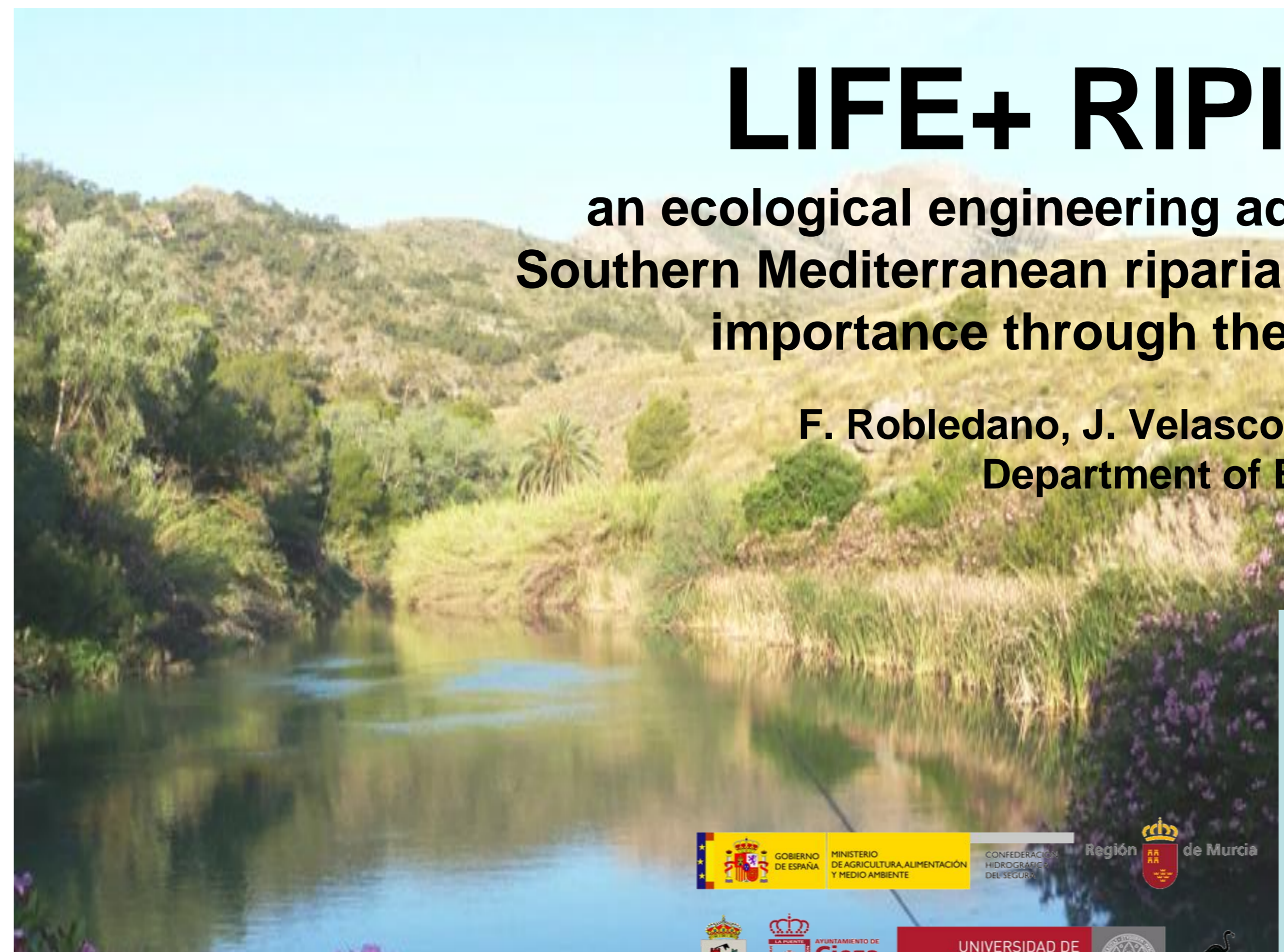
METHODOLOGICAL STEPS:

Drafting restoration projects has required a thorough survey of the river corridor, in order to prioritize areas with higher expectations of success.

Coordinated work involving project drafters and the monitoring team, allowed optimizing the choice of preservation and restoration units, and the type and intensity of actions.

For this aim, the following steps have been taken:

1) Database and literature search on native and exotic biodiversity, and ecological quality indices

2) Field surveys to complete species inventories, habitat maps and quality assessments

3) Definition of reference, good quality riparian stretches

4) Selection of nearby sections of intermediate quality, on which to focus interventions

5) Selection of methods for the control of EIS, depending on their dominance and the presence of remnants of native vegetation

6) Definition of compositional and structural design, including structuring elements (trees and shrubs) and accompanying species to be used in riparian restorations

PROJECT SUMMARY

AIM: to recover the riparian forest along 57 km of the watercourse, through the protection of key habitats and the control of EIS

PARTNERS:
Confederación Hidrográfica del Segura (CHS), the Segura River Basin Authority (Project Leader)
Municipalities of Cieza and Calasparra (Murcia)
Government of Murcia Region
ANSE (Environmental NGO)
University of Murcia (in charge of preparatory assessments of habitats and monitoring)

TARGET FORMATIONS: Habitats of Community Importance 92A0 and 92D0, priority habitat 7210* (Directive 92/43 EEC).

Distribution of autochtonous riparian habitats (yellow) and potential restoration stretches (black) within the project area (57 km of the Segura River)

Monospecific *Arundo donax* stands
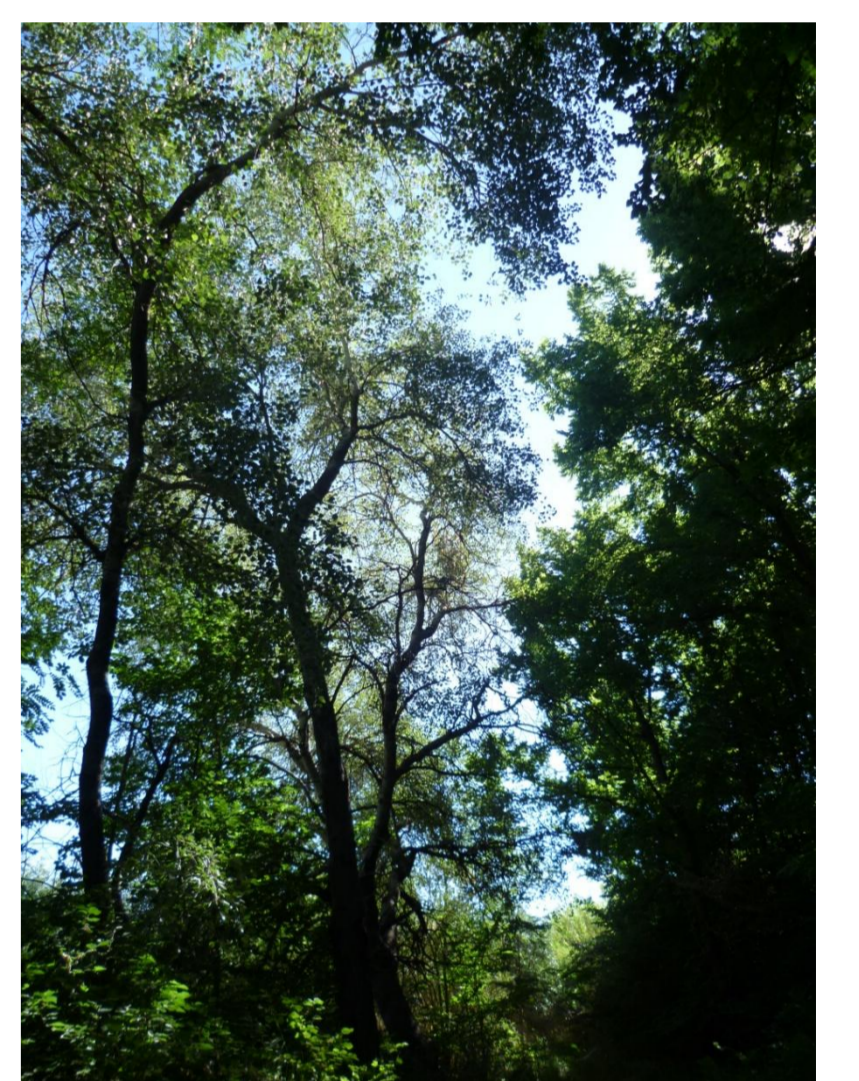
**Autochtonous riparian formations**

MONITORING ACTIONS

FLORISTIC INVENTORY/SPECIES SELECTION:

Trees: *Populus alba, P. nigra, Fraxinus angustifolia, Salix fragilis, Celtis australis, Ulmus minor.*

Shrubs and climbers: *Nerium oleander, Tamarix canariensis, Coriaria myrtifolia, Rubus ulmifolius, Rosa canina, Rubia peregrina, Smilax aspera, Asparagus acutifolius, Pistacia lentiscus, Rhamnus alaternus, Vitex agnus-castus, Salix purpurea.*

Grasses and helophytes: *Saccharum ravennae, Dorycnium rectum, Imperata cylindrica, Equisetum ramossisimum, Brachypodium phoenicoides, B. retusum, Typha dominguensis, Scirpus holoschoenus, Mentha suaveolens, Samolus valerandi, Veronica anagallis-aquatica, Cladium mariscus.*

ECOLOGICAL CONDITION ASSESSMENT

RIPARIAN QUALITY
- GOOD
- MODERATE
- POOR
- BAD
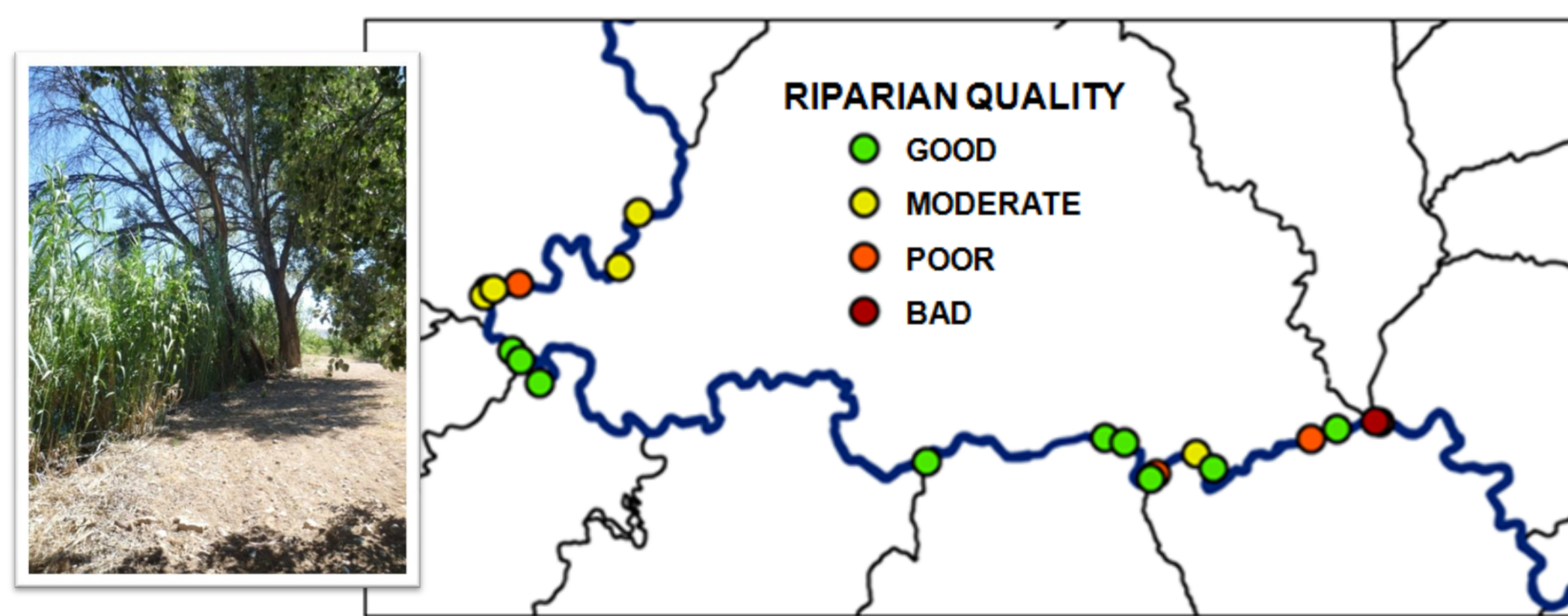
RIPARIAN QUALITY INDEX – RQI
(González del Tánago & García de Jalón, 2011)

SELECTION OF INDICATORS

- **Ecological indicators** (autochtonous riparian habitats, giant reed, water quality, aquatic macroinvertebrates, riparian birds, mammals, amphibians and reptiles, terrestrial gastropods)
- **Socio-economic indicators** (Ecosystem services *sensu* Spain's ME Assesment)

**INITIAL ASSESSMENT (Spring 2015)**
ANNUAL MONITORING (2016-2019)
FINAL EVALUATION (2019)

PREPARATORY ACTIONS

1. **FLORISTIC INVENTORY**
2. **MAPPING OF AUTOCHTONOUS RIPARIAN HABITATS**
3. **INITIAL ASSESSMENT OF RIPARIAN ECOLOGICAL CONDITION**

Set conservation and restoration priorities for riparian habitats
Define restoration actions (location and intensity of treatments)
Select species best suited for vegetation restoration

RESTORATION AREAS AND MONITORING STATIONS

- REFERENCE STATIONS (3)
- MONITORING STATIONS (3 x type of action)
- CONTROL SITES (unmanaged)
- RESTORATION AREAS (53)
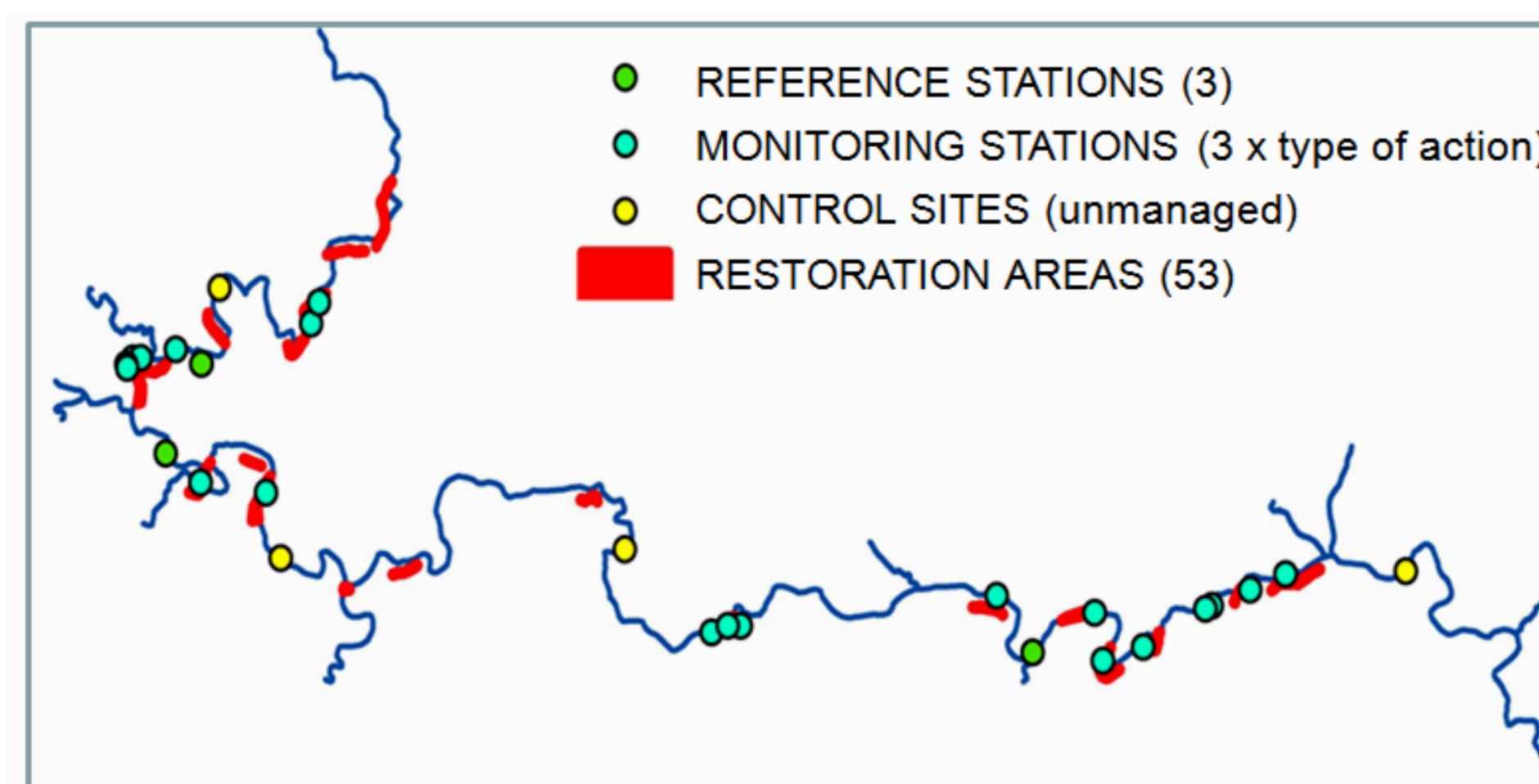
Choice of areas guided by:
a) closeness to natural habitats (to enhance connectivity)
b) presence of native remnants (e.g. isolated riparian trees)
c) vegetation dynamics capable of reinforcing low-intensity, repeated controls of EISs (mostly *Arundo donax*)

Selection modified by:
a) Technical feasibility (access to the bank, cost)
b) Social acceptance (adjacent landowners and local users)
c) Synergies with ongoing projects (e.g. LIFE+ RIVERLINK)

RESTORATION ACTIONS

Guiding principle: To promote competition by native species on EEIs – 3 types:
a) Elimination / fragmentation of monospecific *Arundo donax* and other EIS
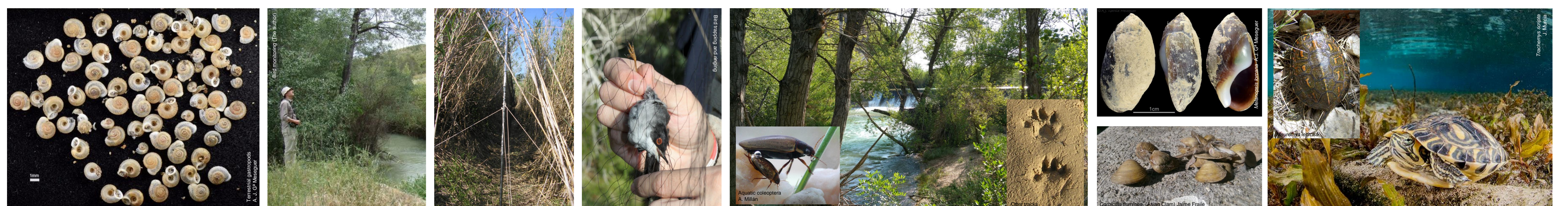b) Planting of native trees, shrubs and herbaceous species
c) Maintenance of plantations

PLANTATION		REED CUTTING		MAINTENANCE	
Arbustive (5 types)	Arboreal (6 types)	HAND	MECHANICAL	Extensive (quarterly, 4 years)	Intensive (6 first months)

DRAFTING OF RESTORATION PROJECTS
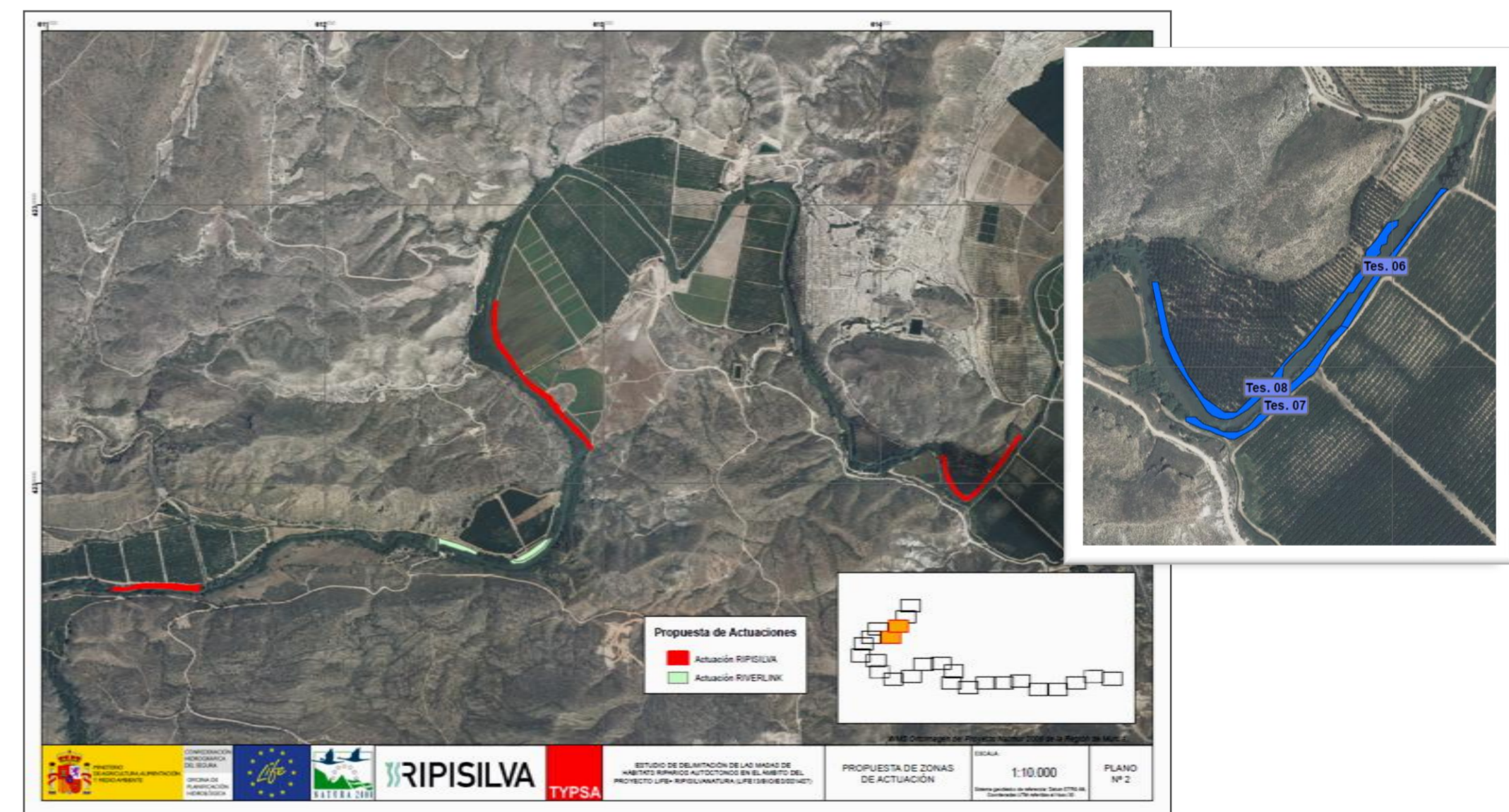
OTHER PROJECT ACTIONS

- Fire prevention
- Public awareness and capacity building among river users and techical staff
- Citizen-based alert network and removal scheme for EIS
- Promotion of riparian land stewardship