Overview on sea lamprey past and current status, habitat restoration and fisheries management in Portugal

P.R. Almeida, I. Oliveira, E. Pereira, A.F. Belo, S. Pedro, C.M. Alexandre, J. Boavida-Portugal, M.J. Lança, B.R. Quintella & C.S. Mateus

UNIVERSIDADE DE ÉVORA

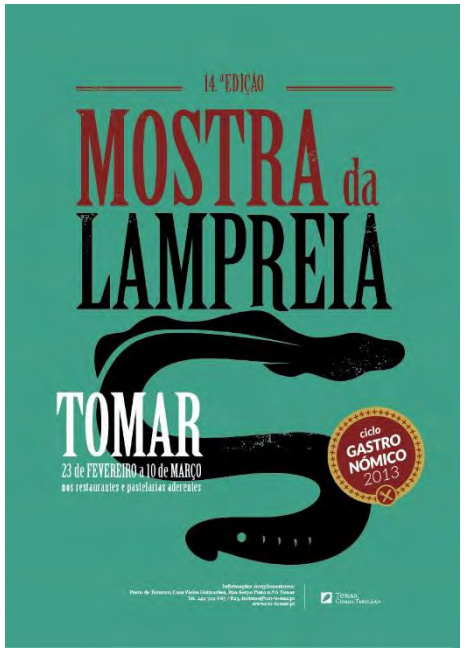
MARE

ARNET
AQUATIC RESEARCH NETwork

Workshop on Conservation of the Sea Lamprey (*Petromyzon marinus* L.)

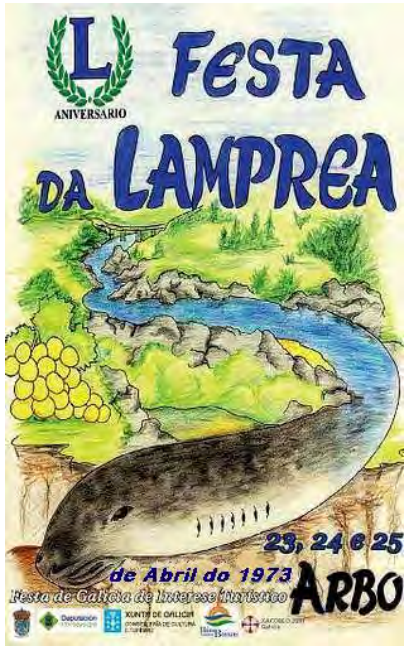
Falkenberg, 16-18 October 2023


2FESTIVAL
lampreia assada
ABRIL 2013 CAMPO DE TIRO LANHESES
27|28
27 | ABRIL
Lampreia à Torinha
Animação com Concertinas
28 | ABRIL
ALMOÇO
Entradas diversas
Lampreia Assada
Javali Assado
Sobremesas diversas
Animação Musical
PRÉ-INSCRIÇÃO
Sócios: 12.50 Pagos
Não Sócios: 15.00 Pagos
INSCRIÇÕES:
966 023 611
862 280 280


14.ª EDIÇÃO
MOSTRA da LAMPREIA
TOMAR
23 de FEVEREIRO a 10 de MARÇO
nos restaurantes e pastelarias aderentes
ciclo GASTRO NÓMICO 2013


XX
20 Anos
Festa do Sável e da Lampreia
FESTA DO SÁVEL E DA LAMPREIA
18 de Fevereiro a
20 de Março de 2011
Gondomar
FIM-DE-SEMANA GASTRONÓMICO
"SÁVEL E LAMPREIA, UM SABOR D'OURO"
11 a 13 de Março de 2011
Multiusos Gondomar
"Coração de Ouro"
ENTRADA GRATUITA
DOURAZUL
GONDOMAR CORAÇÃO DE OURO


festival do arroz e da lampreia
MONTEMOR-O-VELHO
2 a 11 março 2012

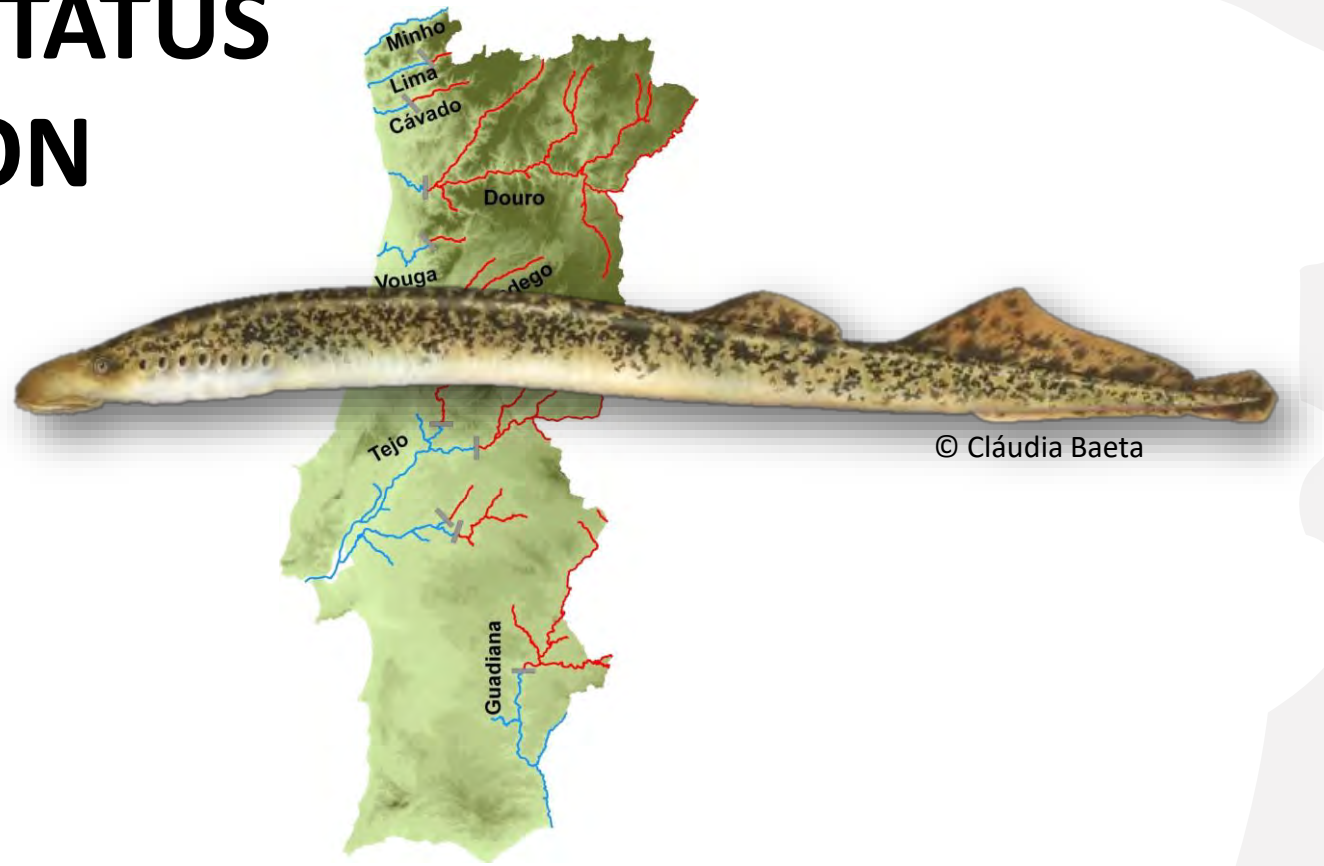

L ANIVERSÁRIO
FESTA DA LAMPREA
23, 24 e 25
de Abril do 1973
Festa de Galicia de Interese Turístico
ARBO


festival do arroz e da lampreia
1 A 10 MARÇO
MONTEMOR-O-VELHO
WWW.CM-MONTEMORVELHO.PT
MOSTRA DE GASTRONOMIA NOS RESTAURANTES
TASQUINHAS ANIMAÇÃO E GASTRONOMIA CRIATIVA 1, 2, 3, 8, 9 E 10 MARÇO
// CENTRO DE ALTO RENDIMENTO
XVII FESTIVAL DA LAMPREIA
17 MARÇO // ERGEIRA

During the **Middle Ages members of the nobility and some religious orders** had fishing rights in some river stretches, where they used **fishing weirs called "caneiros"**, specially constructed to harvest pre-spawning anadromous species (e.g., salmon, sea trout, shads, lamprey).

Reconstruction of a medieval fish weir (painting by Simon Dick, source: University College Dublin, School of Archaeology)

CONSERVATION STATUS AND DISTRIBUTION

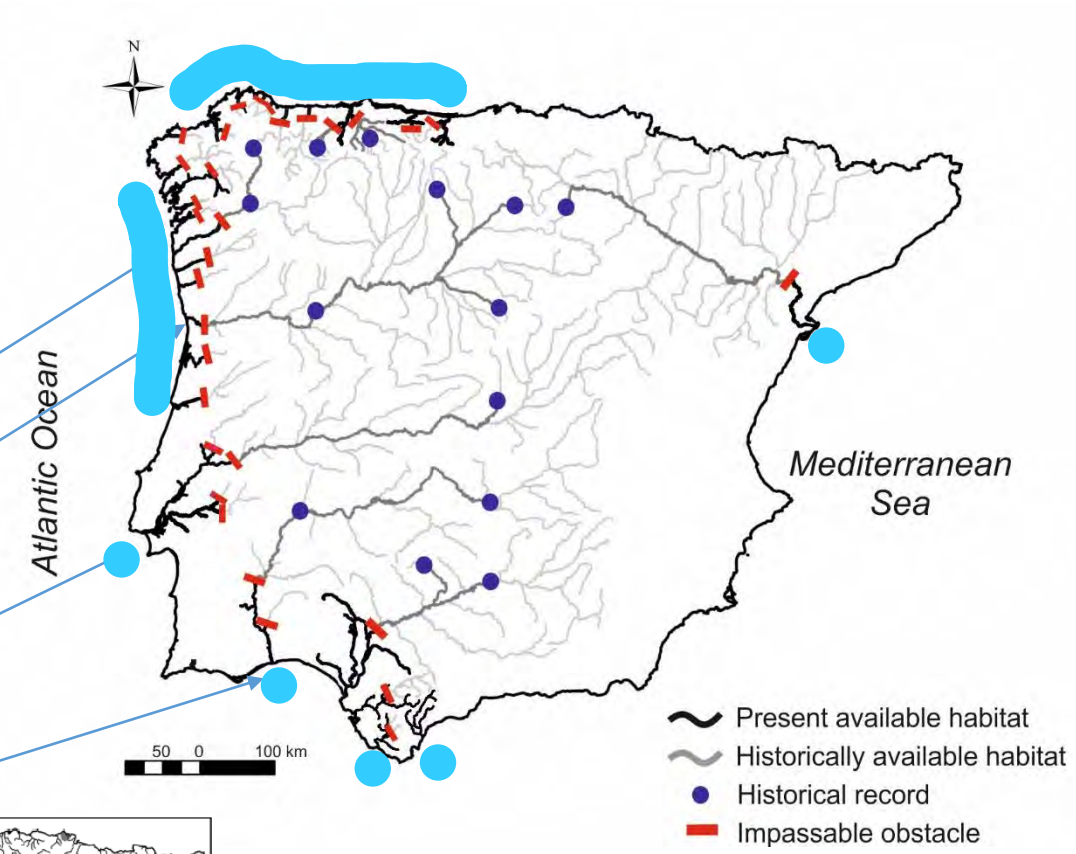


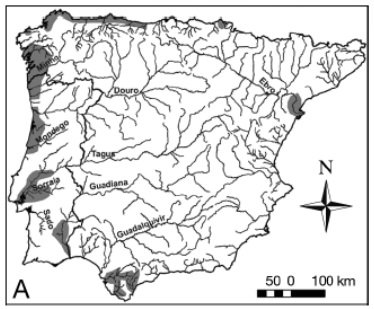
© Cláudia Baeta

It is classified as Vulnerable (V) in the Portuguese Red List of Threatened Species (2023)

Sea lamprey: 80% of the **habitat lost** in the Iberian Peninsula

Country	*River*	*Present available habitat (km)*	*Habitat loss (km)*
Spain (Asturias)	Cares (Deva)	24	-
	Sella	35	-
	Nalón	29	-
	Narcea (Nalón)	33[a]	-
	Navia	15	-
Spain (Galicia)	Eo	32	-
	Masma	7	-
	Ouro	9	-
	Mera	11	-
	Mandeo	12	-
	Anllóns	13	-
	Tambre	16	-
	Ulla	60	-
	Umia	26	-
	Lérez	7	-
	Minho[c]	80	174 (69%)
Portugal	Lima	48	-
	Cávado	27	-
	Douro[c]	20	496 (96%)
	Vouga	53	-
	Mondego	35	-
	Zêzere (Tagus)	12[d]	-
	Tagus[c]	150	483 (76%)
	Sôr (Tagus)	91[d]	-
	Raia (Tagus)	20[e]	-
	Guadiana[c]	132	516 (80%)
Spain (Andalusia)	Chanza (Guadiana)	0.5[g]	-
	Guadalquivir	104	290 (74%)
	Guadalete	84	-
	Barbate	50	-
Spain (Tarragona)	Ebro	116	564 (83%)





Mateus *et al.* (2012) *End. Spec. Res.* **16**: 183-198


North / Central
Seabed topography seems to promote some degree of isolation between adult sea lamprey during the oceanic phase of their life cycle.
Three groups classified based on heart tissue fatty acids.
Tagus
Guadiana
Golfo da Biscaia
Lima
Minho
Cávado
Douro
Vouga
Mondego
Tagus
Guadiana
Mar das Baleares
Estreito de Gibraltar
Mar de Alborão
592 km
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2011 GeoEye
© 2011 Cnes/Spot Image
Image © 2011 GeoContent
39°04'58.62"N 8°37'50.70"O elev 52 m
Altitude de visualização
©2010

FISHERIES MANAGEMENT

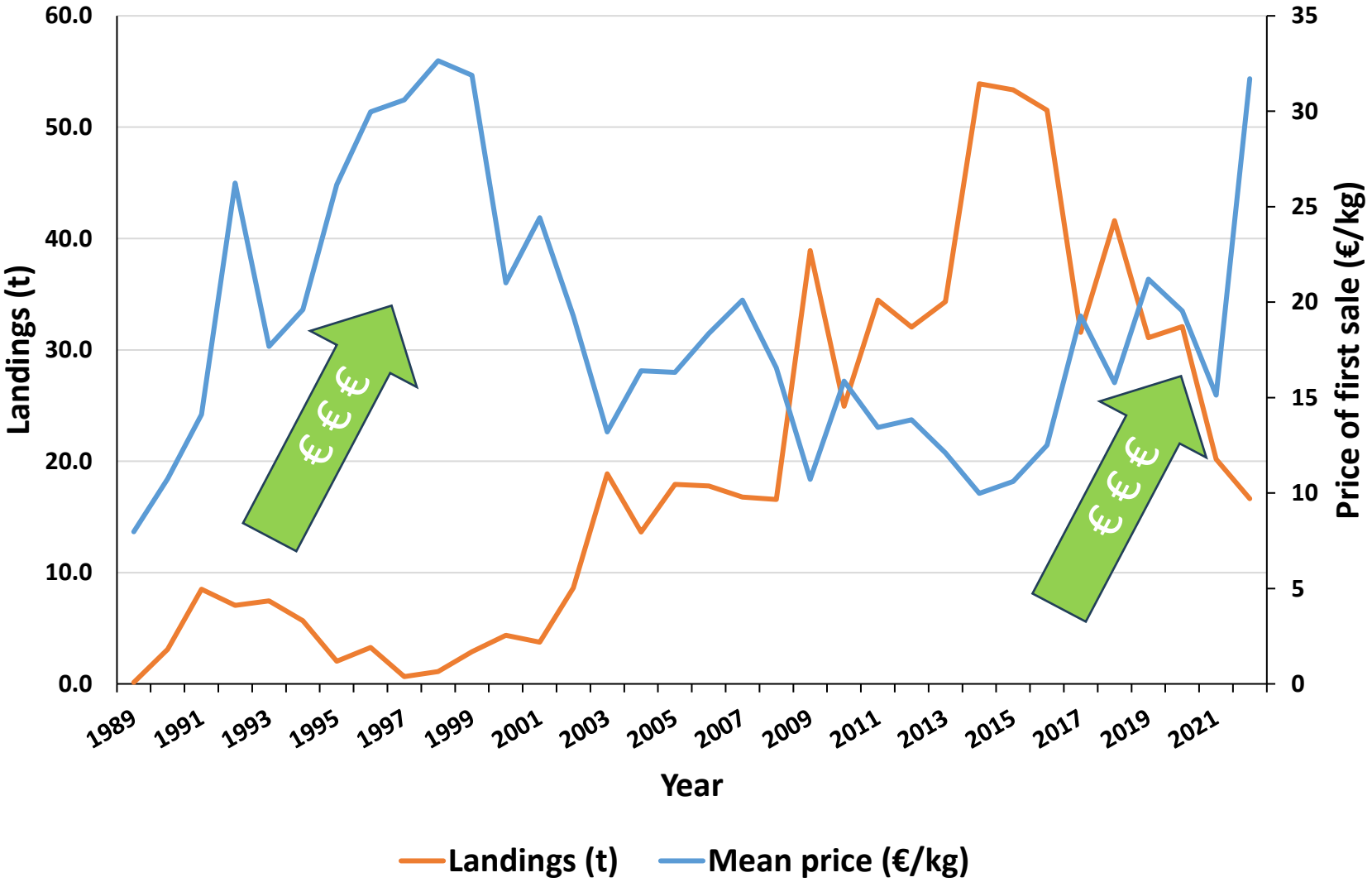
Large fike nets in River Mondego (“Botirão”)

Fike nets in River Mondego (“Botirão”)

Lamprey traps constructed in river beds – River Minho (“Pesqueiras”)

Lamprey traps constructed in river beds – River Minho (“Pesqueiras”)

Sea lamprey landings in Portugal (official records) 1989-2022



In the last decades of the 20th Century and since 2015, the **commercial value rose substantially** until it reached the current status of delicacy.

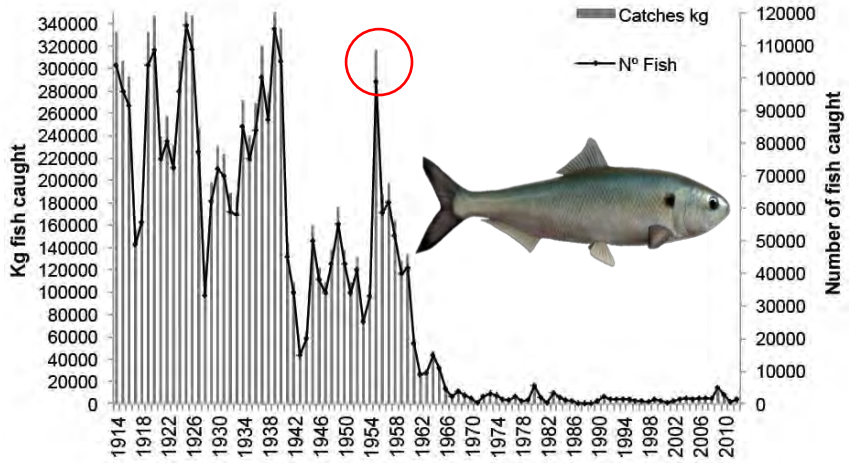
In 2023 one sea lamprey cost 80-100 euros in the restaurant.

(Source: DGRM)

Sea lamprey landings (number of individuals) at Caminha harbour (River Minho) by Portuguese fishermen


© Cláudia Baeta

Most of the Portuguese lamprey catch (ca. 85%) comes from the **northern and central rivers** (Minho, Lima, Vouga and Mondego rivers)



(Source: National Maritime Authority; adapted from Mota et al. 2016)

mar 2020
PROGRAMA OPERACIONAL MAR 2020

Operational Plan for Monitoring and Management of Anadromous Fish in Portugal

AN@DROMOS.PT

UNIVERSIDADE DE ÉVORA · MARE · FIGPESCA · AMAR SÃO PEDRO Associação Mar Rio S. Pedro · VIANAPESCA-OP · IPMA · DGRM · ICNF Instituto da Conservação da Natureza e das Florestas · AGÊNCIA PORTUGUESA DO AMBIENTE · DOCAPESCA PORTOS E LOTAS, S.A. · REPÚBLICA PORTUGUESA SECRETÁRIO DE ESTADO DAS PESCAS

PROJECT ACTIONS

A1. Knowledge transfer between scientists and stakeholders involved in the exploitation and management of anadromous fish populations.

- **Standardisation of fishing regulations (maritime + inland waters)**
- **Annual meetings with fishermen;**
- **Voluntary logbooks;**
- **Intermediate fishing closure (IFC).**

River Mondego (Estuary and freshwater)

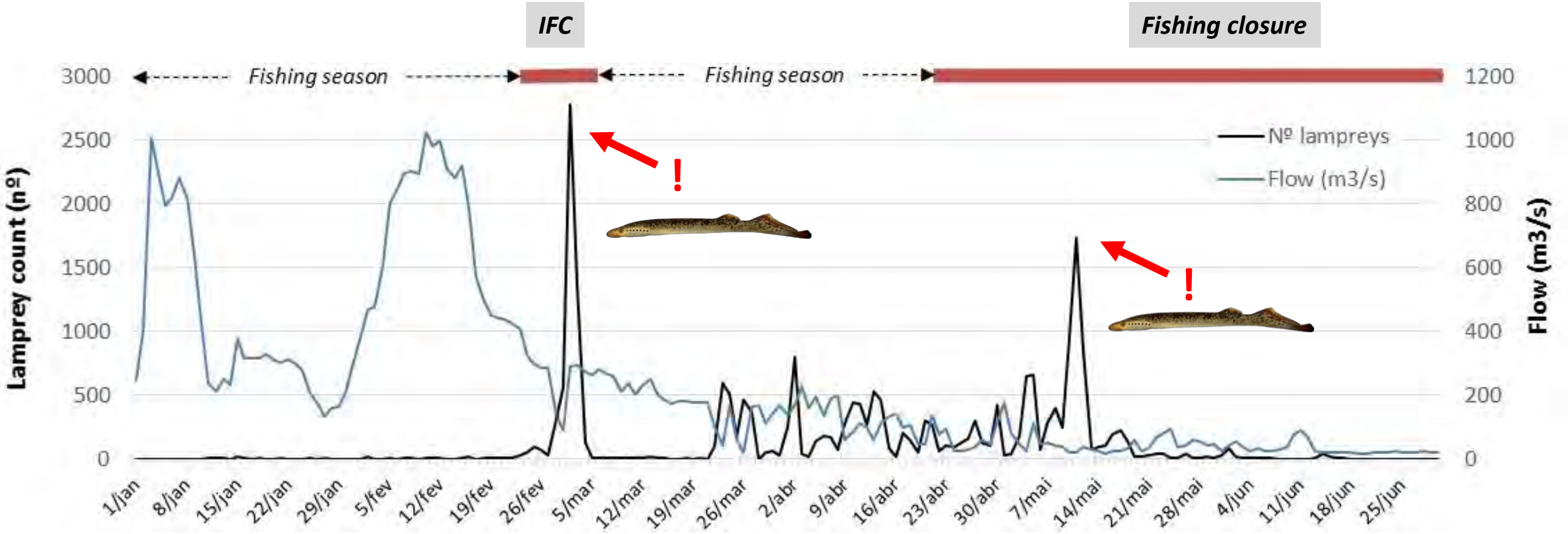
2013 + 2014 – 10 days (IFC);

2015 – 5 days (IFC);

2016, 2017, 2018 e 2019 – 5 days (IFC) + Redution of the fishing season;

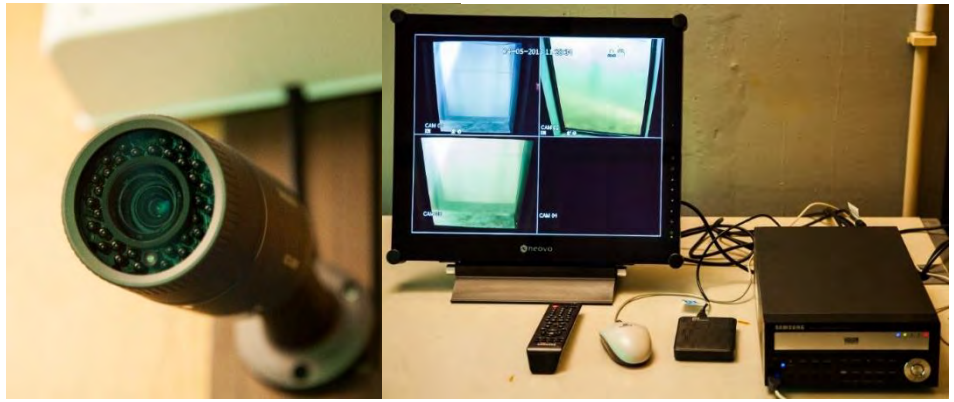
2020 a 2023 – 10 days (IFC) + Fishing season unchanged
(10 Jan – 16 Mar and 27 Mar – 5 Apr)

Sea lamprey counts in the fish pass at the Açude-Ponte dam (Coimbra)



2014

A3. Monitorization of sea lamprey and allis shad populations in River Mondego – Reference watershed



Fish counting window at Coimbra dam

PROJECT ACTIONS

A3. Monitorization of sea lamprey and allis shad populations in River Mondego – Reference watershed

Label of origin

HABITAT RESTORATION

MAIN DIFFICULTIES FOR THE MANAGEMENT AND CONSERVATION OF DIADROMOUS SPECIES

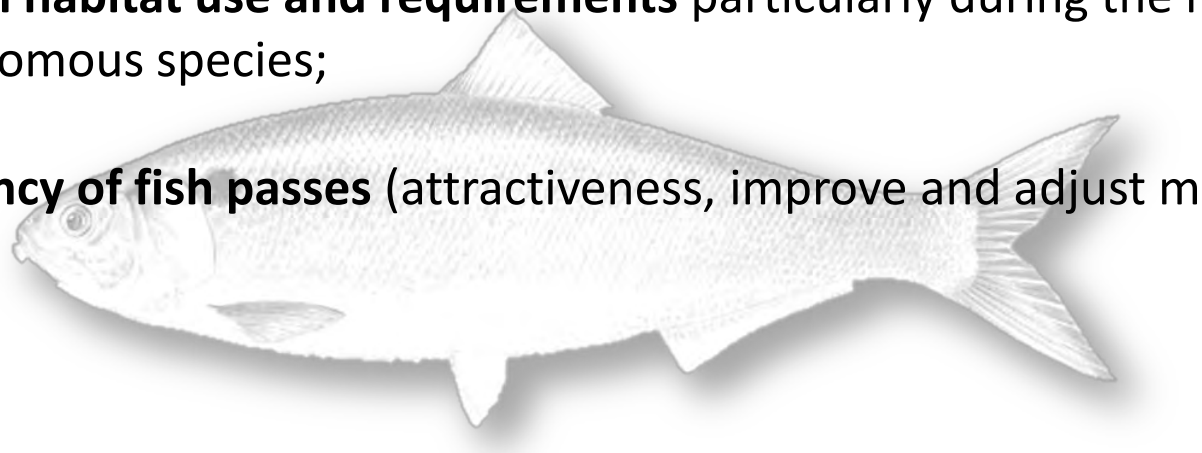
Even though there has been **great effort to restore habitat connectivity** there are still a number of difficulties encountered by researchers, namely:

i. **Lack of political and public awareness**;

ii. **Lack of coordination between administrative jurisdictions** (in different areas of the river basins; and/or between river, estuarine and marine environments);

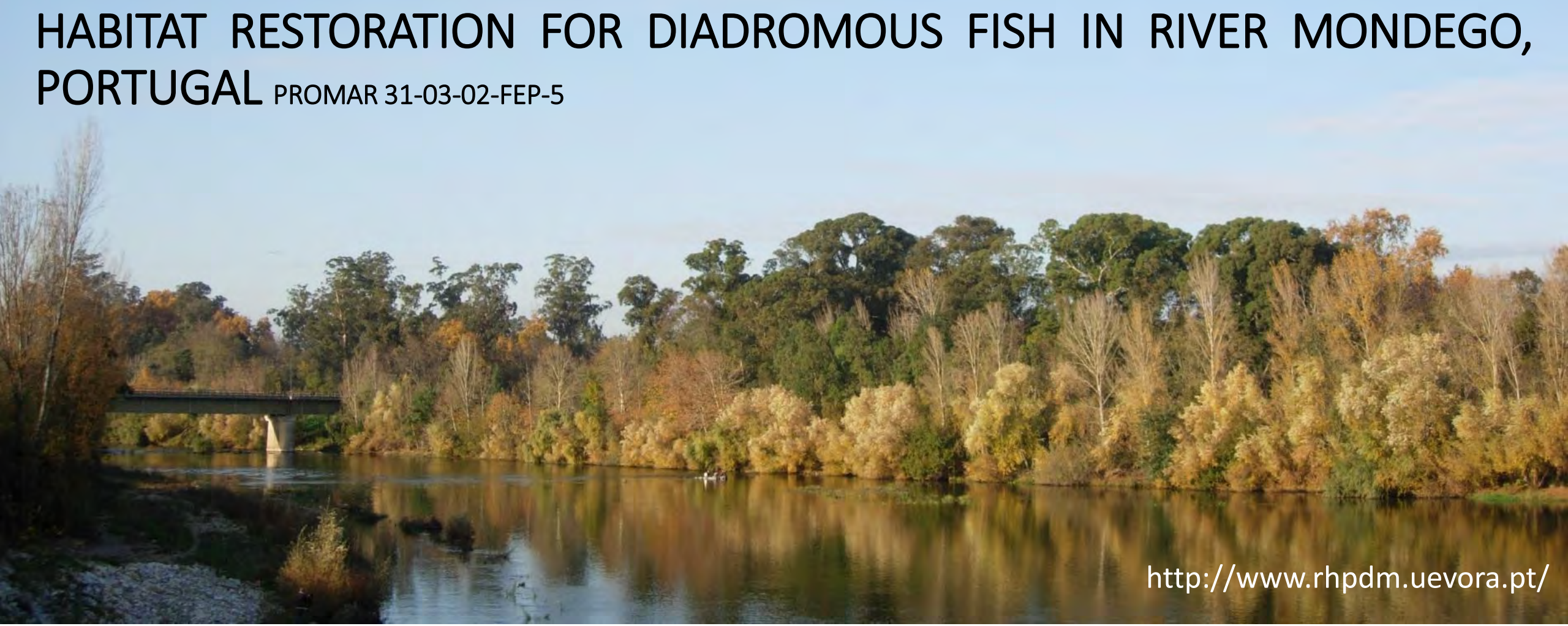
iii. **Lack of fishermen declarations** in rivers, or false declarations (maritime and estuaries);

iv. **Lack of knowledge on habitat use and requirements** particularly during the marine stage of the life cycle of the anadromous species;



v. **Low or lack of efficiency of fish passes** (attractiveness, improve and adjust monitoring, improve hydraulic conditions).

HABITAT RESTORATION FOR DIADROMOUS FISH IN RIVER MONDEGO, PORTUGAL PROMAR 31-03-02-FEP-5



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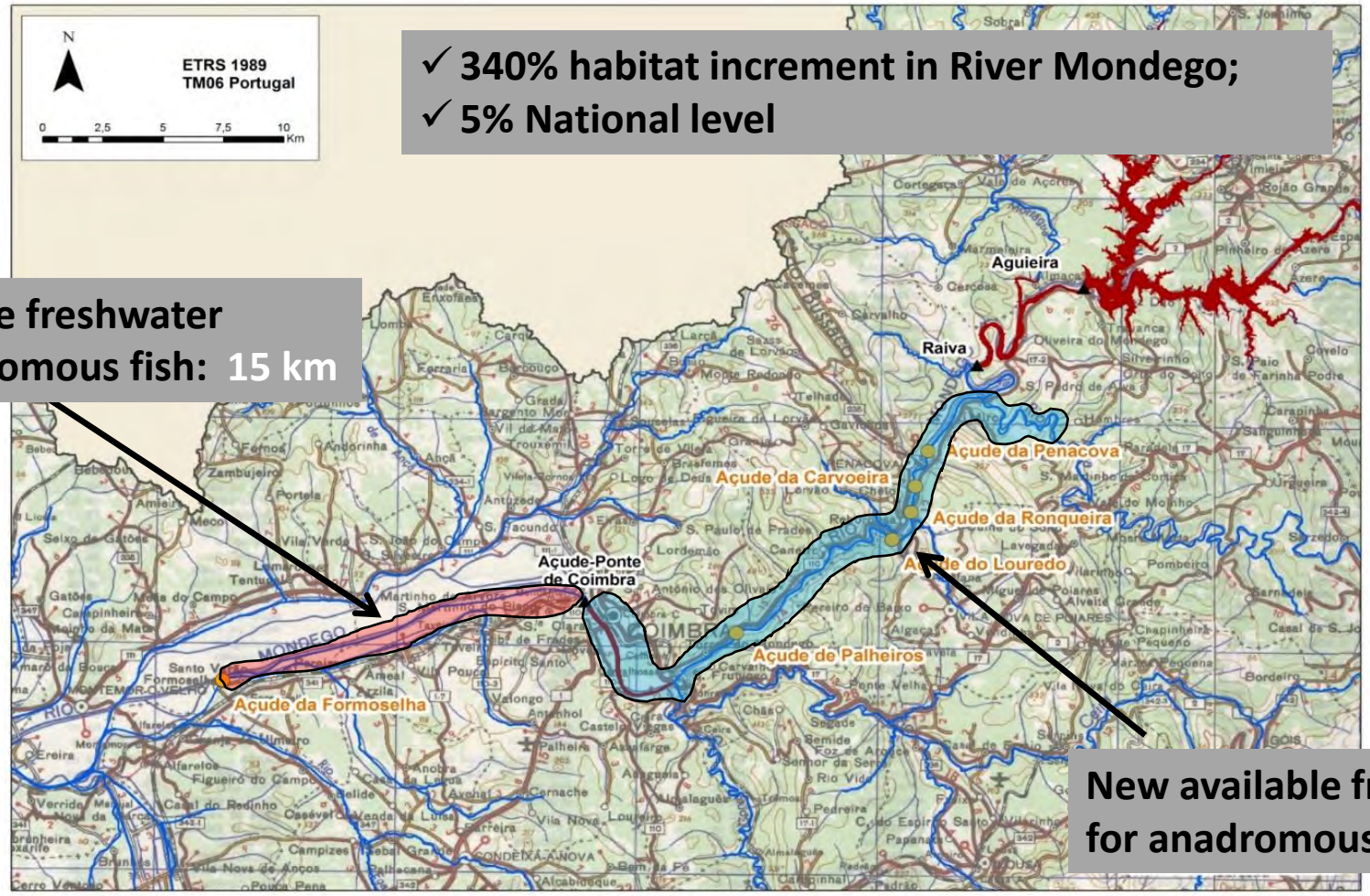
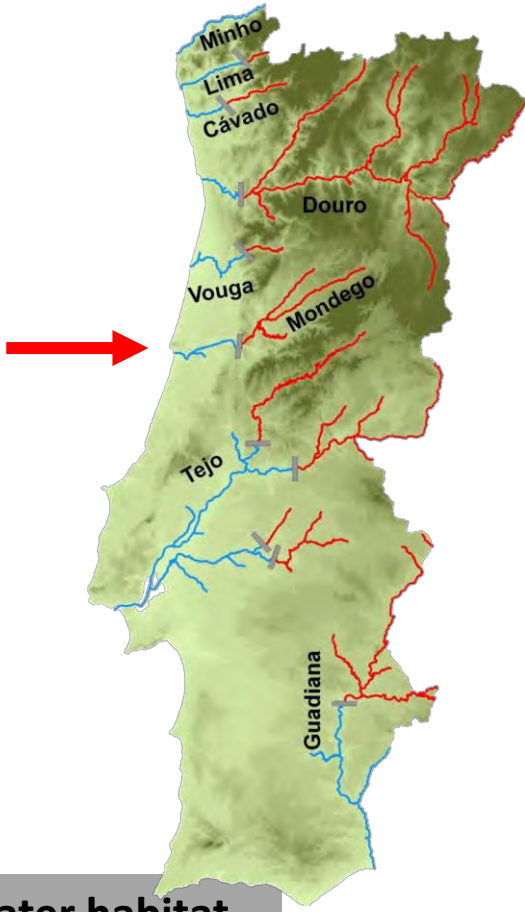
dgrm Direção-Geral de Recursos Naturais, Segurança e Serviços Marítimos
ICNF Instituto da Conservação da Natureza e das Florestas
ipma
edp
onde a natureza vive penacova MUNICÍPIO
MUNICÍPIO DE VILA NOVA DE POIARES
CÂMARA MUNICIPAL DE COIMBRA
Faculdade Ciências Universidade Lisboa
FLUVIÁRIO DE MORA
promar Programa Operacional Pesca 2007 - 2013
União Europeia
Fundo Europeu das Pescas
GOVERNO DE PORTUGAL
MINISTÉRIO DO MAR

HABITAT RESTORATION FOR DIADROMOUS FISH IN RIVER MONDEGO

Construction of 6 fish passes + removal 1 small weir

http://www.rhpdm.uevora.pt/

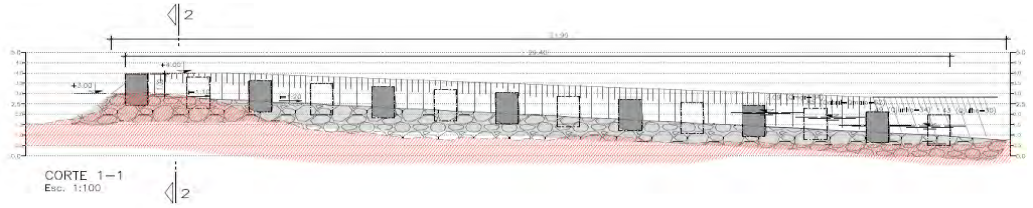




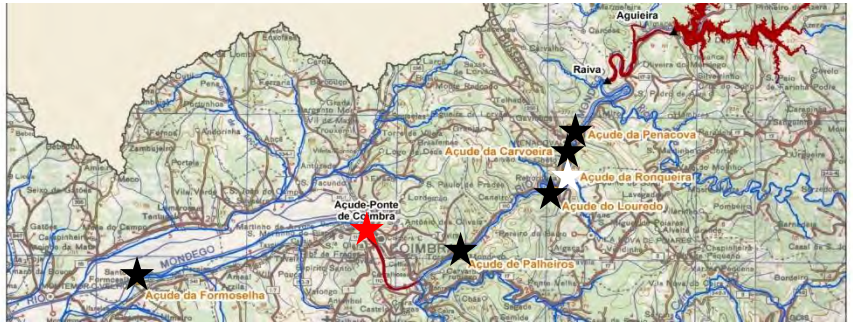
Formoselha weir (low flow condition / Sep2015)

Formoselha weir (*ca.* 80 m^3/s , Jun2016)

Characteristics	
Height	2.0 m
Length	29.4 m
Width	10.0 m
Mean slope	7%
Number of rows	14



AGÊNCIA PORTUGUESA DO AMBIENTE



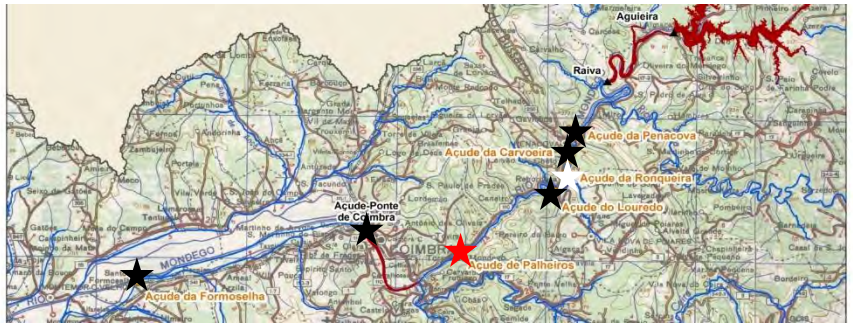
Vertical slots fish pass (2011)
Açude-Ponte dam (Coimbra) – 6.2 m height; 45 km from the river mouth

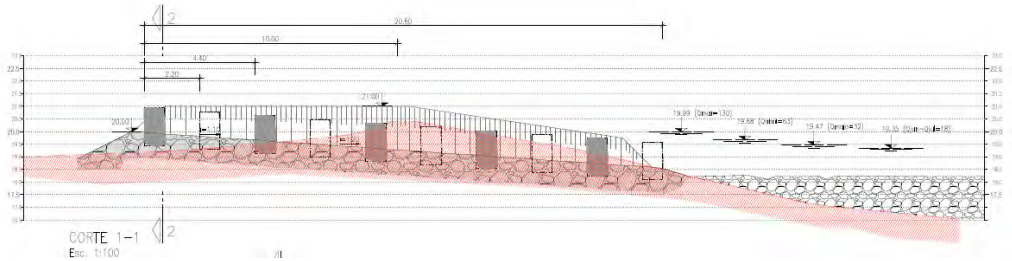
Fish pass characteristics	
Length	125m
Nº pools	23
Pool dim.	4.5x3.0m
Pool depth	2.0m
Flow discharge	2.0 m^3s^{-1}
Attraction flow	2.0 m^3s^{-1}
Water velocity (slots)	ca. 1.5ms^{-1}
Dissipated power	<150 W/m^3

Palheiros weir (77 m^3/s , Mar2016)

Palheiros weir (low flow condition, Sep2015)

Characteristics	
Height	1.5 m
Length	20.4 m
Width	10 m
Mean slope	7%
Number of rows	10

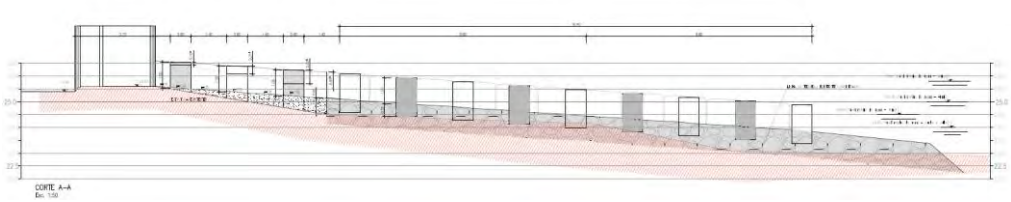




Louredo weir (*ca.* 80 m^3/s , Mar2016)

Louredo weir (low flow condition / Sep2015)

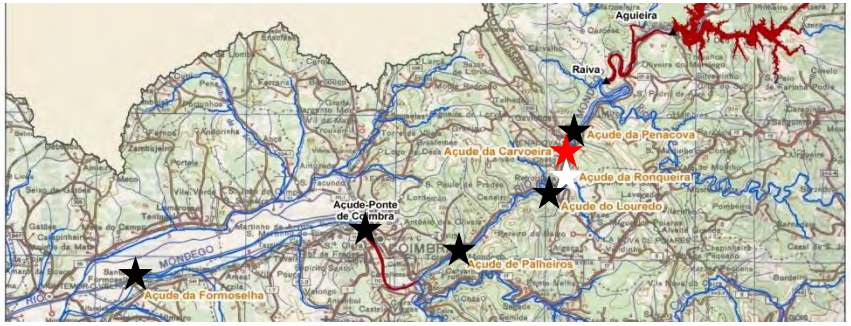
Caracteristicas PPP	
Height	1.8 m
Length	25.0 m
Width	9.6 m
Mean slope	7%
Number of rows	12

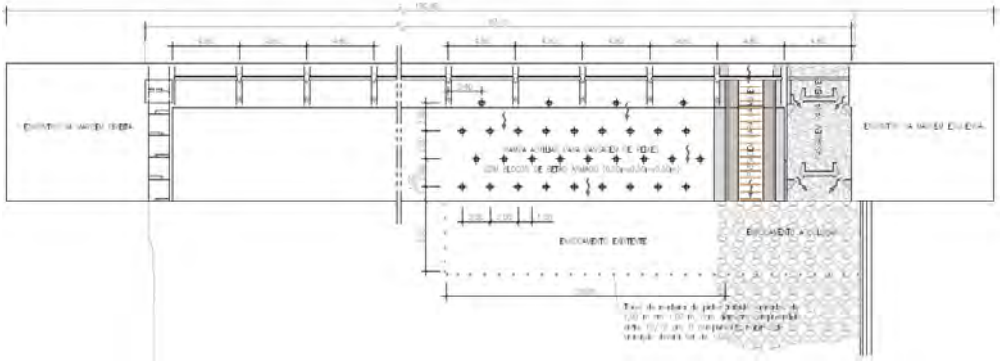


Reconquinho weir (low flow condition / Sep2015)

Reconquinho weir (*ca.* 80 m^3/s , Feb2017)

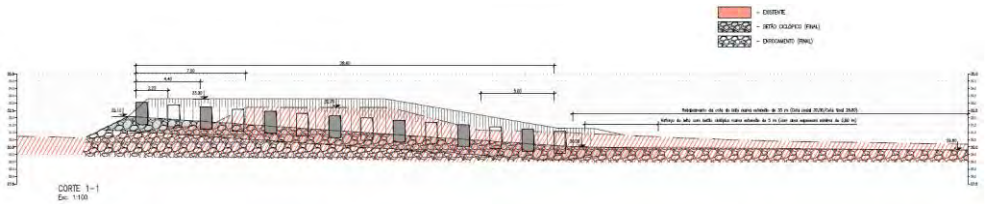
Caracteristicas PPP	
Height	0.4 m
Length	9.7 m
Width	4.8 m
Nr. pools	1



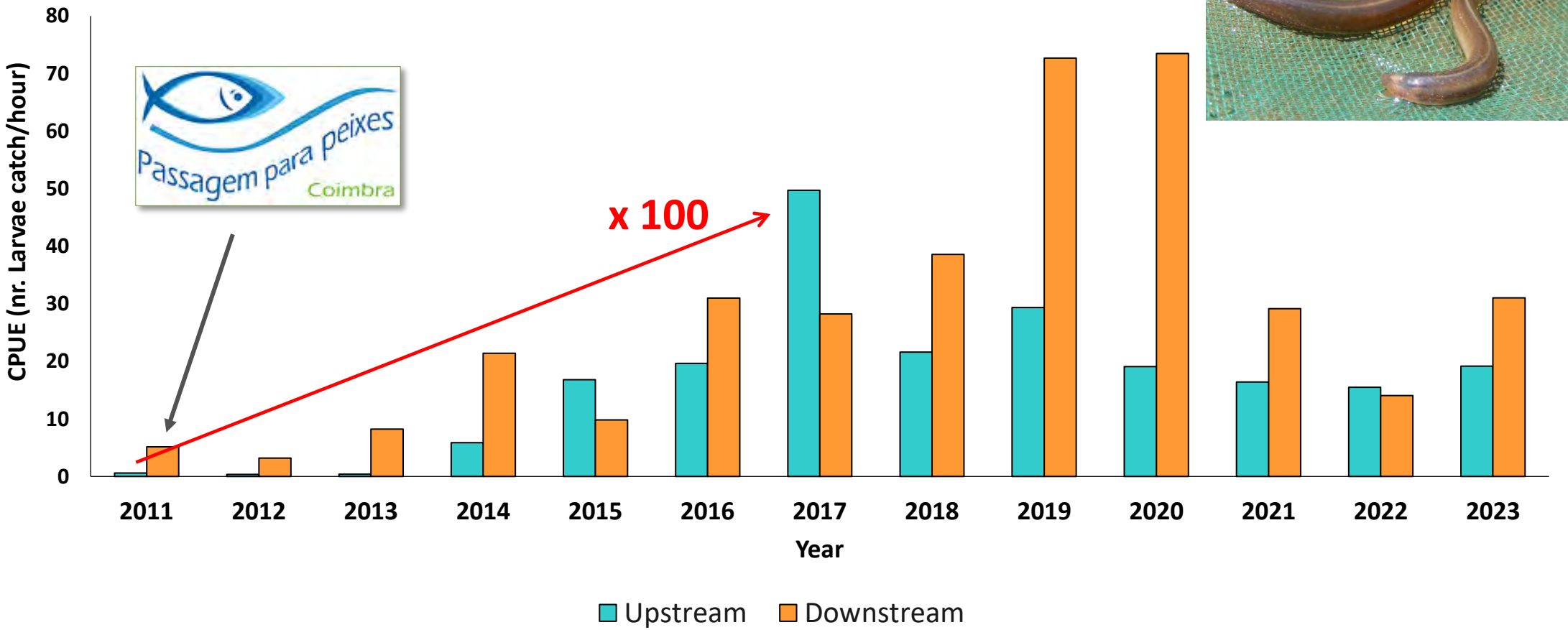


Penacova weir

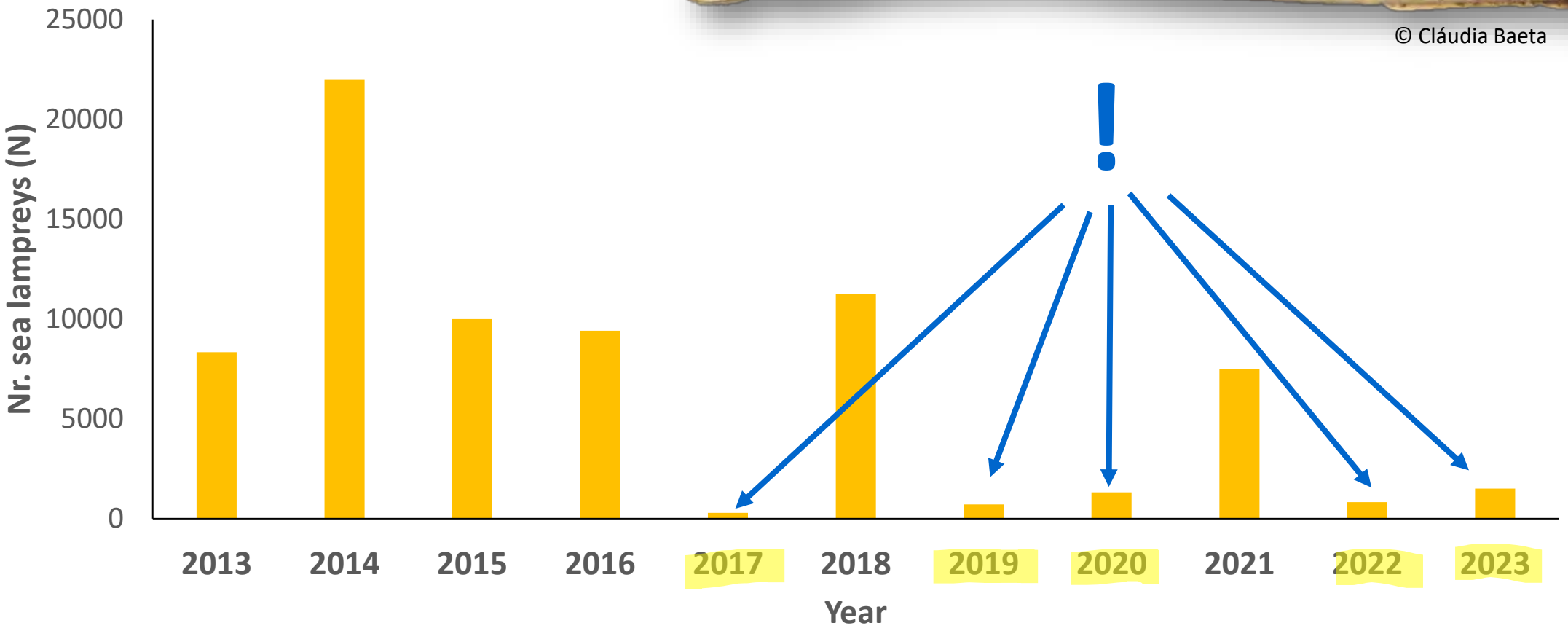
Caracteristicas	
Height	2.1 m
Length	30.0 m
Width	10.0 m
Mean slope	7%
Number of rows	15



Sea lamprey larvae abundance in River Mondego



Sea lamprey counts in the fish pass at Açude-Ponte de Coimbra dam (River Mondego)



LIFE ÁGUEDA

Conservation and management actions for migratory fish in the Vouga river basin

(LIFE16 ENV/PT/000411)

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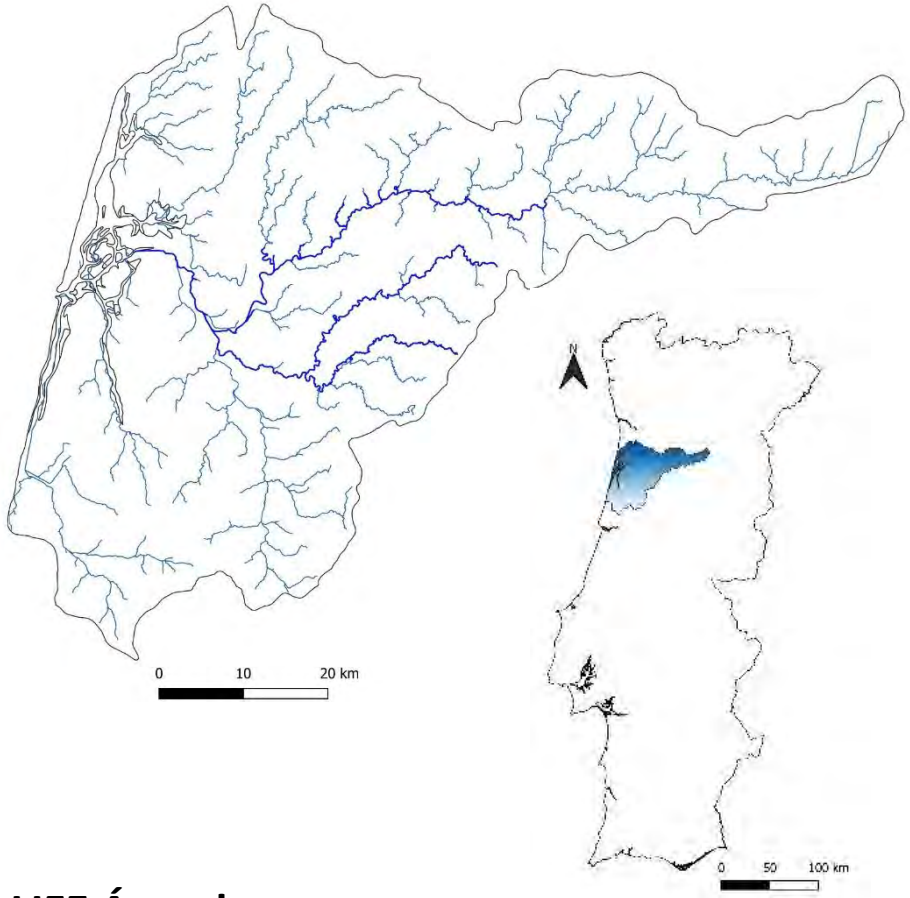
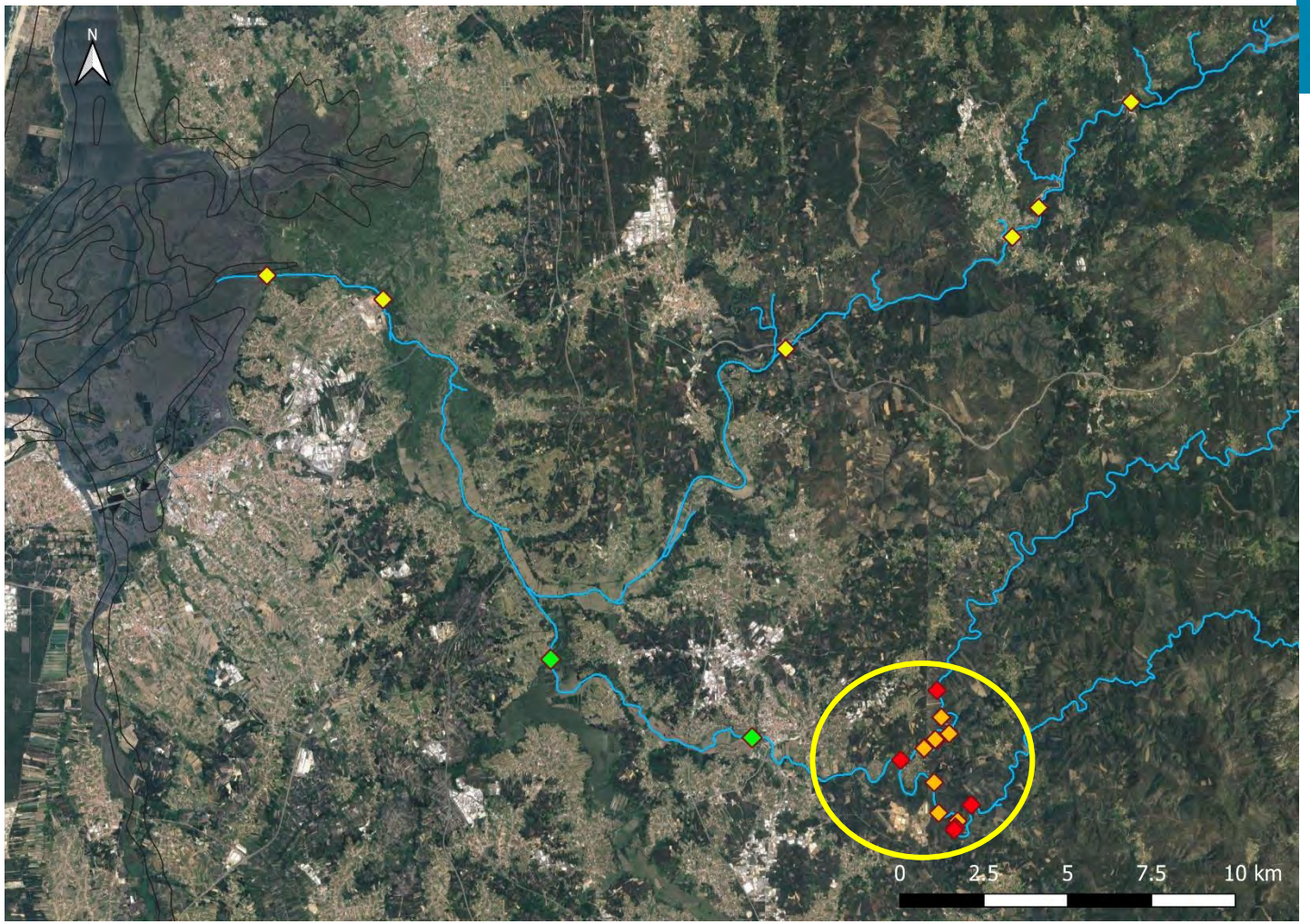
LIFE Águeda | Study Area





LIFE Águeda:

- ◆ - Type I (construction of fish passes) (#5)
- ◆ - Type II (structural modification or removal) (# 1 + # 6)
- ◆ - Operation management

LIFE Águeda | Barriers identification

REMOVAL OF 6 WEIRS

LIFE Águeda | Contact with the owners of the weirs / licensing procedure

- Explaining the project objectives;
- Ancient water mills' weirs (> 100 years old);
- Some legal issues regarding the rightful owners (several heirs);
- Obtaining an approval statement from all the owners;
- Licensing procedure (APA - Portuguese Environmental Agency);

- Public announcement in plenary meetings;
- Meetings with stakeholders;
- Public tender contract.

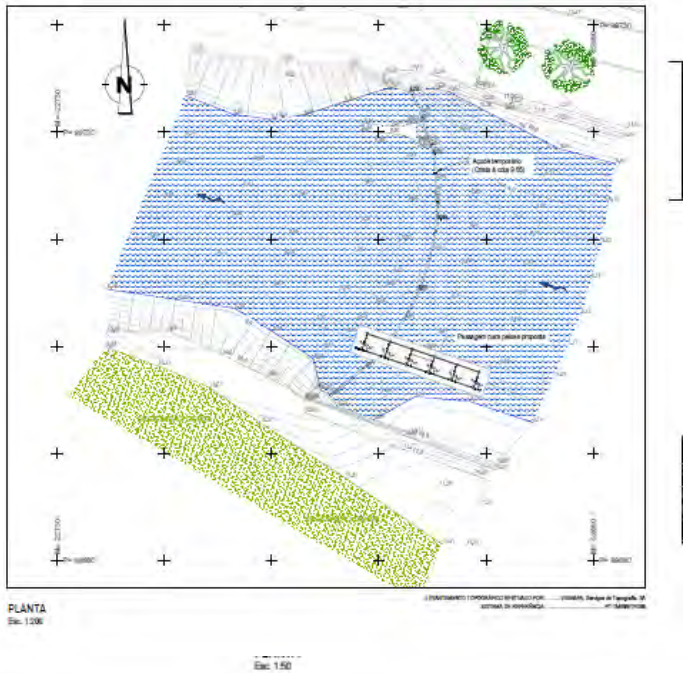

FINALY AFTER MORE THAN 2 YEARS!!!!
Demolition works: < 8h

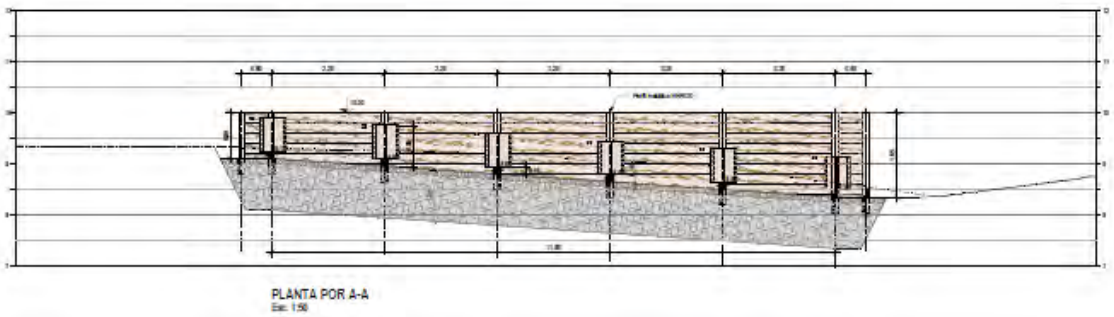
FINALY AFTER MORE THAN 2 YEARS!!!!
Demolition works: < 8h

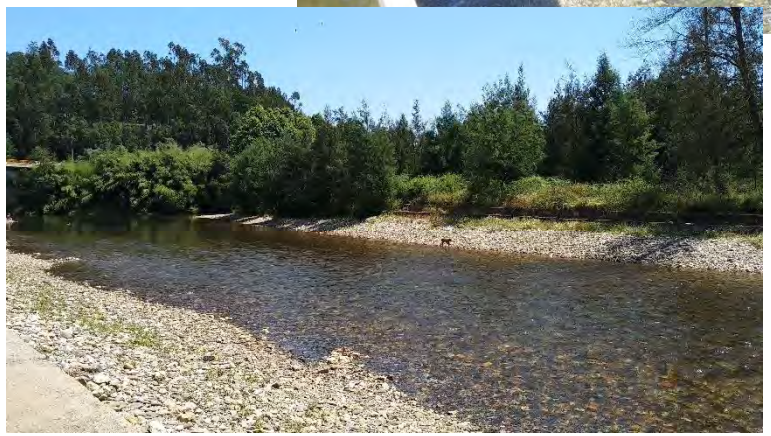
FINALY AFTER MORE THAN 2 YEARS!!!!
Demolition works: < 6h

Recreational weir (Parque Fluvial de Bolfiar – AG3), River Águeda

Removable fish pass construction (Parque Fluvial de Bolfiar – AG3), River Águeda

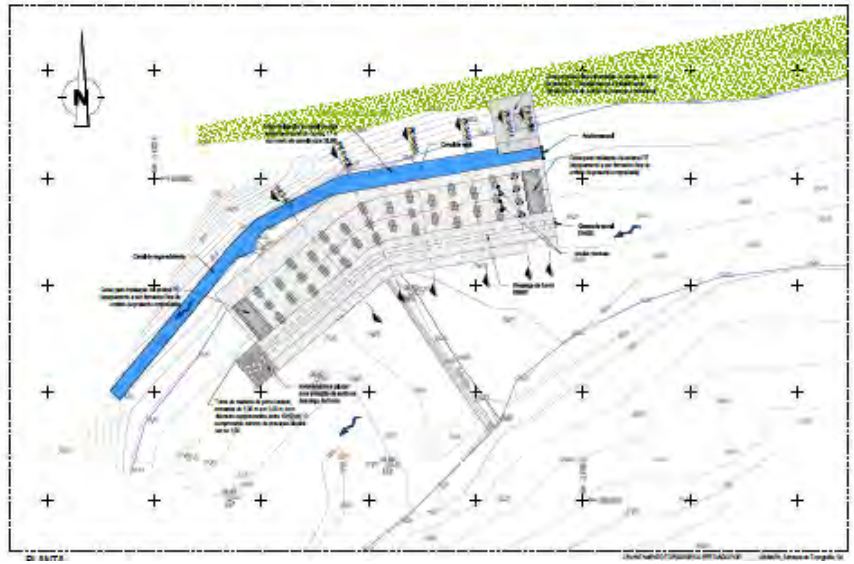


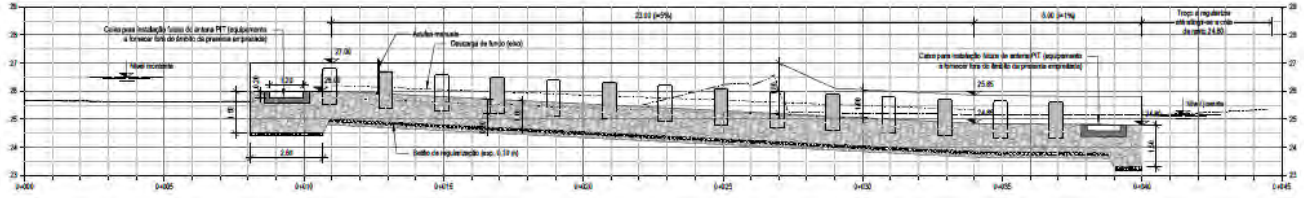




Removable fish pass construction (Parque Fluvial de Bolfiar – AG3), River Águeda

Water for irrigation purposes (Ag10 - Presa da Carvalha – River Águeda)





Water for irrigation purposes (Ag10 - Presa da Carvalha – River Águeda)

Water for drinking and household needs (Ag9 – Parque fluvial da Redonda – River Águeda)

[March 2022]

[March 2023]

Water for drinking and household needs (Ag9 – Parque fluvial da Redonda – River Águeda)

Public outreach

WORLD **FISH MIGRATION** DAY

Connecting fish, rivers and people

April 21 - 2018

www.worldfishmigrationday.com | #worldfishmigrationday

©Jason Ching

LIFE REVIVE

INNOVATIVE AND INTEGRATED SOLUTIONS TO MITIGATE HYDROMORPHOLOGICAL PRESSURES AND ENHANCE ECOLOGICAL STATUS IN THE LIMA AND VOUGA BASINS

LIFE-2023-SAP-ENV — Circular Economy & Quality of LIFE – Topic: Water

European Commission

MAIN OBJECTIVE:

Develop innovative and integrated solutions to mitigate hydromorphological pressures previously identified in RBMPs and enhance local and regional ecological status

- ✓ 8 BENEFICIARY PARTNERS
- ✓ 10 ASSOCIATED PARTNERS
- ✓ +30 SUPPORTING ENTITIES

1. RESTORATION OF RIVER CONNECTIVITY

2. CONTROL OF AQUATIC IAS

3. RESTOCKING/TRANSLOCATION INDICATOR SPECIES

TOTAL BUDGET PROPOSED: € 9 636 574.52

REQUESTED EU CONTRIBUTION (60%): € 5 781 944.71

Leading partner:

UNIVERSIDADE DE ÉVORA

Technical support:

MARE

AR NET AQUATIC RESEARCH NETwork

Other beneficiary partners:

ÁGUEDA CÂMARA MUNICIPAL

AQUALOGUS

FLUVIÁRIO DE MORA

MUNICÍPIO PONTE DE LIMA

FIGUEIRÓ DOS VINHOS

MUNICÍPIO ARCOS DE VALDEVEZ

fi group

Thank you!

Penacova Sea Lamprey Brotherhood