

Towards a sustainable and concerted eel stock management

Estibaliz Diaz
SUDOANG Coordinator

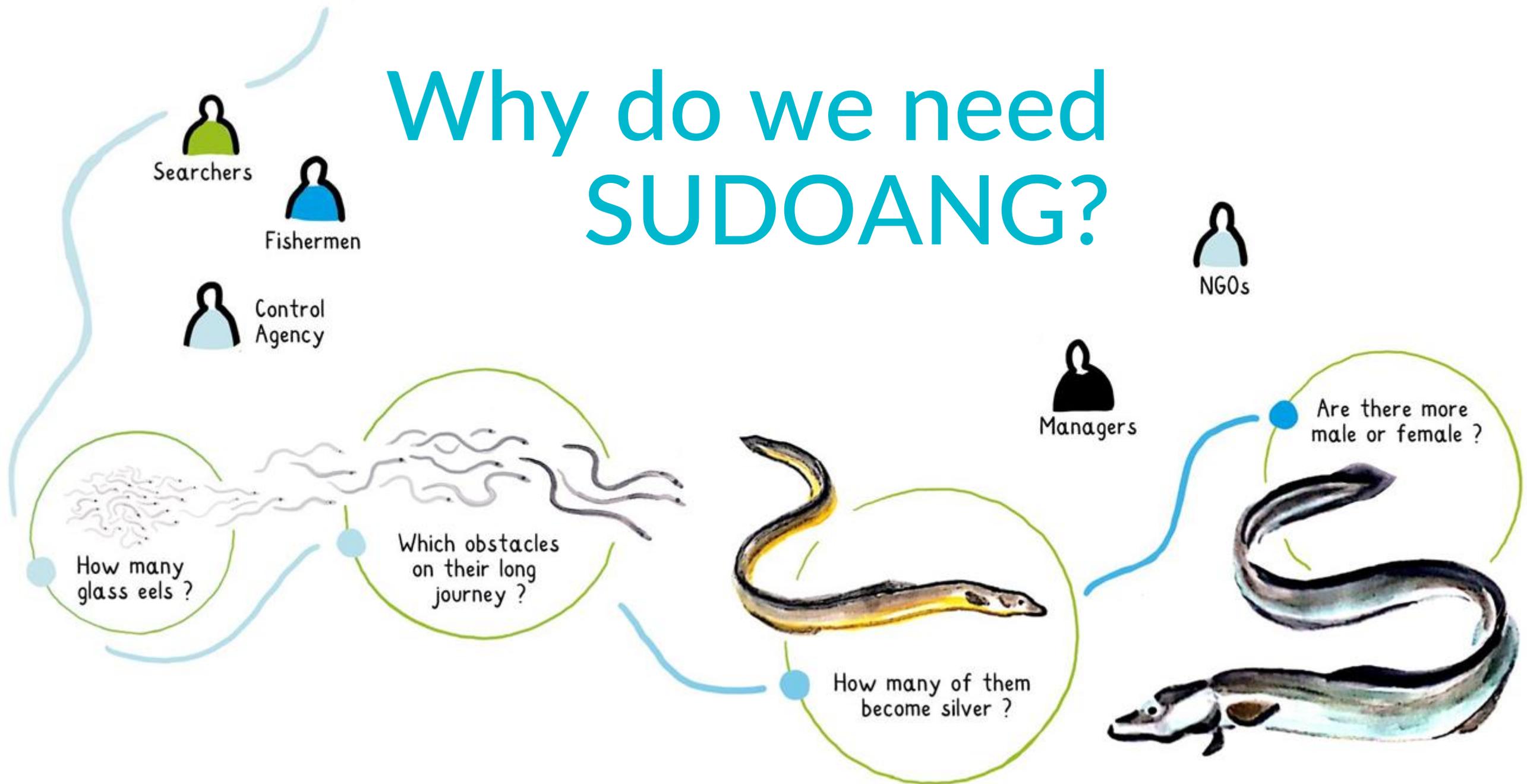
Sustainable Fisheries
Management Coordinator
(ICES)



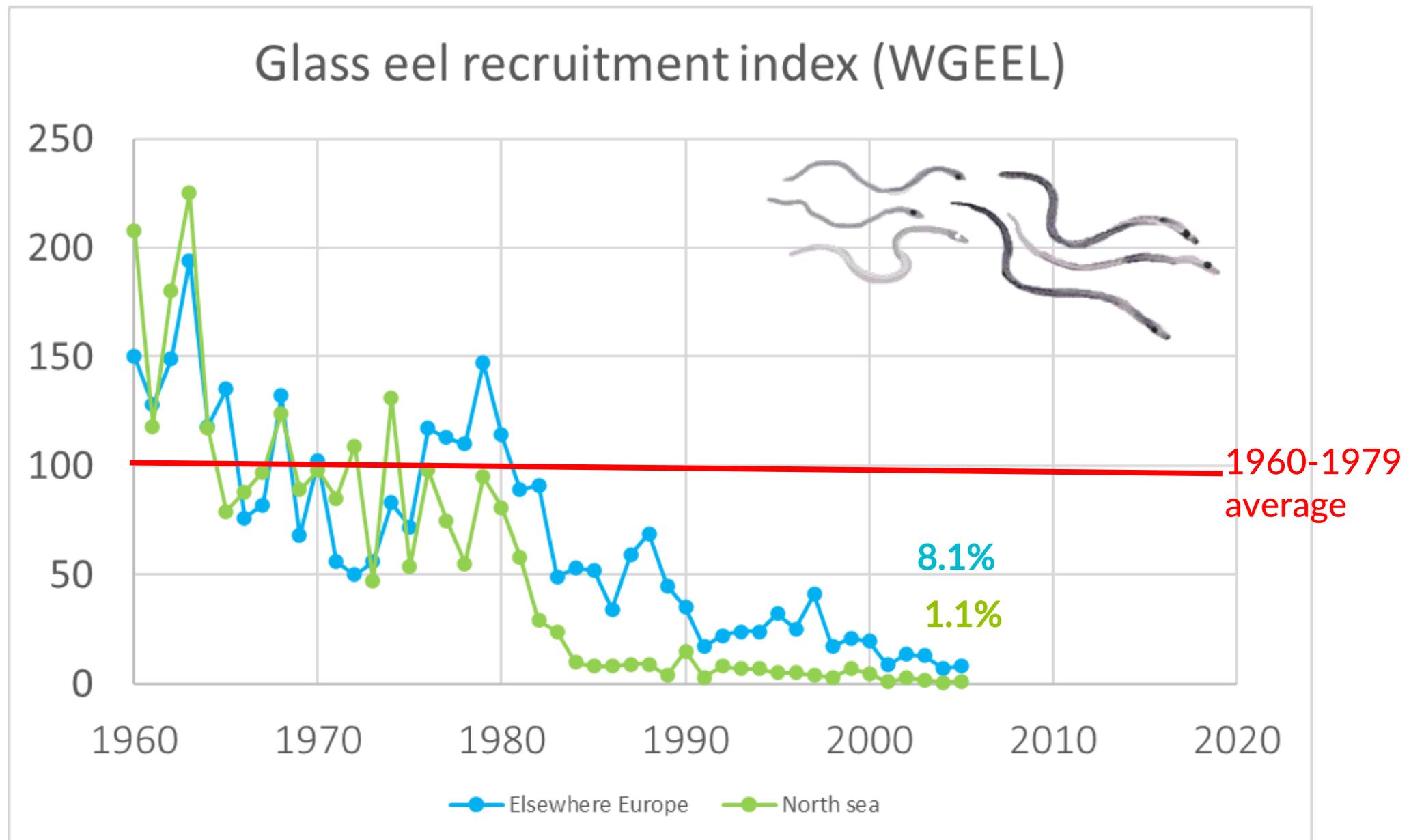
LOCAL AND GLOBAL INITIATIVES:

HOW SCIENCE SUPPORTS MANAGEMENT ACTIONS ON DIADROMOUS FISH

Why do we need SUDOANG?



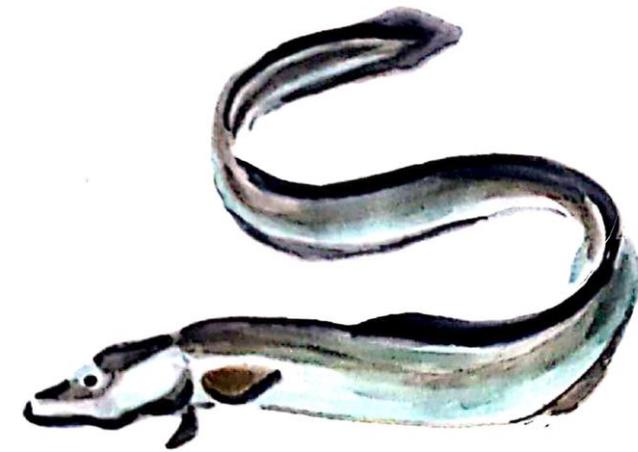
European eel decline





REGLAMENTO (CE) Nº 1100/2007 DEL CONSEJO
de 18 de septiembre de 2007

por el que se establecen medidas para la recuperación de la población de anguila europea



Appendix II



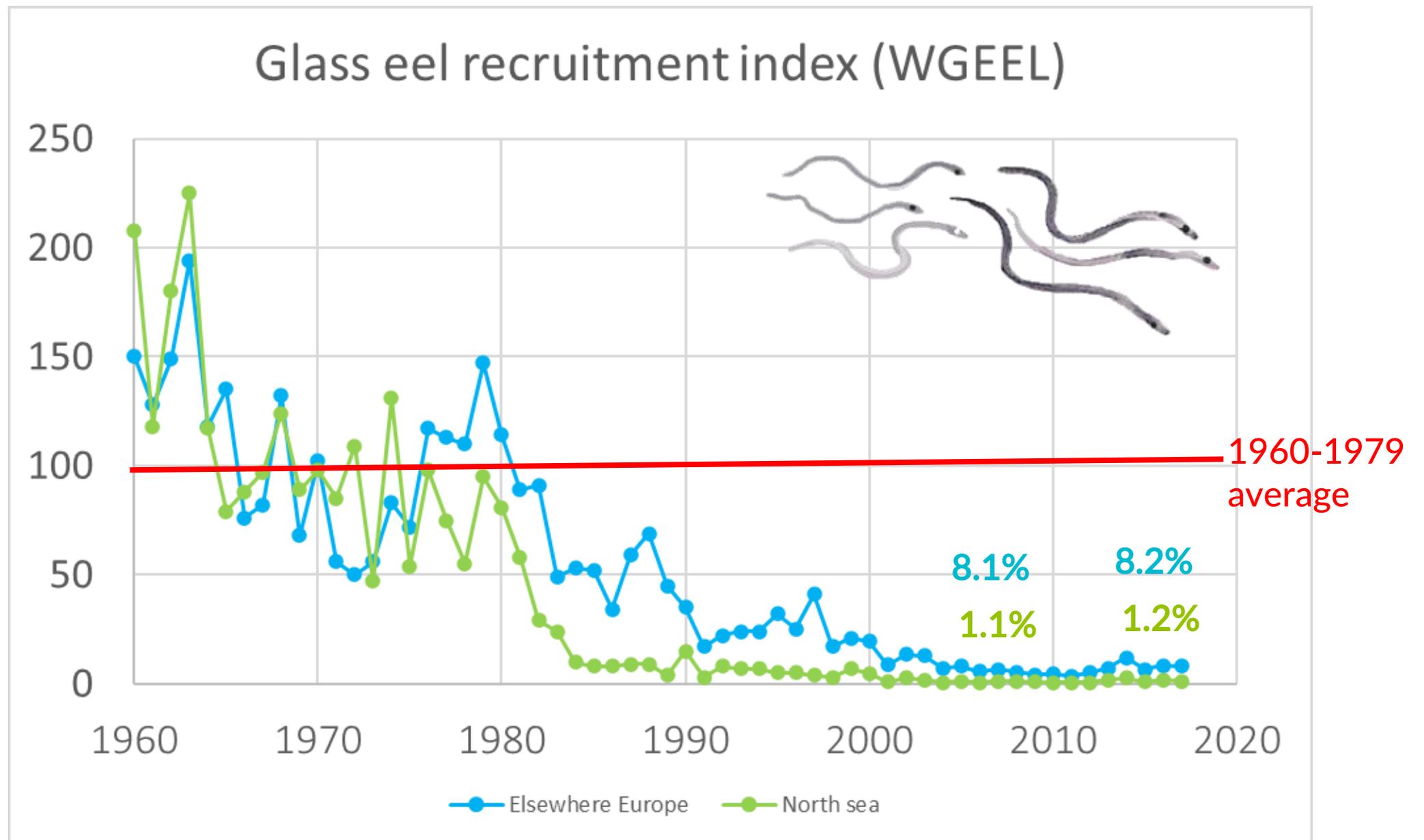
Appendix II



General Fisheries Commission
for the Mediterranean
Commission générale des pêches
pour la Méditerranée



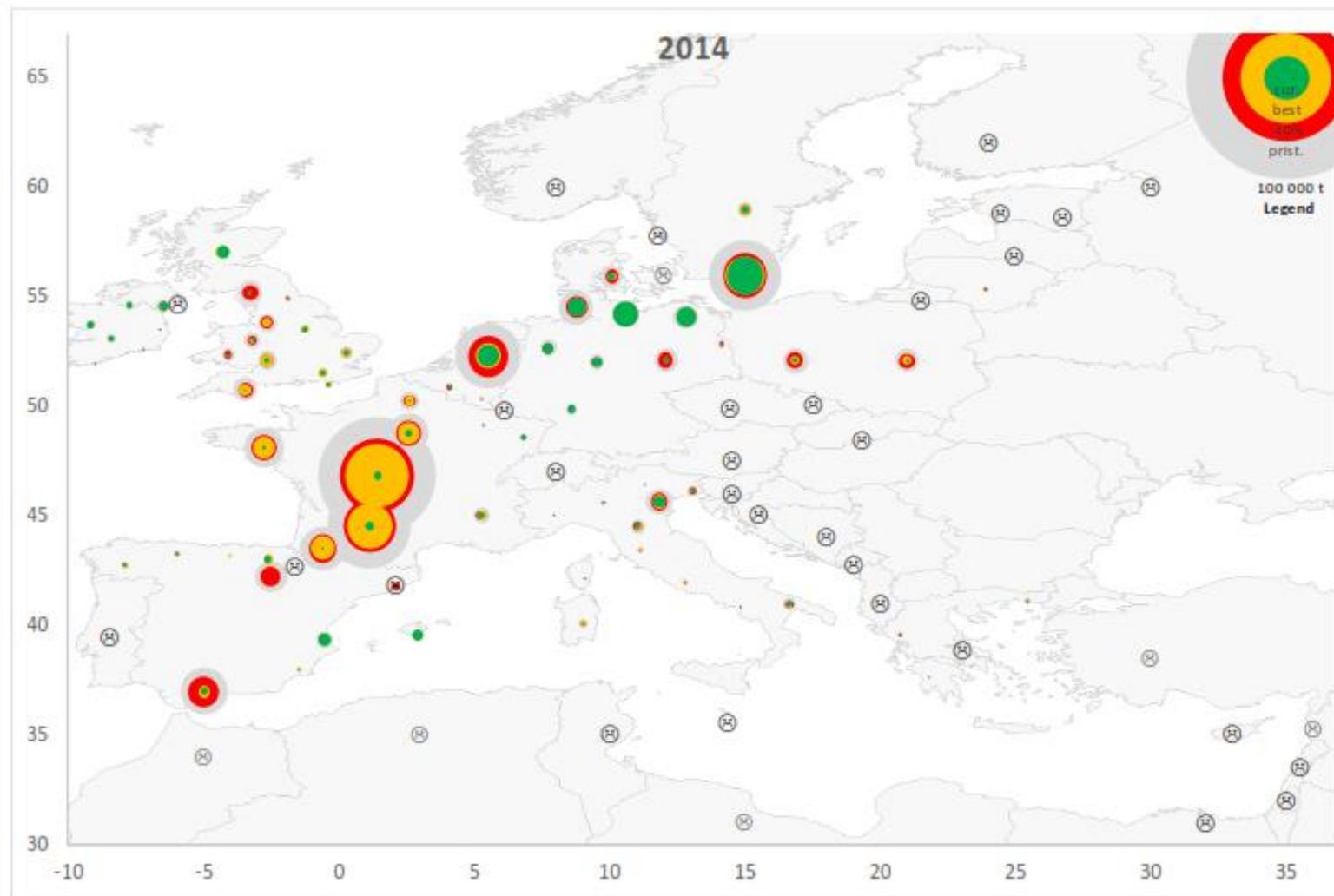
European eel decline



Diagnosis



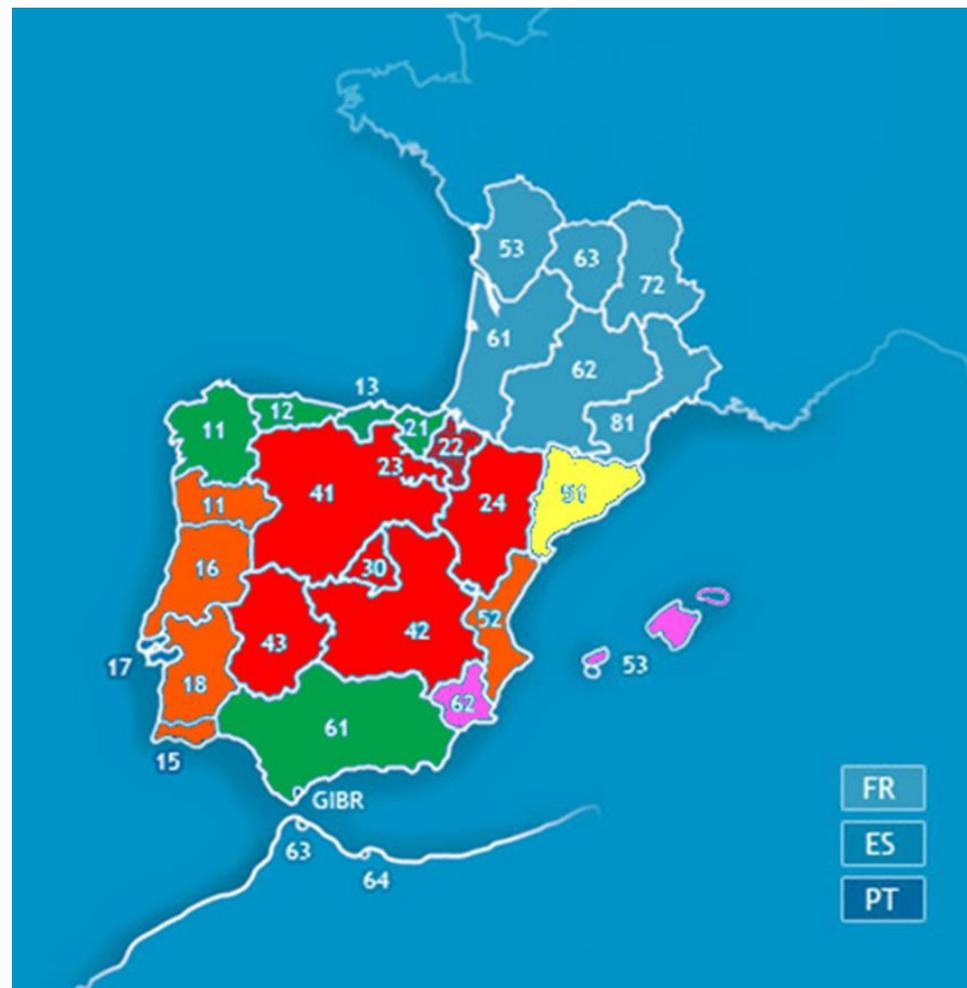
1. Problem: diversity of assessment methods



ICES. 2016. Report of the Joint EIFAAC/ICES/GFCM Working Group on Eel

"Data and knowledge gaps and variability in data collection formats and the level of detail and coverage restrict the value of international population assessment."

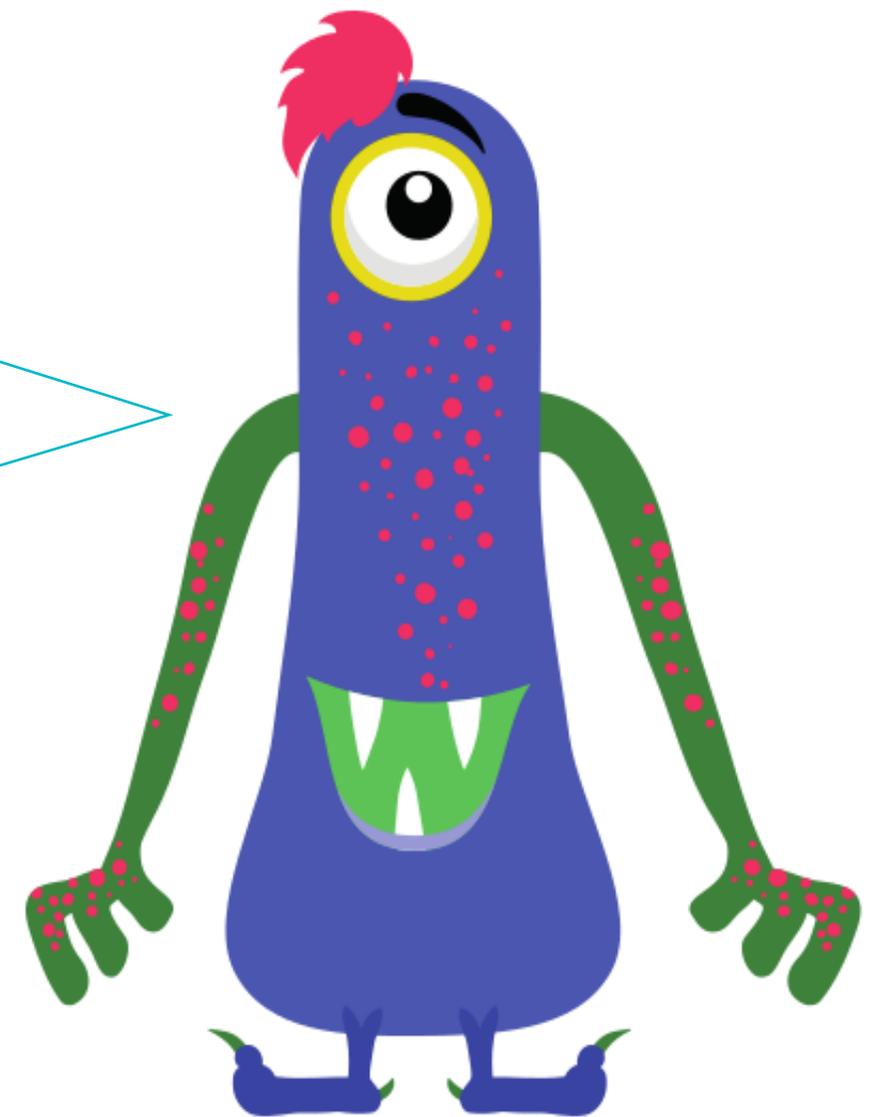
1. Problem: diversity of assessment methods



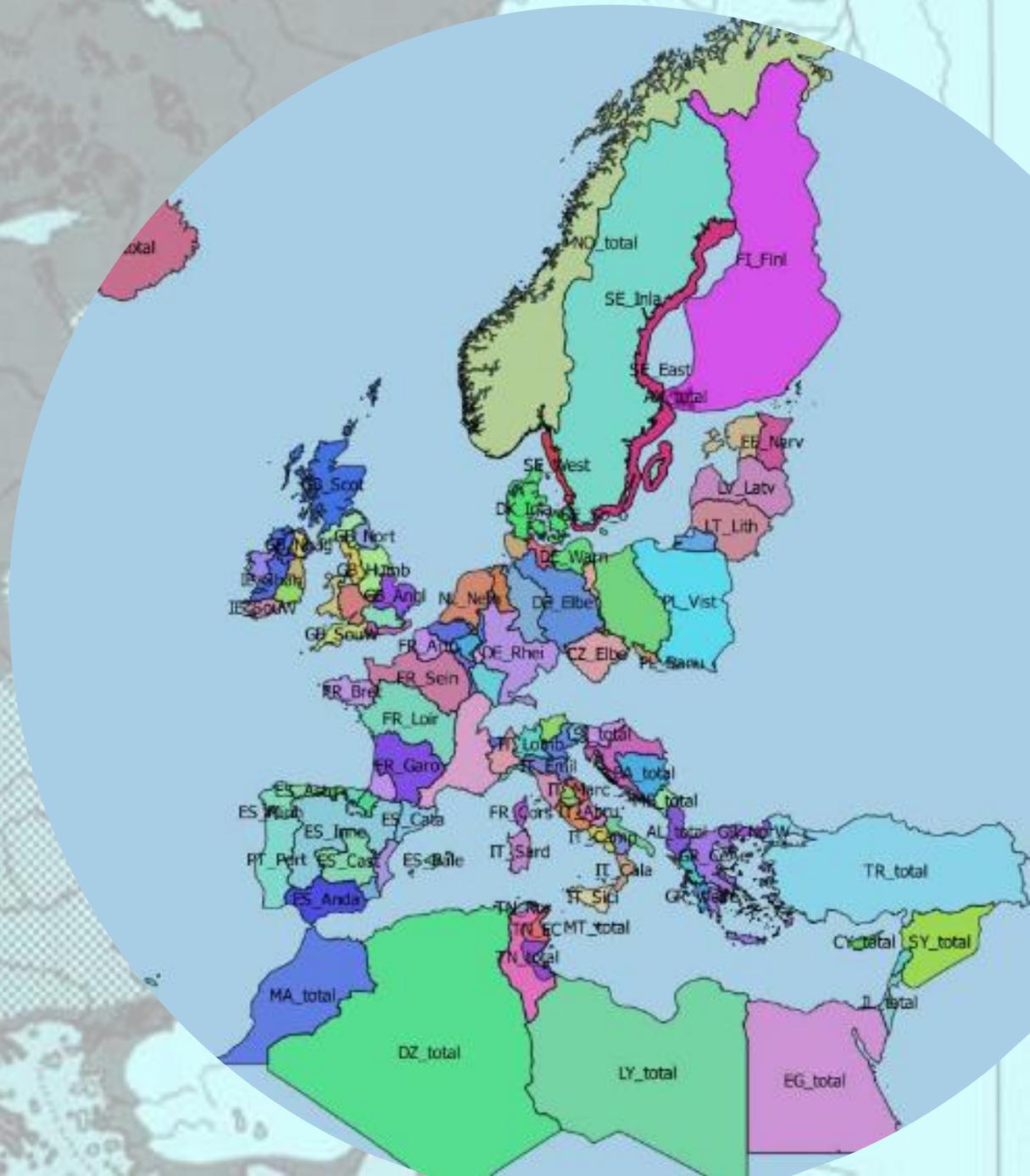
-  Average eletrofishing productivity values extrapolated to the whole basin
-  Calculated in 2010 with reference eletrofishing productivity values. Not updated since then
-  Reference values of the Rhone of 2008 French EMP
-  Old fishing yield data. Not updated
-  No current population

2. Problem: Knowledge gaps

Feed the monster



3. Problem: Very complex management



Many threats, many managers

22.9.2007

ES

Diario Oficial de la Unión Europea

L 248/17

REGLAMENTO (CE) Nº 1100/2007 DEL CONSEJO

de 18 de septiembre de 2007

por el que se establecen medidas para la recuperación de la población de anguila europea

Threat	Related Directives and Conventions
River connectivity	Water Framework Directive, Renewable Energies Directive,
Habitat quality and contaminants	Water Framework Directive, Marine Strategy Framework Directive, Directive of natural habitats and of wild fauna and flora
Unsustainable fishery	Common Fisheries Policy
Illegal trade	CITES, EU Action Plan against Wildlife Trafficking

Many threats, many managers

22.9.2007

ES

Diario Oficial de la Unión Europea

L 248/17

REGLAMENTO (CE) Nº 1100/2007 DEL CONSEJO

de 18 de septiembre de 2007

por el que se establecen medidas para la recuperación de la población de anguila europea

Threat	Related Directives and Conventions	National Competent authority
River connectivity	Water Framework Directive, Renewable Energies Directive,	Hydrographic Confederations (Ministry for Ecological Transition)
Habitat quality and contaminants	Water Framework Directive, Marine Strategy Framework Directive, Directive of natural habitats and of wild fauna and flora	Hydrographic Confederations biodiversity managers (Ministry for Ecological Transition)
Unsustainable fishery	Common Fisheries Policy	Ministry of Fisheries, Agriculture and Food,
Illegal trade	CITES, EU Action Plan against Wildlife Trafficking	Internal Affairs Ministry (SEPRONA), Ministry of Industry, Trade and Tourism (CITES administrative), (Ministry for Ecological Transition (CITES Scientific)

Many threats, many managers

22.9.2007

ES

Diario Oficial de la Unión Europea

L 248/17

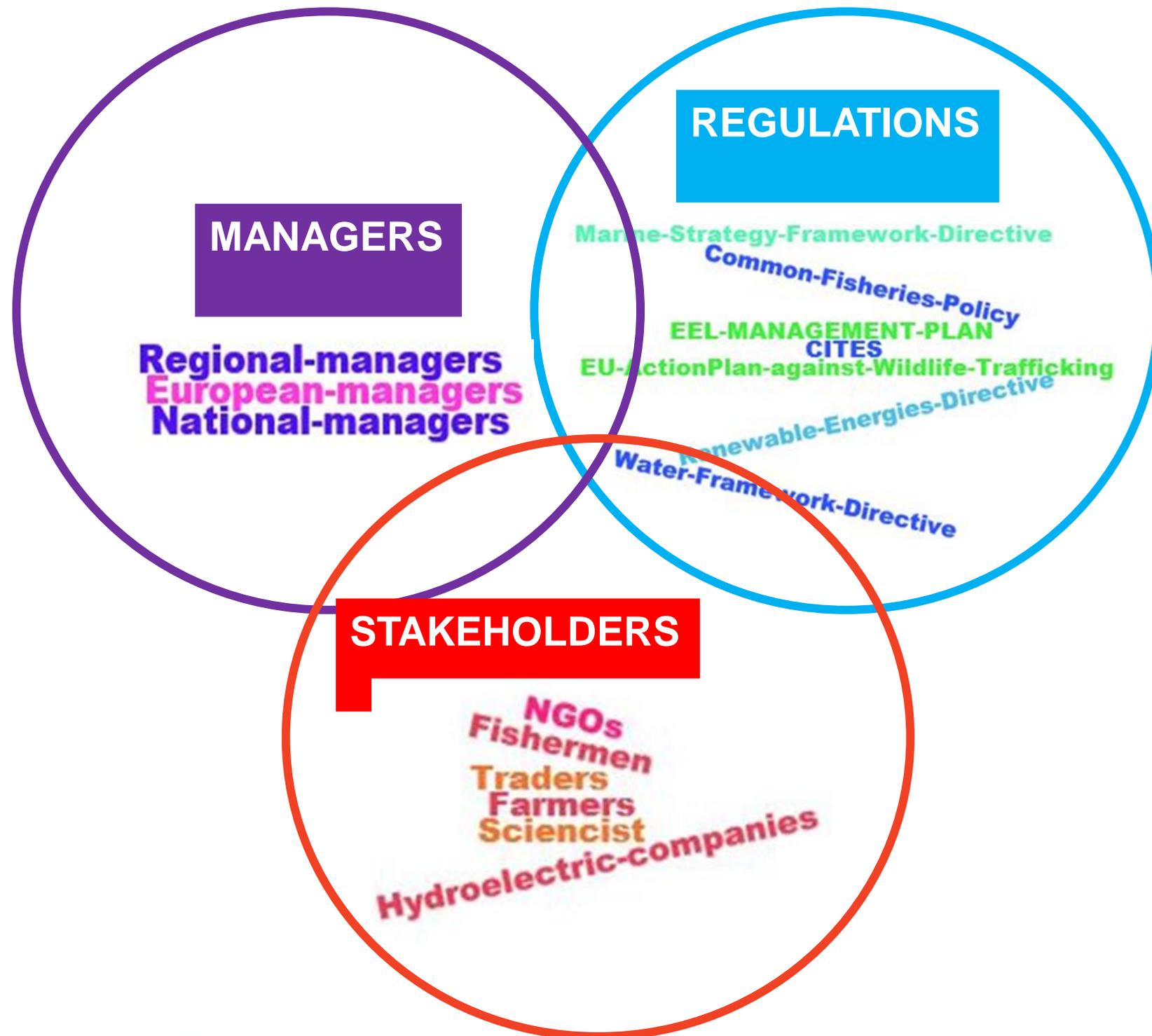
REGLAMENTO (CE) Nº 1100/2007 DEL CONSEJO

de 18 de septiembre de 2007

por el que se establecen medidas para la recuperación de la población de anguila europea

Threat	Related Directives and Conventions	National Competent authority	Regional Competent authority
River connectivity	Water Framework Directive, Renewable Energies Directive,	Hydrographic Confederations (Ministry for Ecological Transition)	Water related regional authorities
Habitat quality and contaminants	Water Framework Directive, Marine Strategy Framework Directive, Directive of natural habitats and of wild fauna and flora	Hydrographic Confederations biodiversity managers (Ministry for Ecological Transition)	Water related regional authorities, biodiversity and hábitat related regional authorities
Unsustainable fishery	Common Fisheries Policy	Ministry of Fisheries, Agriculture and Food,	Regional fishery managers, regional fishery control forces
Illegal trade	CITES, EU Action Plan against Wildlife Trafficking	Internal Affairs Ministry (SEPRONA), Ministry of Industry, Trade and Tourism (CITES administrative), (Ministry for Ecological Transition (CITES Scientific)	Regional fishery control forces

3. Problem: Very complex management

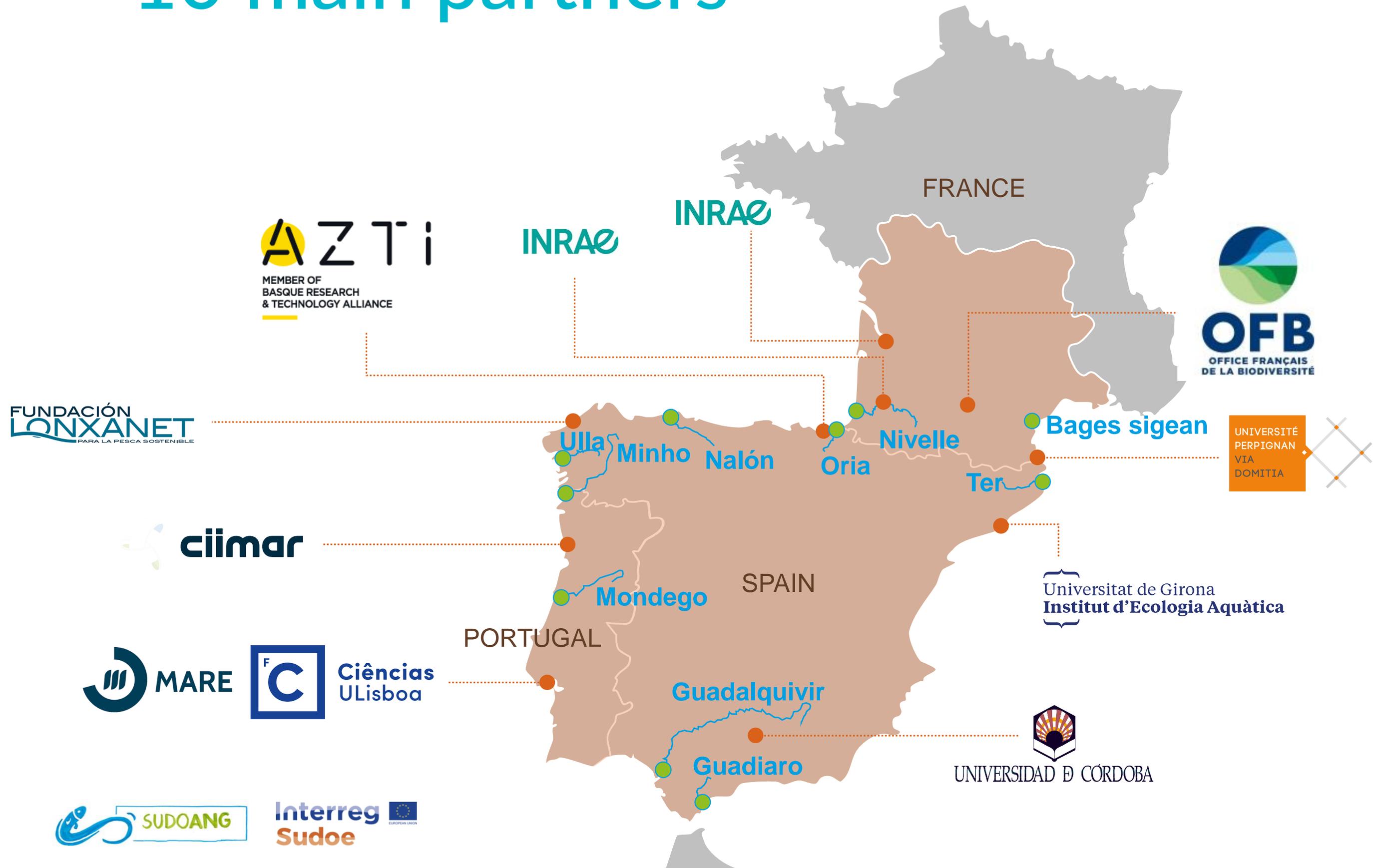


GENERAL OBJECTIVE

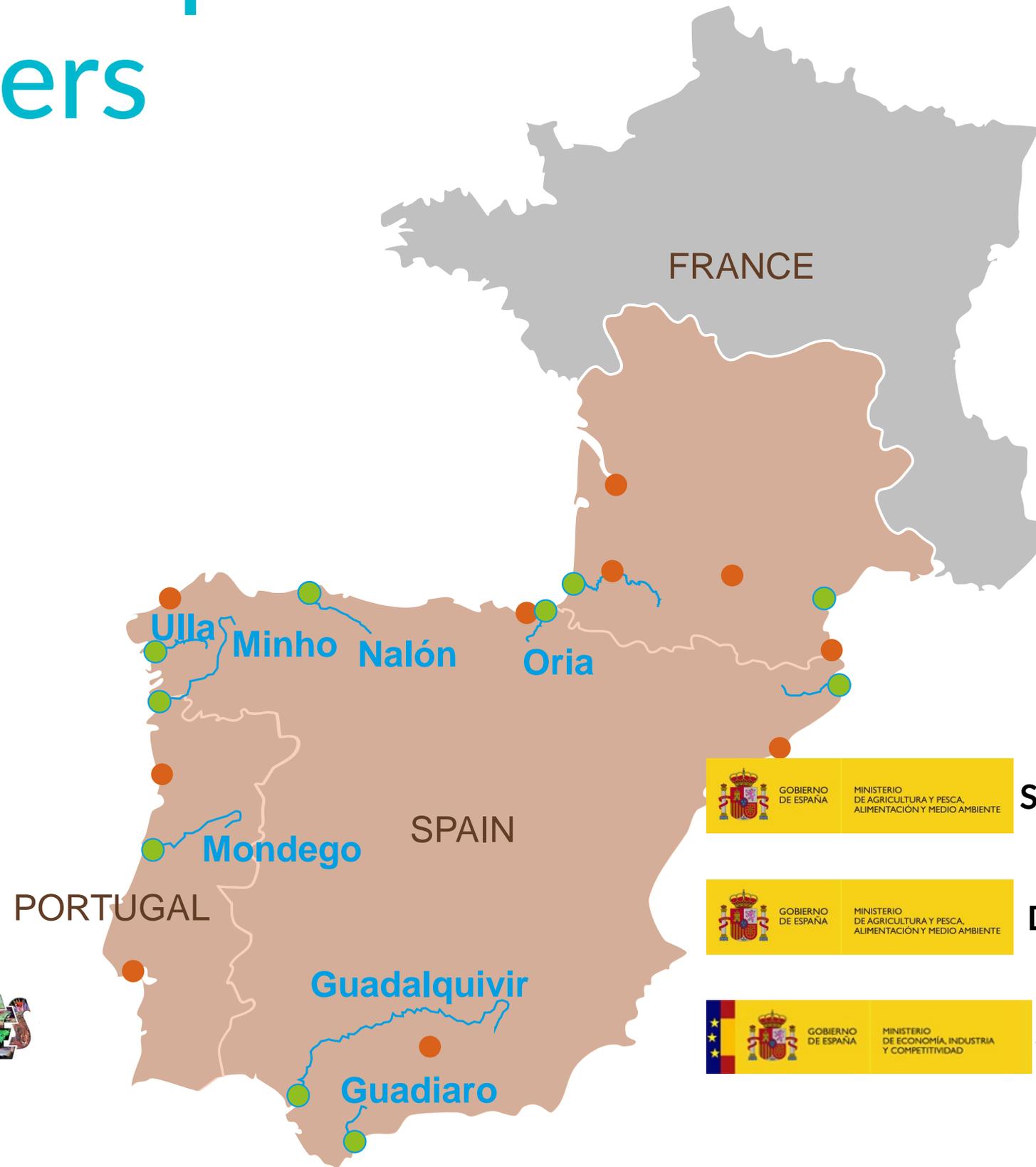
To promote concerted and sustainable management of eel in the SUDOIE area

Problem	Objective
1. Diversity of assessment methods	1. Provide common assessment tools to stakeholders involved in eel management in the SUDOIE area.
2. Knowledge gaps	2. Design a strategy for the collection of data to monitor the eel stock in the SUDOIE area in a coordinated way in the long-term
3. Very complex management	3. Facilitate the governance of eel in the SUDOIE area by fostering dialogue between eel management stakeholders

10 main partners



Associate partners: 7 national managers



Secretaría General de Pesca



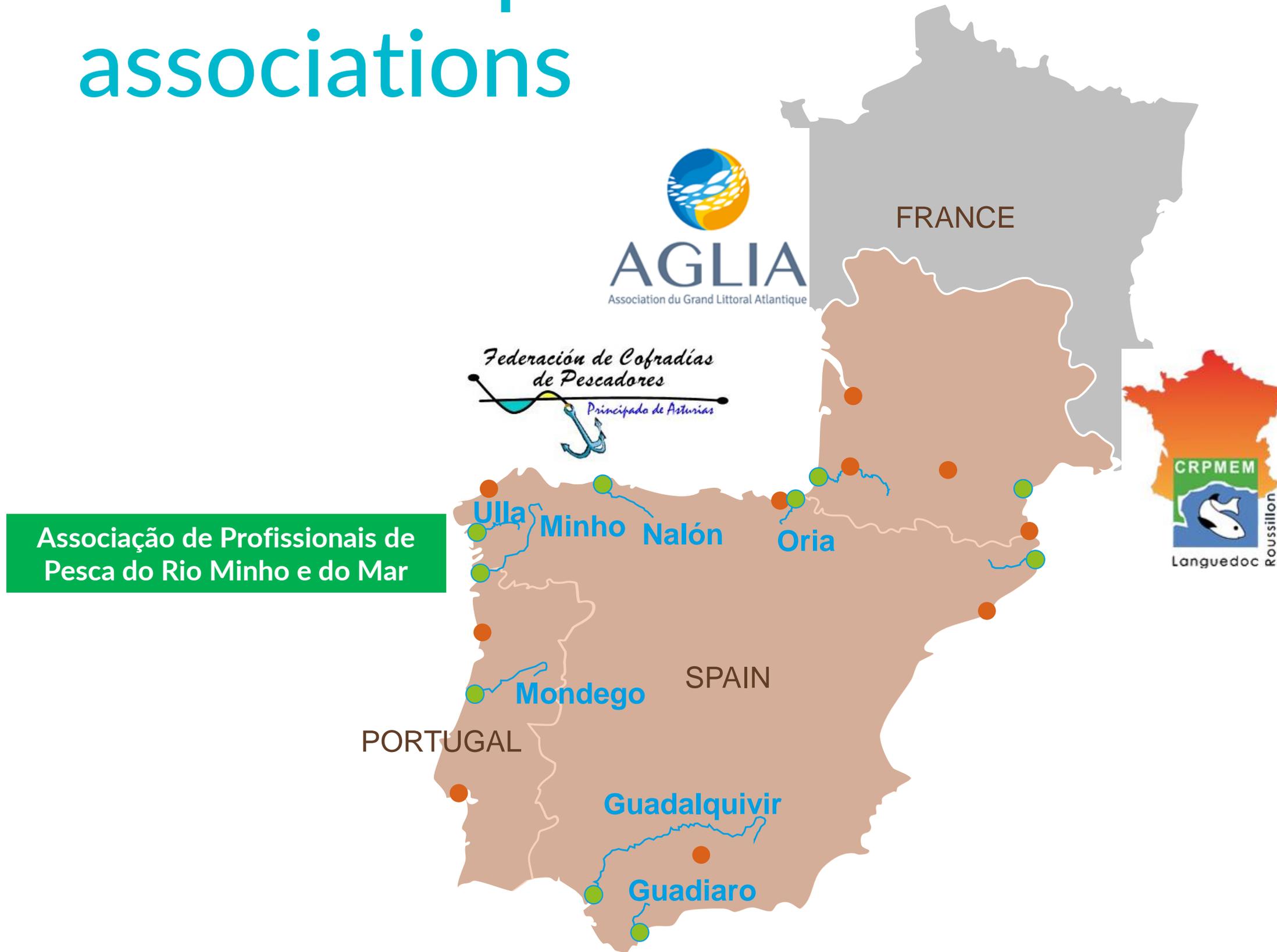
Dirección General del Agua



Associate partners: 11 regional and local managers



Associate partners: 4 fishermen associations



Associate partners: 5 control agencies

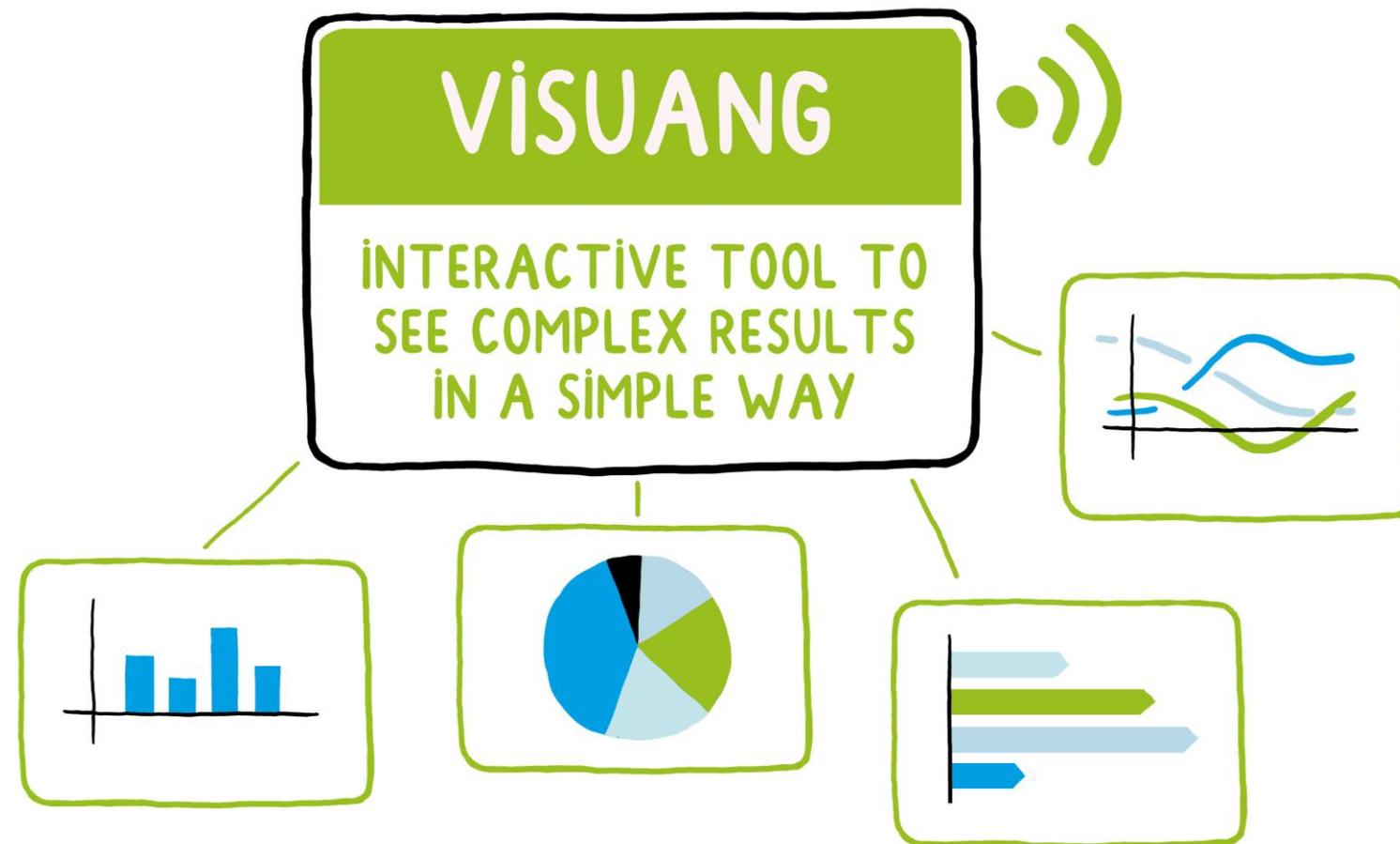


Associate partners: 5 related to conservation or research



30 Associate partners



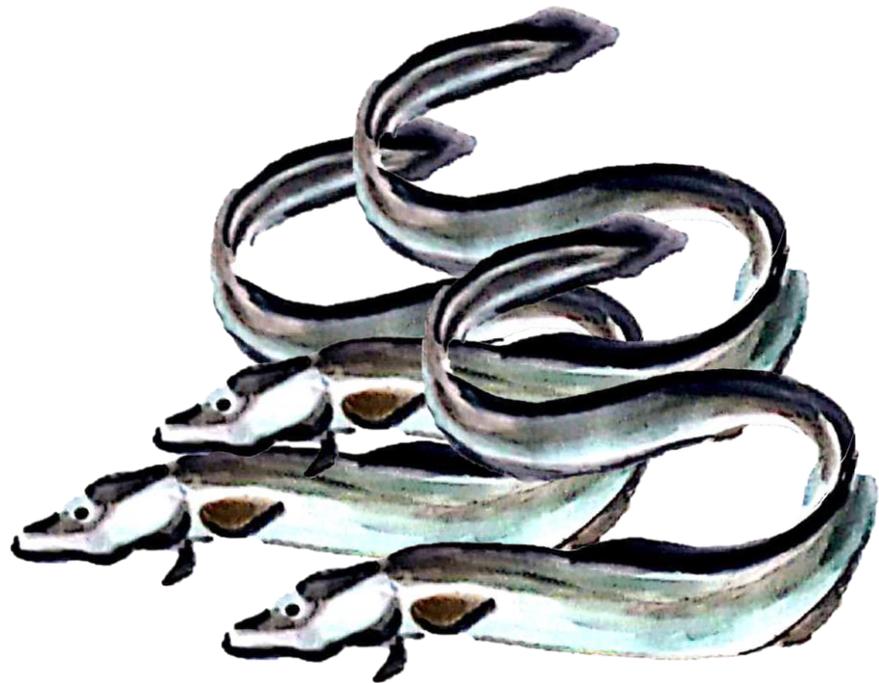


Objective 1. Provide common assessment tools to stakeholders involved in eel management in the SUDOEE area

We need common assessment methods

but for which indicators?

Which indicators?

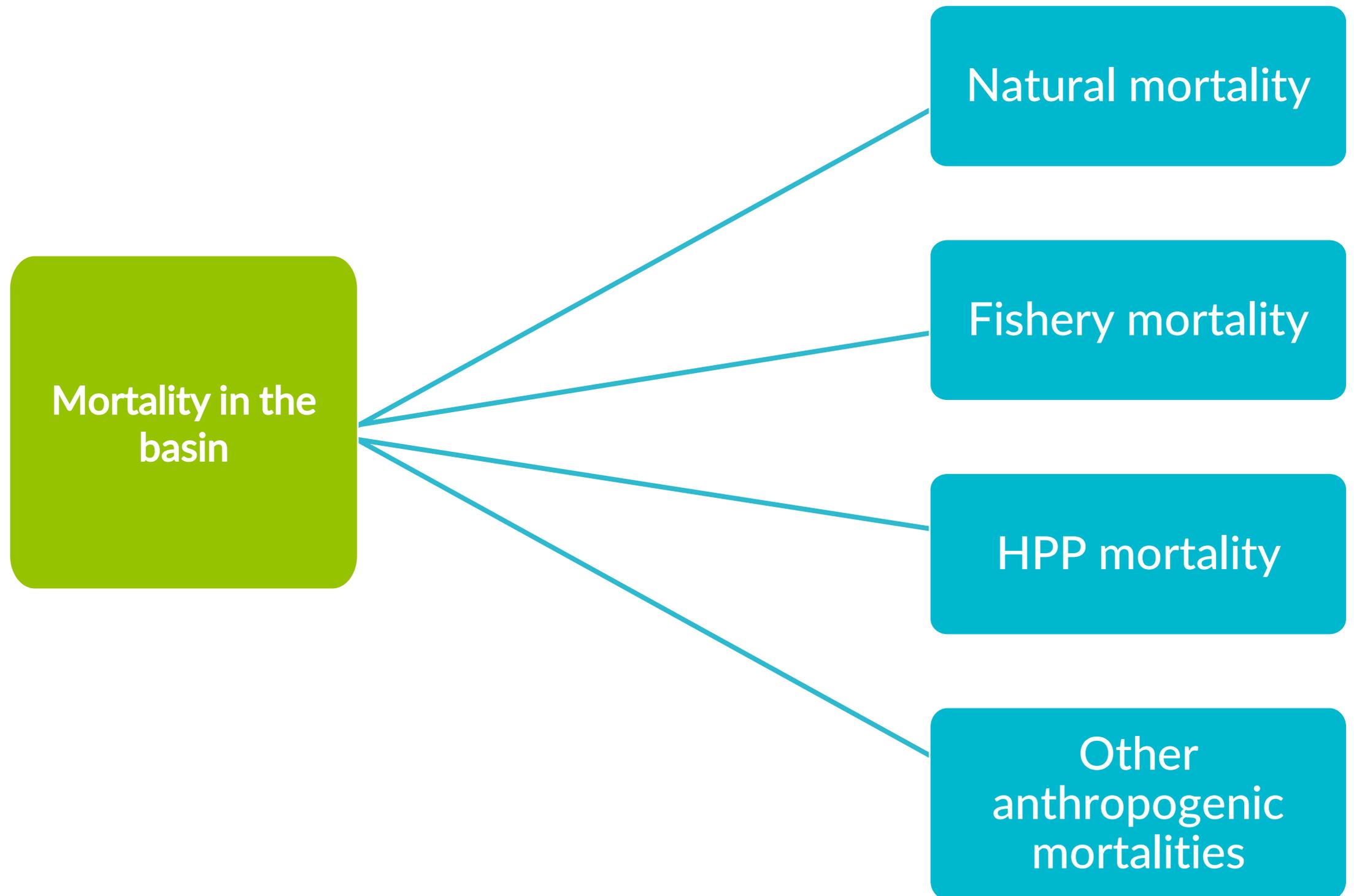


=

Mortality in the basin



Which indicators?

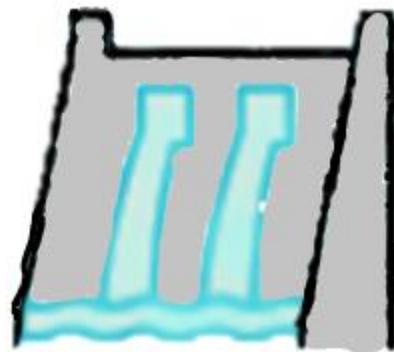


Methods: models

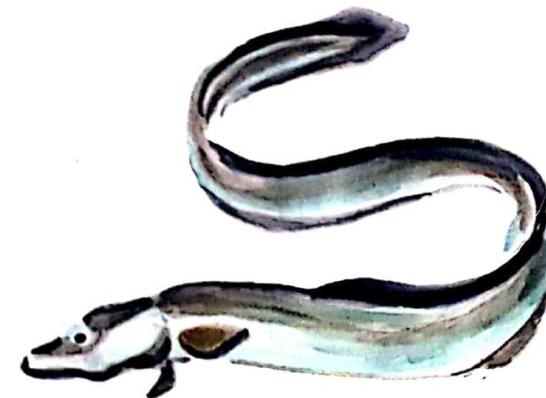
GEREM



HPP mortality



EDA



Methods: code & data base at www.sudoang.eu



Data collection

Led by AZTI

Objective
To build the database to supply the models.

Activities

Construct a spatial database with the environmental and geographical characteristics of the rivers	Compile information on the eel in the SUDOE zone	Create the atlas on eel distribution and abundance
↓ Protocol and template for river data collection	↓ Tool to automatically import and update data	↓ Seminar ↓ Eel database
↓ Database of rivers in the SUDOE area		



Estimation of barrier-related mortality

Led by OFB

Objective
Estimate the impact of the turbines and compare it with the results of the silver eel biomass.

Activities

Defining the data to be collected	Estimate barrier-related mortality	Create an interactive map
↓ Data collection manual	↓ Database collection and storage	↓ Interactive map
↓ Conceptual and physical database model	↓ Report on estimates of barrier-related mortality	
	↓ Manual to estimating barrier-related mortality	



Recruitment

Led by INRAE

Objective
Estimate the recruitment and exploitation rate at three spatial scales: SUDOE area, regions and river basins.

Activities

Estimate recruitment	Results transfer
↓ Technical report: data inventory (in French)	↓ Scientific article
↓ Technical report: application of the GEREM model (in French)	↓ Attending international symposiums and WGEEEL



Escapement

Led by OFB

Objective
Estimate the silver eel biomass in the SUDOE area.

Activities

Estimate escapement	Transfer results of implementation of the model	Produce a silvering model for the SUDOE area
↓ Report	↓ Scientific article	↓ Map of silver eel in the SUDOE zone

Methods: SUDOANG youtube channel

Interreg Sudoe EUROPEAN UNION SUDOANG

Progress in the estimation of recruitment (GT3)

Hilaire DROUINEAU Marie VANACKER INRAE

Maria KORTA AZTI MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Bueno, hola. Me conocen, Hilaire Drouineau de INRAE.

vokoscreen webcam

Interreg Sudoe EUROPEAN UNION SUDOANG

Eel Density Analysis (EDA 2.3)

Escapement of silver eels (*Anguilla anguilla*) from French, Spanish and Portuguese rivers

M. Mateo¹, L. Beaulaton², H. Drouineau³, E. Díaz¹ and C. Briand⁴

² OFB-INRAE-Agrocampus Ouest-UPPA pour la gestion des migrat

AZTI MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

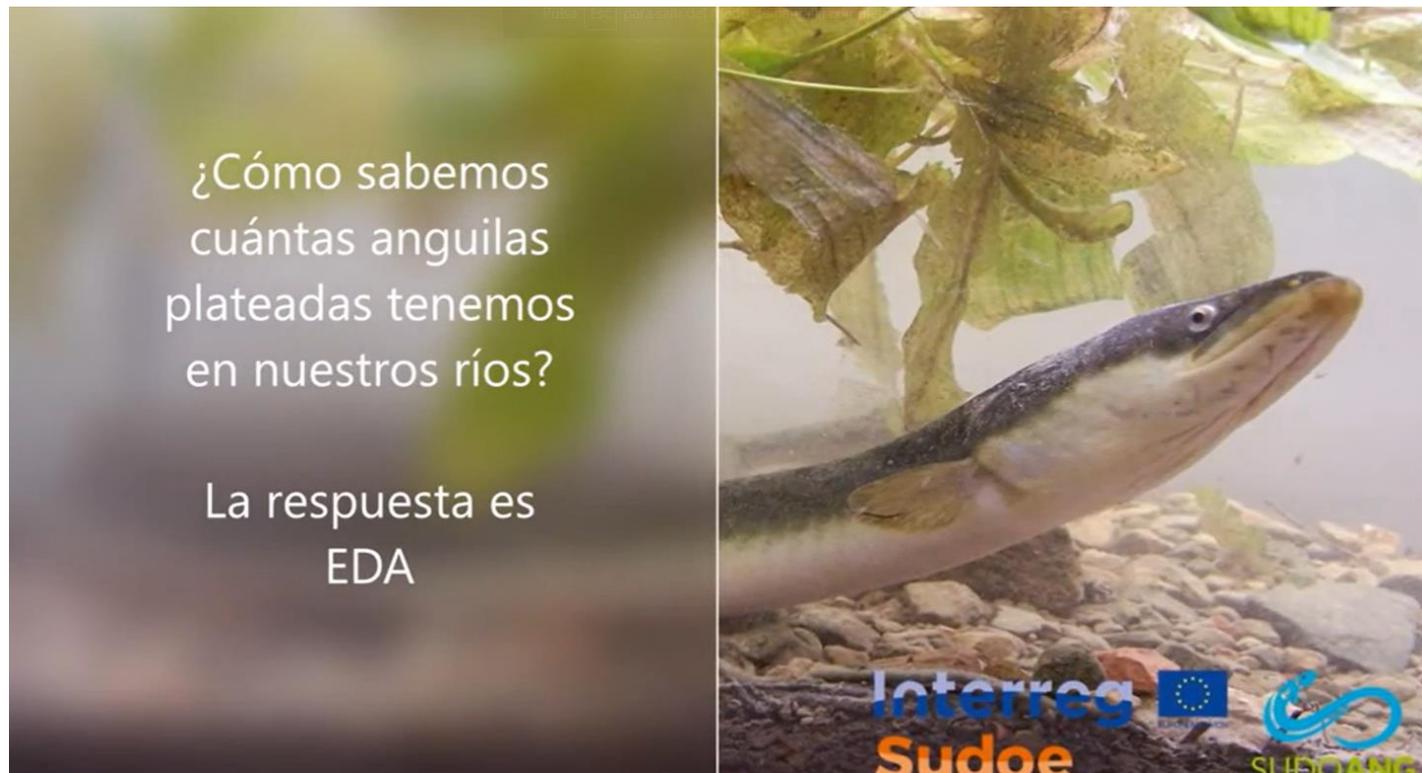
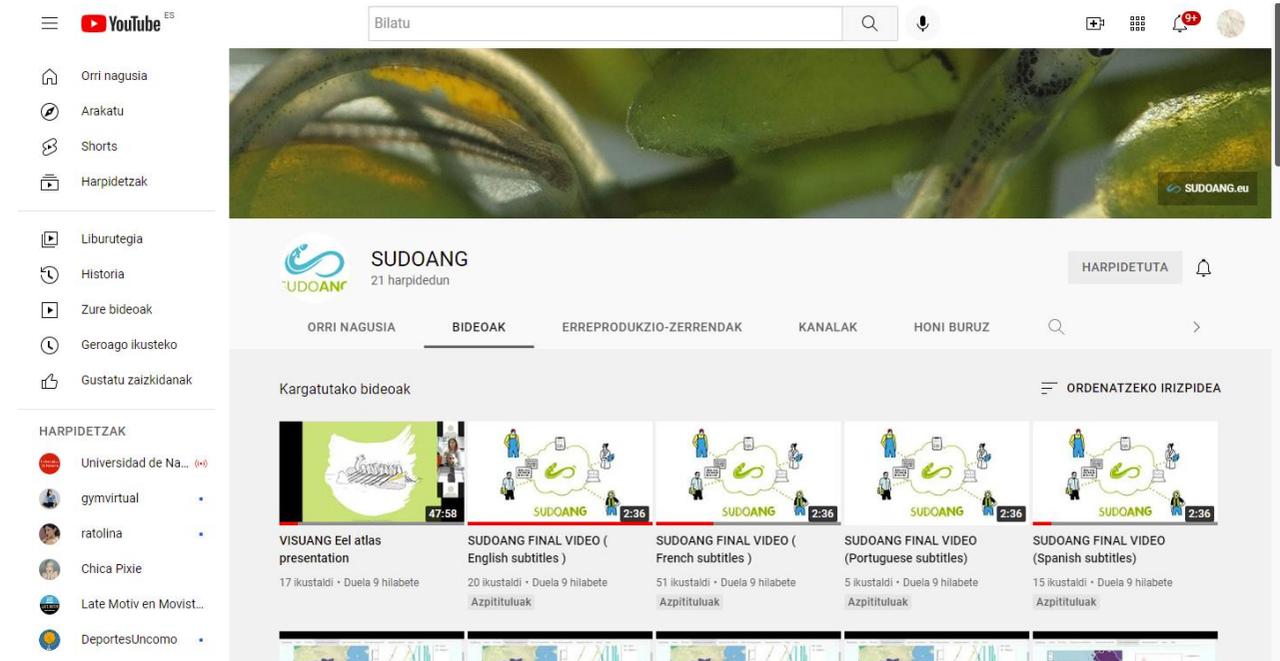
OFB OFFICE FRANÇAIS DE LA BIODIVERSITÉ

INRAE

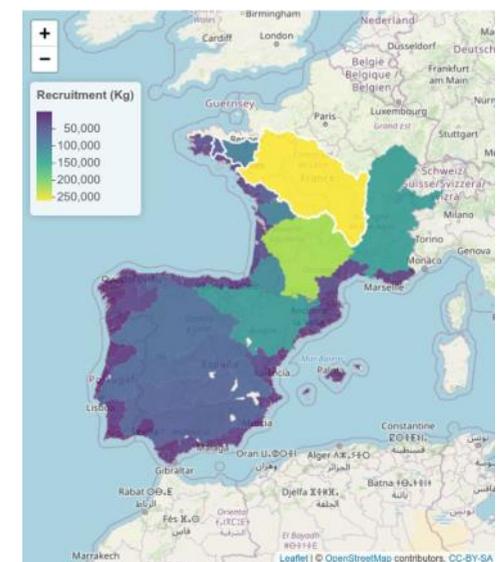
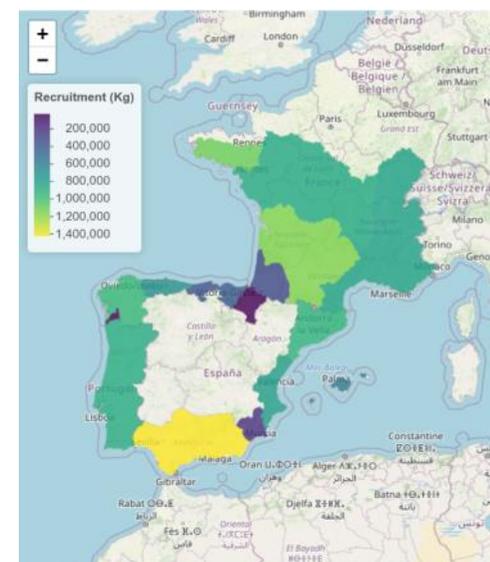
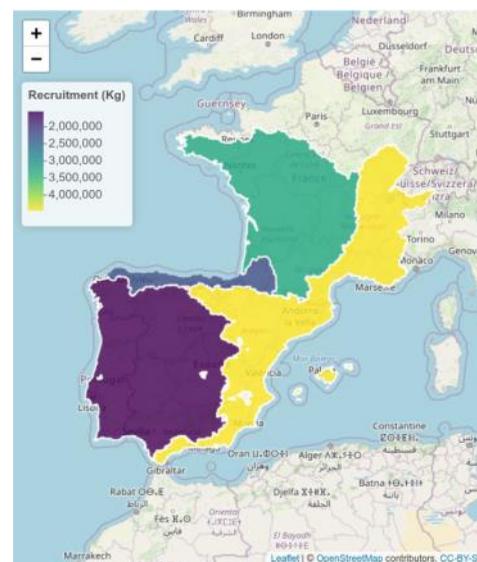
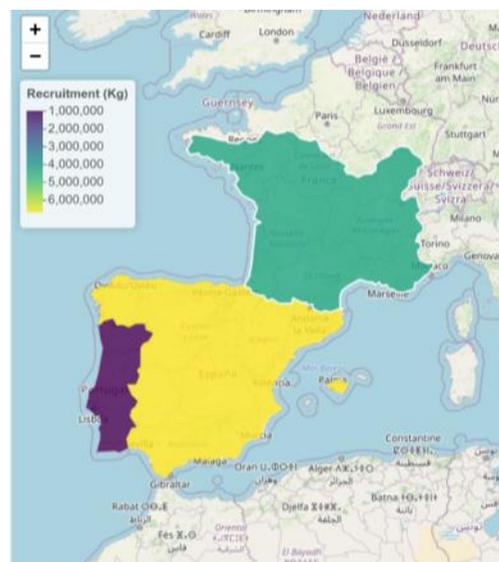
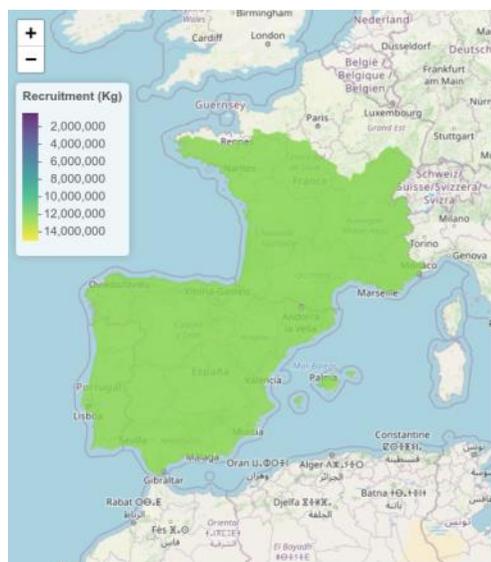
EPTB Vilaine

0:00 / 3:58

Methods: SUDOANG youtube channel



Recruitment (GEREM) 1960-2019



SUDOE

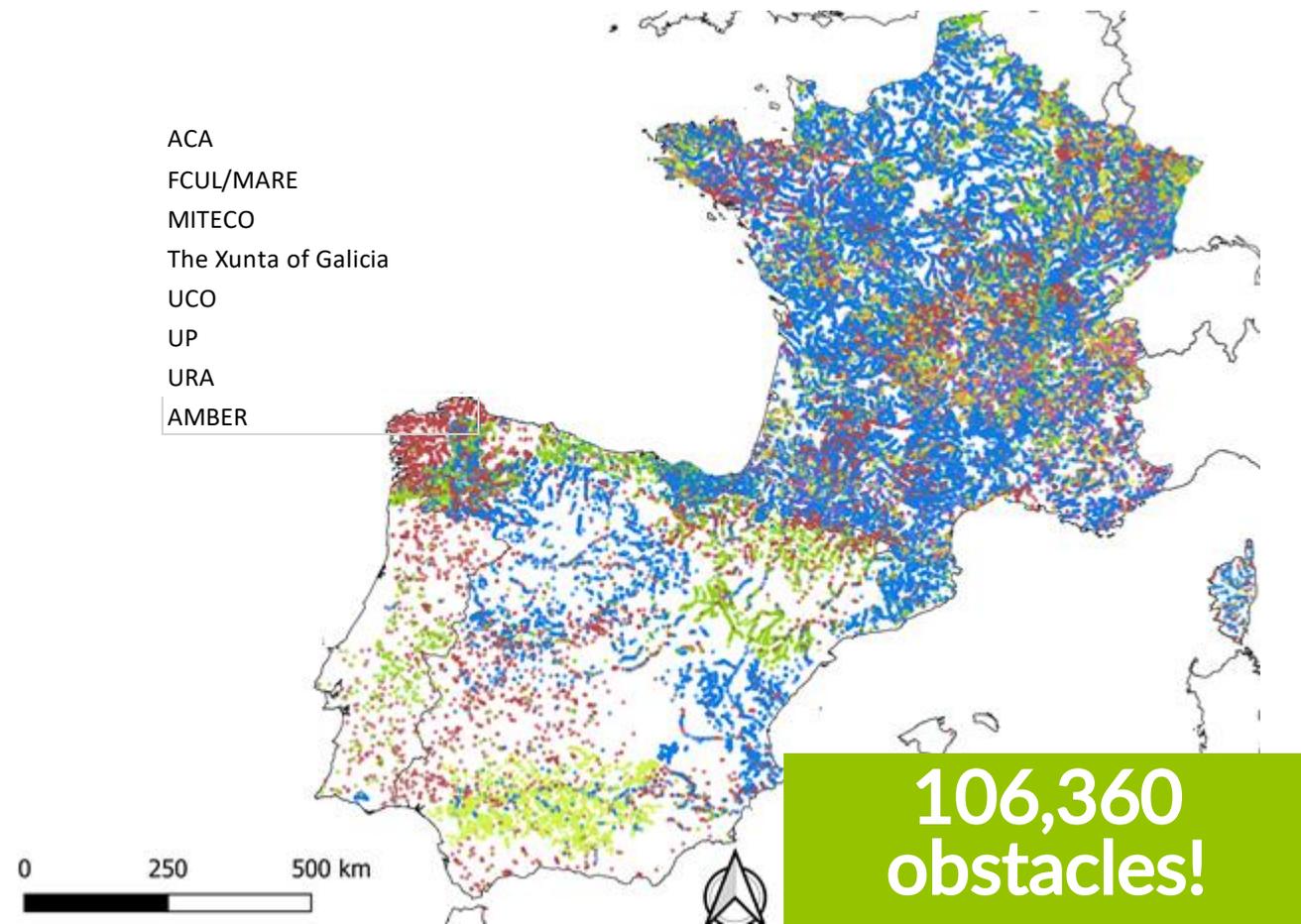
3 countries

4 zones

22 EMUs

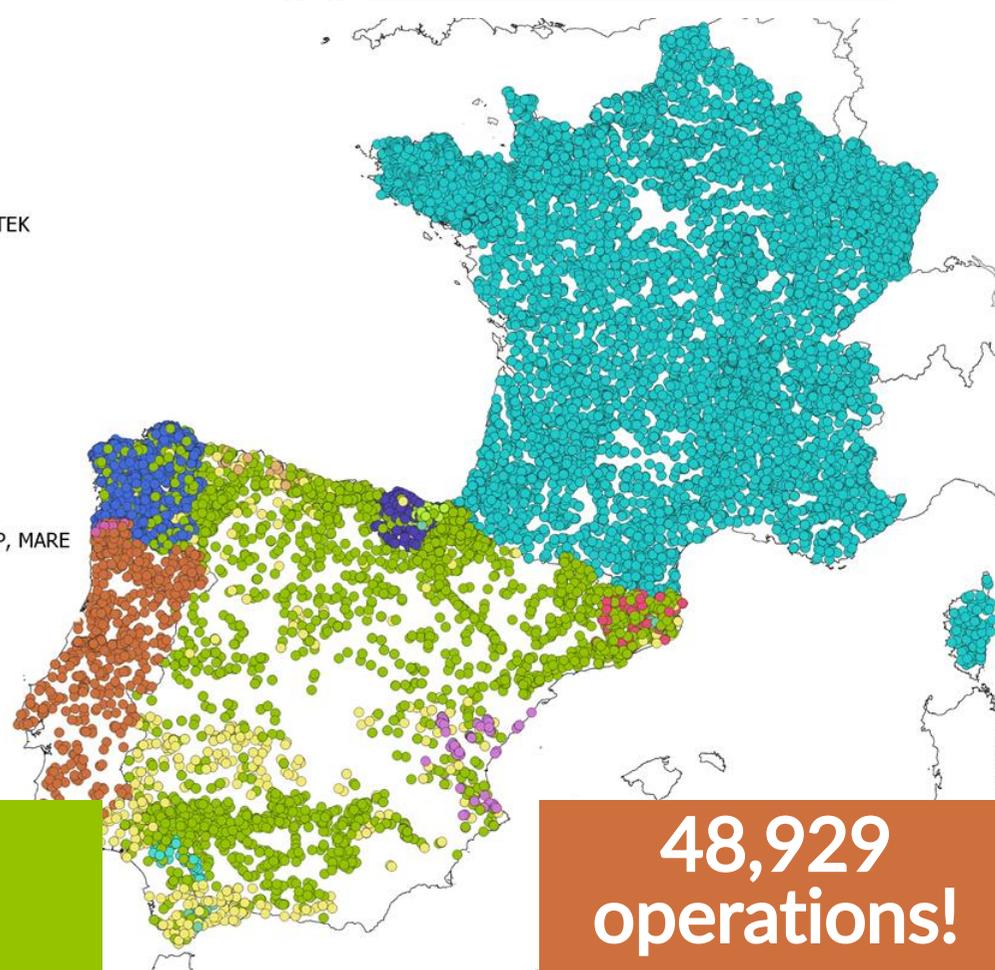
2582 river
basins

Eel abundance (EDA) 1985-2018

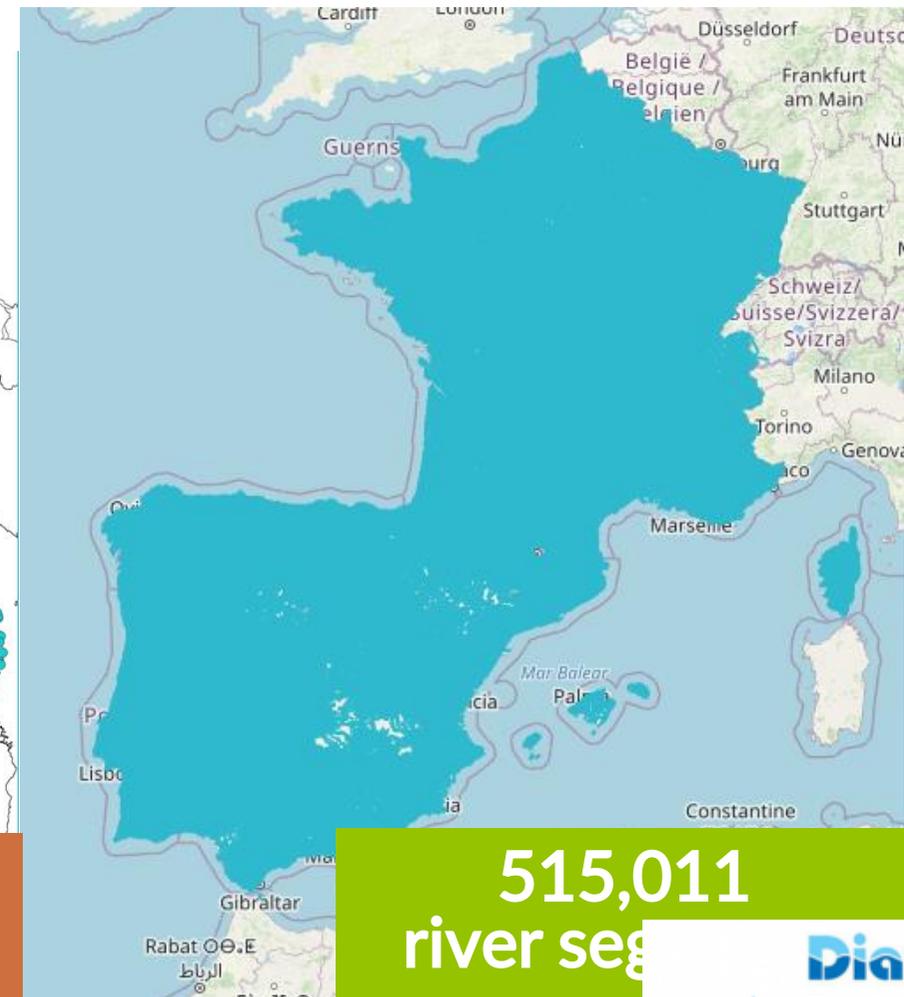


106,360
obstacles!

- Data Provider
- Asturias Council (DGPM Asturias)
 - Basque water agency (URA) & ANBIOTEK
 - Catalonia Council (ACA)
 - French Biodiversity Office (OFB)
 - Galicia Council (Xunta de Galicia)
 - Gipuzkoa Council & EKOLUR
 - Navarra Council (GAN-NIK)
 - Spanish Fish Chart (SIBIC)
 - Spanish Ministry (MITECO)
 - SUDOANG Pilot Basins (GT6)
 - University of Córdoba (UCO)
 - University of Lisbon (FCUL) & APA, EDP, MARE
 - University of Porto (UP)
 - Valencia Council (VAERSA)



48,929
operations!



515,011
river segments

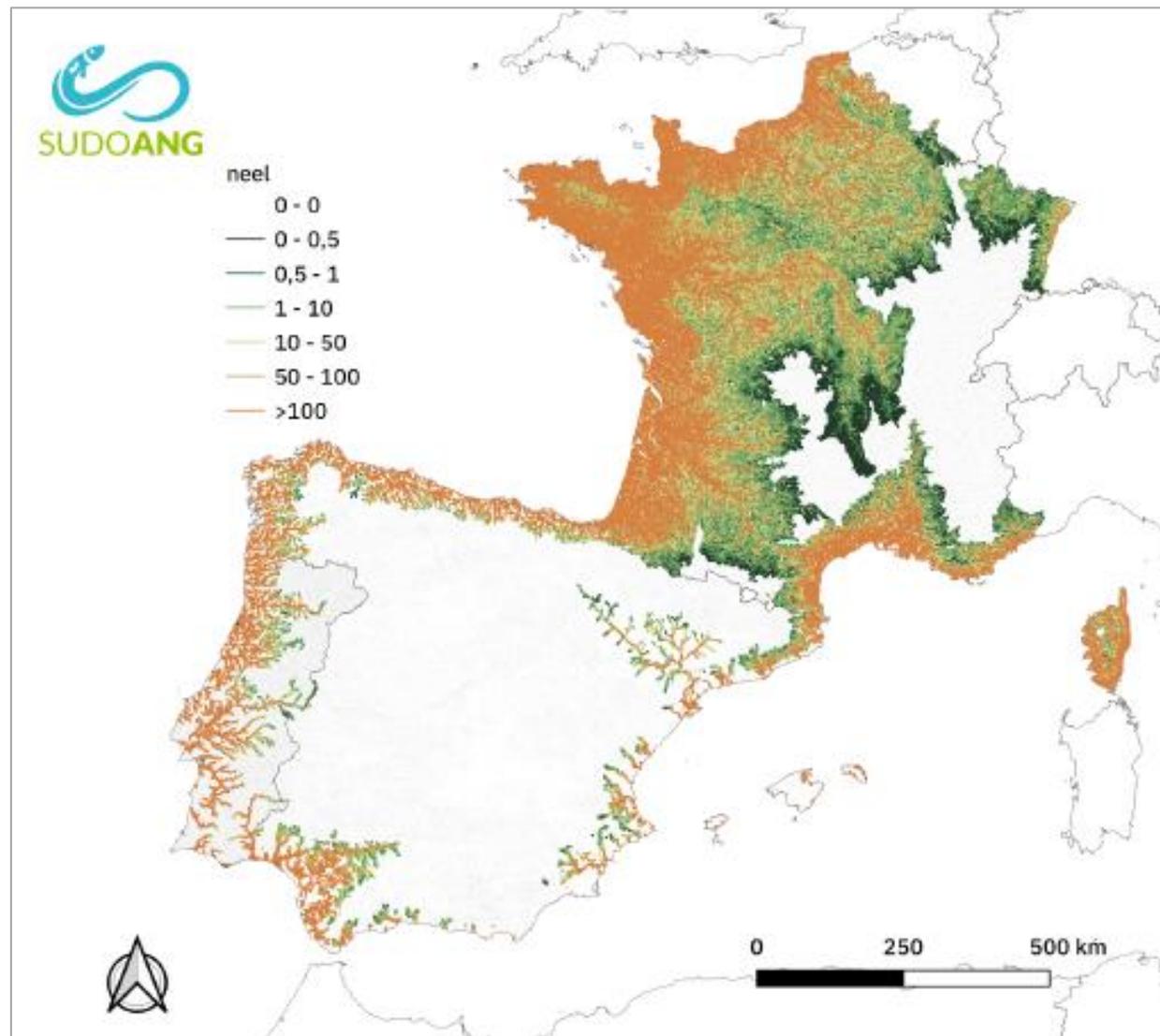
23,164
stations



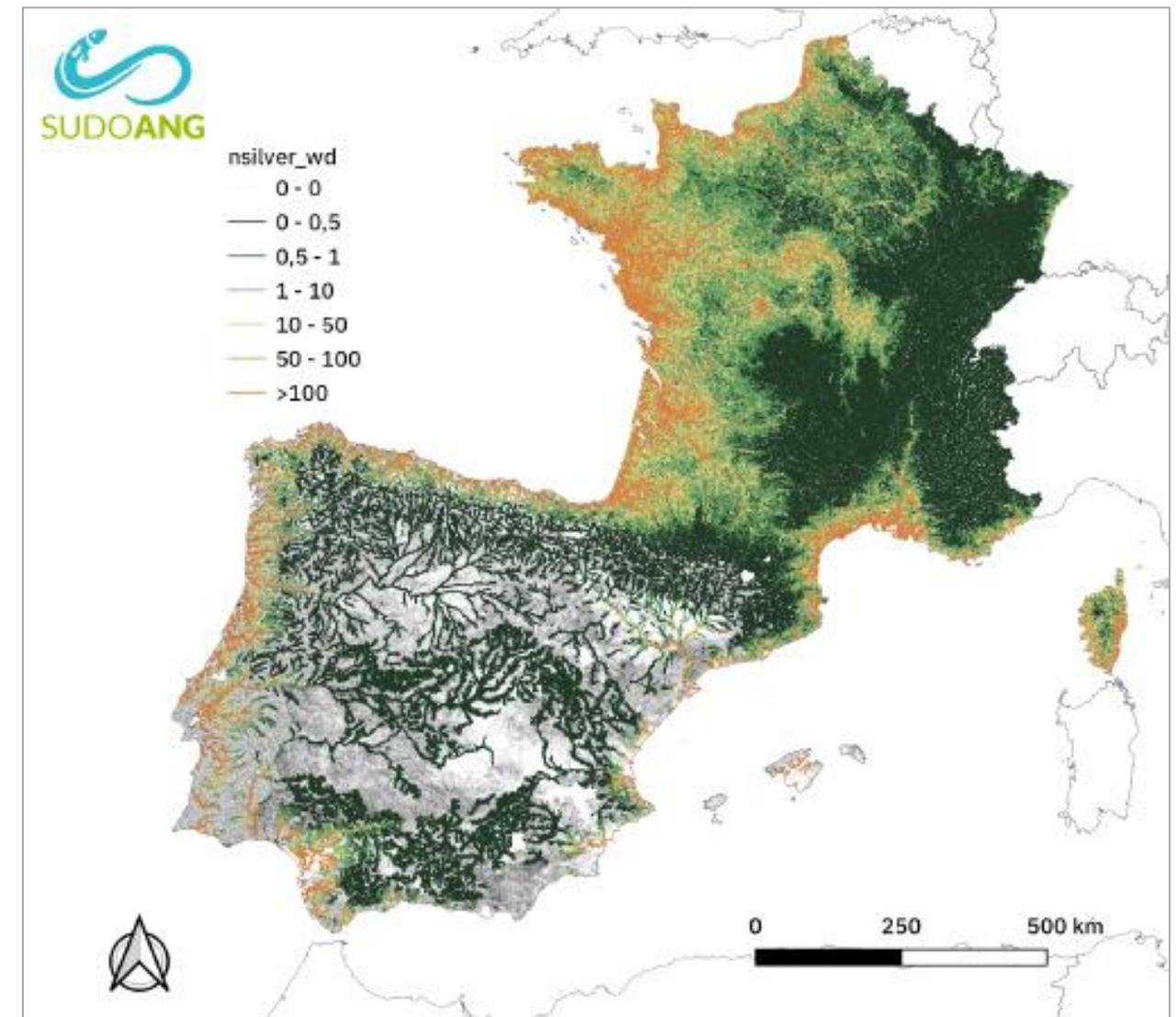
EDA 2.3 – Effect of habitat loss



✓ Eel number lost \approx 10%



► Number of eels



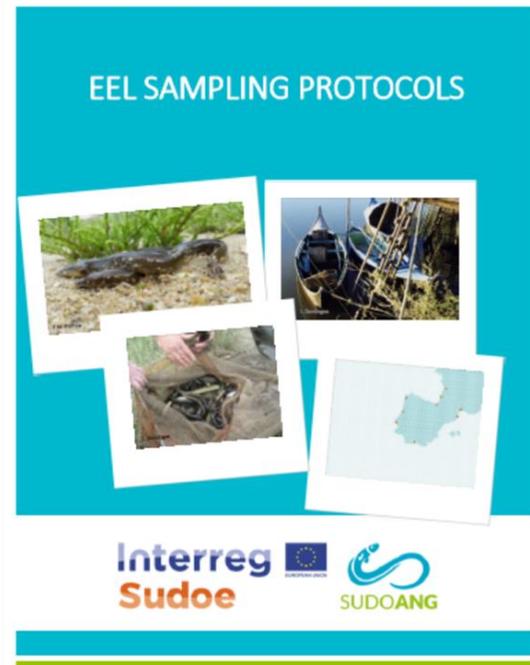
► Number of silver eels without dam

Objective 3. Design a strategy for the collection of data to monitor the eel stock in the SUDOE area in a coordinated way in the long-term

Eel sampling network



Eel sampling network: protocols



- ✓ Protocol for yellow and silver eel sampling in rivers
- ✓ Protocol to estimate glass eel recruitment
- ✓ Protocol for otolith preparation and age reading
- ✓ Protocol to assess the infection by *anguilicola crassus* and the swimbladder degenerative index (SDI)
- ✓ Protocol to sample gonads for sex ratio assessment

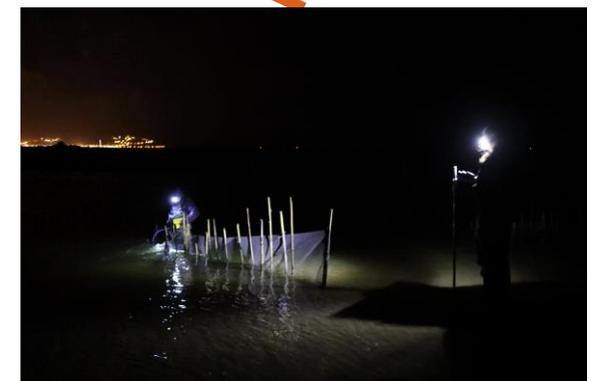
 **Eel stock monitoring transnational network**
Led by FCUL

Objective
Create an eel monitoring network in the SUDOE area to monitor the status of the population in a harmonised way, using standardised methods for data collection.

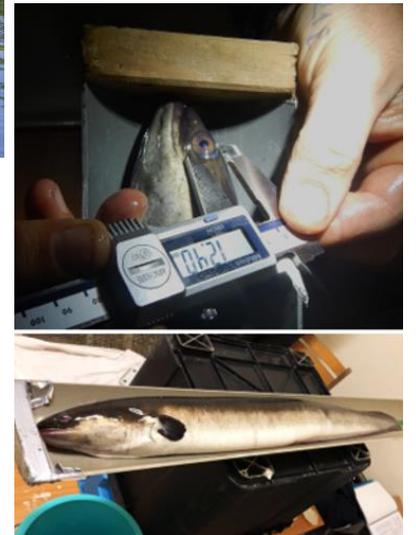
Activities

<p>Organising seminars for training and harmonisation of protocols</p> <ul style="list-style-type: none"> ↳ Eel sampling protocol: recruitment assessment; otolith preparation and reading; <i>A. crassus</i> infestation assessment; sex ratio assessment ↳ Models for the standardised recording of the compiled information ↳ Seminar for calibration of age estimation 	<p>Installing an eel pass in the River Nivelle</p> <ul style="list-style-type: none"> ↳ Setting up a recruitment series for the River Nivelle 	<p>Implementing an eel stock monitoring network</p> <ul style="list-style-type: none"> ↳ Database of SUDOE pilot basins
---	--	--

Eel Sampling network: recruitment



Eel Sampling network: yellow/silver eel



Objective 3: Facilitate the governance of eel in the SUDOEE area by fostering dialogue between eel management stakeholders



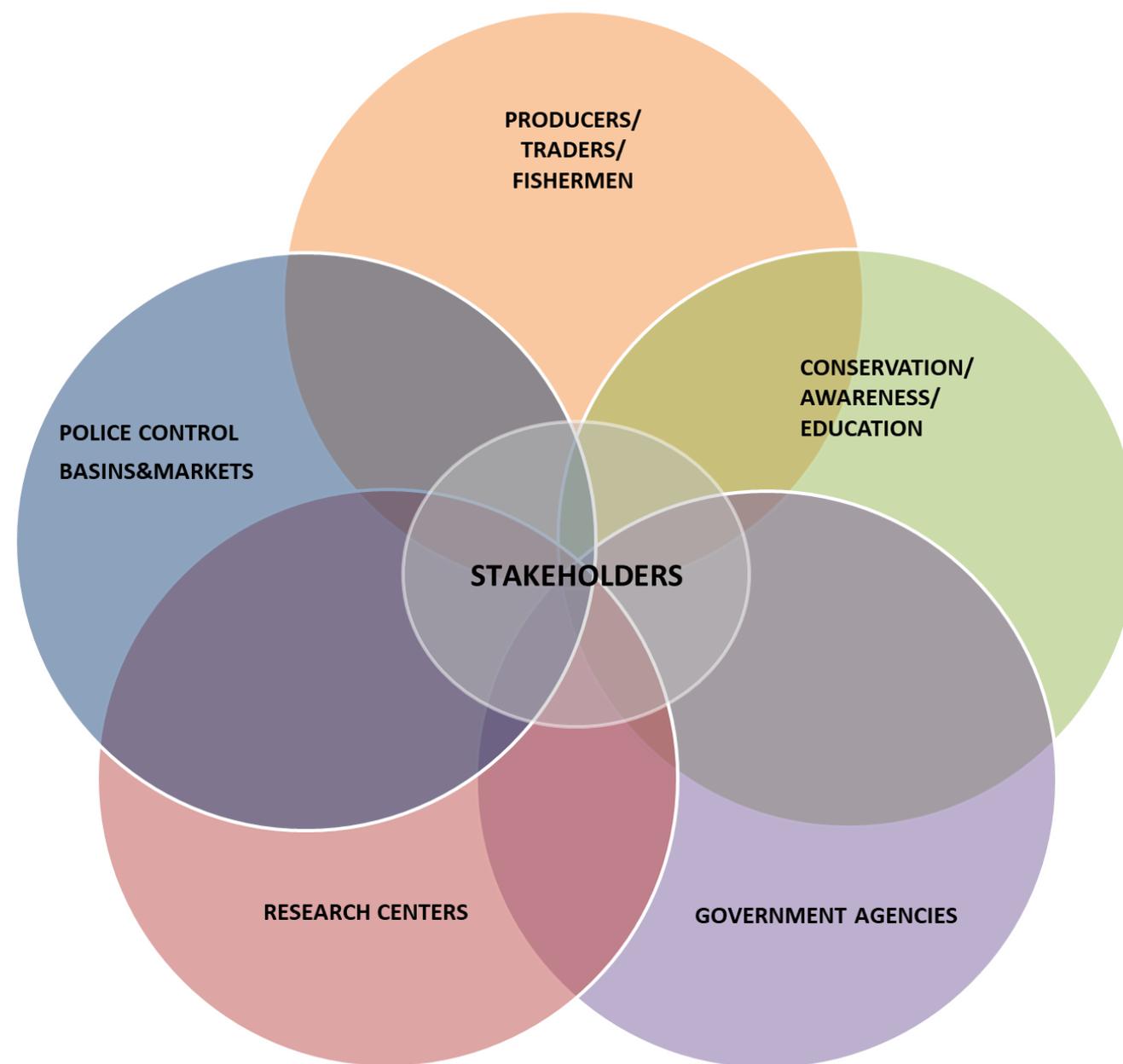
Stakeholders Map



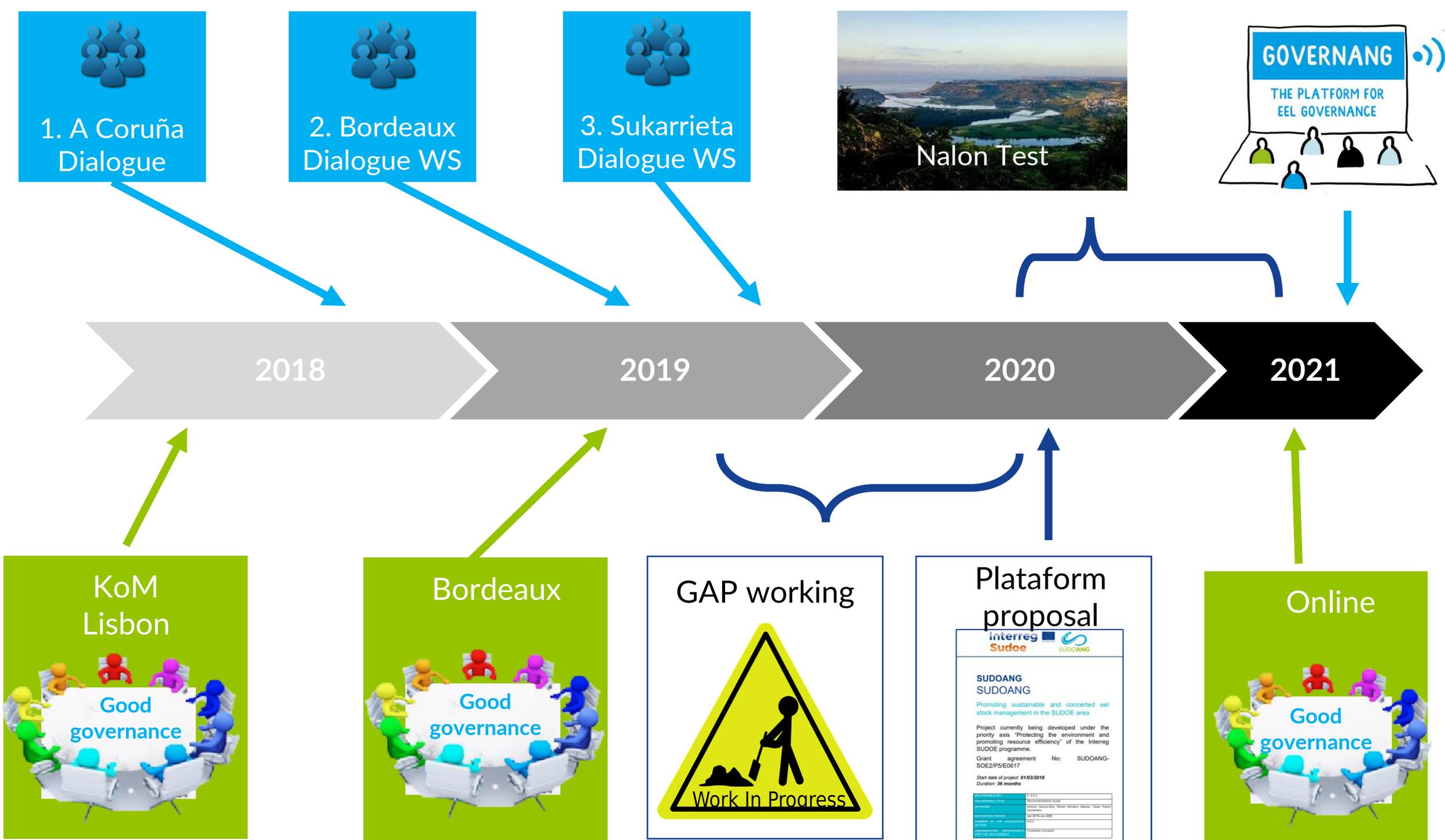
E 8.1.1 – Stakeholder Map

Interreg Sudoe   SUDOANG

 **FUNDACIÓN LONXANET**
PARA LA PESCA SOSTENIBLE



<https://sudoang.eu/en/task-groups/>



Collaborative and collective design

GOVERNANG's mission/vision

- ✓ To contribute to the recovery of the European eel stock, encouraging collaborative participation between stakeholders (fishermen, scientists, NGOs, etc.) from different countries, promoting good practices and facilitating co-responsible and sustainable management.

Internal objectives

- **Strengthen** collaboration
- **Harmonise** protocols
- Create a **network** of information and knowledge



Composition and structure

LEVEL 1 INTERNATIONAL

SCIENTISTS
PUBLIC ADMIN
PROF FISHERMEN
CONTROL FORCES
NGOs

LEVEL 2 NATIONAL

FRANCE

- SCIENTISTS
- PUBLIC ADMIN
- PROF FISHERMEN
- CONTROL FORCES

SPAIN

- SCIENTISTS
- PUBLIC ADMIN
- PROF FISHERMEN
- CONTROL FORCES
- NGOs

PORTUGAL

- SCIENTISTS
- PUBLIC ADMIN
- PROF FISHERMEN
- CONTROL FORCES

LEVEL 3 REGIONAL / MULTI- REGIONAL

CoGePoMi Adour
(Nivelle included)
CoGePoMi Rhône
Méditerranées
(Bages-Sigean included)

Basque Country
Cantabria
Asturias
Galicia
Catalonia
Andalusia

Minho
Mondego

www.sudoang.eu/en/visuang



PROJECT PARTICIPANTS TASK GROUPS COMMUNICATION VISUANG CONTACT

ES F

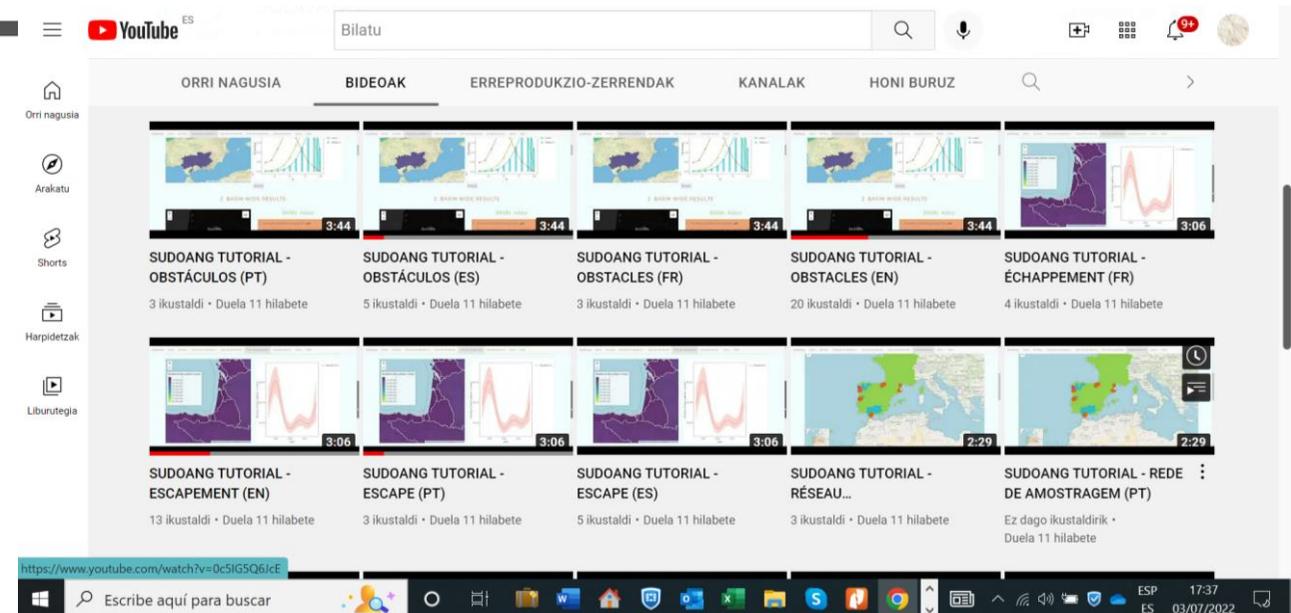
Our interactive tool

VISUANG is an interactive tool that allows complex results to be displayed in a simple way in graphics, tables and summaries. The SUDOANG project will develop this interface to help managers answer their questions and to make decisions based on the best scientific tools. The contents that it will host include:

- Escapement estimates.
- Recruitment estimates.
- Recommendable fishery exploitation rates.
- Turbine mortality estimates that will allow the managers to focus the measures on where the population is most harmed.
- An atlas showing the migration barriers and eel abundance, which will help managers to identify the barriers that most hinder migration and visualize the increase in available habitat that the demolition of each barrier would represent.



[ACCESS VISUANG >](#)





EEL ATLAS



OBSTACLES TO MIGRATION



GLASS EEL RECRUITMENT



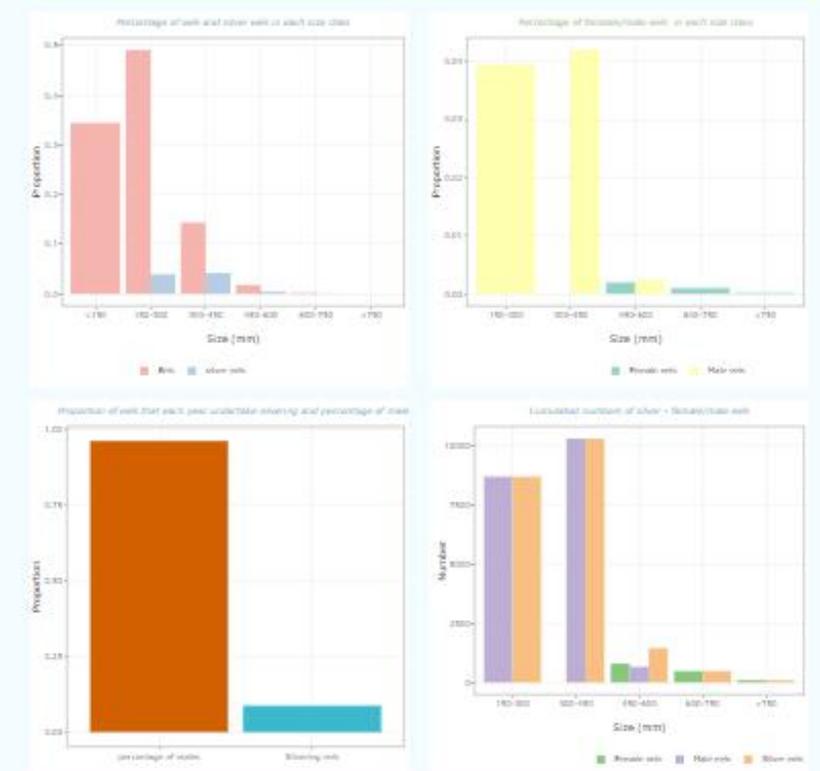
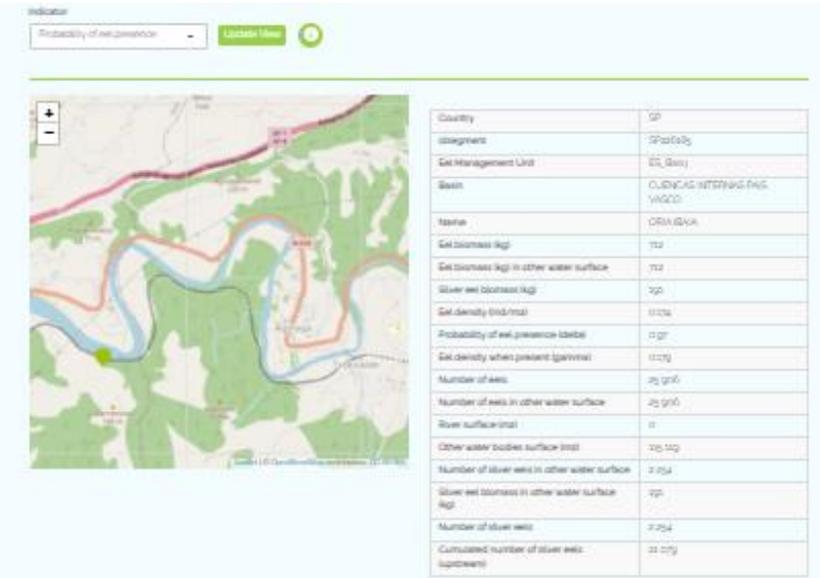
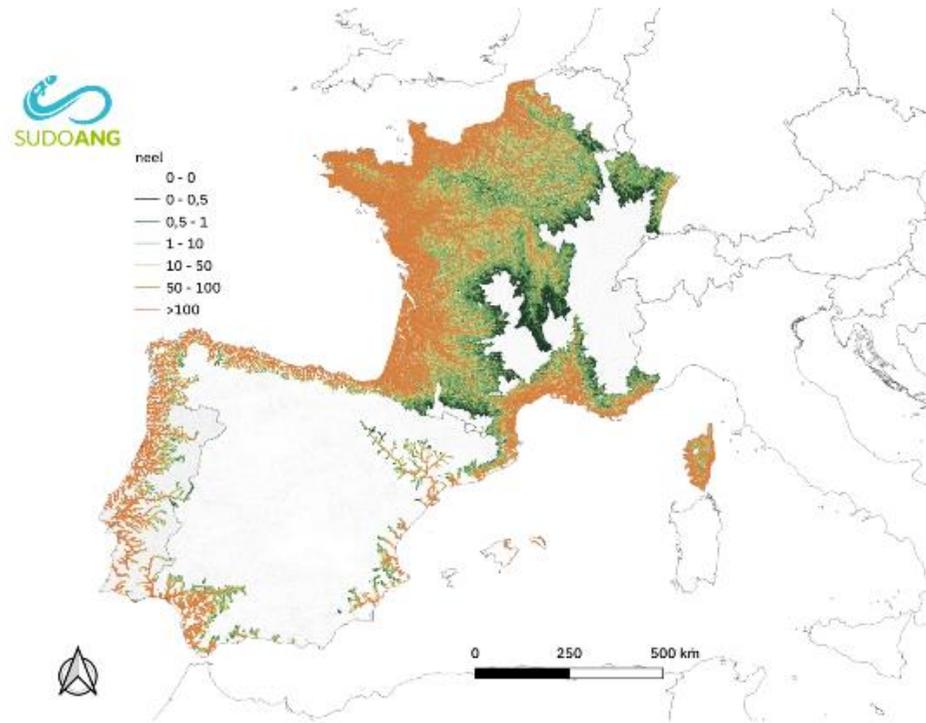
SILVER EEL ESCAPEMENT



SAMPLING NETWORK



AND MORE...





EEL ATLAS



OBSTACLES TO MIGRATION



GLASS EEL RECRUITMENT



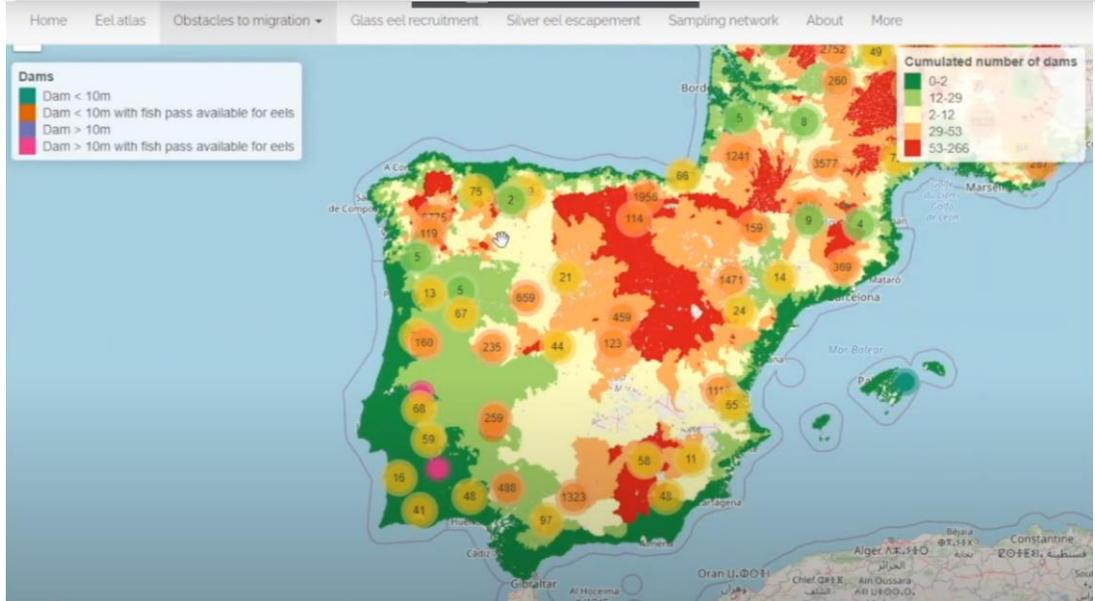
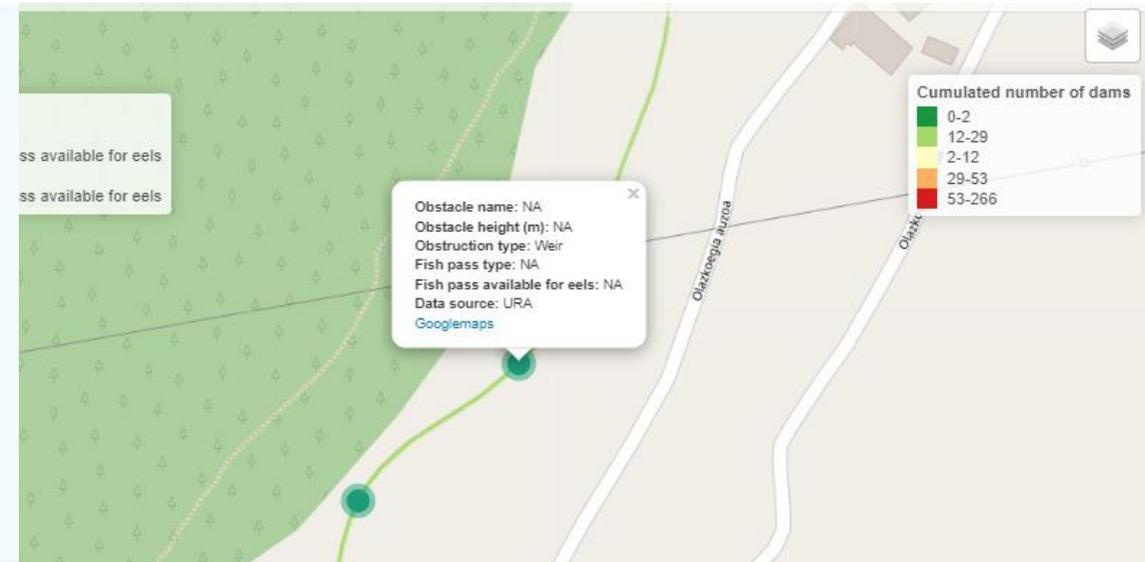
SILVER EEL ESCAPEMENT



SAMPLING NETWORK



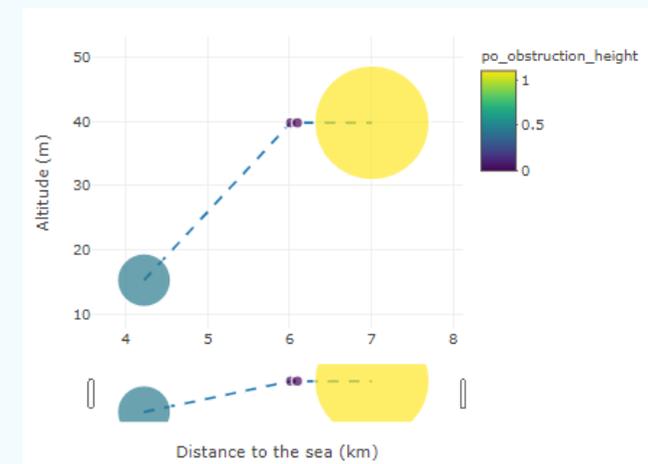
AND MORE...



Dam details

Basin	CUENCAS INTERNAS PAIS VASCO
Country	SP
Eel Management Unit	ES_Basq
Fish pass available	NA
Fishway type	NA
Obstruction height (m)	NA
Obstruction impact	NA
Obstruction name	NA
Obstruction type	Weir

Cumulated dams downstream



Hydropower plant details

This dam has no hydropower plant associated.

