

## ADVANCES IN SUDOANG

We continue to move forward to achieve the project's objectives: innovative management tools, coordinated monitoring network and improved cooperation and dialogue.

**1. Provide common management and evaluation tools to strengthen the capacity of managers to make decisions based on increased scientific evidence.**

In terms of **data collection**, electrofishing surveys have been integrated from the SIBIC database for Spain and Portugal; for some missing data, links were created with the originals. Data for France were already compiled. Data from river basins and other sources are now being integrated. For obstacles, data from different sources have been incorporated and the cumulative height or number of obstacles from the sea has been calculated for the 3 countries.

All these data are being integrated into the SUDOANG database, whose structure comes directly from the eel database (DBEEL) developed in POSE project.

For **mortality in obstacles**, the data to be collected are being described as well as how to use them to estimate mortality in a comparable way in the different obstacles. Data collection will end soon, data storage for Spain and Portugal is done (storage in France has only begun). In addition, mortality has been compared before and after improving downstream fish passages in French hydropower plants.

As regards **recruitment**, work has been done on preliminary analyses to adjust the GEREM model: revision of time series, updating of absolute recruitment estimates in the Oria, definition of homogeneous recruitment zones

Finally, for the **estimation of eel abundance**, a first implementation of the EDA (Eel Density Analysis) model is being worked on to calibrate the model for the 3 countries. Figure 2 shows the steps of the model: (1) The delta model calculates the probability of eel presence and (2) the gamma model calculates the density of the eel when present. (3) Eel abundance is calculated by multiplying the delta and gamma models.

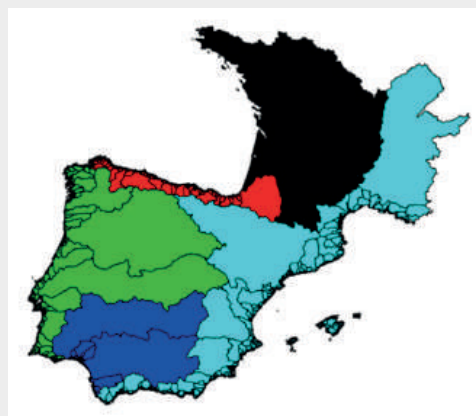


Figure 1. Eel recruitment areas proposed by participants at the kick-off meeting.

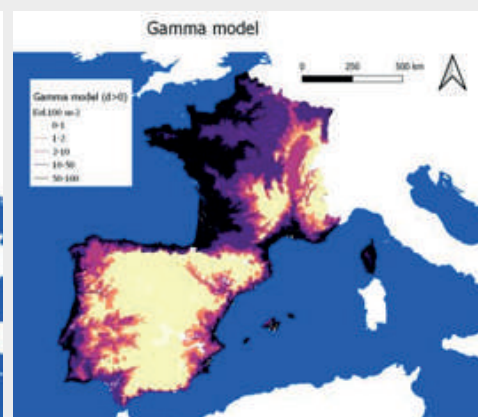
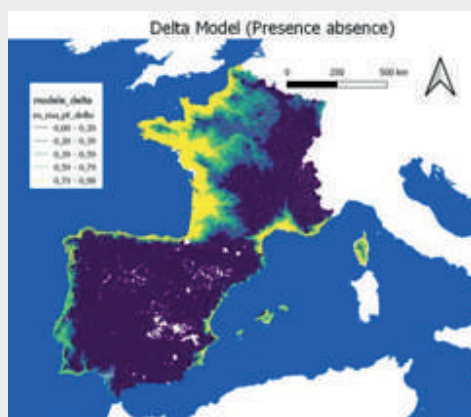


Figure 2. The delta model (probability of presence of eel) and the gamma model (density of eel when present) according to the first implementation of EDA.

## 2. Design a strategy that allows for coordinated, long-term monitoring.

A workshop was organized in June 2019 at the Irstea headquarters in Cestas (France) in coordination with ICES to calibrate the age readings of eel otoliths. A report with the results will be published soon.

As far as sampling is concerned, electrofishing surveys in the Oria, Minho, Mondego, Ter, Guadalquivir, and Bages-Sigean basins started in October. In addition, the sampling protocols for glass eel in the Mediterranean Sea will be adjusted.



## 3. Reinforce the cooperation between the stakeholders involved in eel management.

Interviews with a number of main and associated beneficiaries have been recorded at several SUDOANG events. They will contribute to the creation of an infographics and video clip to raise awareness of the critical state of the eel and the importance of dialogue to improve its conservation.

A good **governance** workshop was held at the Annual Meeting, focusing on the origin and meaning of this concept. The aim is to improve its knowledge and apply it to the design of a support platform for eel management. The workshop also advanced the elements that should be present and agreed on the fundamental principles that should guide its functioning.

On the other hand, a **stakeholder map** for the 10 SUDOANG pilot basins has been elaborated with contributions from the main and associated beneficiaries and other stakeholders. The actors involved in eel management have been categorized and their current role and possible involvement in the future governance platform has been analysed. Overall, most stakeholders were in favour of the creation of the platform although some showed clear opposition. In addition, most of the key actors (great capacity for influence and great interest) turned out to belong to the Administration.

In the coming months, the structure, composition and functions of the platform will be proposed and applied as a pilot experiment in June 2020, in one of the basins. A guide, based on the principles of good governance, will also be developed to encourage the active and coordinated participation of stakeholders.

## RECENT EVENTS

### ANNUAL MEETING ( 19-21 June )



*Photo 1. Photo of the participants of the annual meeting of SUDOANG, with eel mural, in the Irstea facilities.*

The members of the SUDOANG Consortium met at Cestas (near Bordeaux, France) at the Irstea headquarters between 19-21 June 2019. The meeting was attended by 60 people from 35 different institutions, so practically all our main beneficiaries and associate partners were present.

In addition, we were joined by two external experts who acted as project reviewers: Dr. Willem Dekker and Dr. Alan Walker. The progress of the tasks was presented, the next year's work was planned and several workshop discussions on databases, biology, habitat, management, sampling and trafficking of eel, as well as the future governance platform were held during the annual meeting.

### WORKSHOP ON AGE READING OF EEL OTOLITHS (WKAREA3) ( 17-18 June )

A workshop on eel age reading was held at Irstea (Cestas, France), from 17 to 18 June 2019. Organised and chaired by Françoise Daverat (Irstea) and Isabel Domingos (FCUL - MARE), this workshop, proposed by SUDOANG, was accepted and co-organised within the scope of the ICES.

The otoliths were prepared by the SUDOANG members, within the framework of the sampling monitoring network, and uploaded for age reading into the Smartdots application, hosted by ICES. The objective was to perform an intercalibration exercise of age reading to improve the precision of age determination in the Sudoe area.

In addition to the members of SUDOANG, responsible for determining the age of eels caught in the pilot basins, the workshop was open to the participation of people from outside the project, namely members of the WGEEL and other ICES groups.

A total of 32 people from 13 countries and 22 institutions participated in the workshop. The main results were presented in the meeting of the WGBIOP (from ICES), which was held in Lisbon, in October 2019. The report will soon be published by ICES.

## RECENT EVENTS

### ATTENDANCE TO THE JOINT EIFAAC/ICES/GFCM WGEEL ( From 26 August to 2 September )

Several members of SUDOANG (Hilaire Droineau, Laurent Beaulaton, Elsa Amilhat, Cédric Briand, Isabel Domingos and Estibaliz Díaz) participated in the Joint EIFAAC/ICES/GFCM Working Group on Eels (WGEEL) held in Bergen, Norway from 26 August to 2 September 2019.

In this group they participated in the annual assessment of the state of the stock. The ICES results and advice for the European eel stock will be published shortly.

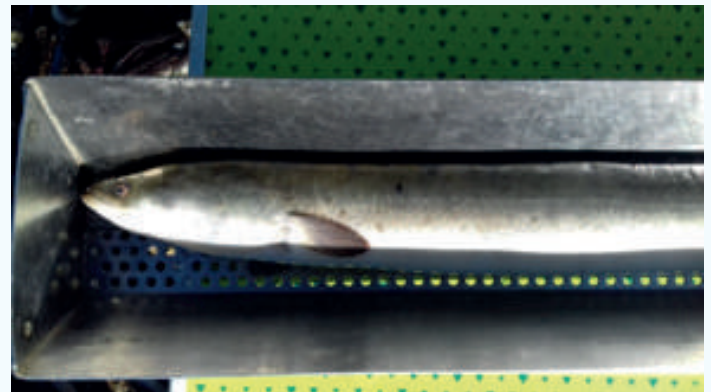
### ATTENDANCE TO THE EEL SESSION OF THE AQUACULTURE CONGRESS ( 9 October )

On 9 October 2019, the coordinator of SUDOANG (Estibaliz Díaz) was invited to give a talk at the special session on eel as part of the Annual Congress organised by the European Aquaculture Society ([Aquaculture Europe 2019](#)) in Berlin.

In this talk she described the challenges we face in the management and conservation of eel and how SUDOANG will contribute to reach them.

### SAMPLING SEASON IS UNDERWAY

The 2019 electrofishing sampling season has started in the Oria, Minho, Mondego, Guadiaro, Bages-Sigean and Ter river basins. In the Guadiaro river, prolonged drought is making sampling difficult because the water is concentrated in puddles, which prevents electric fishing and biases the estimate of abundance by concentrating individuals.



*Photo 2. Eel female (83 cm) sampled in the river Oria (Guipuzcoa, Spain).*



*Photo 3. Sampling with electric fishing at the Ter river (Spain).*

## COMING SOON

### WORKSHOP WITH STAKEHOLDERS ( 2-3 December 2019 )

A workshop with stakeholders will be held in Sukarrieta (Spain) at the beginning of December 2019. The objectives of the workshop are:

- **Validate the data** obtained to date through the web application shiny.
- **Show the progress of the implementation of the GEREM model** in order to estimate exploitation and recruitment rates of eel. Furthermore, to debate the results of the model, as well as to choose jointly with the stakeholders the most relevant indicators that should be shown in the generated tools.
- **Define which escape and mortality data** (by hydro-power station) the Atlas will show publicly and at what spatial resolution level.
- **Training action on improving dialogue and governance.** Definition of the structure and composition of the governance platform by integrating the results of the survey.

### EEL MANAGEMENT IN THE THREE SUDOANG COUNTRIES

During the workshops of the Annual Meeting, it became evident that the participants do not know the governance structures in eel management in the other SUDOANG countries. What the three countries have in common is the large number of threats to the species and the high number of competent authorities involved in combating them.

In order to build a consensual governance platform, it is important that involved actors know how management works in other countries, so it was decided to draw up a document summarizing the particularities of eel management in Spain, France and Portugal. This document will be circulated shortly to all members of the Consortium.



Eel management authorities by basin in France, Spain and Portugal

## RELATED PROJECT AMBER

Given the impacts of some barriers on the environment and the predicted increase in the construction of hydropower dams and dams for water supply, fish and other aquatic species will suffer and there is a clear need for change.

Adaptive management of river barriers necessitates an understanding of issues such as:

- Determining **the degree to which river engineering inhibits natural movements** of organisms,
- What the **impacts of altered movement patterns** are, and
- How best to **alleviate them**.

AMBER (Adaptive Management of Barriers in European Rivers) is helping to develop methods to measure these processes. It is a 4-year research project involving 20 organisations throughout Europe and is funded by the European Commission.

One of the primary objectives is to create an **inventory of all river barriers in Europe**. This in itself is challenging enough because many regions can only supply limited information of existing barriers and moreover, barriers are managed by many different organizations.

To overcome this, the team has undergone some field validation work that they may then extrapolate to the rest of Europe to gain a better sense of the fragmentation and density of barriers within European rivers. This so-called **Barrier Atlas** and its data will be available before the end of the project period in May 2020!

Also a **Barrier Tracker application** that will support this atlas and engage the public on the topic of barriers and their impacts has been launched. Already, citizens across Europe have helped to record some 3,000 barriers and of these we are finding a percentage that are obsolete and may be removed to create more free-flowing habitat!

At the end of the project, one of the partners, **World Fish Migration Foundation**, plans to use these data to gather a list of barriers to be taken down.

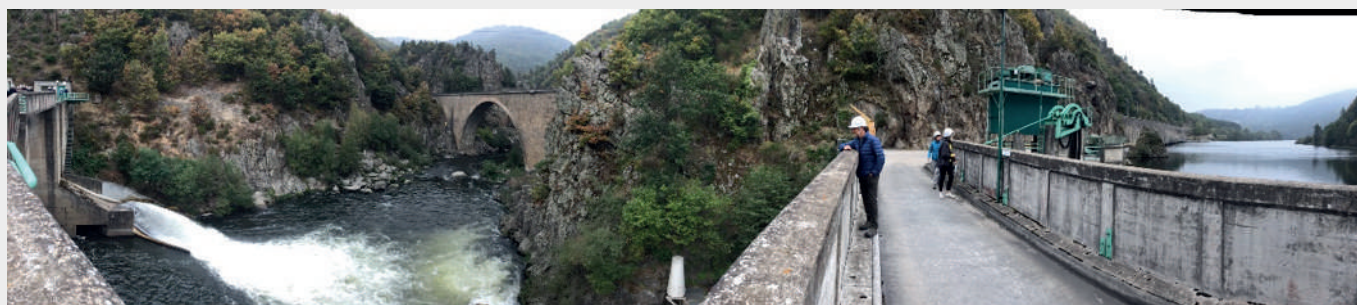


Photo 4. Poutes dam on the river Allier (France).

## RELATED PROJECT AMBER

Yet a key requirement remains: in **how best to measure the degree of effect that dams and weirs have on native fish movements, and how well mitigations such as fishways or modifications to dam management perform.**

AMBER is developing four decision support tools to help dam managers and planners to adjust the operation, improve existing barriers or carefully plan new ones.

One of these tools, the **Rapid Barrier Passability and Hydropower Assessment Tool** is already available online to download and use. It helps to determine how likely a certain species of fish may migrate upstream a barrier.

These support tools and other generated models are tested and validated on our seven **case study** sites around Europe then made available for use.

To learn and read more about the project and associated outcomes please visit: [amber.international](http://amber.international)

