

Executive Summary of Management Plan for European Eel (*Anguilla anguilla*) in the International Stretch of the Minho River (ISMR)¹

The Management Plan for European Eel in the ISMR, in compliance with Article 6 of *Regulation (EC) 1100/2007 of the Council, establishing measures for the recovery of the stock of European eel*, was drafted within the framework of the Working Group created for this purpose, under the aegis of the International Minho River Standing Commission. The Plan was based on research financed within the framework of Project INTERREG IV for Spain/Portugal Cross-Border Cooperation on Enhancement of Natural Resources in the Minho River Basin, NATURA MIÑO-MINHO, commissioned by the Directorate-General for Conservation of the Galician Regional Government, and carried out by the Encoro do Con Hydrobiology Station of the University of Santiago de Compostela, and the CIIMAR of the University of Oporto. The final document presented to the Commission for its evaluation was adopted by the International Minho River Standing Commission, including Spain and Portugal, established within the framework of the Regulation of the International Stretch of the Minho River, pending approval by the International Boundary Commission of Spain and Portugal.

HABITAT DESCRIPTION AND DEFINITION OF THE MANAGEMENT UNIT

The Minho River is 343 km long, from its source in northern Lugo province (Spain) to where it flows into the Atlantic Ocean. The last 76 km of the river mark the border between Spain and Portugal; moreover, the last 33 km are navigable. Most of the river basin is located in Spain—95% of its total of 17,080 km² (including the Sil)—whereas the remaining 5%, or 799 km², are in northeastern Portugal. The presence of the Frieira hydroelectric dam, built in 1970, limits the access zone for eel (and other migratory fish species) to the international stretch of the Minho River and its tributaries, including 16 major tributaries in Spain (the Tea River is the principal tributary of the Lower Minho due to its length, basin size, and stream flow) and 30 tributaries in Portugal, some of these quite small.

Therefore, the **Management Unit** of the present Plan encompasses both the international stretch and its tributaries emptying into that stretch in both countries (Frieira hydroelectric dam as upper limit), known jointly as the Lower Minho region, given the interrelationship of the factors affecting the species and the management measures to be implemented in order to achieve the goal set forth in Regulation (EC) 1100/2007 of the Council, which is to reduce anthropogenic mortality so as to permit, with high probability, the escapement to the sea of at least 40 % of the silver European eel biomass relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock.

In the Minho River, glass eels enter year-round. However, most of these entries occur between November and April, depending on weather conditions. Eel density drops as we move farther away from the river's mouth towards the Upper Minho, and average size rises.

The pressures on surface water masses include, especially, pollution from both specific and diffuse sources, water extraction, flow management, morphological alterations, land use, and other significant impact from human activity. In the course of habitat assessment research, the degree of compliance with the norms regarding water quality was evaluated at different points. Difficulty of passage was also assessed—resulting in

¹ Summary of Eel Management Plan dated when adopted by Commission Decision of 21 May 2012

an inventory of 81 natural and artificial barriers in the Spanish stretch and 297 in the Portuguese stretch—based on difficulties affecting migratory species.

SITUATION OF THE SPECIES IN THE MANAGEMENT PLAN AREA

- GLASS EEL (<12 cm)

Since the 1980s, experimental glass eel fishing has been carried out intermittently as part of projects promoted by the University of Oporto, and also within the framework of the Natura Project. These catches were made during the New Moon, in the Minho River estuary, analysing the total glass eel catch and by-catches.

Moreover, a series of data on glass eel catches in the international stretch of the Minho River by the Maritime Authorities of Portugal and Spain was launched in 1974, as reflected in the 2010 EIFAC/ ICES WGEEL report, showing a downward trend also seen in other European rivers. Between 1974 and 1984, an average of nearly 25 tonnes was reported, reaching a maximum of 50 tonnes in the 1980-81 season. Between 1985 and 1999, the average dropped to 10 tonnes, with a maximum of 15 tonnes for the period in 1995. Between 2000 and 2009, the average was only 3 tonnes. Since 1981, this steady decline has been confirmed by experimental fishing data from different years. Within the glass eel sample set, the dominant length class is 6.5 - 7.0 cm, and the dominant weight class between 0.26 and 0.32 g.

- YELLOW / SILVER EEL

The sampling campaigns were carried out in 2009 and 2010, with electric fishing, at 36 sampling points all along the international stretch. Furthermore, a statistical analysis was made of the data obtained from the A Freixa catch station on the Tea River, which made it possible to track the evolution of weight and length over the past 10 years, both for yellow eel and for silver eel.

Eel is present in all tributaries of the international stretch, although their density and biomass is highly variable. For example, biomass ranges from 0.10 kg/ha at Ribeiro de Chaqueu to 64.44 kg/ha at the Barrio da Tomada station on the Hospital River, with an average of 22.69 kg/ha (sd = 17.44). These data reflect a much wider margin of variation than that found by Moriarty & Dekker (1997), highlighting the anthropogenic pressure on tributaries of the Lower Minho. The international stretch of Minho River represents 27.7%, in terms of surface with respect to the entire river Minho basin.

Size-class distribution carried out with electric-fishing catches shows the dominance of the intermediate class of 30-45 cm, essentially males (45.8%); however, the proportion of eels measuring more than 45 cm—which corresponds to females—is low (8.7%). The percentage of silver eels (breeder density) is 24.33% in terms of average biomass.

- CALCULATING PRISTINE SURFACE AND ESCAPEMENT LEVEL

To calculate the pristine surface, the hydrographic network was used at a scale of 1:25000, considering only those water courses with a Strahler hydraulic ranking higher than 2. The length of each was calculated using digital cartography, and each water course was assigned a certain average width according to its hydraulic ranking. The principal course of the Minho River was divided into two stretches, and the average width was determined for each one.

To calculate current escapement levels, the average total biomass values were taken into consideration, as well as the percentage of silver eel caught in the tributaries and the main course of the river, resulting in a current estimated escapement level of 25.41%, which is 63.53% of the target set in Regulation (EC) 1100/2007 of the Council. The main data used to calculate escapement level are presented in the following table:

	TOTAL
Wet surface available (ha)	1678,88
Pristine wet surface (ha)	1823,69
Total average biomass (kg/ha)	22,69
Reproductive silver eels (%)	24,33
Silver eels (kg/ha)	5,52
ICES (kg/ha)	20
40%ICES (kg/ha)	8
40% Pristine escapement biomass (kg) – B lim	14590
Current escapement biomass (kg) – B post	9268
Pristine escapement biomass (kg) – B ₀	36475

FIHERIES OF EUROPEAN EEL IN THE INTERNATIONAL STRETCH OF THE MINHO RIVER. MANAGEMENT MEASURES TO ACHIEVE THE 40% TARGET

The International Minho River Standing Commission (IMRSC) is responsible for the control and management of fisheries in the ISMR, due to the fact that this river constitutes the border between Portugal and Spain. It includes representatives from several government departments of both countries. Current Regulation on Fisheries in the International Stretch of the Minho River (RFISMR), which regulates the activity in the area, has been approved by this Commission and has been published in Portugal by Decree 8/2008 of April 9th, and in Spain by Change of Notes published in BOE of June 12th 2008.

The exploitation of eel in the ISMR consists mainly on glass eel fishing (being the only area where glass eel fishing is allowed in Portugal), which presence is still significant, although with a sharp decrease in catches related to the ones verified in the 70-80's, as it can be also observed in the other remaining areas of distribution. Fishing of yellow/ silver eels (> 20cm) will be banned from season 2011-12, allowing only a 10% by-catch when using longliners.

Appropriate management measures have been defined in order to achieve the target set out in paragraph 4 of Article 2 in Council Regulation (EC) N° 1100/2007, *“to reduce anthropogenic mortalities so as to permit with high probability the escapement to the sea of at least 40 % of the silver eel biomass relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock...”*. These management measures include the following:

Management measures

1. Reduction of commercial fisheries

Glass eel fisheries

- Reduction of the fishing season from 7 to 4 “New Moons” (corresponding to the period between new crescent and old crescent). This measure is fully implemented from 2009-2010 season.
- Limit of a maximum number of fishing licenses to be issued (established in 200 by each country), subject to a fee payment, and withdrawing fishing licenses not annually renewed. This measure is implemented from 2010-2011 season.
- Reduction of the fishing area in 25 km upstream. This measure is implemented from 2010-2011 season.
- Monitoring of the use of the “tela” (specific fishing gear for glass eel), by an annual evaluation of the continuity of its use, taking into account the evolution of the fishing activity regarding the situation of the eel stock.

Yellow / Silver eel fisheries

Fishing of yellow / silver eels in the ISMR will be banned from 2011-2012 season. In fact, from 2009-2010 season it was already prohibited the use of traps, traditional and most effective fishing gear for eels > 20cm. From 2011-2012 season, it will only be allowed to retain on board a maximum of 10% of the total catch of eel incidentally captured, when fishing with longliners, respecting the minimum size of 20 cm.

The measures above mentioned for commercial fisheries of the species, that have been already implemented, are considered to have an impact in the reduction of the eel fishing effort of at least 50% with regard to the reference period 2004-2006 established in paragraph (2) of article 4 of Council Regulation (EC) N° 1100/2007.

2. Prohibition of recreational fisheries

A ban on recreational/sport fishing in the ISMR is in force from 2010-2011 season (in Spain this ban is also applied to the tributaries of the river).

3. Fisheries control and traceability of catches

- Strengthening of surveillance on legal activity and combating illegal fisheries. Measure already implemented.
- Creation of a fishing logbook with compulsory daily report, as condition to the renewal of the license. Measure already implemented from 2010-2011 fishing season.
- Obligation of declaring catches at first sale at the auction market or through sales notes. System already implemented in Portugal and expected to be implemented in a similar way in Spain.

4. Restocking / transport of eels

According to Article 7 of Council Regulation (EC) N° 1100/2007 a percentage of the glass eel catches, from 35% (initial) to 60% (final), should be reserved to be used in restocking in eel river basins as defined by Member States.

It is foreseen a five year period until the adequate implementation of this measure, due to the lack of infrastructures and the need to find financing sources that allow fishermen to be partially compensated, which will not prevent that glass eel demand for restocking from other regions or Member States, may be included within the percentages established in the Council Regulation.

Nevertheless, restocking measures with yellow eels (<20cm) are foreseen in the short term. Frieira dam blocks the migration of yellow eels that accumulate in the downstream area. A capture station, already in place, will allow the catch and transport of a significant amount of eels to appropriate areas that will make possible the return to the sea.

5. Improving physical and chemical quality of water

With the implementation of the Water Framework Directive, the competent authorities in Portugal and Spain are awaiting the approval of their hydrological plans, that includes strategies to achieve, by 2015, a good ecological status of waters within the International Stretch of River Minho.

With the implementation of these plans it is expected a reduction in anthropogenic eel mortality, still to be calculated, with a positive impact in the increase of the reproductive stock, and consequently in the level of escapement to the sea.

6. Structural measures: increasing the accessibility of tributaries (obstacles removal)

Obstacles that contribute to the reduction of available habitat for eels in the tributaries of the ISMR had been inventoried.

As mentioned in the previous paragraph, in the framework of hydrological plans, most appropriate actions to make rivers accessible to the migration of eels will be studied, either by removing barriers or installing fish passages.

7. Predators

The control of the Black Cormorant (*Phalacrocorax carbo*) will be studied within the International Joint Hunting Commission, where this measure has been already addressed, taking into consideration the negative impact of this species on the stocks of other commercial fish stocks.

Monitoring and estimation of the achievement of the target

The monitoring of the measures included in the Management Plan will be carried out by the International Minho River Standing Commission and the International Joint Fishing Commission. If found necessary, a specific ad hoc Commission should be created.

It is not possible to fix a date of achieving the objective fixed in Council Regulation (EC) N° 1100/2007, although taken into account the species life cycle and growth rates of eels in Lower Minho management Unit, this target will not be able to be achieved before 2047.