

# ICES WKEPEMP REPORT 2013

ICES ADVISORY COMMITTEE

ICES CM 2013/ACOM:32

## Report of the Workshop on Evaluation Progress Eel Management Plans (WKEPEMP)

13–15 May 2013

Copenhagen, Denmark



**ICES**

International Council for  
the Exploration of the Sea

**CIEM**

Conseil International pour  
l'Exploration de la Mer

## **International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer**

H. C. Andersens Boulevard 44–46  
DK-1553 Copenhagen V  
Denmark  
Telephone (+45) 33 38 67 00  
Telefax (+45) 33 93 42 15  
[www.ices.dk](http://www.ices.dk)  
[info@ices.dk](mailto:info@ices.dk)

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## Terms of Reference

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2012/2/ACOM56      The **Workshop on Evaluating Progress with Eel Management Plans** (WKEPEMP), chaired by Alan Walker, UK, will meet 13–15 May 2013 at ICES HQ, to review the Eel Management Plan progress reports submitted to the Commission in 2012 in order to determine and report to the EU Commission on:

- a) Report on the status of the local stock (3Bs) and mortality rates (F & H) for each EMU and how they relate to the overall stock;
- b) Report on the implementation of the management actions committed to in the EMPs for each EMU;
- c) Which management measures implemented in EMPs can be reasonably judged to be already increasing silver eel escapement towards achieving the 40% target, or maintaining escapement above target?
- d) Which management measures implemented in EMPs can be reasonably expected to increase silver eel escapement towards achieving the 40% target, or maintaining escapement above target, within 2–3 eel generations (based on local average generation time)?
- e) Which management measures implemented in EMPs can be reasonably expected to neither increase nor maintain silver eel escapement relative to the target, nor are likely to do so within 2–3 generations based on local average generation time?
- f) Which management measures implemented in EMPs could be made more effective in increasing or maintaining silver eel escapement, and by what means could this be achieved?
- g) Are there other management measures not implemented in EMPs that could be effective?

WKEPEMP will report by 29 May for the attention of the Advisory Committee.

## Supporting information

PRIORITY:	HIGH
Scientific justification and relation to action plan:	<p>To answer the EU request from DG MARE “in order for the Commission to be able to propose enhanced/amended/additional measures (to the Eel Recovery Plan EC1100/2007), we need to know from ICES: A. which measures are delivering results; B. which measures are not; C. which need to be improved.”</p> <p>To service the EU DGMARE Special Request: "<i>Technical evaluation of the progress reports submitted by the EU Member States to the European Commission in line with Article 9 of the Eel Regulation (1100/2007). The reports describe the progress achieved since the implementation of the Member States' eel management plans. ICES is asked to carry out an assessment of the progress achieved via the measures implemented. In view of this, the regulation may be amended and further/additional measures may be taken in order to ensure the recovery of the eel stock</i>".</p>
Resource requirements:	
Participants:	<p>Core experts: Russell Poole, Martin de Graaf, Alan Walker, Willem Dekker and Cedric Briand</p> <p>Nationally nominated members.</p> <p>Stakeholders can attend the Workshop.</p>
Secretariat facilities:	The meeting will be held at ICES HQ to benefit from WebEx facilities and full Secretariat support.
Financial:	<p>Included in the Secretariat budget and partly covered by EC via the MOU.</p> <p>Travel and per diem will be covered for core experts.</p>
Linkages to advisory committees:	Reports to ACOM.
Linkages to other committees or groups:	WGEEL
Linkages to other organizations:	FAO EIFAAC, GFCM

## Executive summary

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The WKEPEMP met in May 2013 at ICES HQ, Copenhagen, Denmark. Shortly before the meeting, Alan Walker (UK) was appointed as chair; there were 17 participants to the workshop, including seven eel scientists, seven observers from the eel industry and conservation organizations, one representative from DGMare of the European Commission, and two representatives of ICES ACOM. The meeting was preceded by a core scientists coordination meeting on Sunday 12th May and the full meeting was opened at 09.00 on Monday 13th May.

In 2007, the EU adopted the Eel Regulation, which led to the development of Eel Management Plans. Progress on the implementation of these plans was reported to the EU by Member States in 2012. In December 2012, EU DGMARE sent ICES a Special Request for: *"Technical evaluation of the progress reports submitted by the EU Member States to the European Commission in line with Article 9 of the Eel Regulation (1100/2007). The reports describe the progress achieved since the implementation of the Member States' eel management plans. ICES was asked to carry out an assessment of the progress achieved via the measures implemented. In view of this, the regulation may be amended and further/additional measures may be taken in order to ensure the recovery of the eel stock"*. DG MARE clarified this request with the following questions: *"in order for the Commission to be able to propose enhanced/amended/additional measures (to the Eel Recovery Plan EC1100/2007), we need to know from ICES: A. which measures are delivering results; B. which measures are not; C. which need to be improved."* ICES set up an independent workshop (WKEPEMP) to carry out this assessment.

EIFAAC/ICES WGEEL, including the core scientists, constructed tables summarizing the stock indicator data (biomass and anthropogenic mortalities), assessment type, habitats and impacts assessed, and the management actions that the Member States committed to in their EMPs. Some of these tables were checked prior to the workshop by scientists from the relevant countries, but this was not possible for all because of time constraints prior to the workshop. Where necessary therefore, the workshop completed these tables to their best ability based on data and information available in the 2012 Progress Reports, the ICES Data Call, and expert judgement. However, time constraints limited the depth of investigation and so much of the data and information available to the WK was accepted in good faith.

This report addresses ToR in reporting on the status of biomass and mortality indicators assessed against relevant interim (WGEEL) and long-term (EU) targets; on whether the management actions committed to in the EMPs (in fact those declared in the Progress Reports) were implemented fully, partially or not at all; whether these management measures were contributing to the increase of silver eel escapement directly, with delay or not at all; whether management measures could be improved; and whether any novel management measures might be implemented. In addition, this report provides recommendations on how this evaluation procedure could be streamlined and made more effective in future.

ICES was not able to fully understand the basis for the stock indicators in some Progress Reports that were written in languages not understood by ICES experts at the meeting. Some Eel Management Units (EMU) did not report all required stock indicators. This made it impossible to evaluate their contribution to stock protection and recovery.

In most Eel Management Units, and depending on local conditions, progress has been made in implementing eel-specific management measures for commercial and recreational fisheries, hydropower, pumping stations and obstacles, restocking, measures on habitat and a few cases predator control.

Comparing local stock indicators provided in the 81 EMP Progress Reports examined and/or those provided in response to the ICES Data Call, to EMU targets, 17 EMU are reported as achieving their biomass targets, 42 are not and 22 did not report. Of the 42 EMU not at the target, 20 are trending towards achieving the target in the future; of the 17 at the target, eleven are trending down and will be below the target in the future. ICES did not evaluate the reliability of the methods used to derive the stock indicators and assumed they were reliable – this assumption remains to be tested.

The biomass targets correspond to total anthropogenic mortality targets: 24 EMUs have reached their targets, 19 have not and 38 have not reported all the stock indicators necessary to make this evaluation. Of the 19 not at the target, eleven are trending towards achieving target in the future; of the 24 at the target, seven have an increasing trend which means they will no longer meet targets in the future.

Most management actions were for commercial and recreational fisheries, followed by hydropower-pumping stations-obstacles, then measures on habitat, restocking, and predator control. Other actions expected to have indirect effects, such as implementing monitoring programmes and scientific studies, were almost as common as controls on fisheries. A total of 756 management actions proposed in the EMPs have been implemented fully, 259 partially and 107 declared as not implemented at all. No information was available to judge whether 18 actions had been implemented or not.

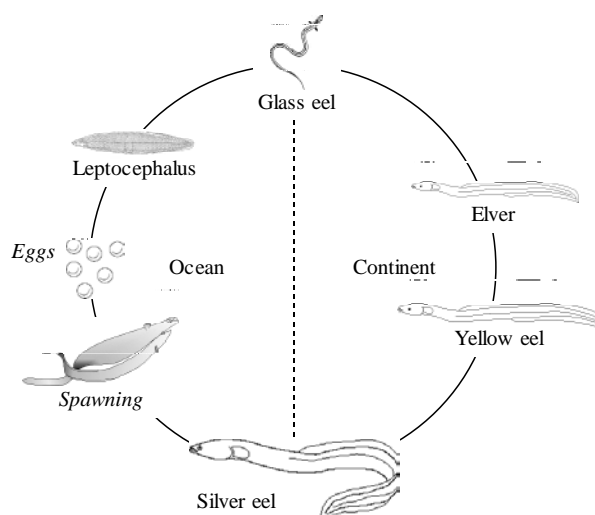
Few progress reports included data to directly demonstrate the effects of individual management measures that had been implemented so far in increasing silver eel escapement towards EMU targets. ICES expert judgement is that restrictions on commercial and recreational fisheries for silver eel have contributed most to increases in silver eel escapement in the short time since the implementation of management plans. With the exception of trap and transport, where the amount of eel transported can be quantified, the effectiveness of measures related to hydropower, pumping stations and obstacles, is difficult to demonstrate or judge because of the site-specific nature of potential impacts and lack of post-evaluation data. Measures to improve habitats may reduce density-dependent mortality rates, but their effectiveness is driven by local conditions. Restocking is not expected to have contributed to increased silver eel escapement yet because of the generational lag time. The efficacy of restocking for recovering the stock remains uncertain while proof of net benefit is lacking. Recent studies of marine migrations suggest no behavioural differences between eel of natural and stocked origins. Control of predators was proposed in 14 actions but only five were fully implemented. Several predators of eel are themselves protected by European legislations and therefore control can be difficult even where they are considered an anthropogenic-induced mortality factor.



## Glossary

Eels are quite unlike other fish. Consequently, eel fisheries and eel biology come with a specialized jargon. This section provides a quick introduction. It is by no means intended to be exhaustive.

There are two species of eel in the North Atlantic, the European eel (*Anguilla anguilla*) and the American eel (*A. rostrata*).



**The life cycle of the European eel. The names of the major life stages are indicated; spawning and eggs have never been observed in the wild and are therefore only tentatively included. (Diagram: Willem Dekker).**

The European eel *Anguilla anguilla* (L.) is found and exploited in fresh, brackish and coastal waters in almost all of Europe and along the Mediterranean coasts of Africa and Asia. The life cycle has not been fully elucidated but current evidence supports the view that recruiting eel to European continental waters originate in a single spawning stock in the Atlantic Ocean, presumably in the Sargasso Sea area, where the smallest larvae have been found. Larvae (*Leptocephali*) of progressively larger size are found between the Sargasso Sea and European continental shelf waters. While approaching the continent, the laterally flattened *Leptocephalus* transforms into a rounded glass eel, which has the same shape as an adult eel, but is unpigmented. Glass eel migrate into coastal waters and estuaries mostly between October and March/April, before migrating, as pigmented elvers, on into rivers and eventually into lakes and streams between May and September. Following immigration into continental waters, the prolonged yellow eel stage (known as yellow eel) begins, which lasts for up to 20 or more years. During this stage, the eels may occupy freshwater or inshore marine and estuarine areas, where they grow, feeding on a wide range of insects, worms, molluscs, crustaceans and fish. Sexual differentiation occurs when the eels are partly grown, though the mechanism is not fully understood and probably depends on local stock density. At the end of the continental growing period, the eels mature and return from the coast to the Atlantic Ocean; this stage is known as the silver eel. Female silver eels are twice as large and may be twice as old as males.

Glass eel	Young, unpigmented eel, recruiting from the sea into continental waters.
Elver	Young eel, in its first year following recruitment from the ocean. The elver stage is sometimes considered to exclude the glass eel stage, but not by everyone. Thus, it is a confusing term.
Bootlace, fingerling	Intermediate sized eels, approx. 10–25 cm in length. These terms are most often used in relation to stocking. The exact size of the eels may vary considerably. Thus, it is a confusing term.
Yellow eel (Brown eel)	Life-stage resident in continental waters. Often defined as a sedentary phase, but migration within and between rivers, and to and from coastal waters occurs. This phase encompasses the elver and bootlace stages.
Silver eel	Migratory phase following the yellow eel phase. Eel characterized by darkened back, silvery belly with a clearly contrasting black lateral line, enlarged eyes. Downstream migration towards the sea, and subsequently westwards. This phase mainly occurs in the second half of calendar years, though some are observed throughout winter and following spring.
Eel River Basin or Eel Management Unit	“Member States shall identify and define the individual river basins lying within their national territory that constitute natural habitats for the European eel (eel river basins) which may include maritime waters. If appropriate justification is provided, a Member State may designate the whole of its national territory or an existing regional administrative unit as one eel river basin. In defining eel river basins, Member States shall have the maximum possible regard for the administrative arrangements referred to in Article 3 of Directive 2000/60/EC [i.e. River Basin Districts of the Water Framework Directive].” EC No. 1100/2007.
River Basin District	The area of land and sea, made up of one or more neighbouring river basins together with their associated surface and groundwaters, transitional and coastal waters, which is identified under Article 3(1) of the Water Framework Directive as the main unit for management of river basins. The term is used in relation to the EU Water Framework Directive.
Restocking	Restocking is the practice of adding fish [eels] to a waterbody from another source, to supplement existing populations or to create a population where none exists.

DEFINITION OF TERMS	
Anthropogenic mortality after management ( $A_{post}$ )	Estimate of anthropogenic mortality after management actions are implemented
Anthropogenic mortality before management ( $A_{pre}$ )	Estimate of anthropogenic mortality before management actions are implemented
Spawner escapement biomass after management ( $B_{post}$ )	Estimate of spawner escapement biomass after management actions are implemented
Spawner escapement biomass before management ( $B_{pre}$ )	Estimate of spawner escapement biomass before management actions are implemented
Best achievable biomass ( $B_{best}$ )	Spawning biomass corresponding to recent natural recruitment that would have survived if there was only natural mortality and no stocking
Interim Target for biomass ( $B_{interim}$ )	Pragmatic intermediate goals for spawner escapement biomass set by managers.
Interim Target for mortality ( $A_{interim}$ )	Pragmatic intermediate anthropogenic mortality goal set by managers.
Limit anthropogenic mortality ( $A_{lim}$ )	Anthropogenic mortality, above which the capacity of self-renewal of the stock is considered to be endangered and conservation measures are requested (Cadima, 2003).
Limit spawner escapement biomass ( $B_{lim}$ )	Spawner escapement biomass, below which the capacity of self-renewal of the stock is considered to be endangered and conservation measures are requested (Cadima, 2003).
Precautionary anthropogenic mortality ( $A_{pa}$ )	Anthropogenic mortality, above which the capacity of self-renewal of the stock is considered to be endangered, taking into consideration the uncertainty in the estimate of the current stock status.
Precautionary spawner escapement biomass ( $B_{pa}$ )	The spawner escapement biomass, below which the capacity of self-renewal of the stock is considered to be endangered, taking into consideration the uncertainty in the estimate of the current stock status.
Pristine biomass ( $B_0$ )	Spawner escapement biomass in absence of any anthropogenic impacts.
%SPR	Ratio of SPR as currently observed to SPR of the pristine stock, expressed in percentage. %SPR is also known as Spawner Potential Ratio.

## 1 Introduction

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In December 2012, EU DG Mare sent the International Council for the Exploration of the Seas (ICES) a Special Request for: "Technical evaluation of the progress reports submitted by the EU Member States to the European Commission in line with Article 9 of the Eel Regulation (1100/2007). The reports describe the progress achieved since the implementation of the Member States' eel management plans. ICES was asked to carry out an assessment of the progress achieved via the measures implemented. In view of this, the regulation may be amended and further/additional measures may be taken in order to ensure the recovery of the eel stock". DG Mare extended/clarified this request with the following questions: "in order for the Commission to be able to propose enhanced/amended/additional measures (to the Eel Recovery Plan EC1100/2007), we need to know from ICES: A. which measures are delivering results; B. which measures are not; C. which need to be improved."

ICES set up an Advisory Committee (ACOM) Resolution for an independent workshop to carry out this assessment, which was held in Copenhagen in May 2013. The Terms of Reference (ToR) were designed such that the workshop would report on the status of biomass and mortality (stock) indicators assessed against relevant interim and long-term targets; on whether the management actions committed to in the Eel Management Plans (EMPs) were implemented fully, partially or not at all; whether these management measures were contributing to the increase of silver eel escapement directly, with delay or not at all; whether management measures could be improved; and whether any novel management measures might be implemented.

### 1.1 Stock indicators for European eel

The European eel (*Anguilla anguilla*) stock in the whole distribution area is considered to constitute one single population. This contrasts strongly with the scattered, small-scale pattern of the continental stock and the national/regional scale of management (Dekker 2000; 2008). Attempts in the early 2000s to manage the stock by uniform measures all over the EU (e.g. a common minimum legal size, a common closed season or a shared catch quota, etc.) failed already in the drafting stage, since uniform measures could not be designed in a way that would be effective all over the continent. A break-through in the international management debate occurred in 2003–2005, when uniform common measures were no longer pursued, and it was suggested to aim for regionalised management (Dekker 2004; 2009-presented and discussed in 2003, Quebec symposium); i.e. a common objective and target, but local action planning, local measures and local implementation. The EU Eel Regulation is indeed centred on orchestrated action, and Eel Management Plans have been developed per country/region.

The EU Eel Regulation sets a long-term general objective ("the protection and sustainable use of the stock of European eel"), but delegates the local management, the implementation of protective measures, the monitoring, and the local post evaluation to its Member States (EC 1100/2007; Dekker, 2004; 2009). An objective is set for the biomass of silver eel escaping from each management area, at 40% of the notional pristine biomass.

Due to the panmixia of the eel (i.e. local silver eel production contributes an unknown fraction to the entire European eel spawning stock, which in turn generates new glass eel recruitment), the efficacy of local protective actions (single EMPs, national export

regulation) in contributing to the recovery of the stock cannot be post-evaluated without considering the overall efficacy of all protective measures taken throughout the distribution range. This requires an international post-evaluation, as planned by WGEEL.

Standard fish stock assessments, for stocks exploited by several countries, usually proceeds as follows: field data are collected in each country (total landings weight, length–frequency, length–age-key, etc.), worked up to a catch-at-age matrix, which is summed over the countries; and finally a single, international stock assessment based on the (summed) catch-at-age matrix yields the required stock indicators. That is: orchestrated data collection, feeding into a single, shared assessment. Though this approach could be followed for eel too, but the assessment would be almost meaningless (ICES 2010a). For instance, the number-at-age 5 would combine small yellow eels far below the minimum legal size in Scandinavia, with large silver eels in the Mediterranean that have already endured almost all their anthropogenic mortalities; the estimated anthropogenic mortality at this age would represent a meaningless mix of northerly and southerly processes, that could no-where be related to specific anthropogenic actions. A single pan-European assessment of the continental stock (not: the oceanic stock!) is meaningless. The alternative is to assess local stocks by country/area, to derive local stock indicators, and to design an international integration procedure for the local stock indicators (Dekker, 2010a, Annex C). International stock indicators are based on national data only through the national stock indicators, not directly.

A framework for international post-evaluation and international stock assessment has been developed (Dekker, 2010; ICES 2010a,b; ICES 2011a,b). At the heart of this framework is the notion of subsidiarity: monitoring, assessment and post-evaluation are organized and executed at the lowest management level being effective. This parallel is the subsidiarity in the management process (Dekker, 2008); parallel structures are probably easier accepted and implemented. The recent meeting of WKESDCF subscribed to the idea of region-specific monitoring, under international orchestration (ICES, 2012a).

ICES (2010a, 2011a) derived a framework for international assessment based on national/regional stock indicators, using four estimates:

- a)  $B_{\text{current}}$ , the biomass of the escapement in the current year, also known as  $B_{\text{post}}$  in years since implementation of EMPs;
- b)  $B_0$ , the biomass of the escapement in the pristine state;
- c)  $B_{\text{best}}$ , the estimated biomass in the assessment year, based on the recently observed recruitment, but assuming no anthropogenic impacts have occurred (neither positive nor negative impacts);
- d)  $\sum A$ , the lifetime anthropogenic mortality rate, or %SPR, the ratio of actual escapement  $B_{\text{post}}$  to best achievable spawner escapement  $B_{\text{best}}$ . ICES (2011 London) indicated that estimates of either  $\sum A$  or %SPR usually refer to anthropogenic impacts in the most recent year, not to impacts summed over the life history of any individual or cohort in the current stock.  $\sum A$  is the addition of  $\sum F$  the fishery mortality and  $\sum H$  all other anthropogenic mortalities.

It is not yet possible to determine the contribution of any individual EMU to the recovery of the whole stock, because the method to assess the overall stock has not been

fully developed. However, it is possible to assess whether or not the EMU has achieved progress in the right direction. SGIPEE (ICES, 2010a) designed such tests based on comparisons between stock indicators and targets, and the direction of change in indicators (summarized in Table 1.1).

**Table 1.1. Schematic overview of potential post evaluation tests, based on biomass or anthropogenic mortalities, detecting trends or testing against specific set-points (reproduced from ICES, 2010a).**

	TREND	INTERIM TARGET/LIMIT	LONG-TERM TARG./LIMIT	MAXIMUM ACHIEVABLE
Biomass <b>B</b>	$B_{\text{post}} > B_{\text{pre}}$ An increasing trend in the biomass of silver eels escaping?	$B_{\text{post}} \geq B_{\text{interim}}$ Has the biomass increased to the level set as interim target/limit?	$B_{\text{post}} \geq B_{\text{lim}}$ Has the biomass increased to the level set as long-term target/limit?	$B_{\text{post}} \ll B_{\text{best}}$ How far is current biomass below the maximum achievable?
Anthropogenic mortality <b>A</b>	$A_{\text{post}} \leq A_{\text{pre}}$ A decreasing trend in anthropogenic mortalities?	$A_{\text{post}} \leq A_{\text{interim}}$ Has mortality decreased below the interim target/limit?	$A_{\text{post}} \leq A_{\text{lim}}$ Has mortality decreased below the long-term target/limit?	$A_{\text{post}} \approx A_0$ Is the minimum anthropogenic impact achieved?

Note that the tests are ordered on mortalities (from low to high ambition), and thus the biomass tests might out of order (in particular: the maximum achievable is often less demanding than the long-term goal,  $B_{\text{best}} < B_{\text{lim}}$ ).

For the purposes of this post-evaluation of EMPs,  $B_{\text{pre}}$  and  $A_{\text{pre}}$  are the values of the 3B's and A, immediately prior to the implementation of the EMPs, i.e. 2008, or in some cases a mean value from several years e.g. 2005–2007, or the values for 2009 if 2008 was not available.  $B_{\text{post}}$  and  $A_{\text{post}}$  are the 2011 (or the 2010 if 2011 was not available) values of the 3B's and A. The interim targets ( $B_{\text{interim}}$  and  $A_{\text{interim}}$ ), if any, were those presented in the EMP or Progress Report. We can test the mortality against the advised mortality target (hereafter called "WGEEL 2012 limit"). A long-term limit can also have been designated for the EMU in the EMP. The regulation set the long-term biomass limit ( $B_{\text{lim}} = 40\%$ ) for every EMU.

## 2 Methods

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### 2.1 Sources of information

The fully comprehensive and independent scientific evaluation of stock status/ management plans generally requires a lot of expert knowledge and time. All the data and information should be available before the start of the evaluation process. The evaluation process thereafter concentrates on examining the data and the methods by which they were produced. As this is the first time that EMP progress has been evaluated however, and the eel management plans differ considerably from the standard marine shared stock assessments and management plans, the evaluation process has had to be developed to fit the eel. The evaluation process is still developing, and the workshop identified areas where this process could be improved (see Section 6).

The primary source of information for the evaluation was intended to be the EMP Progress Reports submitted to the European Commission in 2012. One of the 19 countries did not submit a progress report. Only six countries provided all the stock indicators required in Article 9 of the Eel Regulation (EC 1100/2007), nine reported incomplete data and three did not provide any of the required stock indicators. Furthermore, since the national reports did not follow a standard format, the level of detail of the reporting differed significantly, and reports were written in a range of languages.

Given the level of non-compliance with the reporting template, ICES made efforts to streamline the process through preparations by WGEEL and homework by the core scientist team of the workshop. ICES issued a request for Stock Indicator data in February 2013 at the ICES Data Call. This request was sent to national delegates of ICES countries and ACOM representatives. The reason for making the request was to seek the most-up-to-date information on stock indicators in order to ensure that stock assessments performed by ICES would be based on the best available and most complete dataset. Not all relevant contacts in the countries received the Data Call and some countries are not members of ICES. In some cases, WGEEL participants filled in the data at the WGEEL March meeting.

WGEEL 2013 (March: unpublished) also reviewed the Progress Reports to compile a list of management actions, classifying them into broad action types and examining information provided in the reports of their implementation.

In April and May 2013, WKEPEMP core scientists combined the various tables of data into an evaluation factsheet. Immediately prior to the workshop, the evaluation factsheet was completed by scientists from some, but not all, countries with EMPs. Where completed factsheets were not available, the WK completed them as best they could by referring to the Progress Reports and ICES Data Call, and using expert judgements where necessary. However, since the 2012 Progress reports were often written in native languages, some of which were not available to the WK, and no translations were available, final crosschecks of the preparatory work provided by WGEEL with the original EMPs and Progress Reports were not possible in all cases.

### 2.2 Analyses

EMPs and their Progress Reports were evaluated as to whether or not stock indicators were reported, whether or not those indicators had met various short-term and long-term targets, and whether or not they were trending in the right direction to theoretically contribute to the increase of silver eel escapement in the EMU. Some

EMUs do not have EMPs or Progress Reports but data were provided to the ICES Data Call, e.g. eleven EMUs in Italy. These were not evaluated by the workshop because they lacked EMPs from which to evaluate progress.

Three targets for  $\Sigma A$  and  $B_{\text{current}}$  were considered:

- the EMP 2012 target = value of the short-term (2012) target if it was set in the EMP. Values can be given for  $\Sigma A$  and  $B_{\text{current}}$ .
- the EMP long-term target = value of the long-term target if it was set in the EMP. Values can be given for  $\Sigma A$  and  $B_{\text{current}}$ .
- the EU/ICES targets. For Biomass it corresponds to 40% of  $B_0$ . For  $\Sigma A$  it corresponds to (0.92 if  $B_{\text{current}}/B_0 > 40\%$ , or  $0.92 * B_{\text{current}}/(40% * B_0)$  if  $B_{\text{current}}/B_0 < 40\%$ ).

The implementation of management actions was determined as having been implemented fully, partially or not at all (at the time of the Progress Report), based on the information available in the Progress Reports. Where no information could be identified, this was recorded.

There was very little information available to the WK to quantify the direct effects of individual management actions on silver eel escapement in specific EMUs. Therefore, the potential impact of actions was judged using the expert opinion of the WKEPEMP. Impacts were categorized as High, Interim, Low or None according to their potential to increase of silver eel biomass or reduction of anthropogenic mortality, when considered in the context of their effect compared with the current levels of silver eel production or anthropogenic mortality and catches. Three additional categories were also used: Unsure, for where there was not enough information available to ascribe one of the first four categories; Knowledge, when the action would have no direct effect on biomass or mortality (e.g. increasing scientific knowledge); and Regulation, when the action was taken to fulfil some mandatory requirement of the regulation without having a direct effect on the stock, e.g. ensuring the traceability of glass eel catches.

Due to the very different backgrounds of the workshop participants, the elaboration of a standardized protocol, especially for the assessment of the impact of management actions was only partially developed during the workshop. Clearly formulated indicator-based evaluation guidelines should therefore be provided in a future approach. Cross-validation between subgroups was conducted through discussions amongst the core eel scientists (the subgroup leaders). However, some variations in the interpretation of the categorization of action impacts remained. Therefore, these impact assessments are presented in the individual EMU evaluations only as a guide (see Annex A), but no comparisons or summaries are attempted across the set of EMPs.

In addition to these challenges in evaluating the progress of the EMPs, information was not available to the workshop to examine the quality of the methods used to provide the stock indicators. WGEEL (ICES, 2012b) has previously considered the comparability, or lack of, between assessment methods applied across EMUs, identifying differences in assessment method, treatment of habitat area producing eels, and selection and treatment of anthropogenic impacts (see ICES, 2012b, Section 8).

**Therefore, the contents of this report are intended for guidance alone and must not be treated as a comprehensive and definitive evaluation of progress in individual EMUs.**



### 3 Report on the status of the local stock (3Bs) and mortality rates (*F & H*) for each EMU

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This section addresses ToR a.

In most cases, the stock indicator did not change between the Progress Report and the Data Call: exceptions were some data from Germany, Italy and the UK. The workshop understood that the German and UK data had been improved by further development of assessment methods and/or the analysis of new data. The workshop did not have the knowledge to explain, nor the opportunity to explore, the considerable differences between the data provided in the Progress Report vs. Data Call for the nine Italian EMUs with approved EMPs. For example, the Progress Report provided information for each EMU but stock indicators (especially mortalities) only for the whole territory. As noted above, the workshop accepted the data provided in good faith, but recognized that detailed examinations of the data and methods used to calculate stock indicators are urgently required.

Furthermore, it should be noted that silver eels of restocked origin contribute to the escapement from an EMU; biomass indicators (other than  $B_0$ ) generally do include this contribution. For mortality estimates, however, countries have used different approaches: either the reported mortality  $\Sigma A$  reflects the positive anthropogenic effect of restocking (but not the actual mortality experienced by natural and restocked eels), or it reflects the actual mortality on natural and restocked eels (but ignores the positive effect of restocking). Depending on the approach, a different interpretation applies. The workshop noted an inconsistency among countries, but it was not in a position to analyse in detail or to correct.

Hence, our analysis of stock indicators should be read with care.

Table 3.1 provides an overview of the stock indicators reported most recently for each EMU, with colour coded evaluations of whether each EMU achieves targets and whether trends are in the right direction to increase silver eel escapement. Table 3.2 presents biomass and mortality stock indicators and the quantity of restocked eel for each EMU during 2008 and 2009 to 2011, synonymous with pre and post EMP implementation.

Comparing local stock indicators provided in the 81 EMP Progress Reports examined and/or those provided in response to the ICES Data Call to EMU targets, 17 EMU are reported as achieving their biomass targets, 42 are not and 22 did not report. Of the 42 EMU not at the target, 20 are trending towards achieving the target in the future; of the 17 at the target, eleven are trending down and will be below the target in the future. ICES did not evaluate the reliability of the methods used to derive the stock indicators and assumed they were reliable.

The biomass targets correspond to total anthropogenic mortality targets ( $\Sigma A$ ): 24 EMUs have reached their targets, 19 have not and 38 have not reported all the stock indicators necessary to make this evaluation. Of the 19 not at the target, eleven are trending towards achieving target in the future; of the 24 at the target, seven have an increasing trend which means they will no longer meet their targets in the future.

In addition to reporting total anthropogenic mortality, MS were required to report mortality rates due to fisheries ( $\Sigma F$ ) and to non-fisheries anthropogenic mortalities ( $\Sigma H$ ). These two stock indicators were both reported in at least one year for 43 EMU (Table 3.2). In 24 of these EMU, the rate due to F was greater than that due to H in the

most recent year reported. H was greater than F in 15 EMU, and the two rates were equal in the other 4 EMUs.

Note that WKEPEMP was not able to address the second part of ToR a, to relate the biomass and mortality indicators for EMUs to the overall status of the stock, because there has been no assessment of the overall stock using these indicators. ICES will try to evaluate the effect of the EMPs on the overall stock when it assesses the overall stock in autumn but this will be complicated because the overall stock includes waters outside the EMUs (e.g. North Africa, Mediterranean Basin, some Baltic Basin, Norway and Iceland).

**Table 3.1. Overview of the stock indicators provided for the EMUs, with colour coded evaluations of whether each EMU achieves targets and trends. For the mortality, a green value for  $M_{trend}$ , indicates that the mortality is decreasing. A green value for 'Target?' under 'Mortality' indicates that the mortality is below the target as proposed by WGEEL 2012. This target is  $\Sigma A$  if the current biomass ( $B_{current}$ ) is larger than the target (i.e. 40% of the pristine biomass ( $B_0$ )), but will decrease linearly if  $B_{current}$  is lower than the target. For the biomass, a green value for 'Target?' under 'Biomass' indicates that the biomass is larger than the target (i.e. 40% of the pristine biomass ( $B_0$ )). A green value of 'Trend?' under 'Biomass' indicates that the biomass is increasing. For all values, an amber cell indicates that no data were provided to evaluate the indicator. The indicators presented here are those reported for the most recent data provided, but the trends are based on comparison between indicators before and after implementation of the EMP. %SPR is the ratio of silver eel produced per recruiting individuals under present conditions, against that estimated if no anthropogenic mortality was applied, expressed as a percentage.**

CODE	NAME	MORTALITY				BIOMASS			
		$\Sigma A$	%SPR	TREND ?	TARGET?	$B_{CURRENT}$	$B_0$	TREND ?	TARGET ?
SE_East	East coast	0.072	93.1	Yes	Yes	3499	12500	Yes	No
SE_Inla	Inland	1.58	20.6	No	No	57	300	No	No
SE_West	West coast	0.93	39.5	Yes	No	12	1154	No	No
FI_Finl	Finland								
EE_Narv	Narva								
EE_West	West Estonia								
LV_Latv	Latvia					2	125	No	No
LI_Lith	Lithuania					9	87	Yes	No
PL_Oder	Oder	1.53	21.7	No	No	117	1611	No	No
PL_Vist	Vistula	3.4	3.3	No	No	82	1343	No	No
CZ_Elbe	Elbe								
CZ_Oder	Oder								
DE_Eide	Eider					107	240	No	Yes
DE_Elbe	Elbe	0.292	74.7	Yes	No	140	1450	No	No
DE-Ems	Ems	0.08	92.3	Yes	Yes	364	711	No	Yes
DE_Maas	Maas	0.86	42.3	Yes	No	0	4	No	No
DE_Oder	Oder	1.14	32	No	No	12	118	No	No
DE_Rhei	Rhein	1.03	35.7	Yes	No	146	288	No	Yes
DE_Schl	Schlei/ Trave					281	641	No	Yes
DE_Warn	Warnow/ Peene	-2.01	746.3	Yes	Yes	529	1395	No	No
DE_Wese	Weser	0.41	66.4	Yes	Yes	339	605	No	Yes
DK_Inla	Inland waters	0.287	75.1	No	Yes	172	1110	Yes	No
NL_Neth	Netherlands	1.1	33.3	Yes	No	482	10400	Yes	No
BE_Meus	Meuse	1.025	35.9	No	No	14	54	No	No
BE_Sche	Schelde	0.187	82.9	Yes	Yes	34	178	Yes	No
LU_Luxe	Luxemburg								
IE_East	Eastern	0.01	99	Yes	Yes	9	20	Yes	Yes
IE_NorW	Northwestern	0.05	95.1	Yes	Yes	52	136	Yes	No
IE_Shan	Shannon	0.09	91.4	Yes	Yes	69	201	Yes	No
IE_SouE	Southeastern	0	100	Yes	Yes	7	15	No	Yes

CODE	NAME	MORTALITY				BIOMASS			
		$\Sigma A$	%SPR	TREND ?	TARGET?	B <sub>CURRENT</sub>	B <sub>0</sub>	TREND ?	TARGET ?
IE_SouW	Southwestern	0.03	97	Yes	Yes	11	25	No	Yes
IE_West	Western	0	100	Yes	Yes	69	189	Yes	No
GB_Angl	Anglian	0.827	43.7	No	Yes	54	123	No	Yes
GB_Dece	Dee	0.157	85.4	No	No	21	422	No	No
GB_Humb	Humber	0.278	75.7	No	Yes	120	158	No	Yes
GB_Neag	Neagh Bann	1.325	26.6	No	No	155	500	No	No
GB_NorE	Northeastern	0	100	No			4		
GB_Nort	Northumbria	0.005	99.5	No	Yes	70	71	No	Yes
GB_NorW	Northwest	0.436	64.7	Yes	No	24	654	Yes	No
GB_Scot	Scotland	0.325	72.3	No	Yes	47	196	No	No
GB_Seve	Severn	0.268	76.5	Yes	Yes	181	513	No	No
GB_Solw	Solway Tweed	0.001	99.9	No	Yes	345	1170	No	No
GB_SouE	Southeast	0.448	63.9	No	Yes	63	98	No	Yes
GB_SouW	Southwest	0.929	39.5	No	No	56	596	Yes	No
GB_Tham	Thames	0.215	80.6	Yes	Yes	411	510	Yes	Yes
GB_Wale	Western Wales	0.092	91.2	Yes	Yes	23	371	Yes	No
FR_Adou	Adour	2.759	6.3			184			
FR_Arto	Artois- Picardie	2.759	6.3			80			
FR_Bret	Bretagne	2.759	6.3			225			
FR_Cors	Corse	2.759	6.3			62			
FR_Garo	Garonne	2.759	6.3			429			
FR_Loir	Loire	2.759	6.3			343			
FR_Meus	Meuse	2.759	6.3			1			
FR_Rhin	Rhine	2.759	6.3			2			
FR_Rhon	Rhone- Mediterranea n	2.759	6.3			533			
FR_Sein	Seine- Normandie	2.759	6.3			286			
ES_Anda	Andalusia					563	4649	No	No
ES_Astu	Asturias					13	55	No	No
ES_Bale	Balearic Islands					221	331	Yes	Yes
ES_Basq	Basque Country					129	137	Yes	Yes
ES_Cant	Cantabria					1	24	No	No
ES_Cast	Castilla-La Mancha					0	18	No	No
ES_Cata	Ebro					50	859	Yes	No
ES_Gali	Galicia					9	130	No	No
ES_Inne	Ebro					0	2420	No	No
ES_Murc	Murcia					50	859	No	No



Table 3.2. Stock indicators for EMUs, as reported in the Progress Report or ICES Data Call.  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ , same as Table 4.1). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking. Missing values are highlighted as grey cells.

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		B0	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
SE_East	2008	12500	3385	3770	0.10	0.00	0.10	0.131
	2009	12500	3461	3770	0.08	0.00	0.08	0.066
	2010	12500	3463	3770	0.08	0.00	0.08	0.011
	2011	12500	3499	3770	0.07	0.00	0.07	0.025
SE_Inla	2008	300	66	239	0.63	0.65	1.28	0.450
	2009	300	65	255	0.47	0.91	1.38	0.220
	2010	300	58	271	0.51	1.04	1.55	0.617
	2011	300	57	280	0.36	1.22	1.58	0.719
SE_West	2008	1154	12	1154	1.86	0.00	1.86	0.000
	2009	1154	12	1154	1.19	0.00	1.19	0.000
	2010	1154	12	1154	1.20	0.00	1.20	0.064
	2011	1154	12	1154	0.93	0.00	0.93	0.194
FI_Finl	2008							
	2009							
	2010							
	2011							
EE_Narv	2008							
	2009							
	2010							
	2011							
EE_West	2008							
	2009							
	2010							
	2011							
LV_Latv	2008	125.5	1.7	4				0.000
	2009	125.5	1.7	4				0.000
	2010	125.5	1.7	4				0.000
	2011	125.5	1.7	4				0.051
LI_Lith	2008	87	7.1	24.9				0.000
	2009	87	7.9	19.7				0.000
	2010	87	14.6	36.7				0.000
	2011	87	9.4	23.5				0.052
PL_Oder	2008	1611	236	336	0.74	0.51	1.25	0.195
	2009							0.273
	2010							0.273
	2011	1611	117	426	1.02	0.51	1.53	0.526
PL_Vist	2008	1343	233	416	1.08	0.80	1.88	0.195

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		BO	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
	2009							0.273
	2010							0.273
	2011	1343	82	355	2.06	0.80	2.86	0.526
CZ_Elbe	2008							
	2009							
	2010							
	2011							
CZ_Oder	2008							
	2009							
	2010							
	2011							
DE_Eide	2008	239.5	111.1	148.3				0.000
	2009	239.5	108.7	146.0				0.000
	2010	239.5	107.4	143.8				0.000
	2011	240.0						
DE_Elbe	2008	1450.2	239.6	139.1	0.04	0.01	1.07	3.888
	2009	1450.2	178.7	115.5	0.04	0.00	1.22	3.964
	2010	1450.2	140.2	98.7	0.03	0.00	1.36	4.741
	2011	1450.0						
DE_Ems	2008	711.2	421.7	259.0	0.00	0.00	0.09	0.233
	2009	711.2	385.6	234.6	0.01	0.00	0.08	0.190
	2010	711.2	363.9	211.5	0.01	0.00	0.08	0.244
	2011	711.0						
DE_Maas	2008	4.2	0.5	1.2	0.02	0.01	0.95	0.003
	2009	4.2	0.4	0.9	0.02	0.01	0.89	0.002
	2010	4.2	0.3	0.5	0.01	0.00	0.86	0.006
	2011	4.0						
DE_Oder	2008	118.2	26.5	11.3	0.03	0.00	0.82	0.202
	2009	118.2	17.6	8.4	0.02	0.00	1.00	0.179
	2010	118.2	11.8	6.5	0.03	0.00	1.14	0.082
	2011	118.0						
DE_Rhei	2008	288.4	161.5	26.7	0.02	0.03	1.13	1.071
	2009	288.4	154.6	16.5	0.02	0.03	1.07	1.126
	2010	288.4	146.2	9.0	0.02	0.03	1.03	1.163
	2011	288.0						
DE_Schl	2008	641.0	299.2	393.5				0.193
	2009	641.0	289.5	383.6				0.221
	2010	641.0	281.4	375.4				0.383
	2011	641.0						
DE_Warn	2008	1395.5	553.4	613.1	0.01	0.00	0.21	0.449
	2009	1395.5	535.4	611.6	0.01	0.00	0.23	0.411
	2010	1395.5	528.8	617.9	0.01	0.00	0.24	0.454
	2011	1395.0						

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		B0	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
DE_Wese	2008	605.0	378.5	180.9	0.01	0.01	0.44	0.771
	2009	605.0	353.1	163.0	0.01	0.01	0.42	0.714
	2010	605.0	339.2	145.9	0.01	0.01	0.41	0.687
	2011	605.0						
DK_Inla	2008	1110.0	129.5	172.5				
	2009	1110.0	129.5	172.5	0.15	0.13	0.29	0.099
	2010	1110.0	129.5	172.5	0.15	0.13	0.29	0.486
	2011	1110.0	129.5	172.5	0.15	0.13	0.29	0.531
NL_Neth	2008	10400	439	2927	1.85	0.04	1.89	
	2009							
	2010							
	2011	10400	482	1443	1.16	0.04	1.10	
BE_Meus	2008	53	16	41	0.15	0.79	0.94	
	2009							
	2010							
	2011	54	14	39	0.11	0.91	1.02	0.040
BE_Sche	2008	169	33	45	0.29	0.02	0.31	0.117
	2009							0.152
	2010							0.143
	2011	187	34	41	0.18	0.01	0.19	0.120
LU_Luxe	2008							
	2009							
	2010							
	2011							
IE_East	2008	20.5	7.0	14.2	0.68	0.03	0.71	0.000
	2009	20.5	9.4	9.6	0.00	0.01	0.01	0.000
	2010	20.5	9.4	9.6	0.00	0.01	0.01	0.000
	2011	20.5	9.4	9.6	0.00	0.01	0.01	0.000
IE_NorW	2008	135.8	48.8	103.5	0.58	0.18	0.75	0.000
	2009	135.8	51.5	54.3				0.000
	2010	135.8	51.5	54.3	0.00	0.05	0.05	0.000
	2011	135.8	51.5	54.3	0.00	0.05	0.05	0.000
IE_Shan	2008	201.2	19.9	94.2	1.29	0.26	1.55	0.000
	2009	201.2	68.7	75.4	0.00	0.09	0.09	0.000
	2010	201.2	68.7	75.4	0.00	0.09	0.09	0.000
	2011	201.2	68.7	75.4	0.00	0.09	0.09	0.000
IE_SouE	2008	14.8	8.7	10.1	0.15	0.00	0.15	0.000
	2009	14.8	6.8	6.8	0.00	0.00	0.00	0.000
	2010	14.8	6.8	6.8	0.00	0.00	0.00	0.000
	2011	14.8	6.8	6.8	0.00	0.00	0.00	0.000
IE_SouW	2008	24.5	16.6	17.4	0.01	0.04	0.05	0.000
	2009	24.5	11.3	11.6	0.00	0.03	0.03	0.000
	2010	24.5	11.3	11.6	0.00	0.03	0.03	0.000



CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		B0	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
IE_West	2011	24.5	11.3	11.6	0.00	0.03	0.03	0.000
	2008	189.2	41.6	96.9	0.85	0.00	0.85	0.000
	2009	189.2	68.7	68.7	0.00	0.00	0.00	0.000
	2010	189.2	68.7	68.7	0.00	0.00	0.00	0.000
GB_Angl	2011	189.2	68.7	68.7	0.00	0.00	0.00	0.000
	2008	122.9	57.9	122.9	0.09	0.66	0.75	0.007
	2009	122.9	53.7	122.9	0.15	0.68	0.83	0.005
	2010	122.9	53.7	122.9	0.15	0.68	0.83	0.015
GB_Dece	2011	122.9	53.7	122.9	0.15	0.68	0.83	0.011
	2008	422.3	21.6	24.9	0.03	0.01	0.14	0.000
	2009	422.3	21.4	25.1	0.04	0.11	0.16	0.000
	2010	422.3	21.4	25.1	0.04	0.11	0.16	0.000
GB_Humb	2011	422.3	21.4	25.1	0.04	0.11	0.16	0.000
	2008	157.9	119.8	157.9	0.02	0.26	0.28	0.000
	2009	157.9	119.6	157.9	0.02	0.26	0.28	0.018
	2010	157.9	119.6	157.9	0.02	0.26	0.28	0.038
GB_Neag	2011	157.9	119.6	157.9	0.02	0.26	0.28	0.000
	2008	500.0	264.0	582.0	1.25	0.00	1.25	0.433
	2009	500.0	154.6	582.0	1.33	0.00	1.33	0.217
	2010	500.0	154.6	582.0	1.33	0.00	1.33	0.996
GB_NorE	2011	500.0	154.6	582.0	1.33	0.00	1.33	1.035
	2008	4.0			0.000	0.000	0.000	0.000
	2009	4.0			0.000	0.000	0.000	0.000
	2010	4.0			0.000	0.000	0.000	0.000
GB_Nort	2011	4.0			0.000	0.000	0.000	0.000
	2008	70.7	70.3	70.6	0.00	0.00	0.00	0.000
	2009	70.7	70.3	70.6	0.00	0.00	0.00	0.000
	2010	70.7	70.3	70.6	0.00	0.00	0.00	0.000
GB_NorW	2011	70.7	70.3	70.6	0.00	0.00	0.00	0.000
	2008	654.0	23.7	45.5	0.39	0.26	0.65	0.000
	2009	654.0	24.1	37.3	0.15	0.28	0.44	0.000
	2010	654.0	24.1	37.3	0.15	0.28	0.44	0.000
GB_Scot	2011	654.0	24.1	37.3	0.15	0.28	0.44	0.000
	2008	196.3	74.7	102.6		0.27	0.32	0.000
	2009	196.3	129.8	175.6	0.00	0.26	0.30	0.000
	2010	196.3	66.9	89.7	0.00	0.25	0.29	0.000
GB_Seve	2011	196.3	47.1	65.2	0.00	0.28	0.32	0.000
	2008	513.5	181.0	254.0	0.30	0.04	0.34	0.000
	2009	513.5	180.6	236.1	0.23	0.04	0.27	0.000
	2010	513.5	180.6	236.1	0.23	0.04	0.27	0.000
GB_Solw	2011	513.5	180.6	236.1	0.23	0.04	0.27	0.039
	2008	1169.8	345.0	345.0	0.00	0.00	0.00	0.000
	2009	1169.8	344.5	344.7	0.00	0.00	0.00	0.000

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)	
		B0	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV	
	2010	1169.8	344.5	344.7	0.00	0.00	0.00	0.000	
	2011	1169.8	344.5	344.7	0.00	0.00	0.00	0.000	
GB_SouE	2008	97.9	63.0	98.0	0.06	0.38	0.44		
	2009	97.9	62.6	97.9	0.06	0.38	0.45	0.000	
	2010	97.9	62.6	97.9	0.06	0.38	0.45	0.000	
	2011	97.9	62.6	97.9	0.06	0.38	0.45	0.000	
GB_SouW	2008	595.5	52.9	118.2	0.62	0.18	0.80		
	2009	595.5	55.7	141.1	0.77	0.16	0.93	0.000	
	2010	595.5	55.7	141.1	0.77	0.16	0.93	0.000	
	2011	595.5	55.7	141.1	0.77	0.16	0.93	0.000	
GB_Tham	2008	509.9	410.1	509.7	0.01	0.20	0.22		
	2009	509.9	411.1	509.7	0.01	0.20	0.22	0.000	
	2010	509.9	411.1	509.7	0.01	0.20	0.22	0.000	
	2011	509.9	411.1	509.7	0.01	0.20	0.22	0.000	
GB_Wale	2008	371.4	23.0	27.2	0.09	0.08	0.17	0.000	
	2009	371.4	23.1	25.4	0.01	0.08	0.09	0.000	
	2010	371.4	23.1	25.4	0.01	0.08	0.09	0.000	
	2011	371.4	23.1	25.4	0.01	0.08	0.09	0.000	
FR_Adou	2008		220.7			0.03	2.48		
	2009		184.1			0.03	2.76		
	2010								
	2011								
FR_Arto	2008		95.9			0.01	2.48		
	2009		80.0			0.01	2.76		
	2010								
	2011								
FR_Bret	2008		269.8			0.02	2.48		
	2009		224.5			0.02	2.76		
	2010								
	2011								
FR_Cors	2008		74.8			0.01	2.48		
	2009		62.3			0.01	2.76		
	2010								
	2011								
FR_Garo	2008		513.4			0.03			
	2009		428.8			0.03			
	2010								
	2011								
FR_Loir	2008		415.3			0.01	2.48	0.740	
	2009		432.9			0.01	2.76		
	2010								
	2011								
FR_Meus	2008		0.8			0.57	2.48		

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		BO	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
	2009		0.7			0.57	2.76	
	2010							
	2011							
FR_Rhin	2008		2.3			0.22	2.48	
	2009		2.0			0.22	2.76	
	2010							
	2011							
FR_Rhon	2008		639.1			0.05	2.48	
	2009		533.1			0.05	2.76	
	2010							
	2011							
FR_Sein	2008		342.3			0.05	2.48	
	2009		286.2			0.05	2.76	
	2010							
	2011							
ES_Anda	2008	3735.1	626.1					
	2009							
	2010							
	2011	5562.5	562.7	610.4	0.008			0.019
ES_Astu	2008	46.1	16.5					0.012
	2009							0.000
	2010							0.018
	2011	64	12.6	159.1	2.54			0.024
ES_Bale	2008	330.9	21.7					
	2009							
	2010							
	2011	330.9	220.6	222.7	0.01			
ES_Basq	2008	28.7	12.2					
	2009							
	2010							
	2011	245	129	179	0.33			0.051
ES_Cant	2008	38.7	6.4					
	2009							
	2010							
	2011	9.7	1.3	28.1	3.08			0.005
ES_Cast	2008	11.5	0.0					
	2009							
	2010							
	2011	23.5	0.0	0.0	0.00			
ES_Cata	2008	858.8	46.1					
	2009							
	2010							
	2011	858.8	50.4	159.5	1.15			0.001

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		B0	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
ES_Gali	2008	130.3	9.1					
	2009							
	2010							
	2011	130.3	9.1	60.4	1.89			
ES_Inne	2008	2420.2	0.0		0.00			
	2009							
	2010							
	2011	2420.2	0.0	0.0	0.00			
ES_Murc	2008	858.8	50.4					
	2009							
	2010							
	2011	858.4	50.4	159.5	1.15			
ES_Nava	2008							
	2009							0.005
	2010							0.005
	2011	5.4	2.3	2.0	0.00			
ES_Vale	2008	698	385.2					0.017
	2009							0.008
	2010							0.002
	2011	698	385.2	428	0.11			0.007
PT_Port	2008							
	2009							
	2010							
	2011							
IT_Emil	2008	458.2	78.8	117.7	0.84	-0.44	0.40	0.020
	2009	458.2	81.4	117.7	0.80	-0.43	0.37	0.030
	2010	458.2	79.2	117.7	0.81	-0.41	0.40	0.030
	2011	458.2	80.4	117.7	0.79	-0.41	0.38	0.030
IT_Frio	2008	293.0	47.9	74.8	0.87	-0.43	0.45	0.000
	2009	293.0	47.9	74.8	0.87	-0.43	0.45	0.000
	2010	293.0	48.0	74.8	0.83	-0.38	0.44	0.100
	2011	293.0	50.3	74.8	0.77	-0.38	0.40	0.300
IT_Lazi	2008	71.1	3.0	32.5	2.55	-0.18	2.37	0.090
	2009	71.1	4.8	32.5	2.15	-0.22	1.92	0.100
	2010	71.1	6.8	32.5	1.56	0.00	1.56	0.030
	2011	71.1	10.9	32.5	0.99	0.10	1.09	0.070
IT_Lomb	2008	65.6	3.2	10.9	2.86	-1.63	1.24	0.040
	2009	65.6	3.2	10.9	2.86	-1.63	1.24	0.060
	2010	65.6	3.4	10.9	2.86	-1.71	1.16	0.050
	2011	65.6	4.3	10.9	0.04	0.89	0.94	0.010
IT_Pugl	2008	399.8	76.4	130.5	0.52	0.02	0.53	0.000
	2009	399.8	76.3	130.5	0.52	0.02	0.54	0.000
	2010	399.8	80.0	130.5	0.47	0.02	0.49	0.000

CODE	YEAR	BIOMASS (T)			MORTALITY			STOCKED (T)
		B0	BCURRENT	BBEST	$\Sigma F$	$\Sigma H$	$\Sigma A$	G.E. EQV
IT_Sard	2011	399.8	89.5	130.5	0.36	0.01	0.38	0.000
	2008	210.4	18.3	97.3	1.62	0.05	1.67	0.000
	2009	210.4	18.1	97.3	1.64	0.05	1.68	0.000
	2010	210.4	25.2	97.3	1.30	0.05	1.35	0.000
IT_Tosc	2011	210.4	27.8	97.3	1.21	0.05	1.25	0.000
	2008	75.4	2.4	34.7	2.56	0.11	2.67	0.000
	2009	75.4	2.4	34.7	2.56	0.11	2.67	0.000
	2010	75.4	2.6	34.7	2.44	0.14	2.57	0.000
IT_Vene	2011	75.4	2.7	34.7	2.44	0.13	2.57	0.035
	2008	1773.1	39.0	452.2	0.38	-0.08	0.29	0.015
	2009	1773.1	38.4	452.2	0.39	-0.10	0.30	0.010
	2010	1773.1	40.3	452.2	0.36	-0.07	0.29	0.010
GR_CeAe	2011	1773.1	42.9	452.2	0.21	0.07	0.28	0.080
	2008							
	2009							
	2010							
GR_EaMT	2011							
	2008							
	2009							
	2010							
GR_NorW	2011							
	2008							
	2009							
	2010							
GR_WePe	2011							
	2008							
	2009							
	2010							

#### **4 Report on the implementation of the management actions committed to in the EMPs for each EMU**

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This section addresses ToR b.

The management actions are listed in the EMU summaries in Annex A, along with indications of whether they have been implemented (fully or partially) or not, or no information was available to determine this.

In total, 1188 management actions were listed in the Progress Reports; it was not possible within the WKEPEMP to cross-reference these lists with the original EMPs. Of those 1188 actions, 1140 were listed as having been proposed in the EMPs, and an additional 48 were not planned in the EMPs. Though no EMUs implemented all of the proposed actions, 756 of those management actions proposed in the EMPs have been implemented fully, 259 partially and 107 declared as not implemented at all. No information was available to judge whether 18 actions had been implemented or not.

Many actions were targeted at common pressures (impacts). The WK grouped these actions into six types: commercial fisheries; recreational fisheries; habitat improvement; hydropower and obstacles (and pumping stations); predators; restocking; and others. The progress with implementing actions is summarized for these action types in Table 4.1 for those planned in EMPs and Table 4.2 for those developed subsequent to the approval of EMPs.

The most 'direct' management actions were for fisheries (commercial and recreational combined), followed by hydropower and obstacles, then measures on habitat, restocking, and predator control. Other actions expected to have indirect effects, such as implementing monitoring programmes and scientific studies, were almost as common as controls on commercial fisheries.

**Table 4.1. Evaluation of the implementation status of management actions planned in EMPs, as reported in the 2012 Progress Reports, and summarized according to seven broad categories of action types.**

ACTION TYPE	FULLY	PARTLY	NOT	NO INFORMATION	TOTAL
Commercial fishery	204	63	13	5	285
Recreational fishery	78	24	18	2	122
Habitat improvement	53	49	5	1	108
Hydropower and obstacles	158	68	25	2	261
Predator reduction	5	5	4	0	14
Restocking	53	23	11	2	89
Others	205	27	31	2	265
<b>Total</b>	<b>756</b>	<b>259</b>	<b>107</b>	<b>14</b>	<b>1140</b>

**Table 4.2. Evaluation of the implementation status of management actions developed since the approval of EMPs, as reported in the 2012 Progress Reports, and summarized according to seven broad categories of action types.**

ACTION TYPE	FULLY	PARTLY	NOT	NO INFORMATION	TOTAL
Commercial fishery	3	4	0	0	7
Recreational fishery	5	1	0	0	6
Habitat improvement	1	11	0	0	12
Hydropower and obstacles	1	2	0	0	3
Predator reduction	0	0	0	0	0
Restocking	3	1	0	0	4
Others	14	1	1	0	16
<b>Total</b>	<b>27</b>	<b>20</b>	<b>1</b>	<b>0</b>	<b>48</b>

## **5 Review of management actions**

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### **5.1 Introduction**

This section addresses ToR c, d, e, f and g; the text is organized by type of management actions. The aim is to summarize for each type of management action whether they were applied within management measures in an EMU, the level of fulfilment reached, the expected effect on the stock and the improvement that could be achieved in the implementation of the measures to make them more effective in terms of silver eel production.

The findings reported in this section are based on the evaluation of individual EMUs (Annex A). In many cases, the outcome of the management actions was evaluated to be “unsure” due to the absence of (quantitative) information on the action taken and/or the absence of post-evaluation of the actions at the EMU level.

It should be noted, however, that in many cases the impact of any individual action will be difficult to quantify because of the simultaneous and synergistic effects of the package of actions applied in the EMU. Furthermore, those actions that influence glass and yellow eel stages will only influence silver eel escapement after a number of years, with that number depending on the stage affected and the generation time span in the EMU. For these reasons, it will be more pragmatic to consider the impact of the whole package of actions applied in any EMU rather than focusing on any single action, as will be pursued by WGEEL in its September 2013 meeting.

### **5.2 Commercial fisheries**

Almost all countries planned management measures for commercial fisheries. In most cases these measures were implemented, in many cases fully and in time, in some cases with a delay. There is no general answer to whether and when the measures will have an effect on silver eel escapement and how big this effect will be. Measures for silver eel fisheries will have an immediate effect, if designed properly. Measures acting on glass eel and yellow eel fisheries will have a delayed effect on silver eel production. Sometimes, measures are implemented in a way that there will be no (real) effect, e. g. establishing closed seasons for periods when fishing effort has already been very low. Hence, the effect of each single measure has to be assessed considering the case specific conditions. During the evaluation in the Workshop it became clear that an improved assessment of the effectiveness of the measures is needed, both to post-evaluate and to be able to forecast effects in order to select the most appropriate actions to implement in the future. An improved monitoring of the effects of the measures should be established.

### **5.3 Recreational fisheries**

Almost all countries planned management measures for recreational fisheries, and in most cases these measures were implemented. In most cases, there was little or no monitoring of the effects. Since recreational fishery is mainly directed towards yellow eel, the measures will likely have only a weak immediate effect and a larger delayed effect, at least if the measures are designed properly and result in a real reduction of fishing mortality. As for commercial fisheries, it is not possible to give a clear and general statement about their effectiveness, since this depends on the conditions and measures in each case. To be efficient, the measures have to result in a real reduction in fishing mortality. As for commercial fisheries, it became clear during the evalua-



tion in the Workshop that an improved assessment of the effectiveness of the measures is needed, both to post-evaluate and to be able to forecast effects in order to select the most appropriate actions to implement in the future. An improved monitoring of the effects of the measures should be established.

#### **5.4 Habitat**

Actions on habitat improvements were addressed in EMPs and 2012 reports of many EMUs. The descriptions of the actions taken, as well as the expected impact on escapement or mortality were often unspecific, vague and lacking specific reference to eel-specific habitats. Most measures on habitat improvement were related to the implementation of the Water Framework Directive and therefore not specifically related to the EMP. Progress in implementation is often unclear. When actions concerning habitat are considered (e.g. by water level fluctuation to flood meadows), the effect on silver eel production and escapement would be expected only in the long term, while actions focused on improvement of habitat quality (e.g. reduction of pollution) could have an immediate effect not only on escapement and mortality but also on migration and reproductive success. To assess the effect of actions taken, monitoring data and process knowledge are required.

#### **5.5 Hydropower and pumps**

Many EMPs planned actions on hydropower and pumps to reduce eel mortality. Up to now, only few were implemented and those were often not related to actions under EMP, but through WFD or other directives. We observed delayed action and this is probably attributed to the high costs associated with actions in this field. The impact of those actions on silver eel escapement and mortality are expected to be immediate. The magnitude of the effect depends on the number of other obstacles downstream, and this could not be assessed and judged during the evaluation workshop. Improvement could come from technical developments and turbine management.

#### **5.6 Trap and Transport**

Some countries planned Trap and Transport measures to improve silver eel escapement (i.e. catching silver eels above downstream barriers, transporting them across the barriers, and releasing them again). A major advantage of this measure is that the effect can be precisely quantified. In some cases, existing projects were incorporated into Eel Management Plans. Since Trap and Transport is directed to silver eel, an immediate effect is realized. Trap and Transport measures were mostly implemented according to plan, but the quantities actually transported are generally small compared with EMU targets and other impacts.

#### **5.7 Upstream barriers**

Management measures related to upstream barriers were planned in many EMU in their EMP. However, they are often vaguely defined. These measures are often only partly fulfilled. These measures address the early stages (glass eel and yellow eel) and thus have a delayed effect on the silver eel escapement. Due to that delay and the frequent lack of post-evaluation, it is difficult to evaluate the effect these management measures have on the silver eel escapement. Moreover the effect depends on local conditions, e.g. the position in a downstream--upstream gradient of the barriers or

the density of the local stock. It is therefore advocated to post-evaluate barrier-related measures in the field.

## **5.8 Predators**

Predator control has been mentioned in some Eel Management Plans as a measure to decrease mortality. In most cases, cormorants were considered to be the main predator, although catfish, herons and otters have occasionally been mentioned as well. None of the EMUs reported significant progress in predator control, at least not to a degree that eel survival could have been affected. Due to the protective regulations in the EU Birds Directive also applicable to cormorant, a significant increase in predator control measures benefiting the eel is unlikely.

## **5.9 Restocking**

The majority of EMUs planned to use restocking as a management measure. Most of these EMUs have partially reached their restocking targets, a few reached their full target and a few failed to implement the action. The effects will be delayed due to the difference in age at restocking and at silvering. A problem was highlighted with the traceability of glass eels used in restocking. It would be beneficial for evaluation of the restocking measures to have full traceability. Additionally, glass eel can be marked before being released, e.g. in a solution of strontium which creates a ring in the otoliths, enabling the proper identification of restocked eels in the stock.

## **5.10 Knowledge, control and enforcement, and other actions**

Poaching undermines the effectiveness of all management measures taken; this should be addressed at EMU level, in communication with law enforcement agencies. Some EMUs mention this specifically in their management plans but reports of implementation were often lacking. Tracking and Tracing live eels and eel products may be a valuable tool to combat illegal, unreported and unregulated fisheries.

Research, documentation and knowledge development is mentioned in some management plans. Most of these implemented their actions as planned. These measures include among others: scientific studies, improved reporting and documentation. The effect of these on the eel stock will be indirect. Better coordination and standardization of data gathering and reporting can improve the process.

## **5.11 Conclusions**

In most Eel Management Units, and depending on EMU conditions, progress has been made in implementing eel-specific management actions for commercial and recreational fisheries, hydropower, pumping stations and obstacles, restocking, on habitat improvement and/or predator control.

Measures related to fisheries have been fully implemented most often while other measures have often been postponed or only partially implemented. Most increases in silver eel escapement since the implementation of management plans have been achieved by measures addressing silver eel commercial and recreational fisheries.

Where management measures have not been fully implemented or where stock indicators show that management targets have not been reached, additional protection could be achieved by completing the implementation of the actions already planned, by the immediate implementation of the actions that have been postponed or delayed, and by taking additional actions directed at the main anthropogenic mortality

ties. Extending actions that have proven successful, rather than pursue untried actions or those difficult to implement, will reduce the risk of continued underachievement.

The 2012 post-evaluations were aimed at an integral evaluation of the EMPs; individual management measures were often difficult to evaluate, due to lack of data and/or absence of specific assessments. The whole evaluation process is hampered by the wide variation in available data, in assessment methodology and in completeness of the 2012 Progress Reports. Future evaluations might benefit from standardization and tighter coordination.

## 6 Recommendations

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These recommendations are provided in order to streamline the whole process from data collection to post-evaluation process, to make it more cost-effective and informative.

Post-evaluation reports delivered in a standard format would enable a standard evaluation and comparison between EMUs, using clearly defined tables with clear instructions regarding the derivation of data reported in these tables.

It was not possible for the WK to fully understand the basis for the stock indicators from some Member States because the Progress Reports were written in many different languages, not all of which were understood by the WK participants. A comprehensive evaluation of these progress reports (by ICES) can only be achieved if they are provided in an official language of ICES. Further, their distribution/ dissemination would be facilitated by their production in an electronic format that can be submitted via a web-based service.

The failure of some EMU to report all required stock indicators prevented a proper evaluation of their contribution to stock protection and recovery. All the required data should be reported for every EMU individually, in order to allow a full assessment of their contribution to stock protection and recovery. In the absence of information to determine the relative importance of EMUs to the protection and recovery of the stock, indicators should be reported from all EMUs. All EMUs should report, all indicators should be reported and at the scale of each EMU.

Indicators should be derived from field data, ground-truthing the effect of management measures implemented and the status of the local stock, in order to achieve a proper post-evaluation.

This post-evaluation of the 2012 Progress reports was hampered by the extensive variety of methods used to determine indicators, some of which were incomparable, and the confusing ways in which some data were reported. The standardization and coordination of the data collection, analysis and reporting should be made. This would facilitate unequivocal post-evaluation of the EMUs, and will provide for more cost-effective data collection and analysis. It will facilitate the production of the whole-stock indicators required to assess the status of the stock and to evaluate the Regulation. The report of WKESDCF (ICES, 2012a) proposed a standard form of data collection for eel assessment, but a standard analysis is lacking. The standard data collection should be implemented, and the methods developed and implemented in advance of the next post-evaluation.

In order to evaluate individual measures in individual EMUs, much more data are required than currently available and dedicated analyses are required. Current stock indicators are sufficient for the post-evaluation of the EMP as a whole.

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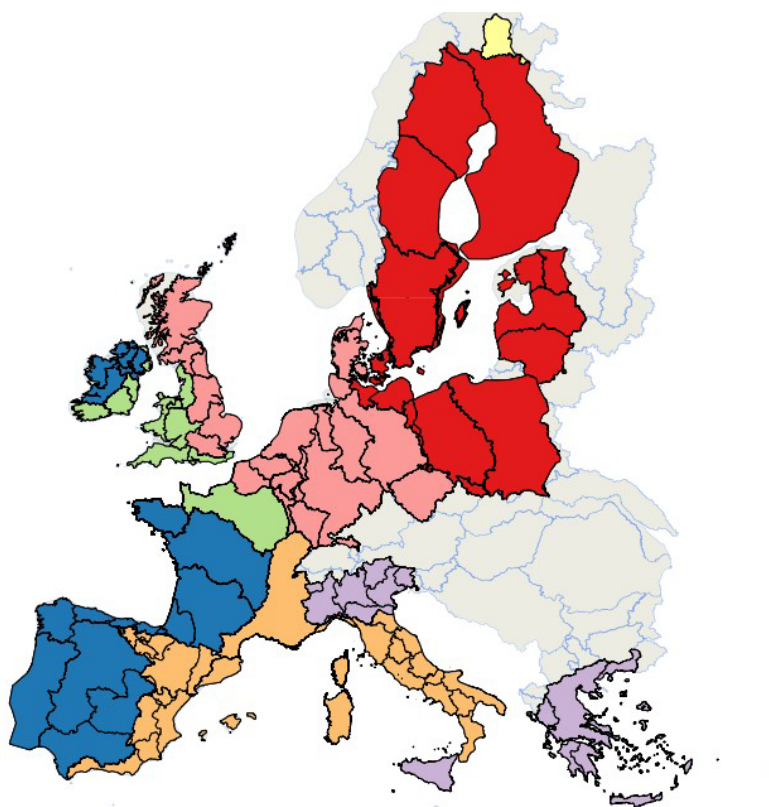
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## **Annex A: Evaluation summaries for each EMU**

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## Annex A: Summary evaluations of EMUs



## 1 Introduction and Help for readers

The following evaluation summaries were constructed automatically from interrogations of the evaluation forms created before and during the workshop. It must be stressed here that the information in the Progress Reports and Data Call were taken in good faith, as was their transcription into the database created by WGEEL. The time limits of the workshop prevented a detailed examination and cross reference of the data and other information provided from these various sources. As such, the information and evaluations presented in the following chapters are provided for reference only, but should not be construed as definitive evaluations.

The following sections in this chapter provide some guidance to explain the sections within each EMU evaluation summary chapter.

### 1.1 Available information

This section covers the information sources used in the evaluations. One table references the data sources. One map indicates the location of the EMU, and a graph indicates the status of the EMU in terms of both current and pristine biomass (expressed on log scales). This graph requires information on  $B_{\text{current}}$ ,  $B_0$ , and the surface area of water from where these indicators were derived.

### 1.2 Assessment

This section covers a general overview of the method used to generate the stock indicators. The short time given for the evaluation prevented a thorough analysis of the models and data. However a general overview was still provided to judge whether the models could be compared, which habitats were assessed, and which impacts were included.

#### 1.2.1 List of impacts

The table of impacts covers the inclusion of impact in the model used to generate the stock indicators. Impacts included in the model are shown as green. If the impact has been omitted but judged to have been of minor importance in the model (i.e. the impact may exist but its effect on eel escapement is negligible), the colour is orange. If the impacts was omitted but judged to be of major importance, then it is shown in red. Some impacts in some parts of the EMU may have not been included in the model, but the source of mortality will still be accounted for in the model if the assessment of that source of mortality has been done in other compartments (for instance fishery in marine waters).



### 1.2.2 *Targets and assessment period*

This table shows the value of the targets for  $\Sigma A$  and  $B_{\text{current}}$ . Three targets can be considered:

- the EMP 2012 target = value of the short term (2012) target if it was set in the EMP. Values can be given for  $\Sigma A$  and  $B_{\text{current}}$ .
- the EMP long term target = value of the long term target if it was set in the EMP. Values can be given for  $\Sigma A$  and  $B_{\text{current}}$ .
- the EU/ICES targets. For Biomass, it corresponds to 40% of  $B_0$ . For  $\Sigma A$  it corresponds to (0.92 if ' $B_{\text{current}}/B_0$ ' >40%, or  $0.92 * B_{\text{current}}/(40%*B_0)$  if ' $B_{\text{current}}/B_0$ ' <40%)

It also shows the dates for which the assessment model has been run. If this information was not provided, it was considered that the years for which the indicators were provided were the years for which the model was run.

### 1.3 *Progress towards recovery*

Due to the panmixia of the eel (i.e. local silver eel production contributes an unknown fraction to the entire European eel spawning stock, which in turn generates new glass eel recruitment), the efficacy of local protective actions cannot be post- evaluated without considering the overall efficacy of all protective measures taken throughout the distribution range. ICES (2010a, 2011) derived a framework for international assessment based on national/regional stock indicators, using four estimates:

- $B_{\text{current}}$ , the biomass of the escapement in the assessment year;
- $B_0$ , the biomass of the escapement in the pristine state;
- $B_{\text{best}}$ , the estimated biomass in the assessment year, based on the recently observed recruitment, but assuming no anthropogenic impacts have occurred (neither positive nor negative impacts);
- $\Sigma A$ , the lifetime anthropogenic mortality rate, or %SPR, the ratio of actual escapement  $B_{\text{current}}$  to best achievable spawner escapement  $B_{\text{best}}$ .

ICES (2011 London) indicated that estimates of either  $\Sigma A$  or %SPR usually refer to anthropogenic impacts in the most recent year, not to impacts summed over the life history of any individual or cohort in the current stock. In the 2010 Report of ICES Study Group on International Post-Evaluation of Eel (SGIPEE), a pragmatic framework to post-evaluate the status of the eel stock and the effect of management measures was designed and presented, resulting in a Modified Precautionary Diagram, in which lifetime anthropogenic mortality  $\Sigma A$  (or the spawner potential ratio %SPR on a logarithmic scale) is plotted against silver eel escapement (in percentage of  $B_0$ ). This modified diagram allows for comparisons between EMUs (%-wise SSB; lifetime summation of anthropogenic mortality) and

comparisons of the status to limit/target values, while at the same time allowing for the integration of local stock status estimates (by region, EMU or country) into status indicators for larger geographical areas (ultimately: population wide). ICES (2011, Lisbon report) explored the standard ICES protocol for setting targets, especially focusing on the extra low mortality advised for stocks that are at extremely low SSB (that is: the linear relation between the F advised and SSB in ICES advice, leading to a curved line in the Modified Precautionary Diagram, see Figure 1).

### 1.3.1 *Table of evaluation of progress towards recovery*

This table shows answer to several questions set in the ICES (2011 London) working group. Some answers regarding the achievement of the EU/WGEEL 2012 target or the trend can also be read on the modified precautionary diagram (Figure A1).

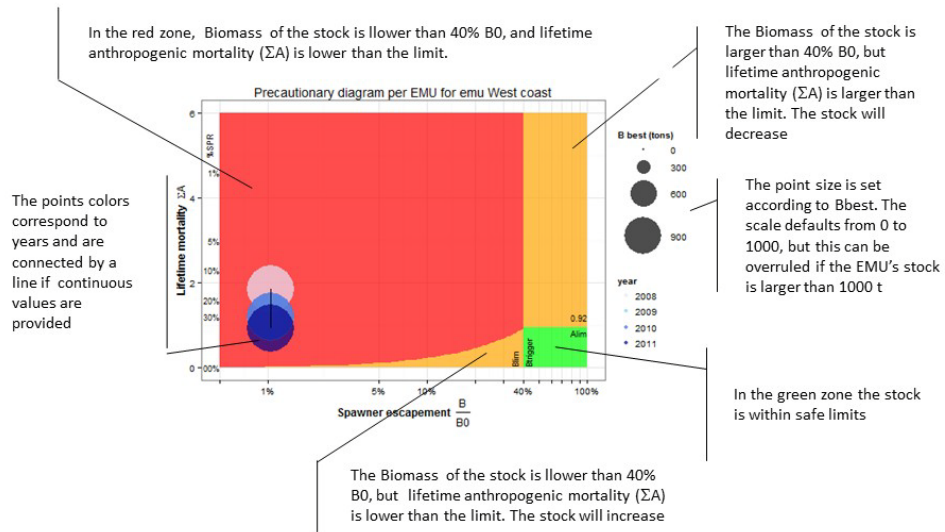
The labels in orange indicate there were no data to calculate the trend, for green and red we have:

- Is the stock indicator quantified? = has there been a quantification of this effect, not judging whether the method is good or not.
- Is the trend good? For  $\Sigma A$ : yes = decreasing trend for anthropogenic mortality, for biomass= increasing trend in biomass of silver eel. The test is made between 2008 and 2011 if those years are available, or fewer years depending on data availability.
- Has the EMU reached the target set for 2012 in the EMP? / reached EMP long term target? For  $\Sigma A$ : yes = the anthropogenic mortality is below the EMU interim / long term target. For Biomass: yes = the biomass is higher than the interim / long term target set at the emu level.
- Has the EMU reached EU/WGEEL 2012 target? For  $\Sigma A$ : yes = the anthropogenic mortality is below the wgeel 2012 target (0.92, or  $0.92 * B_{current}/(40% * B_0)$  if  $B_{current}/B_0 < 40%$ ), Biomass : yes = the biomass is higher  $40% * B_0$ .
- Has the EMU achieved the most it can without increased recruitment? For  $\Sigma A$ : yes = the anthropogenic mortality = 0, for Biomass,  $B_{current} = B_{best}$  (B without anthropogenic mortalities).

### 1.3.2 *Precautionary diagram*

The size of the points (bubbles) indicates the size of the  $B_{best}$ , while their location indicates the status of eel in the EMU in terms of biomass against the 40% target, and anthropogenic mortality against the rate equivalent to that biomass target (i.e. 0.92). The green area indicates the local stock is fully compliant, amber indicates that one target is reached but not the other, and red indicates that neither target is reached.

**Figure 1: Modified precautionary diagram overview (after WGEEL 2012).**



## 2 Sweden

### 2.1 East coast (Baltic)

#### 2.1.1 Available information

Figure 2: *East coast, Sweden*

Table 1: Sources of information for the East coast EMU

Type of source	Reference
EMP	Anonymous 2008 Förvaltningsplan för ål. Bilaga till regeringsbeslut 2008-12-11 Nr 21 2008-12-09 Jo2008/3901 Jordbruksdepartementet. 62 pp. [Swedish eel management plan. In Swedish]
EMP approved in: 2012 post-evaluation report:	2009 Status summary on the Swedish Eel Management Plan.
2013 ICES data-call:	SE - Table Stock Indicators ICES to MS 13 FEB 2013 - returned 2013-03-20 .xlsx
Additional sources:	Dekker, 2012. Assessment of the eel stock in Sweden, spring 2012. First post-evaluation of the Swedish Eel Management Plan. Aqua reports 2012:9.

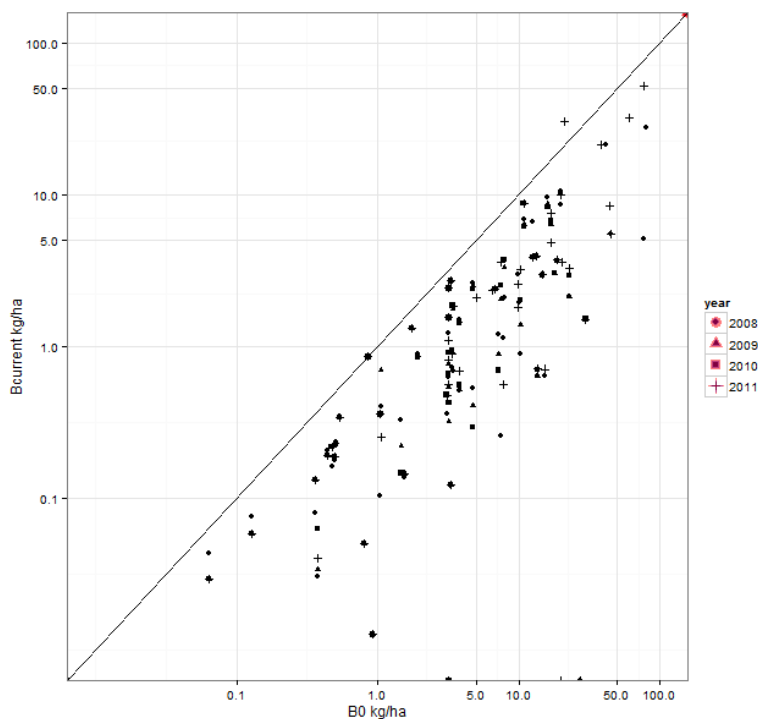


Figure 3:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the East coast EMU are shown in red, those for Sweden are shown in blue.

Table 2: Reported stock indicators for the East coast EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 3: Source of indicators evaluated for the East coast EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 2.1.2 Habitat coverage of the EMU

Table 4: Habitats assessed in the East coast EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed?
Were rivers assessed?	absent
Were lakes assessed?	absent
Were estuaries assessed?	absent
Were lagoons assessed?	absent
Were marine coastal waters assessed?	yes

The assessment covers in fact part of the whole Baltic Sea.

### 2.1.3 Management measures

Table 5: Overview of the management actions proposed in the EMP for the East coast EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b> 1 Decreasing of effort	S	EMP	fulfilled	high
<b>Hydropw. &amp; Obst.</b> 2 Trapping and transporting of silver eels	S	EMP	not done	none
<b>Restocking</b>				

3	Restocking	M	EMP	partially	low
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Given the data we have the only measure that can have a high impact is the reduction in fishing effort. Given the comment on assessment and indicators, we cannot say if this reduction is effective or not.

### 2.1.4 Assessment

Table 6: Summary list of impact types that were included in the assessments for the East coast EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
absent	omitted	absent	omitted	included	omitted	absent	omitted	

Table 7: Summary of targets and assessment period for the East coast EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				0.105
EMP long term target				0.105
EU/ICES targets			5000	0.641
Assessment period start	1950	2000	2000	2000
Assessment period end	2011	2011	2011	2011

Table 8: Additional information for the East coast EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream', or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	yes	yes	no
Does double banking apply?			yes	yes
Is double banking considered?			no	no

The assessment relies on mark-recapture of silver eels within the EMU, but silver eel migrating within the EMU can come from the whole Baltic. The biomass found is thus part of the whole Baltic stock. The mortality indicator only takes into account commercial fishery occurring in the EMU. No other impacts are considered. It is inconsistent to consider only EMU impact while assessing part of the whole stock. Moreover given the mortality is based on past mark-recapture data and that  $B_{best}$  is assumed to be constant, the declining trend in anthropogenic mortality may be in fact be due to a declining  $B_{best}$  while having a constant (or increasing) fishery mortality. An update on mark-recapture data should given the data to evaluate the current fishing mortality.

### 2.1.5 Progress towards recovery

The inconsistency between the mortality and biomass assessments prevents any evaluation on the progress toward the recovery.

Table 9: Overview of fishing effort reported in the ICES Data Call for the East coast EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 10: Overview of total catches (commercial + recreational) of eel stages for the East coast EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		385		
2	2009		309		



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<b>Post</b>		
3	2010	307
4	2011	271

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11: Stock indicators for the East coast EMU, the source of the data is indicated in Table 3.  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	12500	3385	3770	0.10	0	0.10	0.131
2	2009	12500	3461	3770	0.08	0	0.08	0.066
3	2010	12500	3463	3770	0.08	0	0.08	0.011
4	2011	12500	3499	3770	0.07	0	0.07	0.025

Table 12: WKEPEMP evaluation of progress toward recovery for the East coast EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?	yes	yes
Has the EMU reached the target set for 2012 in the EMP?	yes	
Has the EMU reached the long term target set by the EMP?	yes	
Has the EMU reached the EU/wgeel 2012 target?	yes	no
Has the EMU achieved the most it can without increased recruitment?	no	no

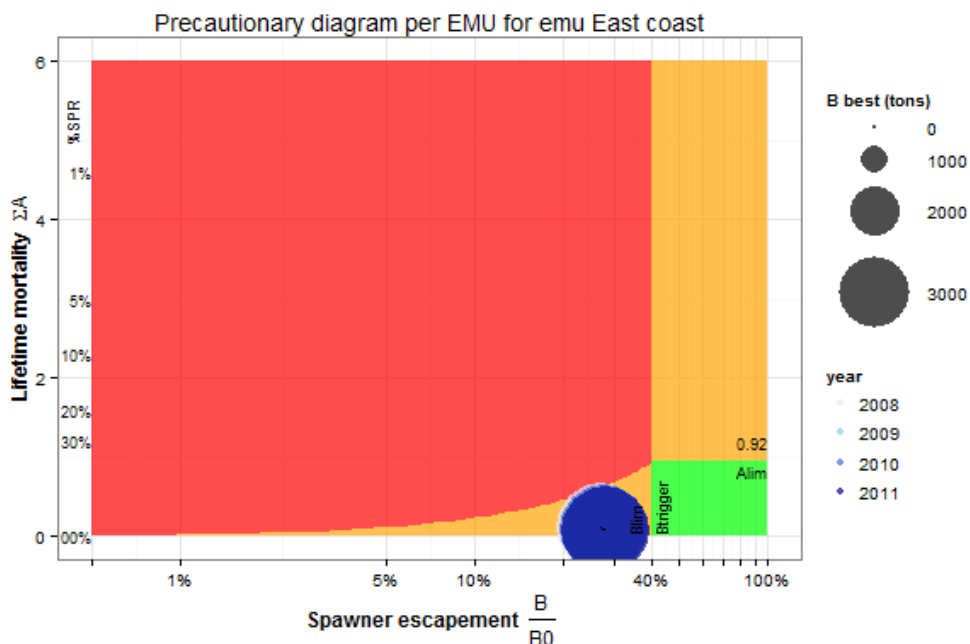


Figure 4: Modified precautionary diagram for the East coast EMU (after WGEEL 2012), see section 1.3.2 for more information. The figure has been built according to a point size larger than the standard (max = 3000 instead of 1000)

### 2.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU. However the way the trend of  $\Sigma F$  and thus the trend  $B_{current}$  are calculated seems without groundtruthing. These impacts were included in the assessment: commercial fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, although some may not be relevant given local conditions. All of the Management Actions identified in the Progress Report have been implemented. Data were identified to rate the impact of management actions applied to Fisheries, and Restocking. Expert judgement was used to evaluate the impact of actions applied to Hydropower (in this case Trap & Transport). As the way that trend is calculated is not reliable, we cannot conclude on the trend of current biomass of silvereel or on  $\Sigma A$ .

The biomass of current silvereel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and is decreasing.

## 2.2 Inland

### 2.2.1 Available information

Figure 5: *Inland*, Sweden

Table 13: Sources of information for the Inland EMU

Type of source	Reference
EMP	Anonymous 2008 Förvaltningsplan för äl. Bilaga till regeringsbeslut 2008-12-11 Nr 21 2008-12-09 Jo2008/3901 Jordbruksdepartementet. 62 pp. [Swedish eel management plan. In Swedish]
EMP approved in:	2009
2012 post-evaluation report:	Status summary on the Swedish Eel Management Plan,
2013 ICES data-call:	SE - Table Stock Indicators ICES to MS 13 FEB 2013 - returned 2013-03-20.xlsx
Additional sources:	Dekker, W. (2012). Assessment of the eel stock in Sweden, spring 2012; first post-evaluation of the Swedish Eel Management Plan. Aqua reports 2012:9. Swedish University of Agricultural Sciences, Drottningholm. 77 pp.

Table 14: Reported stock indicators for the Inland EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

Table 15: Source of indicators evaluated for the Inland EMU

Stock indicator	Source
B <sub>0</sub>	2012 post-evaluation report
B <sub>best</sub>	2012 post-evaluation report
B <sub>current</sub>	2012 post-evaluation report
ΣA	2012 post-evaluation report

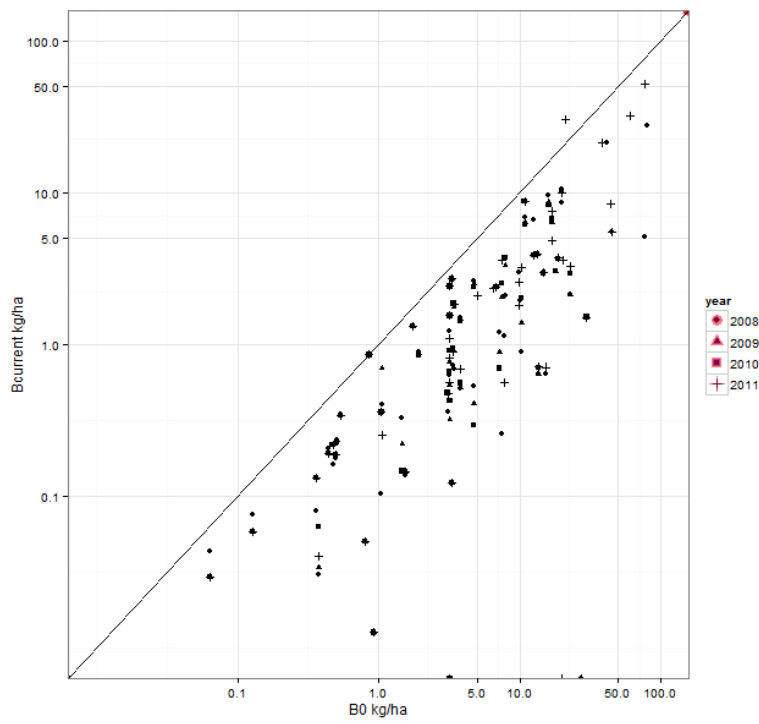


Figure 6:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Inland EMU are shown in red, those for Sweden are shown in blue.

### 2.2.2 Habitat coverage of the EMU

Table 16: Habitats assessed in the Inland EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed?
Were rivers assessed?	no
Were lakes assessed?	yes
Were estuaries assessed?	absent
Were lagoons assessed?	absent
Were marine coastal waters assessed?	absent

A figure for the total area covered is lacking.

### 2.2.3 Management measures

Table 17: Overview of the management actions proposed in the EMP for the Inland EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Decreasing of effort	M	EMP	fulfilled	low
<b>Hydropw. &amp; Obst.</b>				
2 Trapping and transporting of silver eels	S	EMP	fulfilled	low
3 Decreasing of silver eel mortality	S	EMP	partially	high
<b>Restocking</b>				
4 Restocking	M	EMP	fulfilled	high

Consideration of management measures: Reducing F through the regulation of licences is a start. Also compulsory reporting on yellow and silver eel catches adds to knowledge. Other management measures are: Minimum landing size 65 cm, Escapement rings of 60 mm compulsory in certain fisheries, Limited number of consecutive fishing days 125 days, Limited number of gears, Individual quota system of maximum 8 tons. If implemented these will reduce fishing mortality.

Table 18: Summary list of impact types that were included in the assessments for the Inland coast EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	omitted	omitted	included	omitted	included	omitted	

Table 19: Summary of targets and assessment period for the Inland EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			120	0.435
Assessment period start	1914	2008	2008	2008
Assessment period end	1923	2011	2011	2011

### 2.2.4 Assessment

The Swedish Inland assessment is based on numbers of female silver eels. B<sub>0</sub> is calculated using historic catch data and assuming comparable fisheries mortality as current. Natural mortality is assessed to be low. B<sub>current</sub> is calculated based on a model. No field data are available in the reports. As the results of trap and transport are a separate assessment it is not included in the figure given here.



Table 20: Additional information for the Inland EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	yes	yes	no
Does double banking apply?			no	no
Is double banking considered?			no	no

### 2.2.5 Progress towards recovery

Table 21: Overview of fishing effort reported in the ICES Data Call for the Inland EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			69
	2009			68
	2010			68
	2011			72
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Little action taken to reduce mortality at Hydropower stations. Reduced F and only limited trap and transfer, in combination with continued high H will actually increase H.

Table 22: Overview of total catches (commercial + recreational) of eel stages for the Inland EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		112		
2	2009		96		
<b>Post</b>					
3	2010		108		
4	2011		85		

Table 23: Stock indicators for the Inland EMU, the source of the data is indicated in Table 15.  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	300	66	239	0.63	0.65	1.28	0.450
2 2009	300	65	255	0.47	0.91	1.38	0.220
3 2010	300	58	271	0.51	1.04	1.55	0.617
4 2011	300	57	280	0.36	1.22	1.58	0.719

Table 24: WKEPEMP evaluation of progress toward recovery for the Inland EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?		
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no

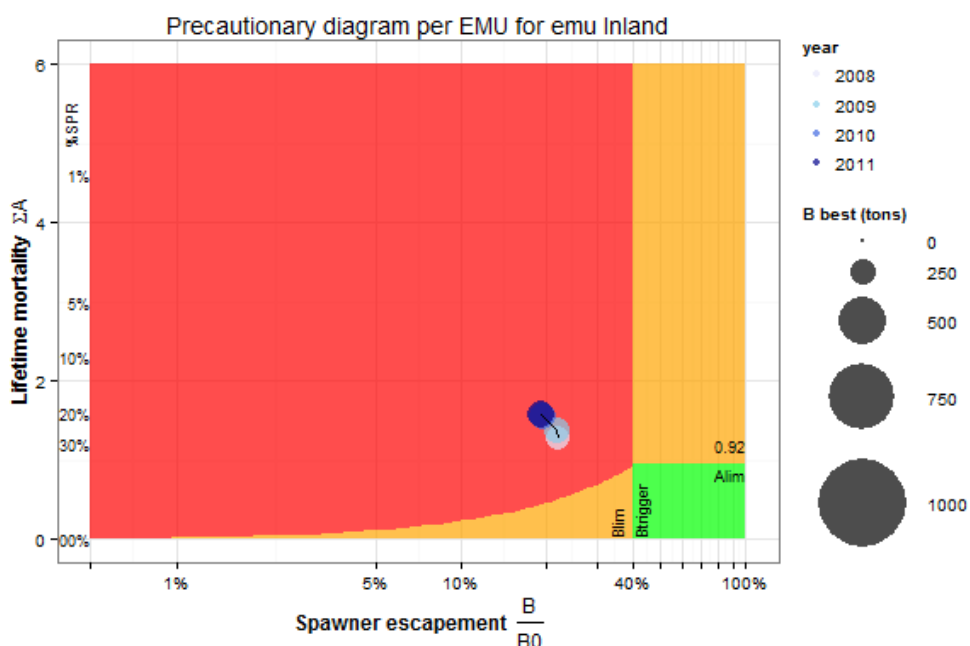


Figure 7: Modified precautionary diagram for the Inland EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 2.2.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report, a background paper on the methods used, and in the ICES Data Call. All stock indicators were available. The stock indicators cover most of the eel habitats in the EMU but the rivers connecting the lakes to the coast are not included. These impacts were included in the assessment: restocking; barriers; indirect effects; commercial fisheries; hydropower. These impacts were not included: habitat loss; recreational fisheries; predators, though some might not have been relevant depending on local conditions. Part of the Management Actions outlined in the Progress Report have been implemented. Improving the survival of silver eels past hydropower dams is not implemented. Where actions have been implemented, some (reduction in fishing pressure) have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation and is increasing. This is largely an effect of the high mortality due to Hydropower not adequately compensated by trap and transport.

## 2.3 West coast

### 2.3.1 Available information

Figure 8: *West coast, Sweden*

Table 25: Sources of information for the West coast EMU

Type of source	Reference
EMP	Anonymous 2008 Förvaltningsplan för ål. Bilaga till regeringsbeslut 2008-12-11 Nr 21 2008-12-09 Jo2008/3901 Jordbruksdepartementet. 62 pp. [Swedish eel management plan. In Swedish] 2009
EMP approved in: 2012 post-evaluation report:	Status summary on the Swedish Eel Management Plan
2013 ICES data-call:	SE - Table Stock Indicators ICES to MS 13 FEB 2013 - returned 2013-03-20.xlsx
Additional sources:	Dekker, W. (2012). Assessment of the eel stock in Sweden, spring 2012; first post-evaluation of the Swedish Eel Management Plan. Aqua reports 2012:9. Swedish University of Agricultural Sciences, Drottningholm. 77 pp.

Table 26: Reported stock indicators for the West coast EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

Table 27: Source of indicators evaluated for the West coast EMU

Stock indicator	Source
B <sub>0</sub>	2012 post-evaluation report
B <sub>best</sub>	2012 post-evaluation report
B <sub>current</sub>	2012 post-evaluation report
ΣA	2012 post-evaluation report

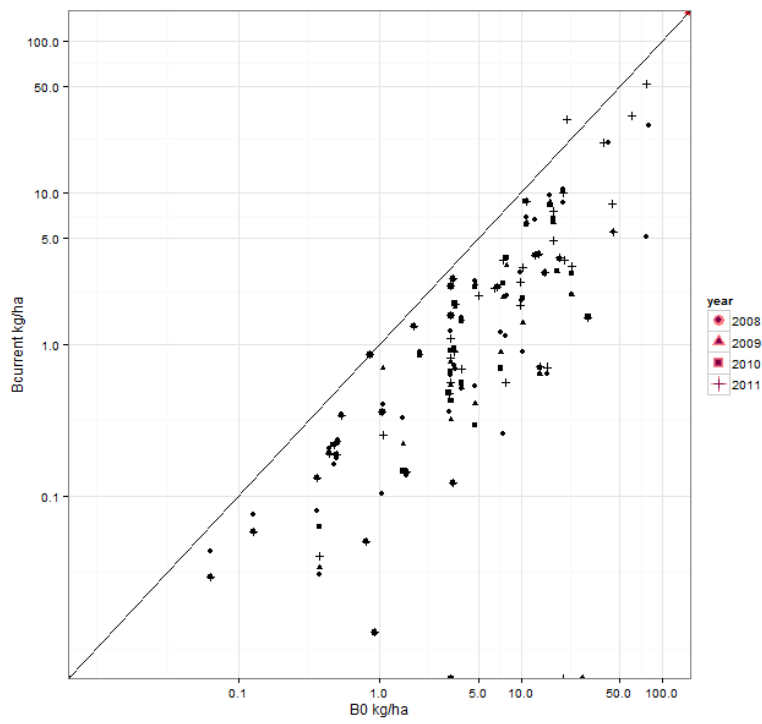


Figure 9:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the West coast EMU are shown in red, those for Sweden are shown in blue.

### 2.3.2 Habitat coverage of the EMU

Table 28: Habitats assessed in the West coast EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed?
Were rivers assessed?	absent
Were lakes assessed?	absent
Were estuaries assessed?	absent
Were lagoons assessed?	absent
Were marine coastal waters assessed?	yes

### 2.3.3 Management measures

Table 29: Overview of the management actions proposed in the EMP for the West coast EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Fishery closed	S	EMP	fulfilled	high
<b>Hydropw. &amp; Obst.</b>				
2 Trapping and transporting of silver eels	S	EMP	fulfilled	none
<b>Restocking</b>				
3 Restocking	M	EMP	fulfilled	low

The major management measure is the total closure of the commercial fishery in 2012. It is expected to have an impact on silver eel escapement in the coming year.

### 2.3.4 Assessment

The assessment is a mortality-based assessment. Only fishery mortality has been considered. Since 2012 the fishery has been closed and other mortalities should now be evaluated.

Table 30: Summary list of impact types that were included in the assessments for the West coast EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	absent	omitted	included	omitted	absent	omitted	

Table 31: Summary of targets and assessment period for the West coast EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				0.220
EMP long term target				0.220
EU/ICES targets			461.6	0.024
Assessment period start	1950	2008	1950	1950
Assessment period end	1970	2011	2011	2011

Table 32: Additional information for the West coast EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	yes	yes	no
Does double banking apply?			yes	yes
Is double banking considered?			no	no



### 2.3.5 Progress towards recovery

Table 33: Overview of fishing effort reported in the ICES Data Call for the West coast EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			93
	2009			86
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 34: Overview of total catches (commercial + recreational) of eel stages for the West coast EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008			168	
2	2009			107	
<b>Post</b>					
3	2010			108	
4	2011			84	

The major source of mortality has been reduced to zero in 2012. As it was a yellow eel commercial fishery, it will not change silver eel biomass before those saved yellow eel mature. It is expected to have a huge impact to future silver eel escapement.

Table 35: Stock indicators for the East coast EMU, the source of the data is indicated in Table 27.  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	1154	12	1154	1.86	0	1.86	0.000
2	2009	1154	12	1154	1.19	0	1.19	0.000
3	2010	1154	12	1154	1.20	0	1.20	0.064
4	2011	1154	12	1154	0.93	0	0.93	0.194

Table 36: WKEPEMP evaluation of progress toward recovery for the West coast EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?	yes	no trend
Has the EMU reached the target set for 2012 in the EMP?	no	
Has the EMU reached the long term target set by the EMP?	no	
Has the EMU reached the EU/wgeel 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no

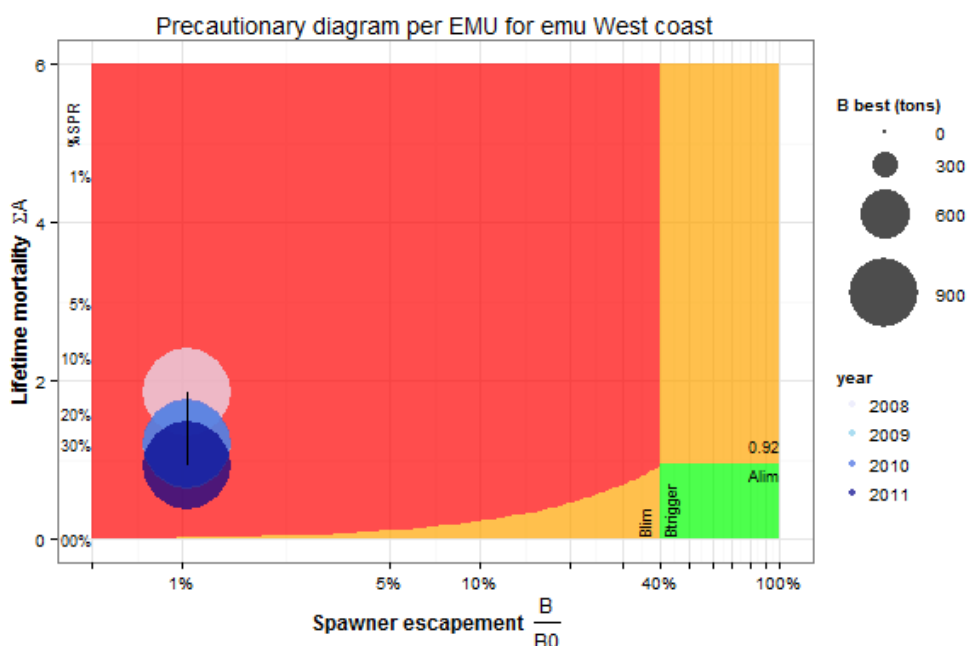


Figure 10: Modified precautionary diagram for the West coast EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 2.3.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU. These impacts were included in the assessment: commercial fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, though some may not be relevant dependent on local conditions. All of the Management Actions outlined in the Progress Report have been implemented. Data were identified to rate the impact of management actions applied to Fisheries, and Restocking. Expert judgement was used to evaluate the impact of actions applied to Hydropower.

The biomass of current silver eel escapement below the target of the EU Regulation (40%) and not changing. Anthropogenic mortality  $\Sigma A$  was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but decreasing during the first three years after implementation of the EMP. It is assessed to be zero since the closure of the fishery in 2012.

### 3 Finland

#### 3.1 Finland

##### 3.1.1 Available information

Figure 11: *Finland*

Table 37: Sources of information for the Finland EMU

Type of source	Reference
EMP	Suomen Kansallinen Ankeriaanhoitosuunnitelma; MAA- JA METSÄTALOUSHALLINTO SUOMI FINLAND
EMP approved in:	2009
2012 post-evaluation report:	no progress report available
2013 ICES data-call:	
Additional sources:	

Table 38: Reported stock indicators for the Finland EMU

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

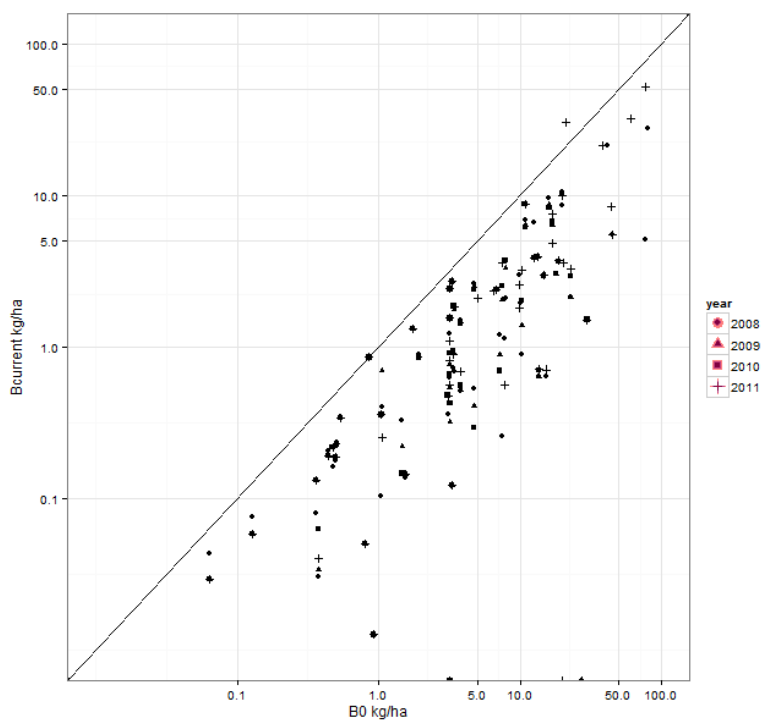


Figure 12: B<sub>0</sub> and B<sub>current</sub> in kg/ha. No data for Finland.

Table 39: Source of indicators evaluated for the Finland EMU

Stock indicator	Source
B <sub>0</sub>	no input
B <sub>best</sub>	no input
B <sub>current</sub>	no input
ΣA	no input

### 3.1.2 Habitat coverage of the EMU

There is no assessment reported. To our understanding the Finnish Management Plan just consists of some restocking measures.



Table 43: Summary of targets and assessment period for the Finland EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start				
Assessment period end				

Table 44: Additional information for the Finland EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA		
Does double banking apply?				
Is double banking considered?				

There is no assessment at all. No indicators were reported.

### 3.1.5 *Progress towards recovery*

Since there is no assessment, no conclusions can be drawn on a potential progress.

Table 45: Overview of fishing effort reported in the ICES Data Call for the Finland EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			980
	2009			946
	2010			950
	2011			944
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 46: Overview of total catches (commercial + recreational) of eel stages for the Finland EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	18			
2	2009				
<b>Post</b>					
3	2010				
4	2011				



Table 47: Stock indicators for the Finland EMU – no data.

year	Biomass (t)			Mortality			Restocked (t)
	B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	ΣF	ΣH	ΣA	g.e. Equ.
1 2008							
2 2009							
3 2010							
4 2011							

Table 48: WKEPEMP evaluation of progress toward recovery for the Finland EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified?	no	no
Is the trend good?		
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?		
Has the EMU achieved the most it can without increased recruitment?		

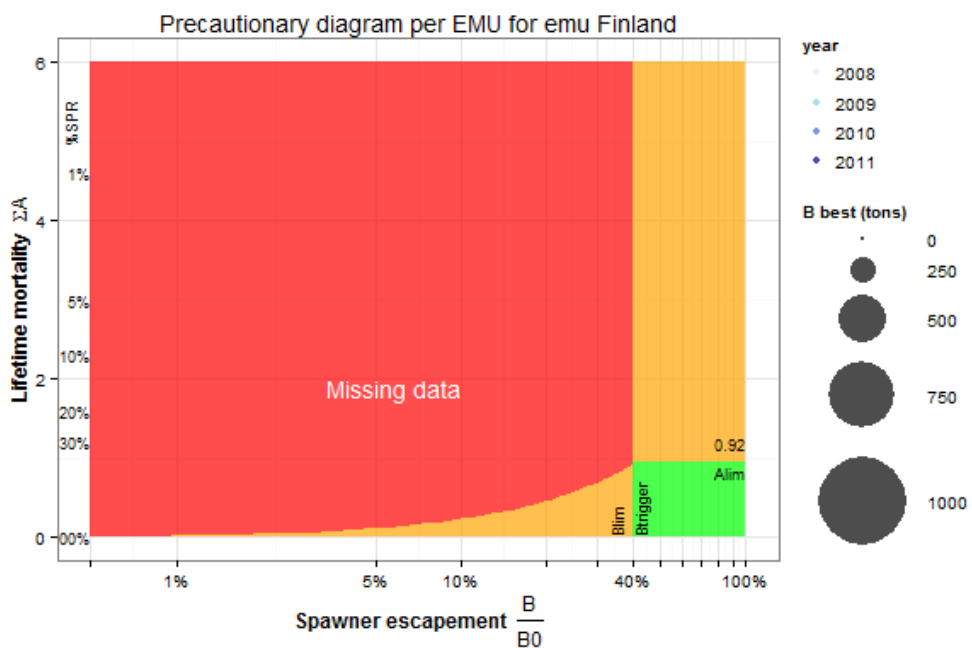


Figure 13: Modified precautionary diagram for the Finland EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 3.1.6 Conclusion

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## 4 Estonia

### 4.1 Narva

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. No stock indicators were available. No impacts were assessed. Restocking, the one Management Action identified for the EMP in the Progress Report has been fully implemented, but no data were identified to evaluate the impact of this management action. No biomass or mortality indicators were available so it is not possible to assess the state or progress.

### 4.2 West Estonia

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. No stock indicators were available. No impacts were assessed. Reductions of the fishing effort, the one Management Action identified for the EMP in the Progress Report has been fully implemented, but no data were identified to evaluate the impact of this management action. No biomass or mortality indicators were available so it is not possible to assess the state or progress.

## 5 Latvia

### 5.0.1 Available information



Figure 14: *Latvia*

Table 49: Sources of information for the Latvia EMU

Type of source	Reference
EMP	
EMP approved in:	2009
2012 post-evaluation re- port:	
2013 ICES data-call:	
Additional sources:	

Table 50: Reported stock indicators for Latvia

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	no	no
ΣH	no	no

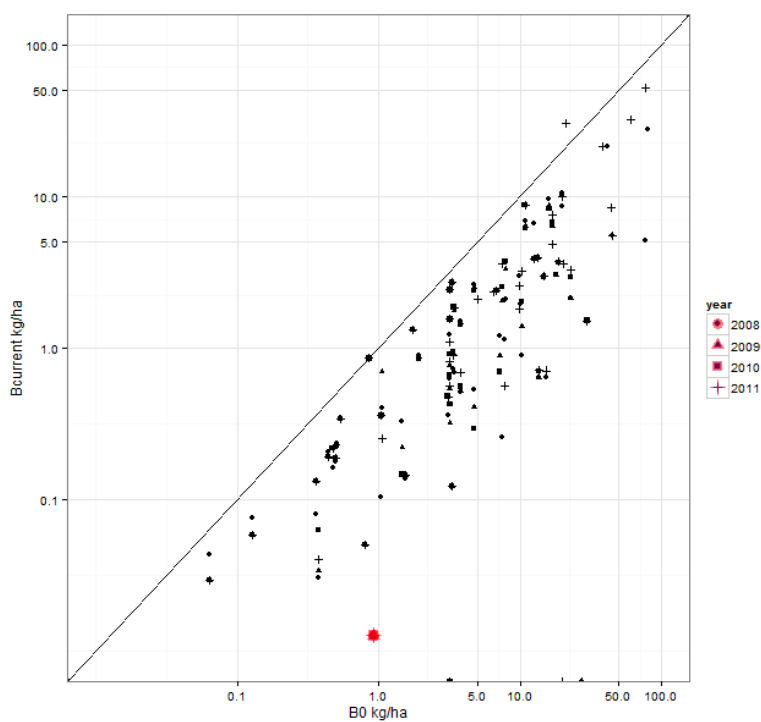


Figure 15:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Latvia EMU are shown in red.

Table 51: Source of indicators evaluated for the Latvia EMU

Stock indicator	Source
$B_0$	no input
$B_{best}$	no input
$B_{current}$	no input
$\Sigma A$	no input

### 5.0.2 Habitat coverage of the EMU

The Latvia EMU is defined as rivers, lakes and coastal waters free accessible for eel, with some additional areas passable downstream



Table 55: Summary of targets and assessment period for the Latvia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			50.2	0.013
Assessment period start	2008	2008	2008	
Assessment period end	2011	2011	2011	

Table 56: Additional information for the Latvia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	NA		
Does double banking apply?				yes
Is double banking considered?				no

No eel assessment in Latvia

### 5.0.5 *Progress towards recovery*

Table 57: Overview of fishing effort reported in the ICES Data Call for the Latvia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008	118987	270	73
	2009	118987	270	79
	2010	118987	270	72
	2011	118987	240	78
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 58: Overview of total catches (commercial + recreational) of eel stages for the Latvia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		1.47		1.47
2	2009		1.21		1.21
<b>Post</b>					
3	2010		1.36		1.36
4	2011		0.89		0.89



Table 59: Stock indicators for the Latvia EMU, the source of the data is indicated in Table 51.  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	125.5	1.7	4				0.000
2 2009	125.5	1.7	4				0.000
3 2010	125.5	1.7	4				0.000
4 2011	125.5	1.7	4				0.051

Table 60: WKEPEMP evaluation of progress toward recovery for the Latvia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	no	yes
Is the trend good?		no
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?		no
Has the EMU achieved the most it can without increased recruitment?		no

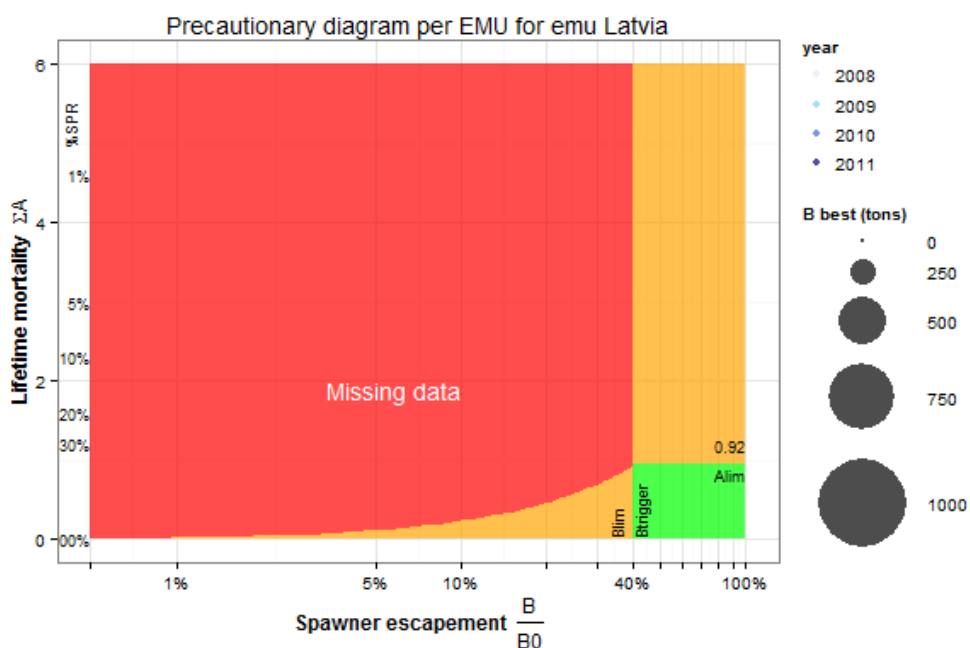


Figure 16: Modified precautionary diagram for the Latvia EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 5.0.6 Conclusion

This EMU has an eel management plan, approved in 2009 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Anthropogenic mortality indicators are missing. The stock indicators do not cover all of the eel habitats in the EMU: lagoons and estuaries are missing. No impacts were included in the assessment. Part of the Management Actions identified in the Progress Report have been implemented. Where actions have been implemented, they have been fully implemented. The impact of management actions could not be evaluated, either because of missing expertise or information. The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and not changing. Indicators of the anthropogenic mortality  $\Sigma A$  are missing.

## 6 Lithuania

### 6.1 Lithuania

#### 6.1.1 Available information

Figure 17: *Lithuania*, EMU

Table 61: Sources of information for the Lithuania EMU

Type of source	Reference
EMP	European eel ( <i>Anguilla anguilla</i> L.) stock management plan. Lithuania. 2008. Responsible: The Fisheries Department of the Ministry of Agriculture of the Republic of Lithuania.
EMP approved in: 2012 post-evaluation report:	2009 Report on the implementation of the Lithuanian eel management plan in 2009-2011. 2012. Responsible: Fisheries Service under the Ministry of Agriculture of the Republic of Lithuania.
2013 ICES data-call:	. Table Stock Indicators ICES to MS 13 FEB 2013 Lithuania. 18/03/2013 (at the Sharepoint).
Additional sources:	

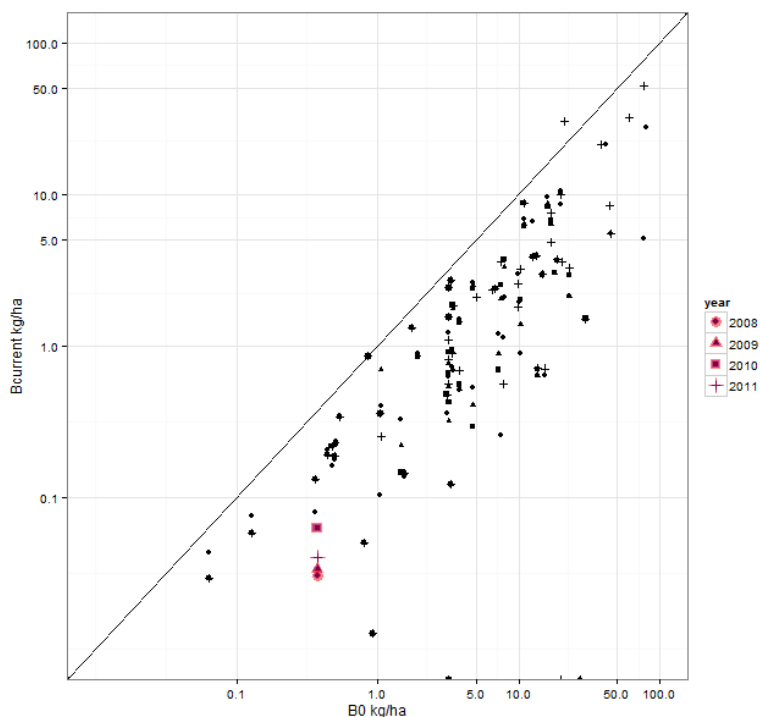


Figure 18: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the Lithuania EMU are shown in red.

Table 62: Reported stock indicators for the Lithuania EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	no	no
ΣH	no	no

Table 63: Source of indicators evaluated for the Lithuania EMU

Stock indicator	Source
B <sub>0</sub>	2013 ICES data-call
B <sub>best</sub>	2013 ICES data-call
B <sub>current</sub>	2013 ICES data-call

### 6.1.2 Habitat coverage of the EMU

Table 64: Habitats assessed in the Lithuania EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed?
Were rivers assessed?	yes
Were lakes assessed?	yes
Were estuaries assessed?	absent
Were lagoons assessed?	yes
Were marine coastal waters assessed?	no

The assessment does not cover the marine coastal water, while there is some abundance of eel there.

### 6.1.3 Management measures

Table 65: Overview of the management actions proposed in the EMP for the Lithuania EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduction of effort in inland waters	M	EMP	partially low
2	Reduction of effort (reduction of trap numbers) in Curonian Lagoon	M	EMP	fulfilled interm
3	Ban for commercial fishery in Baltic Sea	M	EMP	fulfilled low
<b>Rec. Fishr.</b>				
4	Reduction in daily bag limit	Y	EMP	fulfilled unsure
<b>Hydropw. &amp; Obst.</b>				
5	Hydropower mortality	M	EMP	not done unsure
<b>Pedatr.</b>				
6	Reducing cormorants	M	EMP	not done unsure
<b>Restocking</b>				
7	Stocking	M	EMP	partially high

Restocking would have been the main management measure, but it was partly fulfilled. Fishing reduction should also have been one of the main management measures but the catch statistics don't show any change.

### 6.1.4 Assessment

Table 66: Summary list impact types that were included in the assessments for the Lithuania EMU. Habitat = Habitat loss; Restock. = Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	omitted	omitted	included	included	omitted	omitted	

Table 67: Summary of targets and assessment period for the Lithuania EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			34.8	
EU/ICES targets			34.8	0.248
Assessment period start	2008	2008	2008	
Assessment period end	2011	2011	2011	

Table 68: Additional information for the Lithuania EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA		
Does double banking apply?				
Is double banking considered?				

ΣA is not available. We don't know how the B<sub>current</sub> and the B<sub>best</sub> have been calculated. The stock indicators do not cover all of the eel habitats in the EMU: marine waters is missing. These impacts were included in the assessment: commercial fisheries; recreational fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators, though some may not be relevant due to local conditions. Most of the current stock is derived from restocking.

### 6.1.5 Progress towards recovery

B<sub>current</sub> is evaluated as increasing but we don't know the method used to calculate it and the management measure taken can't explain the trend.

Table 69: Overview of fishing effort reported in the ICES Data Call for the Lithuania EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	158154		
	2009	158154		
	2010	158154		
	2011	158154		
<b>YS rec</b>				
	2008	199654	120	85000
	2009	199654	120	85000
	2010	199654	120	74000
	2011	199654	120	87000

Table 70: Overview of total catches (commercial + recreational) of eel stages for the Lithuania EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	12.3	5.5	17.8
2	2009	0	8.0	3.8	11.8
<b>Post</b>					
3	2010	0	15.1	6.9	22.0
4	2011	0	9.4	4.7	14.1



Table 71: Stock indicators for the Lithuania EMU, the source of the data is indicated in Table 63.  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	87	7.1	24.9				0.000
2 2009	87	7.9	19.7				0.000
3 2010	87	14.6	36.7				0.000
4 2011	87	9.4	23.5				0.052

Table 72: WKEPEMP evaluation of progress toward recovery for the Lithuania EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	no	yes
Is the trend good?		yes
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		no
Has the EMU reached the EU/wgeel 2012 target?		no
Has the EMU achieved the most it can without increased recruitment?		no

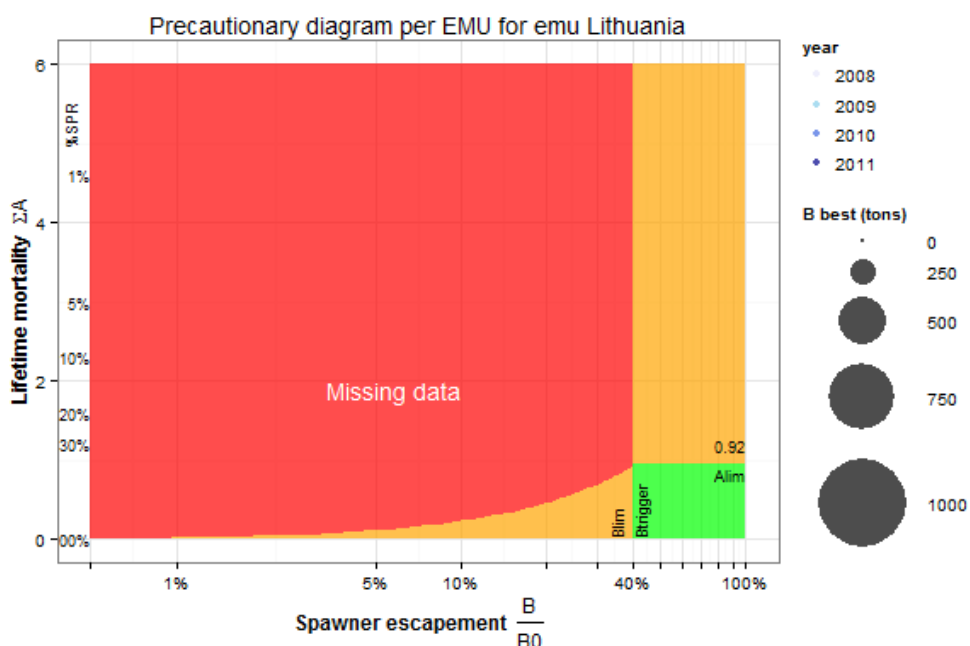


Figure 19: Modified precautionary diagram for the Lithuania EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 6.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the ICES Data Call. Not all of the stock indicators have been reported:  $\Sigma A$  is missing. The stock indicators do not cover all of the eel habitats in the EMU: marine waters are missing. These impacts were included in the assessment: commercial fisheries; recreational fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; fisheries; hydropower; predators, though not all would be relevant depending on local conditions. Part of the Management Actions identified in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Hydropower, recreational fishery and cormorant predation.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%). It is reported as increasing but we don't know the method used to calculate it and the management measure taken can't explain the trend.

## 7 Poland

### 7.1 Oder

#### 7.1.1 Available information

Figure 20: Oder, Poland

Table 73: Sources of information for the Oder EMU

Type of source	Reference
EMP	Polish Eel Management Plan; Ministry of Agriculture and Rural Development, National Marine Fisheries Research Institute Gdynia, The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn 2010
EMP approved in: 2012 post-evaluation report:	Report on the Implementation of the Polish Eel Management Plan in 2009-2011; The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn; National Marine Fisheries Research Institute Gdynia; Ministry of Agriculture and Rural Development Warsaw
2013 ICES data-call: Additional sources:	

Table 74: Reported stock indicators for the Oder EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

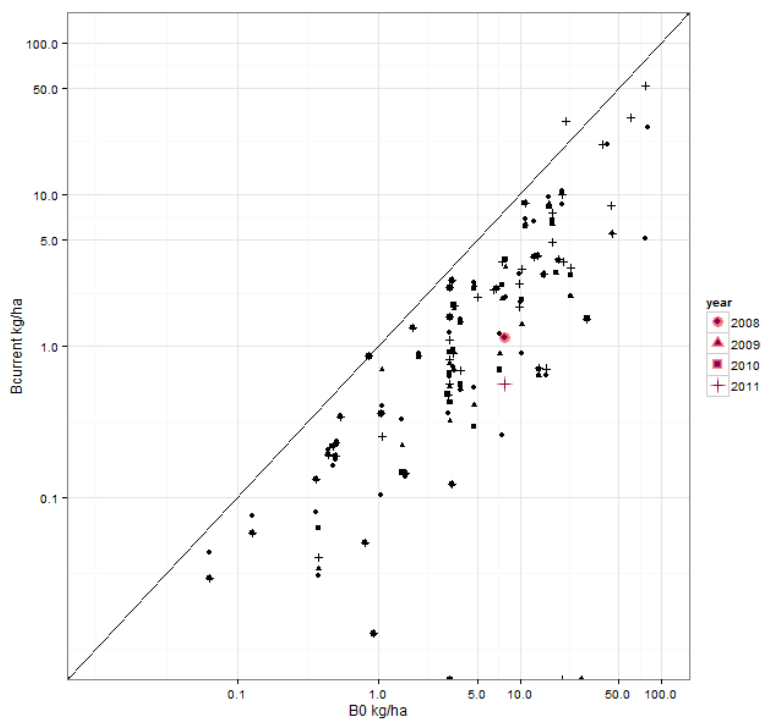


Figure 21:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Oder EMU are shown in red, those for Poland are shown in blue.

Table 75: Source of indicators evaluated for the Oder EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2013 ICES data-call
$B_{current}$	2012 post-evaluation report
$\sum A$	2013 ICES data-call

### 7.1.2 Habitat coverage of the EMU

Table 76: Habitats assessed in the Oder EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed?
Were rivers assessed?	no
Were lakes assessed?	yes
Were estuaries assessed?	yes
Were lagoons assessed?	yes
Were marine coastal waters assessed?	yes

In the Data Call it is stated that rivers had not been assessed. However, expert judgement suggests that there are perhaps fisheries in rivers which would influence the stock.

### 7.1.3 Management measures

Table 77: Overview of the management actions proposed in the EMP for the Oder EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Closing fishing season	M	EMP	fulfilled	interm
2 Increasing minimum length	M	EMP	fulfilled	low
3 More selective gears	M	EMP	fulfilled	low
4 Limiting poaching	M	EMP	not done	unsure
<b>Recr. Fishr.</b>				
5 Closing fishing season	M	EMP	fulfilled	interm
6 Increasing minimum length	M	EMP	fulfilled	low
7 Decreasing daily catch by anglers	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>				
8 Hydropower passable	M	EMP	not done	none
<b>Pedatr.</b>				
9 Reducing cormorants	M	EMP	not done	none
<b>Restocking</b>				
10 Stocking	M	EMP	partially	high

The main measures in this EMU are re-stocking of considerable amounts of eels and restrictive fisheries measures like establishing a closed season of 1 month during summer. They will probably have an intermediate to big effect. That means that the highest source of anthropogenic mortality (fishing mortality) is addressed with the measures (closed season, minimum size limit). Others like reduction of hydropower mortality have not started (foreseen from 2019 onwards). Considering the large amount of hydropower installations and the magnitude of hydropower mortality, this factor could have a great potential for improvements.

### 7.1.4 Assessment

Table 78: Summary list impact types that were included in the assessments for the Oder EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	omitted	omitted	included	included	included	included	

Table 79: Summary of targets and assessment period for the Oder EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			645	
EU/ICES targets			644.4	0.067
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 80: Additional information for the Oder EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	NA	yes	
Does double banking apply?			NA	
Is double banking considered?			NA	

For this EMU, all indicators are reported. However, some points are unclear and cannot be answered and assessed sufficiently in the short time of the workshop. e.g. we cannot prove if restocking applies above dams or not. In the original EMP it was said that there were no provisions to stock reservoirs or their rivers. However, the map shows a huge amount of obstacles and hydropower installations, so that it seems unlikely that many rivers without hydropower influence could be found. This issue should be addressed more clearly in future reports. It is also obvious that barriers have the potential to cause problems to eel (15000 installations in Poland) but there is no quantification of the problem provided and hence, it is not possible to assess it. It was also not possible to check the input variables of the model. It remains a bit unclear how the different habitat types were treated in the model (e.g. were there differences between lakes and lagoons or estuaries?)

### 7.1.5 Progress towards recovery

From 2008 to 2011, an increase in anthropogenic mortality (basically fishing mortality) and a decrease in B<sub>current</sub> was observed /modelled. However, the main fisheries measures (closed season in summer, increased minimum size limit) had been implemented with a delay and as a consequence, the time was too short to see an effect of the measures. The model used for this EMU predicts an increase in silver eel escapement from 2018 onwards. At the best combination of different management measures, the 40%-target will be achieved between 2042 and 2049, according to the model predictions.

Table 81: Overview of fishing effort reported in the ICES Data Call for the Oder EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 82: Overview of total catches (commercial + recreational) of eel stages for the Oder EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		36.71	47.51	84.21
2	2009		40.48	49.31	89.79
<b>Post</b>					
3	2010		41.66	49.21	90.86
4	2011		32.24	35.12	67.36



Table 83: Stock indicators for the Oder EMU.  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t) g.e. Equ.
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	
1 2008	1611	236	336	0.74	0.51	1.25	0.195
2 2009							0.273
3 2010							0.273
4 2011	1611	117	426	1.02	0.51	1.53	0.526

Table 84: WKEPEMP evaluation of progress toward recovery for the Oder EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?		
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		no
Has the EMU reached the EU/wgeel 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no

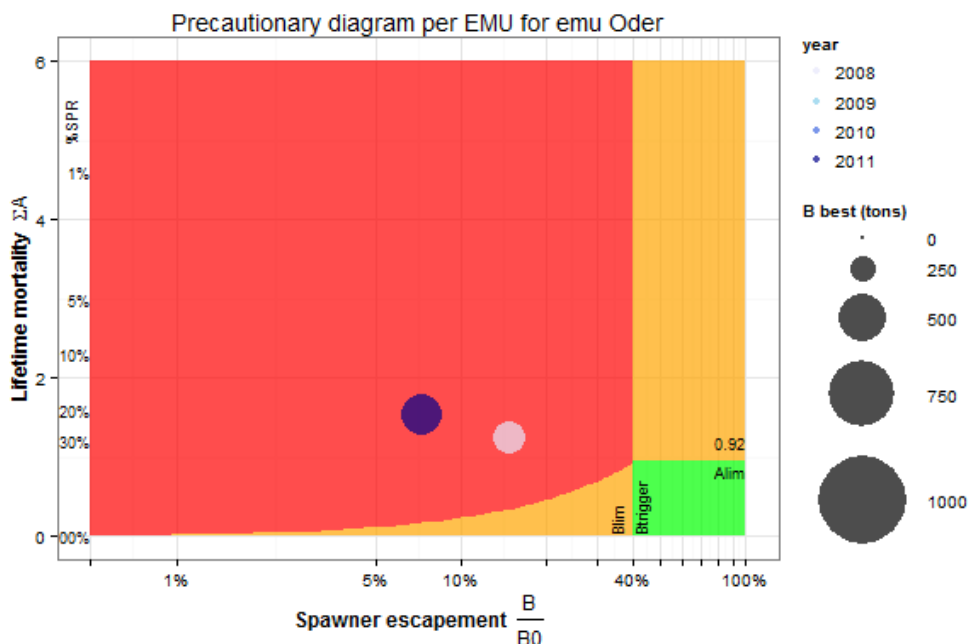


Figure 22: Modified precautionary diagram for the Oder EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 7.1.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU, but it is also stated that rivers had not been assessed. So this aspect remains a bit unclear. These impacts were included in the assessment: habitat; restocking; commercial fisheries; recreational fisheries; hydropower; predators. These impacts were not included: barriers; indirect effects. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Restocking. Expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower and Habitat. The impact of other management actions could not be evaluated, either because of missing expertise or information: they applied to Fisheries (poaching, recreational fisheries).

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and is increasing.

## **7.2 Vistula**

### **7.2.1 Available information**

Figure 23: *Vistula*, Poland

Table 85: Sources of information for the Vistula EMU

Type of source	Reference
EMP	Polish Eel Management Plan; Ministry of Agriculture and Rural Development, National Marine Fisheries Research Institute Gdynia, The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn 2010
EMP approved in: 2012 post-evaluation report:	Report on the Implementation of the Polish Eel Management Plan in 2009-2011; The Stanislaw Sakowicz Inland Fisheries Institute in Olsztyn; National Marine Fisheries Research Institute Gdynia; Ministry of Agriculture and Rural Development Warsaw
2013 ICES data-call: Additional sources:	

Table 86: Reported stock indicators for the Vistula EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

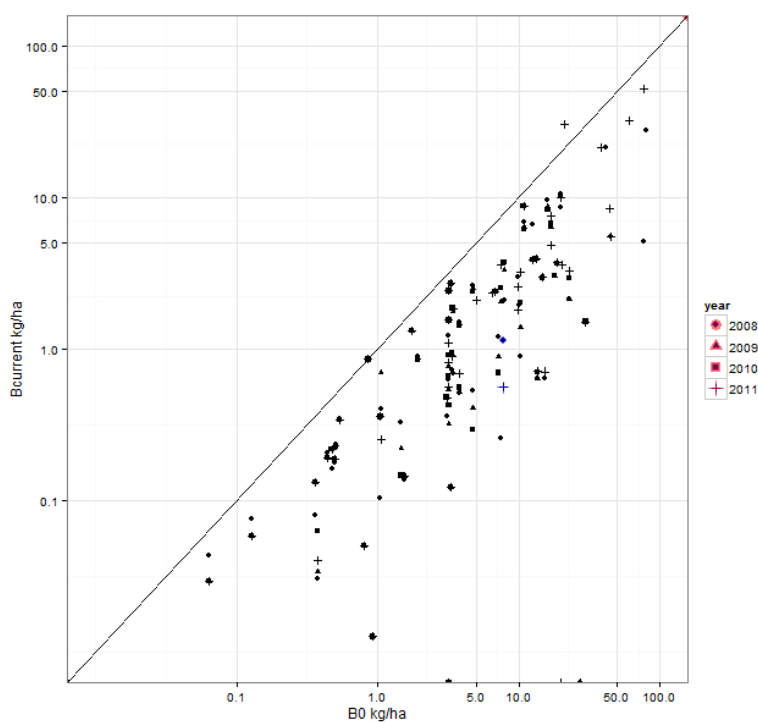


Figure 24:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Vistula EMU are shown in red, those for Poland are shown in blue.

Table 87: Source of indicators evaluated for the Vistula EMU

Stock indicator	Source
B0	2012 post-evaluation report
Bbest	2013 ICES data-call
Bcurrent	2012 post-evaluation report
$\Sigma A$	2013 ICES data-call

### 7.2.2 Habitat coverage of the EMU

Table 88: Habitats assessed in the Vistula EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed?
Were rivers assessed?	no
Were lakes assessed?	yes
Were estuaries assessed?	yes
Were lagoons assessed?	yes
Were marine coastal waters assessed?	yes

In the Data Call it is stated that rivers had not been assessed. However, expert judgement suggests that are perhaps fisheries in rivers which would influence the stock.

### 7.2.3 Management measures

Table 89: Overview of the management actions proposed in the EMP for the Oder EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Closing fishing season	M	EMP	fulfilled	interm
2 Increasing minimum length	M	EMP	fulfilled	low
3 More selective gears	M	EMP	fulfilled	low
4 Limiting poaching	M	EMP	not done	unsure
<b>Recr. Fishr.</b>				
5 Closing fishing season	M	EMP	fulfilled	interm
6 Increasing minimum length	M	EMP	fulfilled	low
7 Decreasing daily catch by anglers	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>				
8 Hydropower passable	M	EMP	not done	none
<b>Pedatr.</b>				
9 Reducing cormorants	M	EMP	not done	none
<b>Restocking</b>				
10 Stocking	M	EMP	partially	high

The main measures in this EMU are re-stocking of considerable amounts of eels and restrictive fisheries measures like establishing a closed season of 1 month during summer. They will probably have an intermediate to big effect. That means that the highest source of anthropogenic mortality (fishing mortality) is addressed with the measures (closed season, minimum size limit). Others like reduction of hydropower mortality have not started (foreseen from 2019 onwards). Considering the large amount of hydropower installations and the magnitude of hydropower mortality, this factor could have a great potential for improvements.

### 7.2.4 Assessment

Table 90: Summary list impact types that were included in the assessments for the Vistula EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	omitted	omitted	included	included	included	included	

Table 91: Summary of targets and assessment period for the Vistula EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			537	
EU/ICES targets			537.2	0.056
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 92: Additional information for the Vistula EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	NA	yes	
Does double banking apply?			NA	
Is double banking considered?			NA	

For this EMU, all indicators are reported. However, some points are unclear and cannot be answered and assessed sufficiently in the short time of the workshop, e.g. we cannot prove if restocking applies above dams or not. In the original EMP it was said that there were no provisions to stock reservoirs or their rivers. However, the map shows a huge amount of obstacles and hydropower installations, so that it seems unlikely that many rivers without hydropower influence could be found. This issue should be addressed more clearly in future reports. It is also obvious that barriers have the potential to cause problems to eel (15000 obstacles in Poland) but there is no quantification of the problem provided and hence, it is not possible to assess it. It was also not possible to check the input variables of the model. It remains a bit unclear, how the different habitat types were treated in the model (e.g. were there differences between lakes and lagoons or estuaries?)

### 7.2.5 Progress towards recovery

From 2008 to 2011, an increase in anthropogenic mortality (basically fishing mortality) and a decrease in B<sub>current</sub> was observed/modelled. However, the main fisheries measures (closed season in summer, increased minimum size limit) had been implemented with a delay and as a consequence, the time was too short to see an effect of the measures. The model used for this EMU predicts an increase in silver eel escapement from 2018 onwards. At the best combination of different management measures, the 40%-target will be achieved in 2066, according to the model predictions.



Table 93: Overview of fishing effort reported in the ICES Data Call for the Vistula EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 94: Overview of total catches (commercial + recreational) of eel stages for the Vistula EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		50.11	80.17	130.29
2	2009		47.28	76.83	124.11
<b>Post</b>					
3	2010		53.88	79.45	133.34
4	2011		40.66	54.78	95.44

Table 95: Stock indicators for the Vistula EMU.  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	1343	233	416	1.08	0.8	1.88	0.195
2 2009							0.273
3 2010							0.273
4 2011	1343	82	355	2.06	0.8	2.68	0.526

Table 96: WKEPEMP evaluation of progress toward recovery for the Vistula EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question (B)	Anthropogenic Biomass	
	mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?		
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/WGEEL 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no

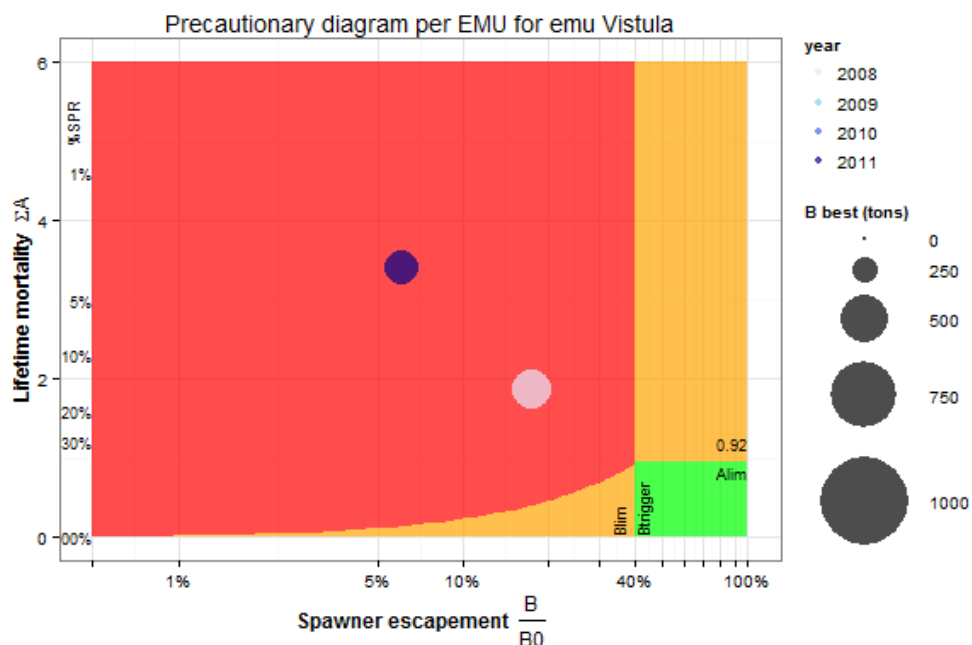


Figure 25: Modified precautionary diagram for the Vistula EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 7.2.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report. All stock indicators were available. Stock indicators are given for the whole EMU, but it is also stated that rivers had not been assessed. So this aspect remains a bit unclear. These impacts were included in the assessment: habitat; restocking; commercial fisheries; recreational fisheries; hydropower; predators. These impacts were not included: barriers; indirect effects. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Restocking. Expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower and Habitat. The impact of other management actions could not be evaluated, either because of missing expertise or information: they applied to Fisheries (poaching, recreational fisheries).

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and increasing.

## 8 Czech republic

### 8.1 Oder

#### 8.1.1 Available information

Table 97: Reported stock indicators for the Oder EMU

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

#### 8.1.2 Management measures

Table 98: Overview of the management actions proposed in the EMP for the Oder EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Ban on commercial fishery	M	EMP	fulfilled	NA
<b>Recr. Fishr.</b>				
2 Closing fishing season in autumn	M	EMP	fulfilled	NA
3 Reduction of maximum catch to 2 indiv	M	EMP	not done	none
4 Increasing minimum length	M	EMP	fulfilled	NA
<b>Hydropw. &amp; Obst.</b>				
5 Opening Up Transcurrent Obstructions	M	EMP	not done	NA
6 Reducing Mortality Caused by Hydroelectric Power Stations	M	EMP	not done	NA
<b>Restocking</b>				

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7	Restocking	M	EMP	fulfilled	NA
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### 8.1.3 Progress towards recovery

Table 99: Overview of fishing effort reported in the ICES Data Call for the Oder EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 100: Overview of total catches (commercial + recreational) of eel stages for the Oder EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

## 8.2 Elbe

### 8.2.1 Available information

Table 101: Reported stock indicators for the Elbe EMU

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

### 8.2.2 Management measures

Table 102: Overview of the management actions proposed in the EMP for the Elbe EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
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<b>Com. Fishr.</b>						
1	Ban on commercial fishery	M	EMP	fulfilled	NA	
<b>Rec. Fishr.</b>						
2	Closing fishing season in autumn	M	EMP	fulfilled	NA	
3	Reduction of maximum catch to 2 indiv	M	EMP	not done	none	
4	Increasing minimum length	M	EMP	fulfilled	NA	
<b>Hydropw. &amp; Obst.</b>						
5	Opening Up Transcurrent Obstructions	M	EMP	not done	NA	
6	Reducing Mortality Caused by Hydroelectric Power Stations	M	EMP	not done	NA	
<b>Restocking</b>						
7	Restocking	M	EMP	fulfilled	NA	

Table 103: Overview of fishing effort reported in the ICES Data Call for the Elbe EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 104: Overview of total catches (commercial + recreational) of eel stages for the Elbe EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

### 8.3 General conclusions for the Czech EMUs

These EMUs have an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. No stock indicators have been reported. These impacts were included in the assessment: restocking and hydropower. Other impacts were probably small, though recreational fishing is unclear. Most of the Management Actions outlined identified for the EMP in the Progress Report have been implemented. The EMP indicates that commercial fishery shall be restricted, while the Progress report states that no fishery occurs. Where actions have been implemented, these have been partially implemented. For both restocking and hydropower-generation-related measures, financial limits have constrained the implementation. The impact of management actions could not be evaluated quantitatively.

## 9 Germany

### 9.1 Eider

#### 9.1.1 Available information



Figure 26: *Eider*, Germany

Table 105: Sources of information for the Eider EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 106: Reported stock indicators for the Eider EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	no	no
ΣH	no	no

Table 107: Source of indicators evaluated for the Eider EMU

Stock indicator	Source
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$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call

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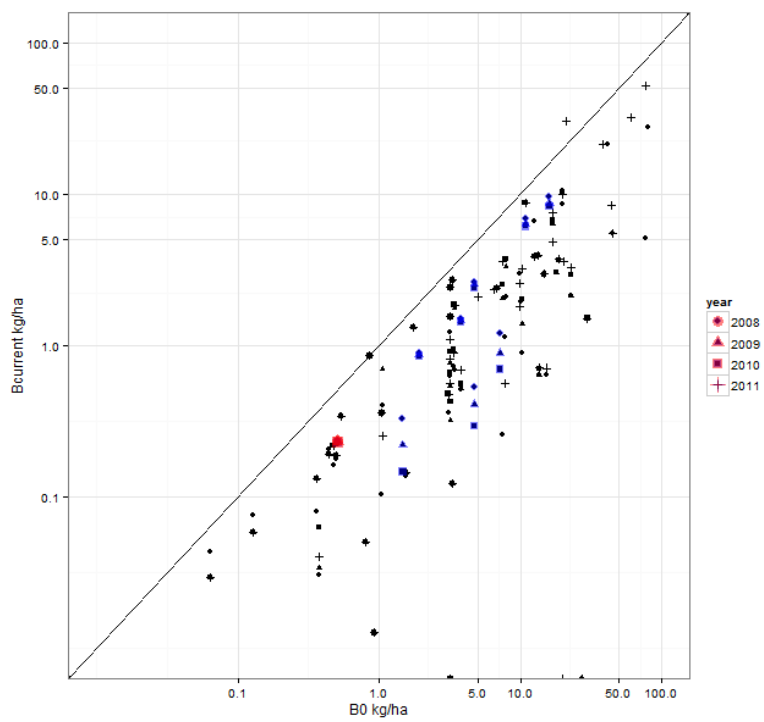


Figure 27:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Eider EMU are shown in red, those for Germany are shown in blue.

### 9.1.2 Habitat coverage of the EMU

Table 108: Habitats assessed in the Eider EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Yes

### 9.1.3 Management measures

Table 109: Overview of the management actions proposed in the EMP for the Eider EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Increase minimum size limit	Y	EMP	not done	NA
2	Closing stationary eel traps	M	Other	partially	unsure
<b>Recr. Fishr.</b>					
3	Increase minimum size limit	Y	EMP	not done	none
<b>Habitat</b>					
4	Improve longitudinal connectivity	M	EMP	partially	unsure
5	Improve longitudinal connectivity	M	Other	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
6	Trap and transport	S	EMP	fulfilled	none
<b>Predatr.</b>					
7	Predator control	M	EMP	fulfilled	none

Table 109: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
8	Scientific studies and monitoring and data collection	M	EMP	fulfilled	knowledge
9	Legal framework	M	EMP	fulfilled	unsure
10	Improve means of fishery control	M	Other	fulfilled	unsure
11	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

9.1.4 Assessment

Table 110: Summary list impact types that were included in the assessments for the Eider EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 111: Summary of targets and assessment period for the Eider EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			96	
Assessment period start	2008	2008	2008	
Assessment period end	2010	2010	2010	

Table 112: Additional information for the Eider EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply?			no	no
Is double banking considered?			NA	NA

### 9.1.5 Progress towards recovery

Table 113: Overview of fishing effort reported in the ICES Data Call for the Eider EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	468783	365	102
	2009	468783	365	102
	2010	468783	365	102
	2011	468783	365	102
<b>YS rec</b>				



2008	468783	365	20000
2009	468783	365	20000
2010	468783	365	20000
2011	468783	365	

Table 114: Overview of total catches (commercial + recreational) of eel stages for the Eider EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			20.71
2	2009	0			22.26
<b>Post</b>					
3	2010	0			22.87
4	2011	0			

Table 115: Stock indicators for the Eider EMU, the source of the data is indicated in Table 107,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	239.5	111.1	148.3				0
2	2009	239.5	108.7	146.0				0
3	2010	239.5	107.4	143.8				0
4	2011							

Table 116: WKEPEMP evaluation of progress toward recovery for the Eider EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified?		yes
Is the trend good?		
Has the EMU reached the target set for 2012 in the EMP?		yes
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/WGEEL 2012 target?		yes
Has the EMU achieved the most it can without increased recruitment?		no

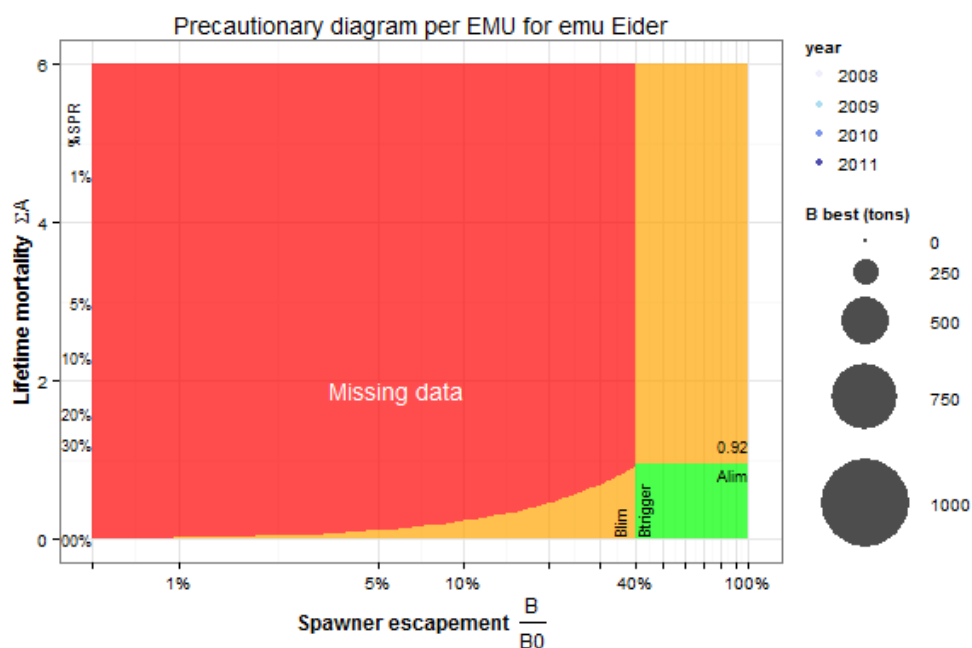


Figure 28: Modified precautionary diagram for the Eider EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.1.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported: anthropogenic mortality indicators are missing. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%), but decreasing. Indicator of the anthropogenic mortality  $\Sigma A$  is missing.

## 9.2 Elbe

### 9.2.1 Available information

Figure 29: *Elbe*, Germany

Table 117: Sources of information for the Elbe EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 118: Reported stock indicators for the Elbe EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

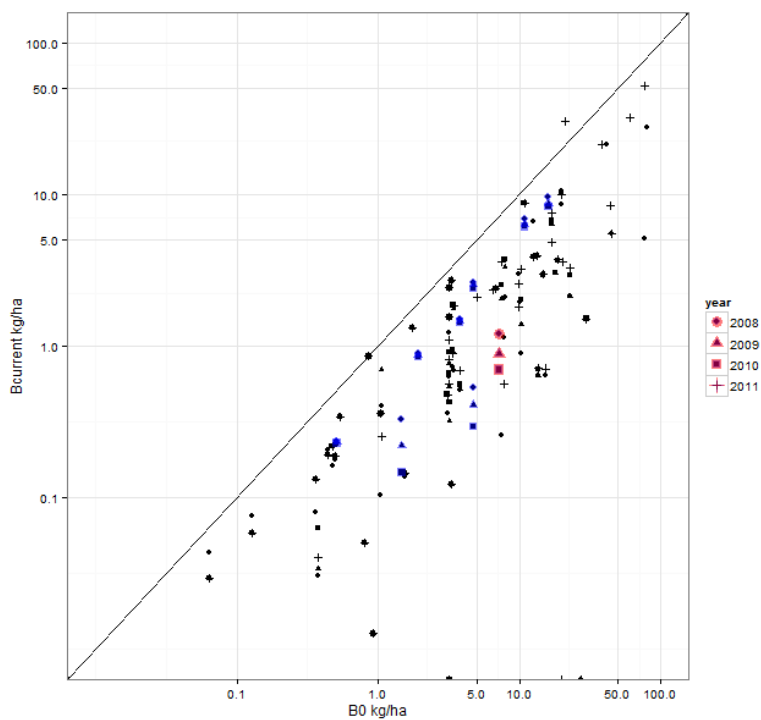


Figure 30:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Elbe EMU are shown in red, those for Germany are shown in blue.

Table 119: Source of indicators evaluated for the Elbe EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 9.2.2 Habitat coverage of the EMU

Table 120: Habitats assessed in the Elbe EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Absent

### 9.2.3 Management measures

Table 121: Overview of the management actions proposed in the EMP for the Elbe EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Increase minimum size limit	Y	EMP	partially	interm
2	Reduction of fisheries intensity in coastal waters	M	EMP	partially	interm
3	Closing stationary eel traps	S	EMP	partially	interm
4	Introduction of regional eel fishing limitations	M	Other	fulfilled	interm
<b>Rec. Fishr.</b>					
5	Increase minimum size limit	Y	EMP	partially	interm
6	Introduction bag size limit for eel anglers	M	Other	fulfilled	interm
7	Closing fishery at night for anglers	M	Other	fulfilled	interm
<b>Habitat</b>					

8	Improve longitudinal connectivity	M	EMP	fulfilled	low
9	Improve longitudinal connectivity	M	Other	partially	low
<b>Restocking</b>					
10	Stabilize/ increase stocking amount	G	EMP	fulfilled	interm



Table 121: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
11	Scientific studies and monitoring and data collection	M	EMP	partially	unsure
12	Legal framework	M	EMP	partially	unsure

Measures on commercial fishery have been only partially fulfilled, the evaluation of impact was conducted on groups of actions (fishery, hydropower...) so their impact was assessed consistently by groups.

9.2.4 Assessment

Table 122: Summary list impact types that were included in the assessments for the Elbe EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	included

Table 123: Summary of targets and assessment period for the Elbe EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			580	0.221
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 124: Additional information for the Elbe EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply?			no	no
Is double banking considered?			NA	NA

Although double banking does not affect the Elbe EMU, there are potentially silver eel fisheries in the Baltic exploiting the silver eel escaping from the Elbe.

### 9.2.5 Progress towards recovery

Biomass is decreasing, whereas anthropogenic mortality rate is increasing.

Table 125: Overview of fishing effort reported in the ICES Data Call for the Elbe EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	201019	365	379
	2009	201019	365	364
	2010	201019	365	392
	2011	201019	365	
<b>YS rec</b>				
	2008	201019	365	332933
	2009	201019	365	333897
	2010	201019	365	323181
	2011	201019	365	

Table 126: Overview of total catches (commercial + recreational) of eel stages for the Elbe EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			296.54
2	2009	0			312.81
<b>Post</b>					
3	2010	0			295.67
4	2011	0			

Table 127: Stock indicators for the Elbe EMU, the source of the data is indicated in table 119, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	Year	Biomass (t)			Mortality		Stocked (t)	
		B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. eqv
1	2008	1450.2	239.6	139.1	0.04	0.01	1.07	3.888
2	2009	1450.2	178.7	115.5	0.04	0.00	1.22	3.964
3	2010	1450.2	140.2	98.7	0.03	0.00	1.36	4.741
4	2011							

Table 128: WKEPEMP evaluation of progress toward recovery for the Elbe EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?	yes	
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no

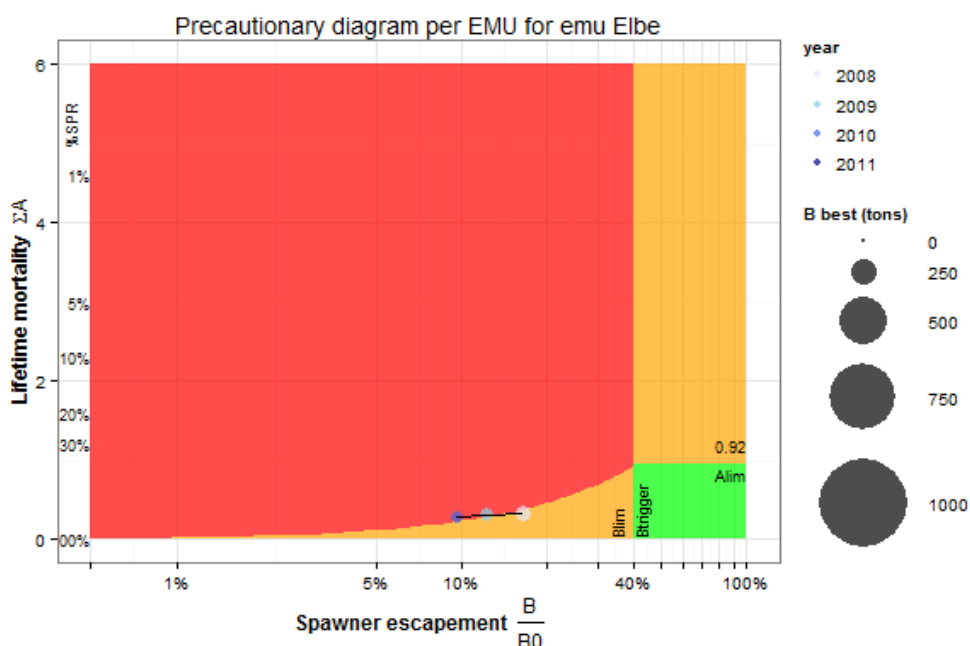


Figure 31: Modified precautionary diagram for the Elbe EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.2.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and is increasing.

## 9.3 Ems

### 9.3.1 *Available information*

Figure 32: *Ems*, Germany

Table 129: Sources of information for the Ems EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 130: Reported stock indicators for the Ems EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

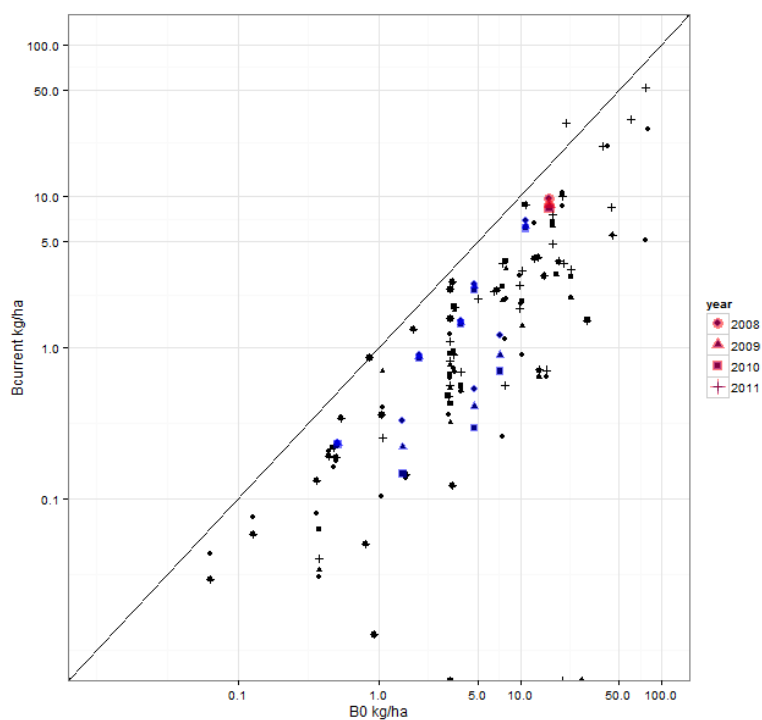


Figure 33:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Ems EMU are shown in red, those for Germany are shown in blue.

Table 131: Source of indicators evaluated for the Ems EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call



### 9.3.2 Habitat coverage of the EMU

Table 132: Habitats assessed in the Ems EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Absent

### 9.3.3 Management measures

Table 133: Overview of the management actions proposed in the EMP for the Ems EMU, grouped according to Action Type: Commercial Fisheries (Com.Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw.Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Increase minimum size limit	Y	EMP	partially	high
2	Reduction of fisheries intensity in coastal waters	M	EMP	not done	NA
<b>Rec. Fishr.</b>					
3	Increase minimum size limit	Y	EMP	partially	high
<b>Habitat</b>					
4	Improve longitudinal connectivity	M	Other	partially	none
<b>Restocking</b>					
5	Stabilize/ increase stocking amount	G	EMP	partially	unsure

6	Supply financial support for stock- ing	G	Other	fulfilled	NA
<b>Others</b>					
7	Legal framework	M	EMP	partially	unsure
8	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

### 9.3.4 Assessment

Table 134: Summary list impact types that were included in the assessments for the Ems EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 135: Summary of targets and assessment period for the Ems EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			284.4	0.916
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 136: Additional information for the Ems EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply?			no	no
Is double banking considered?			NA	NA

### 9.3.5 Progress towards recovery

Biomass is above target but decreasing, anthropogenic mortality is below limits and decreasing further.

Table 137: Overview of fishing effort reported in the ICES Data Call for the Ems EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	44088	365	
	2009	44088	365	
	2010	44088	365	
	2011	44088	365	
<b>YS rec</b>				
	2008	44088	365	49145
	2009	44088	365	48907
	2010	44088	365	486660
	2011	44088	365	

Table 138: Overview of total catches (commercial + recreational) of eel stages for the Ems EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			17.87
2	2009	0			19.40
<b>Post</b>					
3	2010	0			20.21
4	2011	0			

Table 139: Stock indicators for the Ems EMU, the source of the data is indicated in table 131, Bcurrent is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation. ΣA is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL

2012 for ΣA). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	B0	Bcurrent	Bbest	Σ F	Σ H	Σ A	g.e. Equ.
1 2008	711.2	421.7	259.0	0.00	0	0.09	0.233
2 2009	711.2	385.6	234.6	0.01	0	0.08	0.190
3 2010	711.2	363.9	211.5	0.01	0	0.08	0.244
4 2011	711.0						

Table 140: WKEPEMP evaluation of progress toward recovery for the Ems EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified?	yes	yes
Is the trend good?		
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?	yes	yes
Has the EMU achieved the most it can without increased recruitment?	no	no

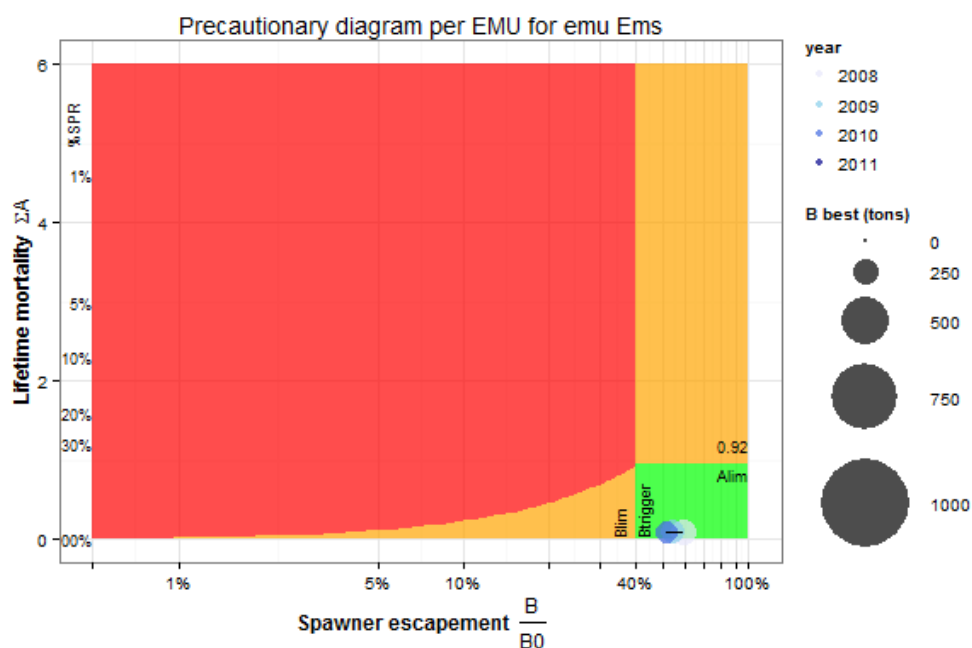


Figure 34: Modified precautionary diagram for the Ems EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.3.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%) but decreasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target) and is decreasing.

## 9.4 Maas

### 9.4.1 *Available information*

Figure 35: *Maas*, Germany



Table 141: Sources of information for the Maas EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 142: Reported stock indicators for the Maas EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

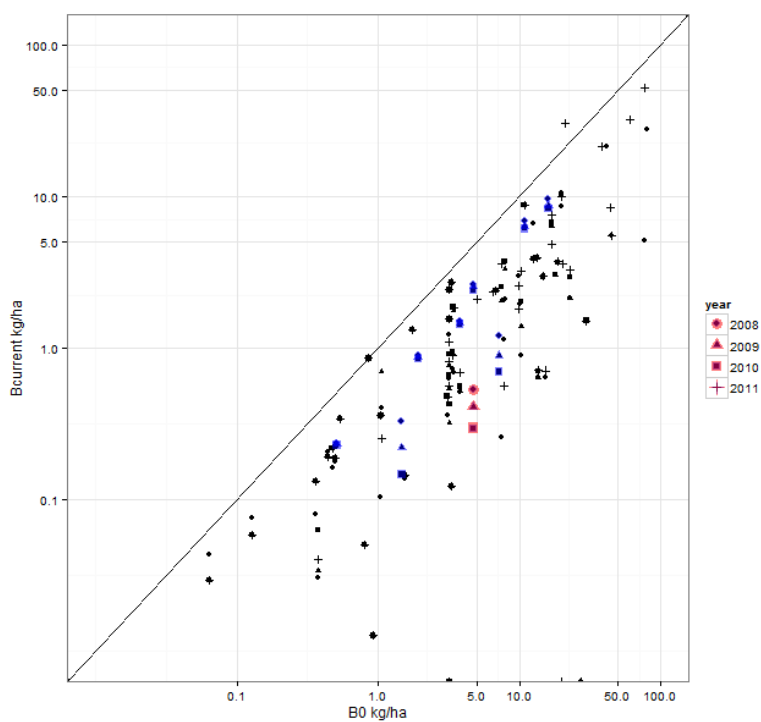


Figure 36:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Maas EMU are shown in red, those for Germany are shown in blue.

Table 143: Source of indicators evaluated for the Maas EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 9.4.2 Habitat coverage of the EMU

Table 144: Habitats assessed in the Maas EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Absent
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Absent

### 9.4.3 Management measures

Table 145: Overview of the management actions proposed in the EMP for the Maas EMU, grouped according to Action Type: Commercial Fisheries (Com.Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw.Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Increase minimum size limit	Y	EMP	fulfilled	high
<b>Rec. Fishr.</b>					
2	Increase minimum size limit	Y	EMP	fulfilled	high
<b>Habitat</b>					
3	Improve longitudinal connectivity	M	Other	partially	none
<b>Restocking</b>					
4	Stabilize/ increase stocking amount	G	EMP	partially	unsure
5	Supply financial support for stocking	G	Other	fulfilled	unsure
<b>Others</b>					

6	Legal framework	M	EMP	fulfilled	unsure
7	Including eel in existing species protection programmes	M	Other	fulfilled	unsure
8	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

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### 9.4.4 Assessment

Table 146: Summary list impact types that were included in the assessments for the Maas EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 147: Summary of targets and assessment period for the Maas EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			1.6	0.143
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 148: Additional information for the Maas EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply?			no	no
Is double banking considered?			NA	NA

#### 9.4.5 *Progress towards recovery*

Biomass is decreasing, as well as anthropogenic mortality rate.

Table 149: Overview of fishing effort reported in the ICES Data Call for the Maas EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	892	365	1
	2009	892	365	1
	2010	892	365	1
	2011	892	365	1
<b>YS rec</b>				
	2008	892	365	7461
	2009	892	365	7305
	2010	892	365	6821
	2011	892	365	

Table 150: Overview of total catches (commercial + recreational) of eel stages for the Maas EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			0.12
2	2009	0			0.11
<b>Post</b>					
3	2010	0			0.12
4	2011	0			

Table 151: Stock indicators for the Maas EMU, the source of the data is indicated in Table 143, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation. ΣA is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for ΣA). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	ΣF	ΣH	ΣA	g.e. Equ.
1 2008	4.2	0.5	1.2	0.02	0.01	0.95	0.003
2 2009	4.2	0.4	0.9	0.02	0.01	0.89	0.002
3 2010	4.2	0.3	0.5	0.01	0.00	0.86	0.006
4 2011	4.0						

Table 152: WKEPEMP evaluation of progress toward recovery for the Maas EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified?	yes	yes
Is the trend good?	yes	
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no



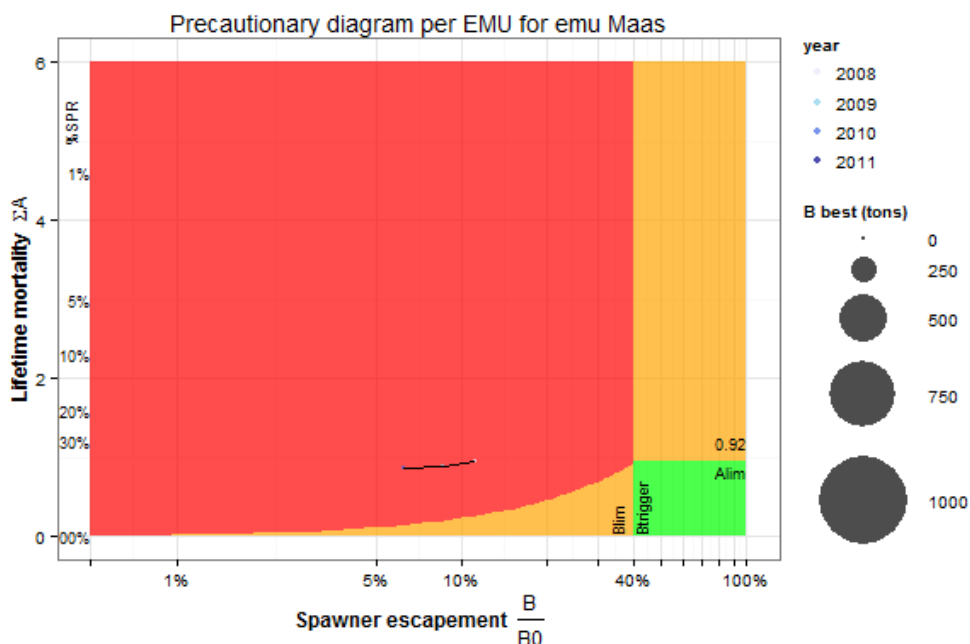


Figure 37: Modified precautionary diagram for the Maas EMU (after wgeel 2012), see section 1.3.2 for more information.

### 9.4.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation and decreasing, but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 9.5 Oder

### 9.5.1 *Available information*

Figure 38: *Oder*, Germany

Table 153: Sources of information for the Oder EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 154: Reported stock indicators for the Oder EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

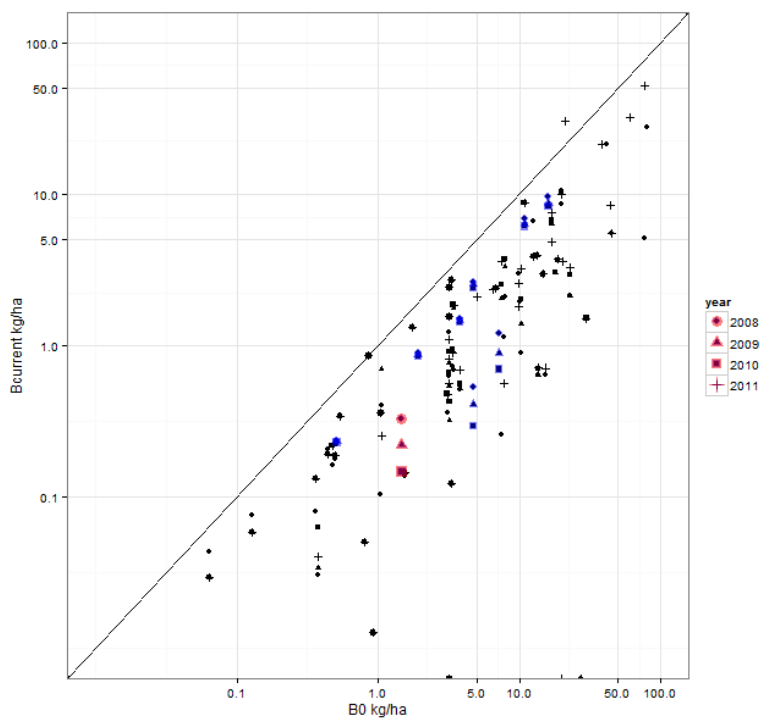


Figure 39:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Oder EMU are shown in red, those for Germany are shown in blue.

Table 155: Source of indicators evaluated for the Oder EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 9.5.2 Habitat coverage of the EMU

Table 156: Habitats assessed in the Oder EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Absent

### 9.5.3 Management measures

Table 157: Overview of the management actions proposed in the EMP for the Oder EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw.Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Increase minimum size limit	Y	EMP	fulfilled low
2	Closing stationary eel traps	S	EMP	partially low
<b>Rec. Fishr.</b>				
3	Increase minimum size limit	Y	EMP	fulfilled low
4	Introduction bag size limit for eel anglers	M	Other	fulfilled low
<b>Habitat</b>				
5	Improve longitudinal connectivity	M	Other	partially none
<b>Restocking</b>				

6	Stabilize/ increase stocking amount	G	EMP	fulfilled	unsure
<b>Others</b>					
7	Scientific studies and monitoring and data collection	M	EMP	partially	unsure
8	Legal framework	M	EMP	fulfilled	unsure

### 9.5.4 Assessment

Table 158: Summary list impact types that were included in the assessments for the Oder EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 159: Summary of targets and assessment period for the Oder EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			47.2	0.228
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 160: Additional information for the Oder EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply?			no	no
Is double banking considered?			NA	NA

Double banking does not apply to this EMU but fisheries in the Baltic exploit the silver eel escaping from this EMU.

### 9.5.5 Progress towards recovery

Table 161: Overview of fishing effort reported in the ICES Data Call for the Oder EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	80366	365	94
	2009	80366	365	88
	2010	80366	365	83
	2011	80366	365	
<b>YS rec</b>				



2008	80366	365	32009
2009	80366	365	32867
2010	80366	365	30080
2011	80366	365	

Table 162: Overview of total catches (commercial + recreational) of eel stages for the Oder EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			25.44
2	2009	0			24.90
<b>Post</b>					
3	2010	0			22.97
4	2011	0			

Table 163: Stock indicators for the Oder EMU, the source of the data is indicated in Table 155,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL

2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	118.2	26.5	11.3	0.03	0	0.82	0.202
2 2009	118.2	17.6	8.4	0.02	0	1.00	0.179
3 2010	118.2	11.8	6.5	0.03	0	1.14	0.082
4 2011							

Table 164: WKEPEMP evaluation of progress toward recovery for the Oder EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?	yes	
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?	no	no
Has the EMU achieved the most it can without increased recruitment?	no	no

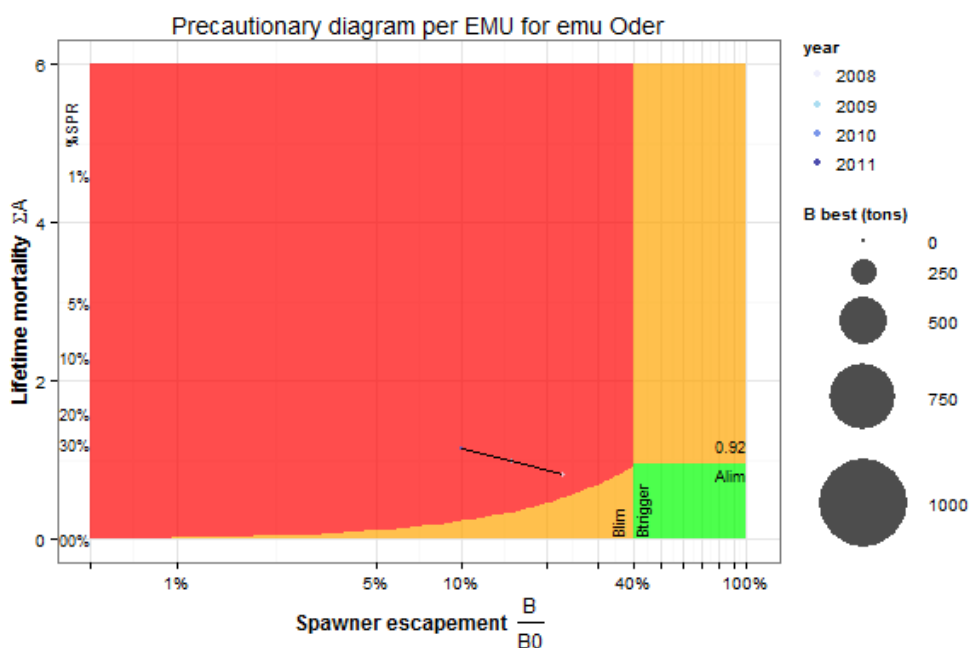


Figure 40: Modified precautionary diagram for the Oder EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.5.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and increasing.

## 9.6 Rhein

### 9.6.1 Available information

Figure 41: *Rhein*, Germany

Table 165: Sources of information for the Rhein EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 166: Reported stock indicators for the Rhein EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

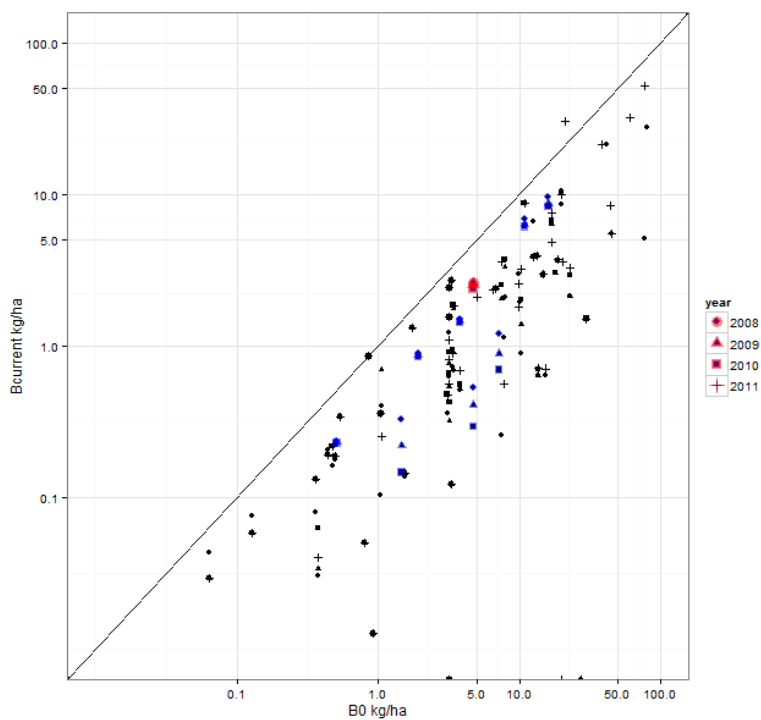


Figure 42:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Rhein EMU are shown in red, those for Germany are shown in blue.

Table 167: Source of indicators evaluated for the Rhein EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 9.6.2 Habitat coverage of the EMU

Table 168: Habitats assessed in the Rhein EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Absent
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Absent

### 9.6.3 Management measures

Table 169: Overview of the management actions proposed in the EMP for the Rhein EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw.Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Increase minimum size limit	Y	EMP	fulfilled	high
2 Introduce closed season	M	EMP	fulfilled	high
3 Establish or prolong closed season for eel fishery	M	Other	fulfilled	high
<b>Recr. Fishr.</b>				
4 Increase minimum size limit	Y	EMP	fulfilled	high
5 Introduce closed season	M	EMP	fulfilled	high
6 Establish or prolong closed season for eel fishery	M	Other	fulfilled	high
<b>Habitat</b>				
7 Improve longitudinal connectivity	M	Other	fulfilled	interm

<b>Hydropw. &amp; Obst.</b>					
8	Trap and transport	S	EMP	fulfilled	low
9	Introduce trap and transport programmes and/or turbine management	S	Other	fulfilled	low



Table 169: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Predatr.</b>					
10	Predator control	M	EMP	partially	interm
<b>Restocking</b>					
11	Stabilize/ increase stocking amount	G	EMP	partially	unsure
12	Supply financial support for stocking	G	Other	partially	unsure
<b>Others</b>					
13	Legal framework	M	EMP	partially	unsure
14	Including eel in existing species protection programmes	M	Other	fulfilled	unsure
15	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

9.6.4 Assessment

Table 170: Summary list impact types that were included in the assessments for the Rhein EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir.anthr.Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 171: Summary of targets and assessment period for the Rhein EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			115.2	0.916
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 172: Additional information for the Rhein EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply?			no	no
Is double banking considered?			NA	NA

Double banking does not directly apply to this EMU, but there are fisheries 'downstream' that exploit silver eel escaping from the Rhein EMU.

#### 9.6.5 Progress towards recovery

Biomass and anthropogenic mortality rate are slightly decreasing.

Table 173: Overview of fishing effort reported in the ICES Data Call for the Rhein EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	61065	365	
	2009	61065		
	2010	61065		132
	2011	61065		
<b>YS rec</b>				
	2008	61065	365	180614
	2009	61065		179878
	2010	61065		178845
	2011	61065		

Table 174: Overview of total catches (commercial + recreational) of eel stages for the Rhein EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			103.23
2	2009	0			82.41
<b>Post</b>					
3	2010	0			64.50
4	2011	0			

Table 175: Stock indicators for the Rhein EMU, the source of the data is indicated in Table 167,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	288.4	161.5	26.7	0.02	0.03	1.13	1.071
2 2009	288.4	154.6	16.5	0.02	0.03	1.07	1.126
3 2010	288.4	146.2	9.0	0.02	0.03	1.03	1.163
4 2011	288.0						

Table 176: WKEPEMP evaluation of progress toward recovery for the Rhein EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified?	yes	yes
Is the trend good?	yes	
Has the EMU reached the target set for 2012 in the EMP?		
Has the EMU reached the long term target set by the EMP?		
Has the EMU reached the EU/wgeel 2012 target?	no	yes
Has the EMU achieved the most it can without increased recruitment?	no	no

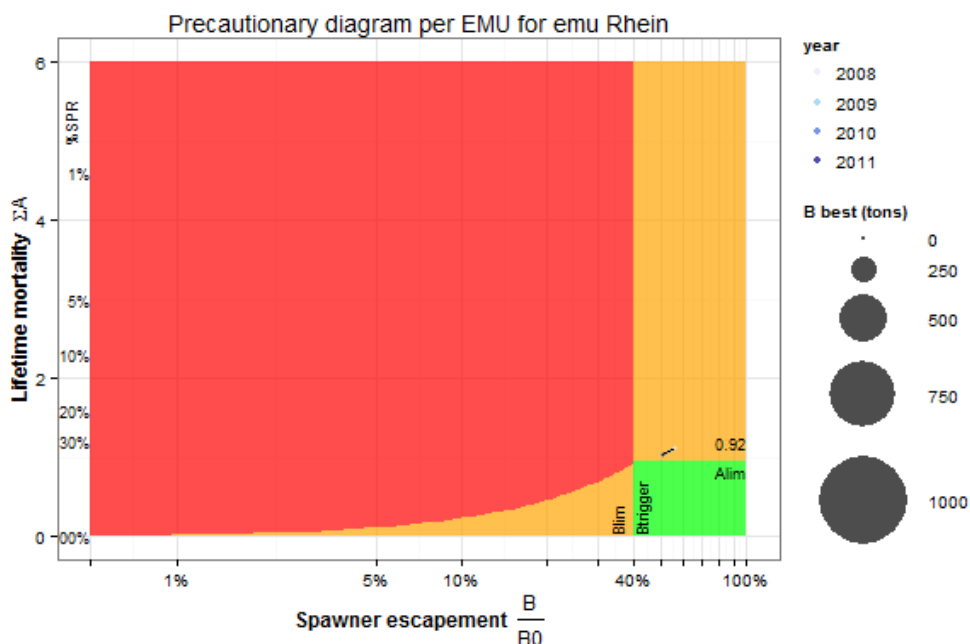


Figure 43: Modified precautionary diagram for the Rhein EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.6.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%) but decreasing. Anthropogenic mortality  $\Sigma A$  is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), but is decreasing.

## 9.7 Schlei/Trave

### 9.7.1 Available information



Figure 44: *Schlei/Trave*, Germany

Table 177: Sources of information for the Schlei/Trave EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 178: Reported stock indicators for Schlei/Trave

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	no
$\Sigma H$	no	no

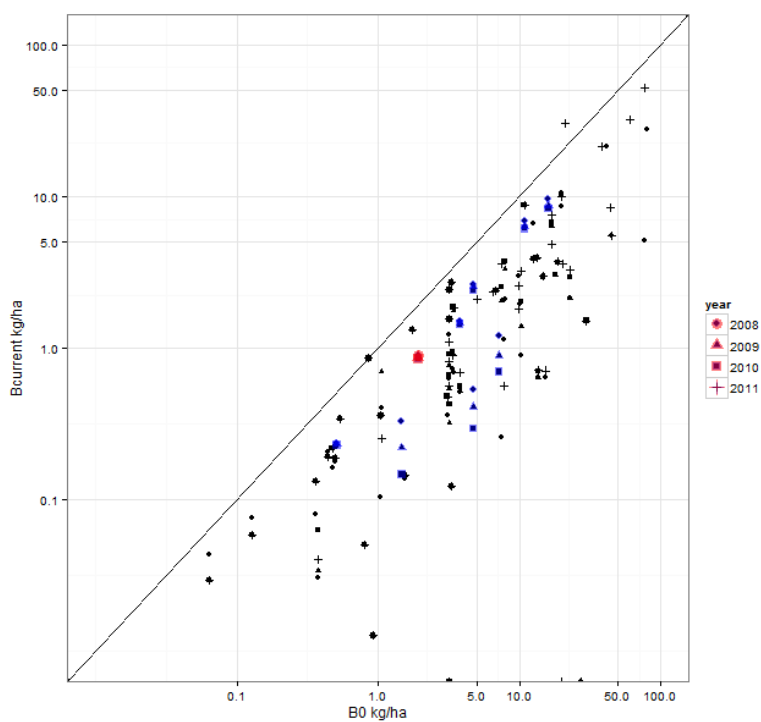


Figure 45:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Schlei/Trave EMU are shown in red, those for Germany are shown in blue.

Table 179: Source of indicators evaluated for the Schlei/Trave EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call



### 9.7.2 Habitat coverage of the EMU

Table 180: Habitats assessed in the Schlei/Trave EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Yes

### 9.7.3 Management measures

Table 181: Overview of the management actions proposed in the EMP for the Schlei/Trave EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Increase minimum size limit	Y	EMP	not done	unsure
2	Reduction of fisheries intensity in coastal waters	M	EMP	fulfilled	unsure
3	Closing stationary eel traps	M	Other	partially	unsure
<b>Rec. Fishr.</b>					
4	Increase minimum size limit	Y	EMP	not done	none
5	Introduction bag size limit for eel anglers	M	Other	fulfilled	unsure
<b>Habitat</b>					
6	Improve longitudinal connectivity	M	EMP	partially	unsure

7	Improve longitudinal connectivity	M	Other	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
8	Trap and transport	S	EMP	partially	unsure
<b>Predatr.</b>					
9	Predator control	M	EMP	fulfilled	low

Table 181: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
10	Stabilize/ increase stocking amount	G	EMP	partially	unsure
<b>Others</b>					
11	Scientific studies and monitoring and data collection	M	EMP	partially	unsure
12	Legal framework	M	EMP	fulfilled	unsure
13	Improve means of fishery control	M	Other	fulfilled	unsure
14	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

9.7.4 Assessment

Table 182: Summary list impact types that were included in the assessments for the Schlei/Trave EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 183: Summary of targets and assessment period for the Schlei/Trave EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			256.4	0.916
Assessment period start	2008	2008	2008	
Assessment period end	2011	2010	2010	

Table 184: Additional information for the Schlei/Trave EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply ?			no	no
Is double banking considered ?			NA	NA

Anthropogenic mortality rate is missing

### 9.7.5 *Progress towards recovery*

Table 185: Overview of fishing effort reported in the ICES Data Call for the Schlei/Trave EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	333790	365	
	2009	333790	365	
	2010	333790	365	
	2011	333790	365	
<b>YS rec</b>				
	2008	333790	365	20000
	2009	333790	365	20000
	2010	333790	365	20000
	2011	333790	365	

Table 186: Overview of total catches (commercial + recreational) of eel stages for the Schlei/Trave EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			49.47
2	2009	0			41.60
<b>Post</b>					
3	2010	0			58.62
4	2011	0			

Table 187: Stock indicators for the Schlei/Trave EMU, the source of the data is indicated in table 179,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	641	299.2	393.5				0.193
2 2009	641	289.5	383.6				0.221
3 2010	641	281.4	375.4				0.383
4 2011	641						

Table 188: WKEPEMP evaluation of progress toward recovery for the Schlei/Trave EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	no	yes
Is the trend good ?	amber	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		no

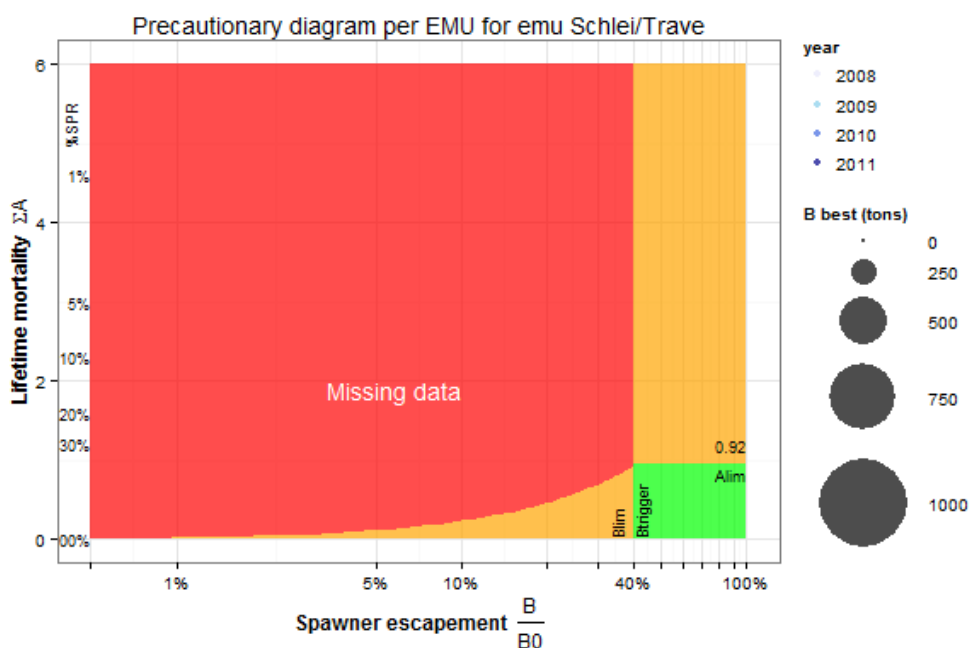


Figure 46: Modified precautionary diagram for the Schlei/Trave EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.7.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported: anthropogenic mortality indicators are missing. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fishery, Restocking and Habitat.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%) but decreasing. Indicator of the anthropogenic mortality  $\Sigma A$  is missing.

## 9.8 Warnow/Peene

### 9.8.1 Available information



Figure 47: *Warnow/Peene*, Germany



Table 189: Sources of information for the Warnow/Peene EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 190: Reported stock indicators for the Warnow/Peene EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

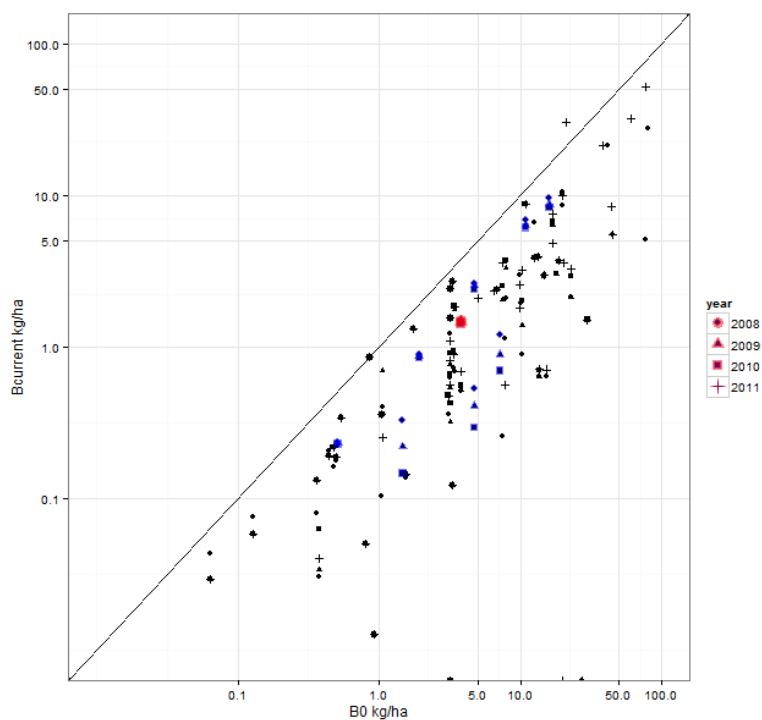


Figure 48:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Warnow/Peene EMU are shown in red, those for Germany are shown in blue.

Table 191: Source of indicators evaluated for the Warnow/Peene EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 9.8.2 Habitat coverage of the EMU

Table 192: Habitats assessed in the Warnow/Peene EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Yes

### 9.8.3 Management measures

Table 193: Overview of the management actions proposed in the EMP for the Warnow/Peene EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Increase minimum size limit	Y	EMP	fulfilled interm
2	Introduce closed season	M	EMP	fulfilled interm
3	Reduction of fisheries intensity in coastal waters	M	EMP	fulfilled interm
4	Closing stationary eel traps	M	Other	partially interm
<b>Recr. Fishr.</b>				
5	Increase minimum size limit	Y	EMP	fulfilled interm
6	Introduce closed season	M	EMP	fulfilled interm
<b>Habitat</b>				
7	Improve longitudinal connectivity	M	Other	partially none
<b>Predatr.</b>				

8	Predator control	M	EMP	partially	none
<b>Restocking</b>					
9	Stabilize/ increase stocking amount	G	EMP	partially	unsure

Table 193: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
10	Scientific studies and monitoring and data collection	M	EMP	fulfilled	unsure
11	Legal framework	M	EMP	fulfilled	unsure
12	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

9.8.4 Assessment

Table 194: Summary list impact types that were included in the assessments for the Warnow/Peene EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 195: Summary of targets and assessment period for the Warnow/Peene EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			558	0.868
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 196: Additional information for the Warnow/Peene EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply ?			no	no
Is double banking considered ?			NA	NA

### 9.8.5 Progress towards recovery

Biomass is decreasing but anthropogenic mortality is increasing slightly.

Table 197: Overview of fishing effort reported in the ICES Data Call for the Warnow/Peene EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	368309		
	2009	368309		
	2010	368309		
	2011	368309		
<b>YS rec</b>				
	2008	368309		133820
	2009	368309		137358
	2010	368309		134655
	2011	368309		

Table 198: Overview of total catches (commercial + recreational) of eel stages for the Warnow/Peene EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			125.62
2	2009	0			113.75
<b>Post</b>					
3	2010	0			112.43
4	2011	0			

Table 199: Stock indicators for the Warnow/Peene EMU, the source of the data is indicated in table 191,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	1395.5	553.4	613.1	0.01	0	0.21	0.449
2 2009	1395.5	535.4	611.6	0.01	0	0.23	0.411
3 2010	1395.5	528.8	617.9	0.01	0	0.24	0.454
4 2011	1395.0						

Table 200: WKEPEMP evaluation of progress toward recovery for the Warnow/Peene EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no



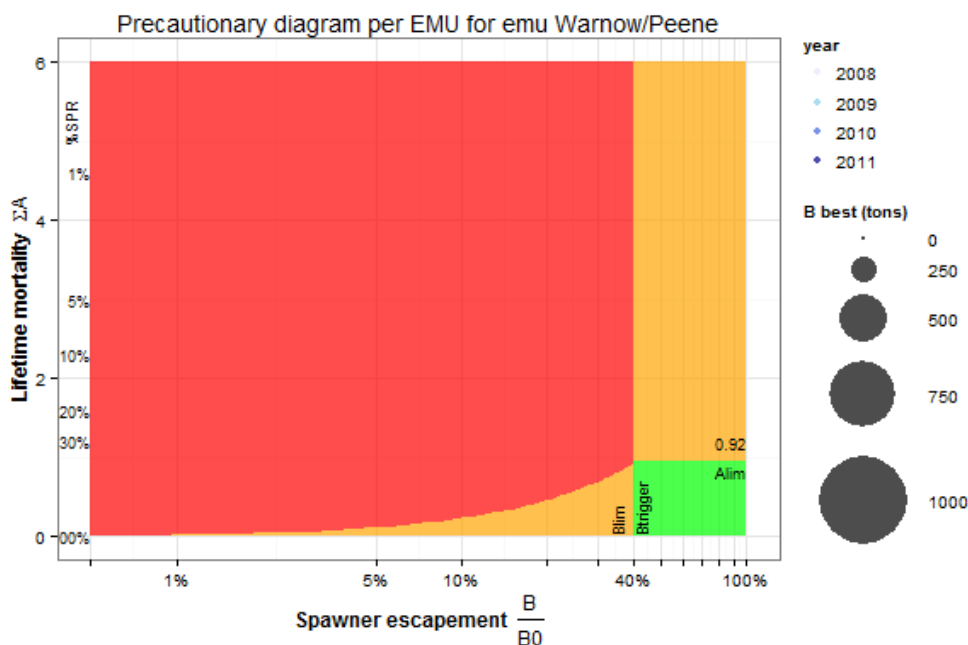


Figure 49: Modified precautionary diagram for the Warnow/Peene EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.8.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), but it is increasing.

## 9.9 **Weser**

### 9.9.1 *Available information*

Figure 50: *Weser*, Germany

Table 201: Sources of information for the Weser EMU

Type of source	Reference
EMP	Aalbewirtschaftungspläne der deutschen Länder zur Umsetzung der EG-verordnung Nr. 1100/2007 (2008)
EMP approved in:	2010
2012 post-evaluation report:	Umsetzungsbericht 2012 zu den Aalbewirtschaftungsplänen der deutschen Länder 2008
2013 ICES data-call:	
Additional sources:	documents made available to WG Eel

Table 202: Reported stock indicators for Weser

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

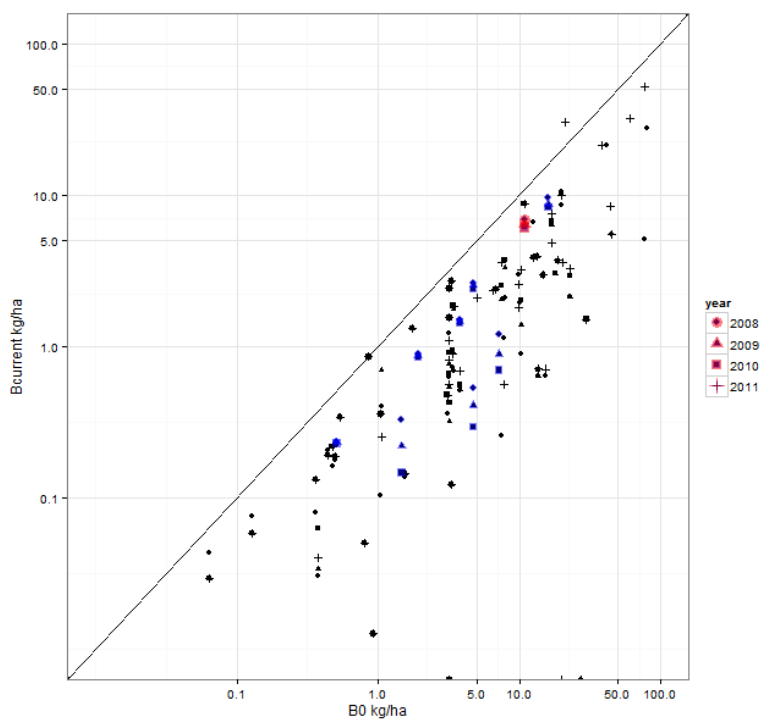


Figure 51:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Weser EMU are shown in red, those for Germany are shown in blue.

Table 203: Source of indicators evaluated for the Weser EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 9.9.2 Habitat coverage of the EMU

Table 204: Habitats assessed in the Weser EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	Absent

### 9.9.3 Management measures

Table 205: Overview of the management actions proposed in the EMP for the Weser EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Increase minimum size limit	Y	EMP	partially high
2	Reduction of fisheries intensity in coastal waters	M	EMP	not done unsure
3	Establish or prolong closed season for eel fishery	M	Other	partially high
<b>Recr. Fishr.</b>				
4	Increase minimum size limit	Y	EMP	partially high
5	Establish or prolong closed season for eel fishery	M	Other	partially high
<b>Habitat</b>				
6	Improve longitudinal connectivity	M	Other	partially interm
<b>Hydropw. &amp; Obst.</b>				
7	Introduce trap and transport pro-		grammes	and/or turbine

manage- ment

S

Other

partially

none

Table 205: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
8	Stabilize/ increase stocking amount	G	EMP	partially	unsure
9	Supply financial support for stocking	G	Other	fulfilled	unsure
<b>Others</b>					
10	Legal framework	M	EMP	partially	unsure
11	Scientific studies and monitoring and data collection	M	Other	fulfilled	unsure

9.9.4 Assessment

Table 206: Summary list impact types that were included in the assessments for the WeserEMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	included	omitted	included	included	included	included	

Table 207: Summary of targets and assessment period for the Weser EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			242	0.916
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2010	2010	2010

Table 208: Additional information for the Weser EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	yes	yes
Does double banking apply ?			no	no
Is double banking considered ?			NA	NA

### 9.9.5 *Progress towards recovery*

Biomass and anthropogenic mortality are decreasing.



Table 209: Overview of fishing effort reported in the ICES Data Call for the Weser EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	55472	365	
	2009	55472	365	
	2010	55472	365	
	2011	55472	365	
<b>YS rec</b>				
	2008	55472		109476
	2009	55472		105748
	2010	55472		105755
	2011	55472		

Table 210: Overview of total catches (commercial + recreational) of eel stages for the Weser EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0			69.29
2	2009	0			61.27
<b>Post</b>					
3	2010	0			49.88
4	2011	0			

Table 211: Stock indicators for the Weser EMU, the source of the data is indicated in table 203,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	605	378.5	180.9	0.01	0.01	0.44	0.771
2	2009	605	353.1	163.0	0.01	0.01	0.42	0.714
3	2010	605	339.2	145.9	0.01	0.01	0.41	0.687
4	2011	605						

Table 212: WKEPEMP evaluation of progress toward recovery for the Weser EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no

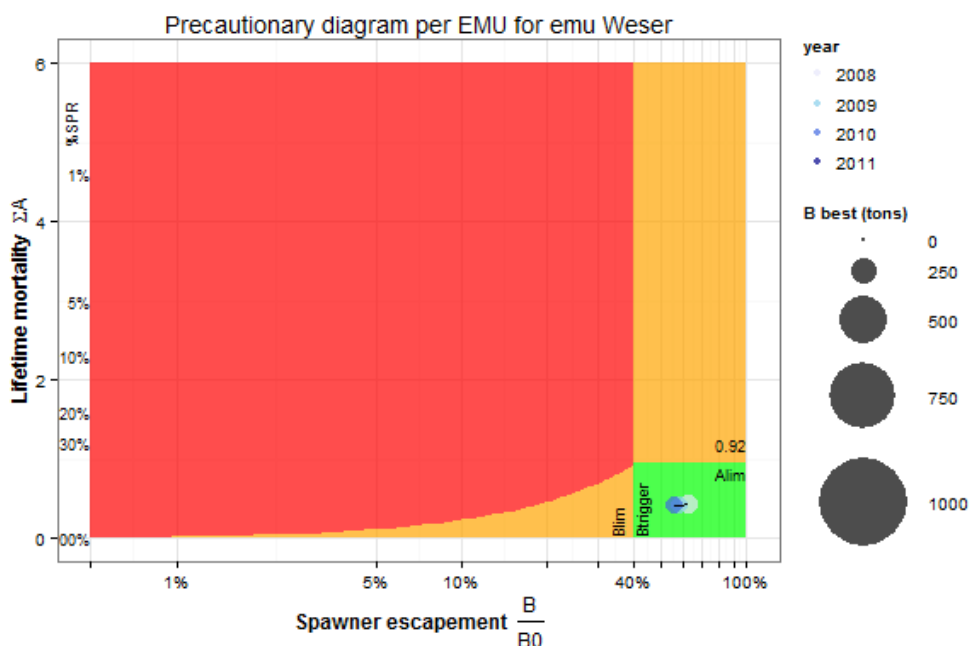


Figure 52: Modified precautionary diagram for the Weser EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 9.9.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All of the stock indicators have been reported. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower and Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Restocking and Habitat.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%) but is decreasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), but is decreasing.

## 10 Denmark

### 10.1 Inland waters

#### 10.1.1 Available information



Figure 53: *Inland water*, Denmark

Table 213: Sources of information for the Inland water EMU

Type of source	Reference
EMP	Danish Eel Management Plan In accordance with COUNCIL REGULATION (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel December 2008
EMP approved in: 2012 post-evaluation re- port:	2009 Danish Report to be submitted in line with Article 9 of Council Regulation (EC) No 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel
2013 ICES data-call: Additional sources:	

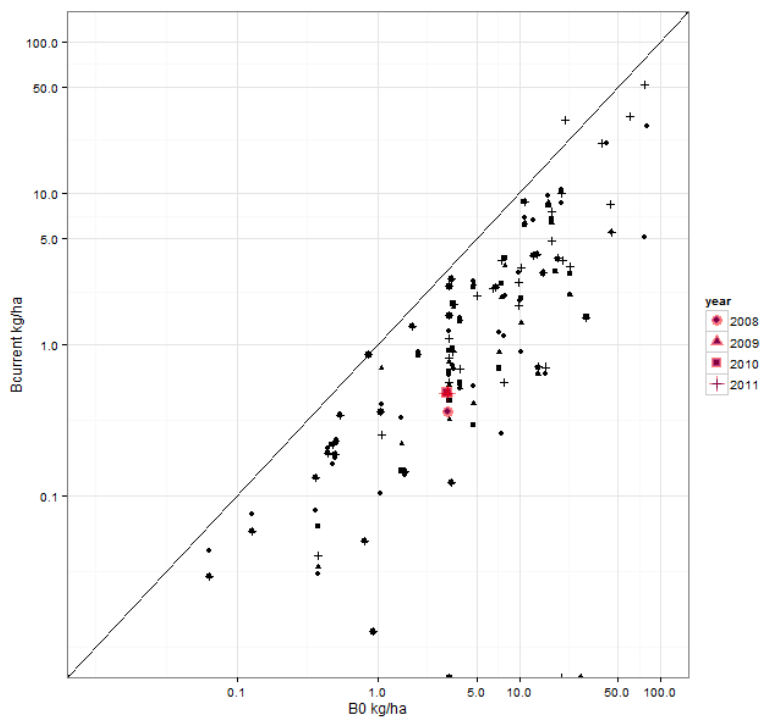


Figure 54: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the Inland water EMU are shown in red, those for Denmark are shown in blue.

Table 214: Reported stock indicators for the Inland water EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	no
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

Table 215: Source of indicators evaluated for the Inland water EMU

Stock indicator	Source
B <sub>0</sub>	2013 ICES data-call
B <sub>best</sub>	2013 ICES data-call
B <sub>current</sub>	2013 ICES data-call
ΣA	2013 ICES data-call

### 10.1.2 Habitat coverage of the EMU

Table 216: Habitats assessed in the Inland water EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Danish river systems total 887 individual river systems. Three index river systems were assessed concerning the production of silver eels escaping to the sea. The results from these 3 river systems are converted into production per area (kg/ha) values and then up-scaled to national level.

### 10.1.3 Management measures

Table 217: Overview of the management actions proposed in the EMP for the Inland water EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b> 1	Reduced fishing effort	M	EMP	fulfilled low
<b>Rec. Fishr.</b> 2	Reduced fishing	M	EMP	fulfilled low
<b>Habitat</b> 3	Limit further contamination of parasites and diseases by monitoring and increased knowledge	M	EMP	partially knowledge
4	Reduce nutrient flows from soil to river basins by re-establishing formerly drained lakes and meadows	M	EMP	partially unsure
<b>Hydropw. &amp; Obst.</b> 5	Generate relevant data and knowl-	M	EMP	partially knowl-







Table 219: Summary of targets and assessment period for the Inland water EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			444	0.107
Assessment period start	2008	2008	2008	2009
Assessment period end	2011	2008	2011	2011

Table 220: Additional information for the Inland water EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	NA		
Does double banking apply ?				
Is double banking considered ?				

The value for B<sub>best</sub> is given as 172.5 tons. However, in the Progress Report, this value is described as the best estimate of (current) silver eel production, which is not necessarily the correct value for B<sub>best</sub>. Since the way this value was calculated is not really clear, the value cannot be assessed here.

### 10.1.5 Progress towards recovery

There is no update of the stock indicators since the implementation of the EMP. Hence, the progress towards the recovery cannot be assessed here. There are however, data on reductions in fishing effort and catches, as well as data on restocking.

Table 221: Overview of fishing effort reported in the ICES Data Call for the Inland water EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008	12086	210	
	2009	12086	210	16
	2010	12086	210	16
	2011	12086	210	16
<b>YS rec</b>				
	2008		210	
	2009		76	
	2010		76	
	2011		76	

Table 222: Overview of total catches (commercial + recreational) of eel stages for the Inland water EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	5	4	9
2	2009	0	8	5	13
<b>Post</b>					
3	2010	0	11	3	14
4	2011	0	10	5	15

Table 223: Stock indicators for the Inland water EMU, the source of the data is indicated in Table 215,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after  $W_{geel}$  2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	Year	Biomass (t)			Mortality			Stocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. eqv
1	2008	1110	129.5	172.5				
2	2009	1110	129.5	172.5	0.15	0.13	0.29	0.099
3	2010	1110	129.5	172.5	0.15	0.13	0.29	0.486
4	2011	1110	129.5	172.5	0.15	0.13	0.29	0.531

Table 224: WKEPEMP evaluation of progress toward recovery for the Inland water EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

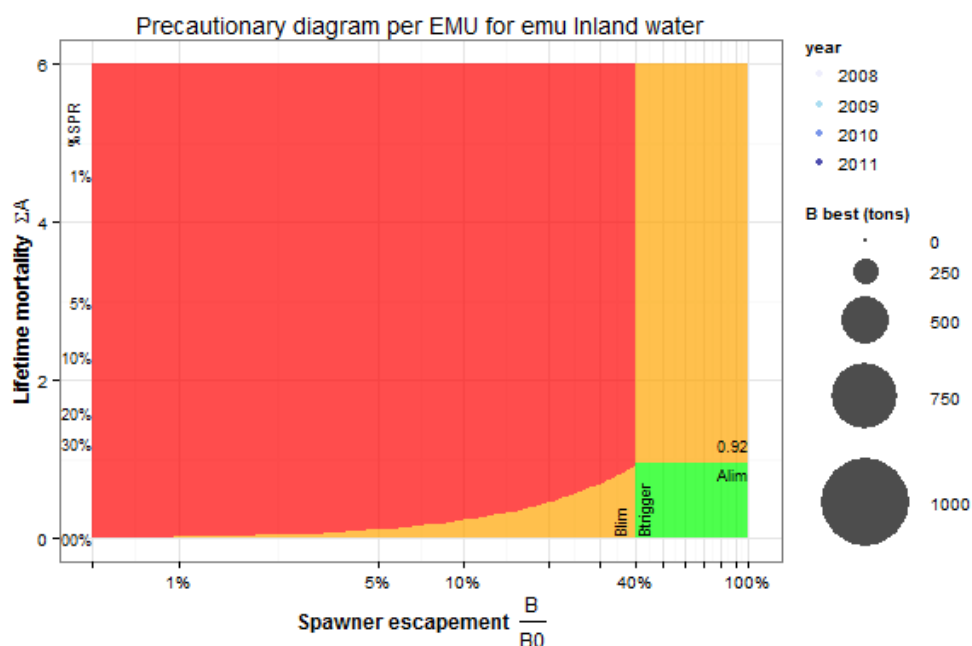


Figure 55: Modified precautionary diagram for the Inland water EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 10.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available but for  $B_{best}$  it is unclear if the correct definition is used. The stock indicators cover all the eel habitats in the EMU. These impacts were included in the assessment: habitat, restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. All of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries and Restocking. Expert judgement was used to evaluate the impact of actions applied to Fisheries and Habitat. The impact of other management actions could not be evaluated, either because of missing expertise or information: they applied to Hydropower, Restocking and Habitat.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and not changing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target). However, the indicators have not been updated since 2008.

## 10.2 Marine waters

The Danish Eel Management Plan consists of two elements - the part for the inland waters and the part for marine waters. For the marine waters it was intended to reduce fishing effort by at least 50% relative to the average effort deployed from 2004 to 2006 in conformity with Article 8 of Council Regulation (EC) No. 1100/2007, and this was intended until 2013. This should be achieved by a license system, which limits each fisherman and entity to a limited number of gears and/or fishing seasons, and thus a limited effort. The system includes a variety of elements, routine compulsory registration and reporting and tangible measures for strengthened control efficiency, providing managers and researchers with comprehensive and reliable data for monitoring, analysis and adequate management of both commercial and recreational eel fishing activities. There is no stock assessment for the marine part, no indicators were reported.

Compared to the period before establishing the EMP, the number of active commercial fishing licenses has decreased from 783 to 361. The number of fyke nets decreased by 25.6%, that of small pound nets by 37%, that of large pound nets by 27.5% and that of hook lines by 81.1%. In the same time frame, a decrease in catch of 33% is reported. Hence, the goal of the plan is partly achieved. The full success cannot be assessed here, because the target of the 50%-reduction is set for 2013, whereas the present period covers data up to 2011. With reference to Article 8 of the Council Regulation, fishing effort was gradually reduced, initially by steps of 15% per year in the first two years. This interim target was achieved, resulting already in a considerable reduction in fishing effort. Based on the data provided, it is not possible to draw any conclusion on a potential progress towards stock recovery. However, according to the reported information, the supposed management measures have been implemented and a considerable reduction in effort has been achieved. This reduction will likely have a positive effect on the eel stock (reduced fishing mortality) but this effect cannot be quantified without further data.

## 11 Netherlands

### 11.1 Netherlands

#### 11.1.1 Available information



Figure 56: *Netherlands*, Netherlands

Table 225: Sources of information for the Netherlands EMU

Type of source	Reference
EMP	The Netherlands Eel Management Plan, The Ministry of Agriculture, Nature and Food Quality, 15 <sup>th</sup> December 2008
EMP approved in:	2009
2012 post-evaluation report:	Bierman et al 2012 IMARES
2013 ICES data-call:	
Additional sources:	

Table 226: Reported stock indicators for the Netherlands EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

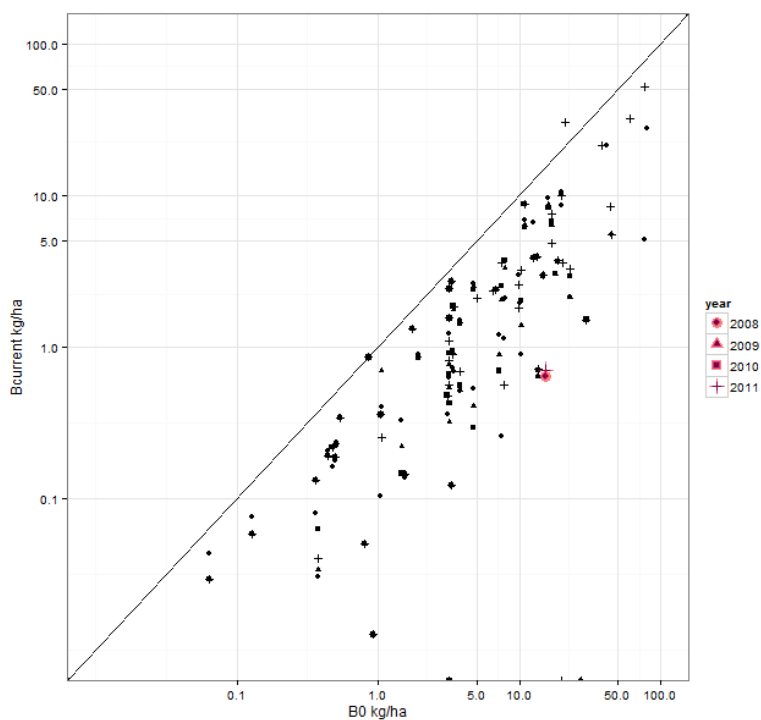


Figure 57:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Netherlands EMU are shown in red, those for Netherlands are shown in blue.

Table 227: Source of indicators evaluated for the Netherlands EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 11.1.2 Habitat coverage of the EMU

Estuaries and marine waters have not been assessed

Table 228: Habitats assessed in the Netherlands EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

### 11.1.3 Management measures

Table 229: Overview of the management actions proposed in the EMP for the Netherlands EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Closing fishing season	M	EMP	fulfilled	high
2 Introducing fishery-free zones	M	EMP	fulfilled	high
3 Closure of fishery in contaminated areas	M	undefined	fulfilled	unsure
4 Snigglng ban	M	EMP	fulfilled	low
<b>Recr. Fishr.</b>				
5 Eel releasing by anglers	M	EMP	fulfilled	low
6 Ban on recreational fishery using professional gears	M	EMP	fulfilled	low
7 Closing fishing season	M	EMP	fulfilled	low
8 Snigglng ban	M	EMP	fulfilled	low
<b>Hydropw. &amp; Obst.</b>				
9 Barriers reduction from 2015	M	EMP	partially	low
10 Hydroelectric stations barriers reduction	M	EMP	partially	low
<b>Restocking</b>				
11 Stocking with glass eels	M	EMP	fulfilled	unsure



#### ***11.1.4 Assessment***

Table 230: Summary list impact types that were included in the assessments for the Netherlands EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	included	included	omitted	

Table 231: Summary of targets and assessment period for the Netherlands EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			4160	0.106
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 232: Additional information for the Netherlands EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	yes	yes	no
Does double banking apply ?			yes	yes
Is double banking considered ?			yes	yes

### 11.1.5 Progress towards recovery

Low increase in biomass, but the mortality is above the limit. However, differences in sampling effort in 2006-2008 and 2009-2011 make a comparison between these periods unreliable.

Table 233: Overview of fishing effort reported in the ICES Data Call for the Netherlands EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008	321149	270	150
	2009			
	2010			
	2011	303149	180	150
<b>YS rec</b>				
	2008	321149	365	1400000
	2009			
	2010			
	2011	321149	275	1400000

Table 234: Overview of total catches (commercial + recreational) of eel stages for the Netherlands EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		280	840	
2	2009				
<b>Post</b>					
3	2010				
4	2011		77	390	

Table 235: Stock indicators for the Netherlands EMU, the source of the data is indicated in table 227,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	10400	439	2927	1.85	0.04	1.89	
2 2009							
3 2010							
4 2011	10400	482	1443	1.16	0.04	1.10	

Table 236: WKEPEMP evaluation of progress toward recovery for the Netherlands EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

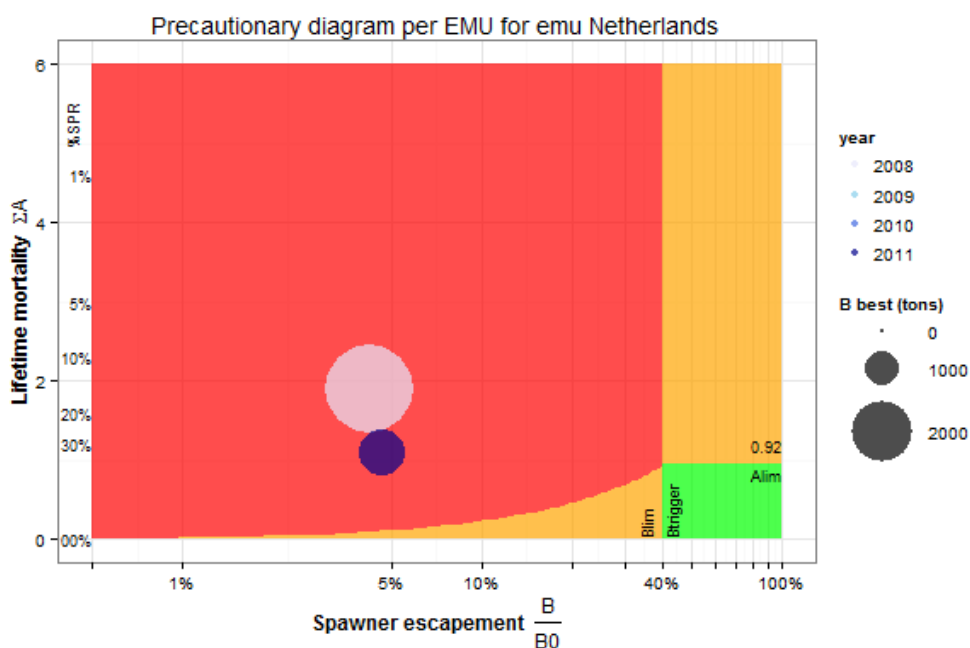


Figure 58: Modified precautionary diagram for the Netherlands EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 11.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the ICES Data Call. All stocks indicators are available. The stock indicators do not cover all of the eel habitats in the EMU: estuaries and marine waters are missing. These impacts were included in the assessment: habitat loss barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: restocking; indirect effects; predators. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower. Expert judgment was used to evaluate the impact of actions applied to Fisheries. The impact of other management actions could not be evaluated, either because of missing information or expertise: the applied to Restocking.

The biomass of current silver eel escapement is estimated to be slightly increasing. It is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is estimated to be decreasing. It is above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation. It is above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target). However differences in sampling effort in 2006-2008 and 2009-2011 make a comparison between these periods complicated.

## 12 Belgium

### 12.1 Meuse

#### 12.1.1 Available information

Figure 59: *Meuse*, Belgium

Table 237: Sources of information for the Meuse EMU

Type of source	Reference
EMP	Eel Management Plan for Belgium
EMP approved in:	2010
2012 post-evaluation report:	Eel Management Plan for Belgium. First report to be submitted in line with Article 9 of the eel Regulation 1100/2007. Brussels, 2012.
2013 ICES data-call:	
Additional sources:	

Table 238: Reported stock indicators for the Meuse EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

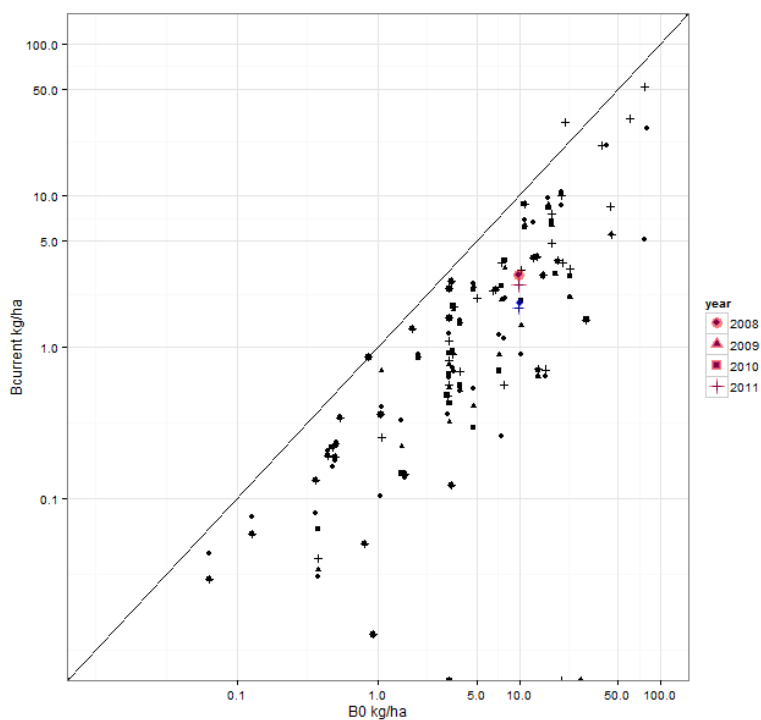


Figure 60:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Meuse EMU are shown in red, those for Belgium are shown in blue.

Table 239: Source of indicators evaluated for the Meuse EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 12.1.2 Habitat coverage of the EMU

Table 240: Habitats assessed in the Meuse EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

### 12.1.3 Management measures

Table 241: Overview of the management actions proposed in the EMP for the Meuse EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Rec. Fishr.</b>				
1	Control and law enforcement	M	EMP	partially none
2	Communication and consciousness raising	M	EMP	partially none
<b>Habitat</b>				
3	Water quality (Water Framework Directive)	M	EMP	partially unsure
4	Sanitation of polluted river sediments	M	EMP	partially unsure
<b>Hydropw. &amp; Obst.</b>				
5	Upward migration obstacles	M	EMP	partially unsure
6	Downward migration obstacles (Impingement)	S	EMP	partially unsure
7	Downward migration obstacles (hydropower)	S	EMP	partially unsure
<b>Restocking</b>				
8	Stocking of glass eel and small yellow eel	M	EMP	partially high



### 12.1.4 Assessment

Table 242: Summary list impact types that were included in the assessments for the Meuse EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	included	included	included	absent	included	included	included	

Table 243: Summary of targets and assessment period for the Meuse EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			21.6	0.594
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 244: Additional information for the Meuse EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	yes	yes	yes	yes
Does double banking apply ?			no	no
Is double banking considered ?			no	no

### 12.1.5 Progress towards recovery

Management actions being implemented affect the eel mostly indirectly. Consequently, no substantial recovery could have been expected in the reporting period.

Table 245: Overview of fishing effort reported in the ICES Data Call for the Meuse EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			56864
	2009			59714
	2010			54636
	2011			55592

Table 246: Overview of total catches (commercial + recreational) of eel stages for the Meuse EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				4
2	2009				
<b>Post</b>					
3	2010				
4	2011				3

Table 247: Stock indicators for the Meuse EMU, the source of the data is indicated in Table 237,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	B0	Bcurrent	Bbest	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	53	16	41	0.15	0.79	0.94	
2 2009							
3 2010							
4 2011	54	14	39	0.11	0.91	1.02	0.04

Table 248: WKEPEMP evaluation of progress toward recovery for the Meuse EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

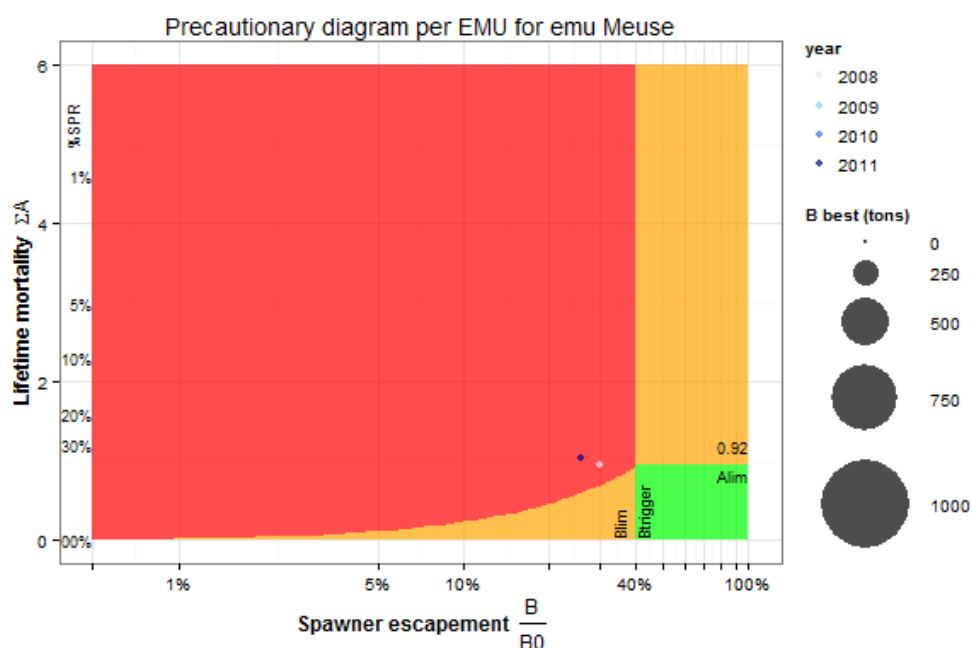


Figure 61: Modified precautionary diagram for the Meuse EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 2.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU, except for the marine waters. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. All of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat and Others. Expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Habitat restoration and Pollution control.

The biomass of current silver eel escapement is estimated to be decreasing. It is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is estimated to be increasing. It is above both the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation and the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 12.2 Schelde

### 12.2.1 Available information

Figure 62: *Schelde*, Belgium

Table 249: Sources of information for the Schelde EMU

Type of source	Reference
EMP	Eel Management Plan for Belgium
EMP approved in:	2010, 5th of January
2012 post-evaluation report:	Eel Management Plan for Belgium. First report to be submitted in line with Article 9 of the eel Regulation 1100/2007. Brussels, 2012.
2013 ICES data-call:	
Additional sources:	

Table 250: Reported stock indicators for Schelde

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

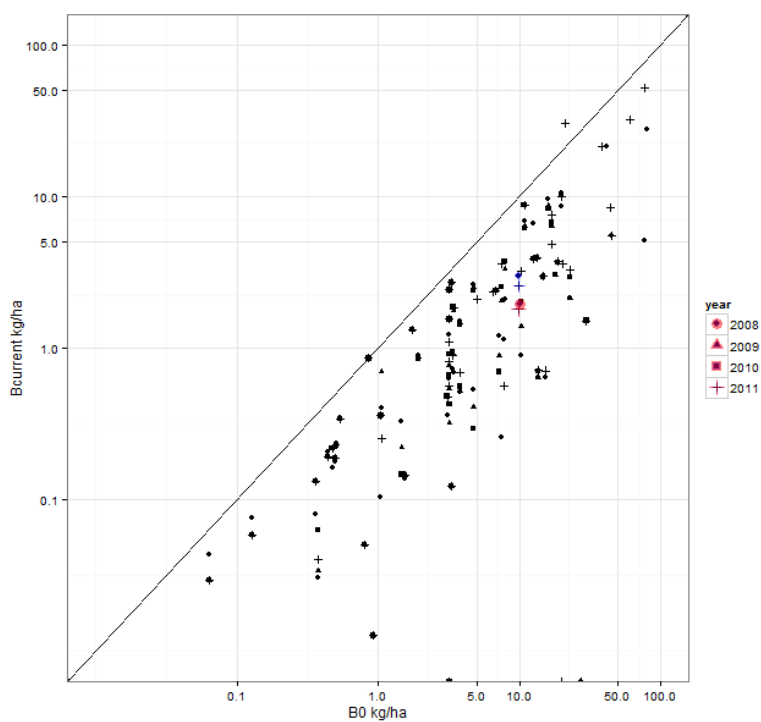


Figure 63:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Schelde EMU are shown in red, those for Belgium are shown in blue.

Table 251: Source of indicators evaluated for the Schelde EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call



### 12.2.2 Habitat coverage of the EMU

Table 252: Habitats assessed in the Schelde EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

### 12.2.3 Management measures

Table 253: Overview of the management actions proposed in the EMP for the Schelde EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Regulating measures on (semi-)professional fisheries	M	EMP	fulfilled high
<b>Recr. Fishr.</b>				
2	Regulating measures on recreational fisheries	M	EMP	fulfilled high
3	Control and law enforcement	M	EMP	partially none
4	Communication and consciousness raising	M	EMP	partially none
5	Regulating measures on recreational fisheries	M	EMP	fulfilled NA
<b>Habitat</b>				
6	Water quality (Water Framework Directive)	M	EMP	partially unsure
7	Sanitation of polluted river sediments	M	EMP	not done unsure

Table 253: (continued)

Action		Life Stage	Planned	Outcome	Impact
<b>Hydropw. &amp; Obst.</b>					
8	Upward migration obstacles	M	EMP	partially	unsure
9	Downward migration obstacles (pumping devices and hydropower)	S	EMP	partially	unsure
<b>Restocking</b>					
10	Stocking of glass eel	G	EMP	partially	high

Measures having immediate effects (closing commercial fishery) have been taken; remaining measures have a long implementation time, but action is indeed taken.

12.2.4 Assessment

Table 254: Summary list impact types that were included in the assessments for the ScheldeEMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	included	included	included	absent	included	included	included	

Table 255: Summary of targets and assessment period for the Schelde EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			74.8	0.416
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 256: Additional information for the Schelde EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream' or vice versa.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	yes	yes	yes	yes
Does double banking apply ?			no	no
Is double banking considered ?			no	no

### 12.2.5 Progress towards recovery

Following the closure of the commercial fishery in the Scheldt, and the ban on recreational gears other than rod-and-line, other actions are implemented affecting the eel mostly indirectly.

Table 257: Overview of fishing effort reported in the ICES Data Call for the Schelde EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			58788
	2009			60956
	2010			58338
	2011			61519

Table 258: Overview of total catches (commercial + recreational) of eel stages for the Schelde EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				38
2	2009				
<b>Post</b>					
3	2010				
4	2011				27

Table 259: Stock indicators for the Schelde EMU, the source of the data is indicated in table 251,  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	Year	Biomass (t)			Mortality			Stocked (t)
		$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. eqv
1	2008	169	33	45	0.29	0.02	0.31	0.117
2	2009							0.152
3	2010							0.143
4	2011	187	34	41	0.18	0.01	0.19	0.120

Table 260: WKEPEMP evaluation of progress toward recovery for the Schelde EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

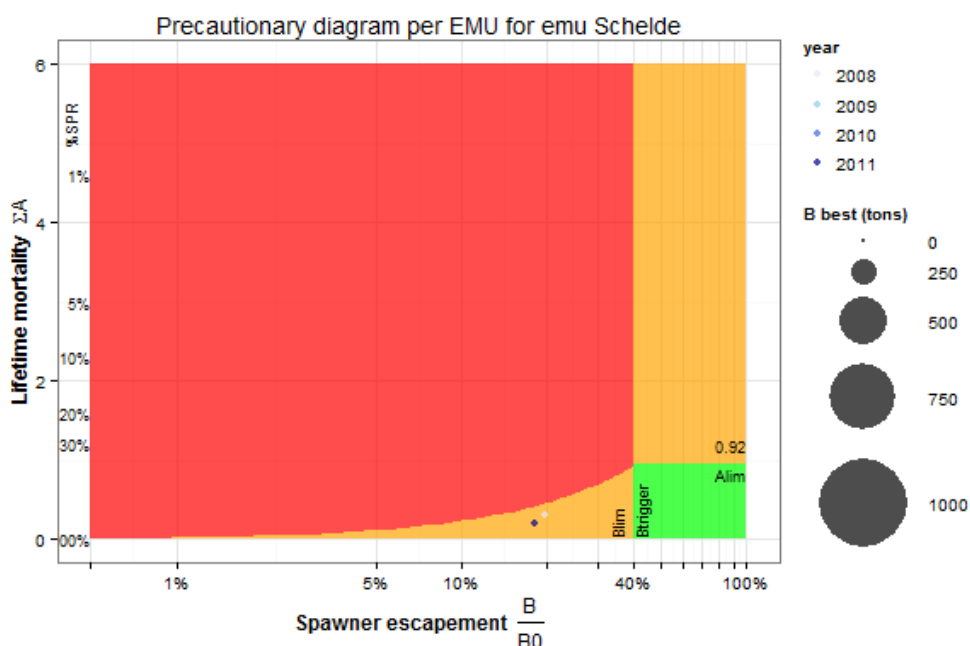


Figure 64: Modified precautionary diagram for the Schelde EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 12.2.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU, except for the marine waters. These impacts were included in the assessment: habitat loss; restocking; barriers; indirect effects; commercial fisheries; recreational fisheries; hydropower; predators. All of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat and Others. Expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat restoration and Pollution control.

The biomass of current silver eel escapement is estimated to be increasing. It is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is estimated to be decreasing. It is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation. It is below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

### 13 Luxemburg

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. No stock indicators were available. No impacts were assessed. The one Management Action identified for the EMP in the Progress Report has been implemented partially. No data were identified to evaluate the impact of management action applied to Hydropower. The expert judgement is that the impact is unsure in the absence of information on the local abundance of silver eels. No biomass or mortality indicators were available so it is not possible to assess the state or progress.

## 14 Ireland

### 14.1 Eastern

#### 14.1.1 Available information

Figure 65: *Eastern*, Ireland

Table 261: Sources of information for the Eastern EMU

Type of source	Reference
EMP	National Report for Ireland on eel Stock Recovery Plan, December 2008.
EMP approved in: 2012 post-evaluation re- port:	2009 Implementation of Eel Management Plans for Ireland, including the transboundary NWIRBD, June 2012. Dept. of Communications, Energy and Natural Resources.
2013 ICES data-call:	Submitted to ICES on 4 March 2013; Table Stock Indicators ICES to MS 13 FEB 2013 Ireland
Additional sources:	REPORT ON THE STATUS OF THE EEL STOCK IN IRELAND 2009 2012; Report by the Standing Scientific Committee for Eel for Ireland, April 2012



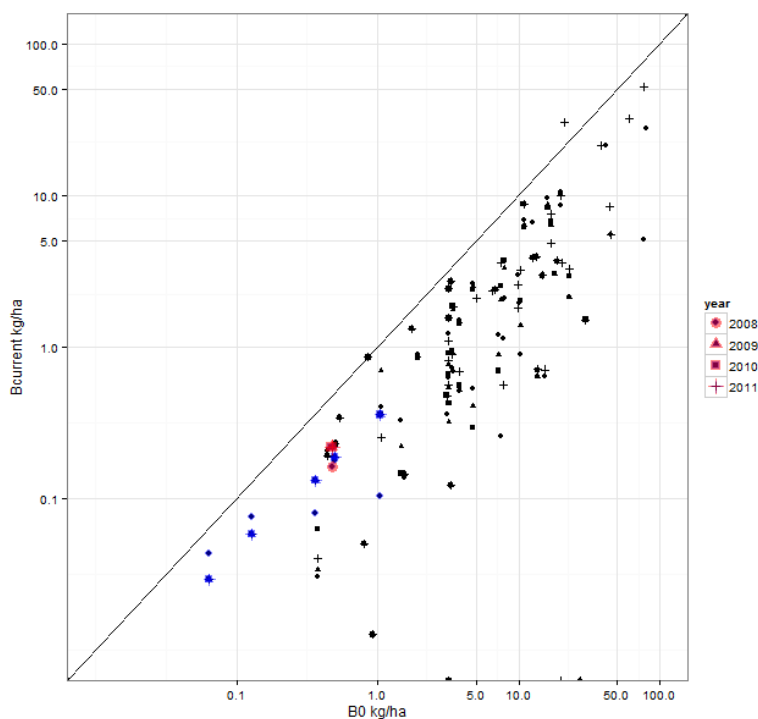


Figure 66:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Eastern EMU are shown in red, those for Ireland are shown in blue.

Table 262: Reported stock indicators for the Eastern EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 263: Source of indicators evaluated for the Eastern EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 14.1.2 Habitat coverage of the EMU

Table 264: Habitats assessed in the Eastern EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Freshwaters were assessed by combining rivers and lakes. All freshwater wetted area was included.

### 14.1.3 Management measures

Table 265: Overview of the management actions proposed in the EMP for the Eastern EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Close eel market	M	EMP	partially high
2	Close fishery	M	EMP	fulfilled high
3	Investigating possible diversification for former commercial fishermen	M	EMP	partially unsure
<b>Rec. Fishr.</b>				
4	Close fishery	S	EMP	fulfilled interm

Table 265: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Hydropw. &amp; Obst.</b>					
5	Engineered solutions (turbine design and modification)	S	EMP	partially	unsure
6	Ensure upstream migration at barriers - assisted migration and stocking	M	EMP	fulfilled	unsure
7	Ensure upstream migration at barriers - existing barriers	M	EMP	partially	unsure
8	Ensure upstream migration at barriers - new potential barriers	M	EMP	fulfilled	unsure
9	Improve water quality - ensure compliance with Water Framework Directive	M	EMP	fulfilled	unsure
10	New turbine installations	S	EMP	fulfilled	unsure
11	Other solutions (e.g. migromat)	S	EMP	not done	unsure
12	Quantify turbine mortality and morbidity	S	EMP	not done	knowledge
<b>Others</b>					
13	Fish health and biosecurity issues - ensure compliance with Fish Health Directive	M	EMP	fulfilled	unsure

A closure of a large fishery has an important impact on the reduction of sumA. Time constraints prevented a detailed examination of the report to judge the hydropower impact, so the effect has been labelled as unsure, though the reported data show that it has achieved a reduction in sumH.

14.1.4 Assessment

Table 266: Summary list impact types that were included in the assessments for the Eastern EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	included	omitted	included	omitted	

Table 267: Summary of targets and assessment period for the Eastern EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			8.2	
EU/ICES targets			8.2	0.422
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 268: Additional information for the Eastern EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			yes	yes
Is double banking considered ?			yes	yes

#### 14.1.5 Progress towards recovery

The fisheries have been closed since 2009 and there is a program on habitat and mitigation of hydropower impact. The Fisheries impact (F) has been reduced to zero and the hydropower impact already low has been reduced further. The indicators show that B<sub>current</sub> has increased, and that it is currently achieving the 40 % biomass target.

Table 269: Overview of fishing effort reported in the ICES Data Call for the Eastern EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		92	6
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008			
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 270: Overview of total catches (commercial + recreational) of eel stages for the Eastern EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0.04	4.45	4.45
2	2009	0	0.00	0.00	0.00
<b>Post</b>					
3	2010	0	0.00	0.00	0.00
4	2011	0	0.00	0.00	0.00

Table 271: Stock indicators for the Eastern EMU, the source of the data is indicated in Table 263,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	20.5	7.0	14.2	0.68	0.03	0.71	0
2	2009	20.5	9.4	9.6	0.00	0.01	0.01	0
3	2010	20.5	9.4	9.6	0.00	0.01	0.01	0
4	2011	20.5	9.4	9.6	0.00	0.01	0.01	0

Table 272: WKEPEMP evaluation of progress toward recovery for the Eastern EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		yes
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no

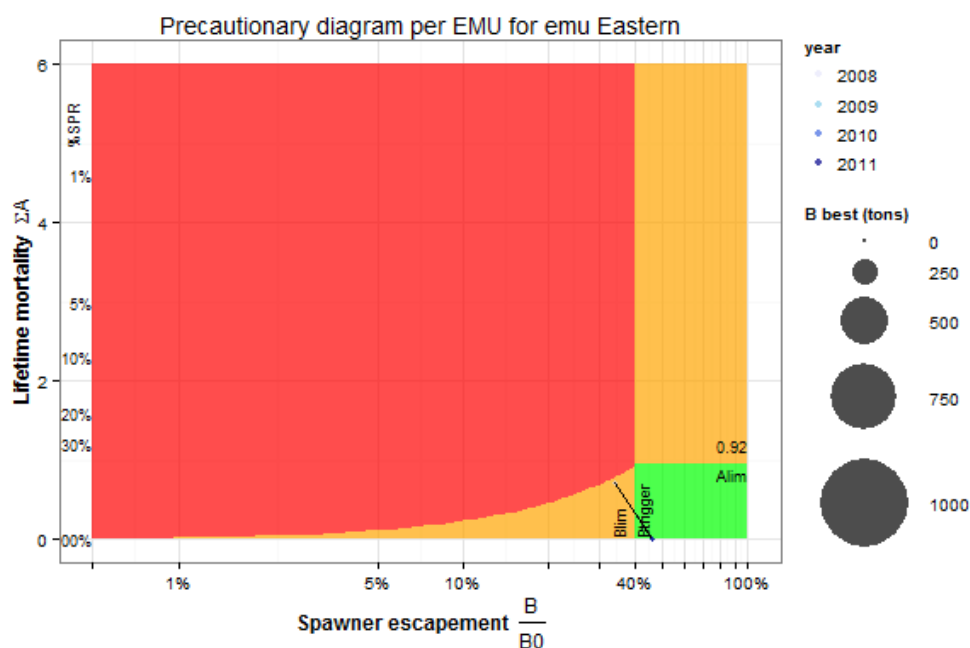


Figure 67: Modified precautionary diagram for the Eastern EMU (after WGEEL 2012), see section 1.3.2 for more information.

#### 14.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with 2012 progress report. All stock indicators were available though they do not cover estuarine or coastal habitat. All Impacts have been considered except indirect anthropogenic effect. All the Management Actions outlined in the Progress Report have been implemented, though some have been only partially implemented yet. Data and expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is increasing. It is now above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  has been diminished to very low levels. It is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 14.2 Shannon

### 14.2.1 Available information

Figure 68: *Shannon*, Ireland



Table 273: Sources of information for the Shannon EMU

Type of source	Reference
EMP	National Report for Ireland on eel Stock Recovery Plan, December 2008.
EMP approved in: 2012 post-evaluation re- port:	2009 Implementation of Eel Management Plans for Ireland, including the transboundary NWIRBD, June 2012. Dept. of Communications, Energy and Natural Resources.
2013 ICES data-call:	Submitted to ICES on 4 March 2013; Table Stock Indicators ICES to MS 13 FEB 2013 Ireland
Additional sources:	REPORT ON THE STATUS OF THE EEL STOCK IN IRELAND 2009 2012; Report by the Standing Scientific Committee for Eel for Ireland, April 2012

Table 274: Reported stock indicators for Shannon

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 275: Source of indicators evaluated for the Shannon EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

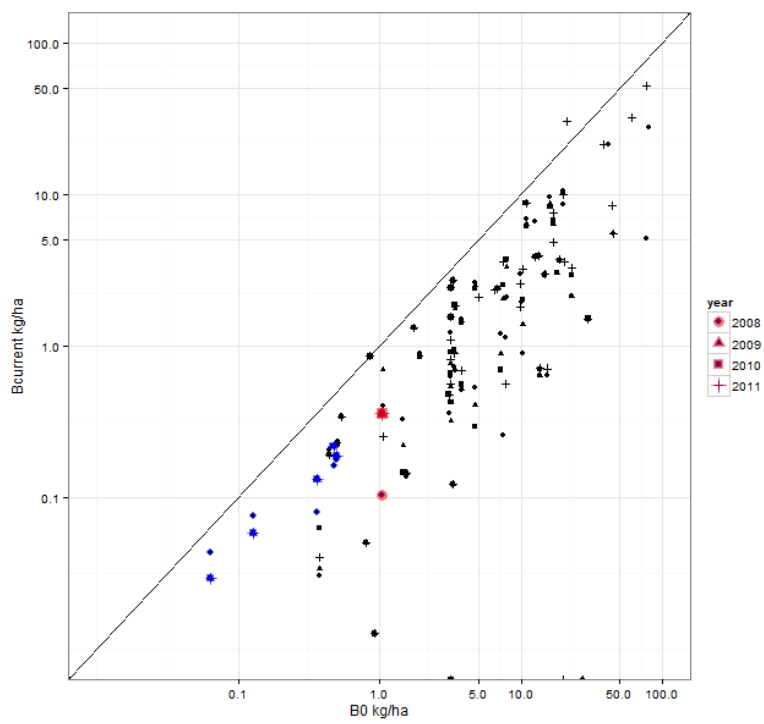


Figure 69:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Shannon EMU are shown in red, those for Ireland are shown in blue.

### 14.2.2 Habitat coverage of the EMU

Table 276: Habitats assessed in the Shannon EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Freshwaters were assessed by combining rivers and lakes. All freshwater wetted area was included.

### 14.2.3 Management measures

Table 277: Overview of the management actions proposed in the EMP for the Shannon EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Close eel market	M	EMP	partially high
2	Close fishery	M	EMP	fulfilled high
3	Investigating possible diversification for former commercial fishermen	M	EMP	partially none
<b>Rec. Fishr.</b>				
4	Close fishery	S	EMP	fulfilled interm

Table 277: (continued)

Action	Life Stage	Planned	Outcome	Impact	
<b>Hydropw. &amp; Obst.</b>					
5	Engineered solutions (turbine design and modification)	S	EMP	partially	unsure
6	Ensure upstream migration at barriers - assisted migration and stocking	M	EMP	fulfilled	unsure
7	Ensure upstream migration at barriers - existing barriers	M	EMP	partially	unsure
8	Ensure upstream migration at barriers - new potential barriers	M	EMP	fulfilled	unsure
9	Improve water quality - ensure compliance with Water Framework Directive	M	EMP	fulfilled	unsure
10	New turbine installations	S	EMP	fulfilled	unsure
11	Other solutions (e.g. migromat)	S	EMP	fulfilled	unsure
12	Quantify turbine mortality and morbidity	S	EMP	fulfilled	knowledge
13	Trap and Transport	S	EMP	fulfilled	high
<b>Others</b>					
14	Fish health and biosecurity issues - ensure compliance with Fish Health Directive	M	EMP	fulfilled	low

A closure of a large fishery has an important impact on the reduction of sumA. Time constraints prevented a detailed examination of the report to judge the hydropower impact, so the effect has been labelled as unsure, though the reported data show that it has achieved a reduction in sumH.

14.2.4 Assessment

Table 278: Summary list impact types that were included in the assessments for the Shannon EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	included	omitted	included	omitted	

Table 279: Summary of targets and assessment period for the Shannon EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			80.5	
EU/ICES targets			80.5	0.783
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 280: Additional information for the Shannon EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

#### 14.2.5 Progress towards recovery

The fisheries have been closed since 2009 and there is a program on habitat and mitigation of hydropower impact. The Fisheries impact (F) has been reduced to zero, and (H=turbines) reduced. The indicators show that B<sub>current</sub> is increasing a lot, but that due to past low recruitment, it is still not possible to currently achieve the 40 % biomass target.

Table 281: Overview of fishing effort reported in the ICES Data Call for the Shannon EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		92	46
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008			
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 282: Overview of total catches (commercial + recreational) of eel stages for the Shannon EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	27.16	32.31	59.46
2	2009	0	0.00	0.00	0.00
<b>Post</b>					
3	2010	0	0.00	0.00	0.00
4	2011	0	0.00	0.00	0.00

Table 283: Stock indicators for the Shannon EMU, the source of the data is indicated in Table 275,  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	201.2	19.9	94.2	1.29	0.26	1.55	0
2	2009	201.2	68.7	75.4	0.00	0.09	0.09	0
3	2010	201.2	68.7	75.4	0.00	0.09	0.09	0
4	2011	201.2	68.7	75.4	0.00	0.09	0.09	0

Table 284: WKEPEMP evaluation of progress toward recovery for the Shannon EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		no
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

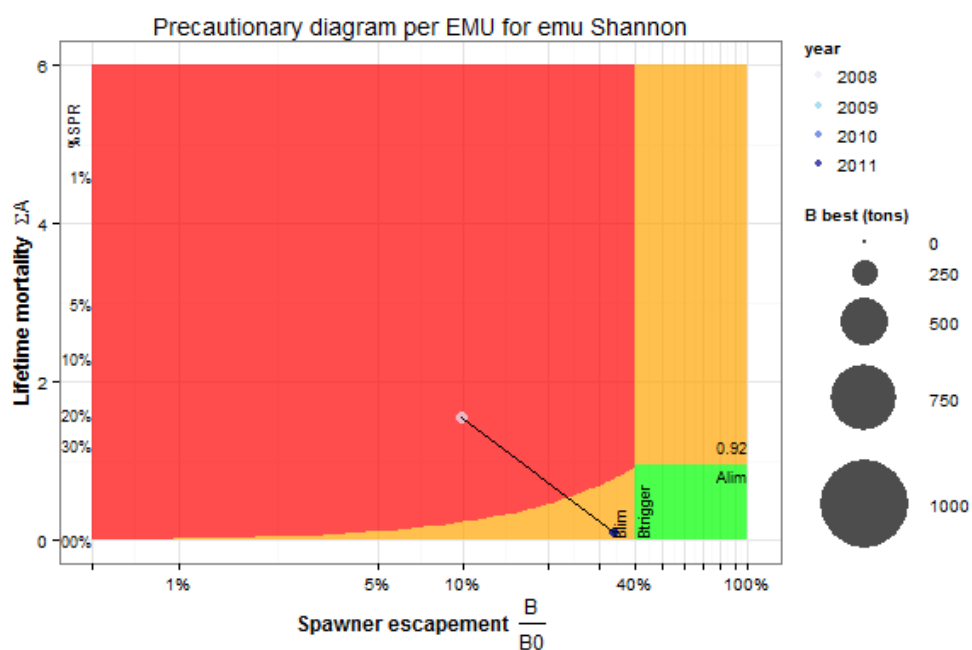


Figure 70: Modified precautionary diagram for the Shannon EMU (after WGEEL 2012), see section 1.3.2 for more information.

#### 14.2.6 Conclusion

This EMU has an eel management plan, approved in 2009, with 2012 progress report. All stock indicators were available though they do not cover estuarine or coastal habitat. All impacts have been considered except indirect anthropogenic effect. All the Management Actions outlined in the Progress Report have been implemented, though some (hydropower) have been only partially implemented yet. Data and expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and decreasing.



### 14.3 South Eastern

#### 14.3.1 Available information

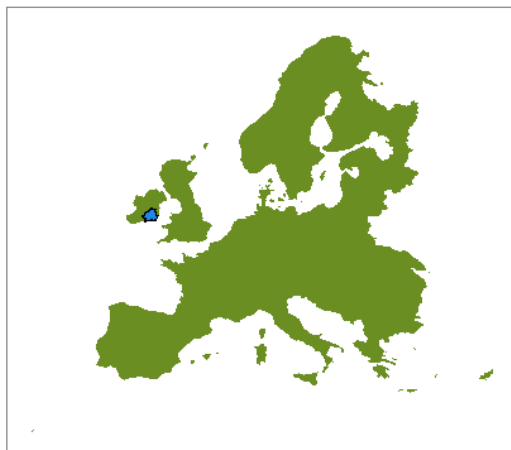


Figure 71: *South Eastern, Ireland*

Table 285: Sources of information for the South Eastern EMU

Type of source	Reference
EMP	National Report for Ireland on eel Stock Recovery Plan, December 2008.
EMP approved in: 2012 post-evaluation re- port:	2009 Implementation of Eel Management Plans for Ireland, including the transboundary NWIRBD, June 2012. Dept. of Communications, Energy and Natural Resources.
2013 ICES data-call:	Submitted to ICES on 4 March 2013; Table Stock Indicators ICES to MS 13 FEB 2013 Ireland
Additional sources:	REPORT ON THE STATUS OF THE EEL STOCK IN IRELAND 2009 2012; Report by the Standing Scientific Committee for Eel for Ireland, April 2012

Table 286: Reported stock indicators for South Eastern

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 287: Source of indicators evaluated for the South Eastern EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

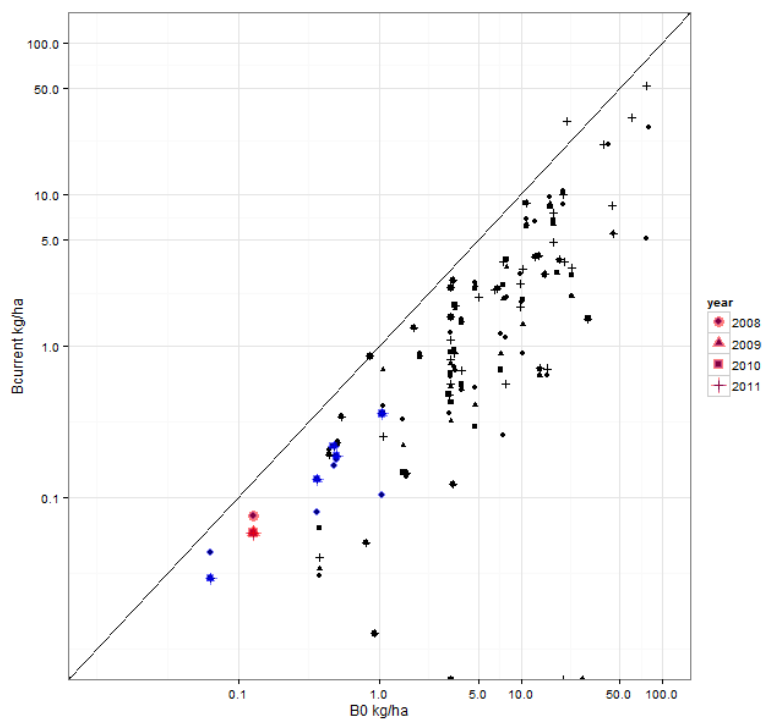


Figure 72:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the South Eastern EMU are shown in red, those for Ireland are shown in blue.

### 14.3.2 Habitat coverage of the EMU

Table 288: Habitats assessed in the South Eastern EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Freshwaters were assessed by combining rivers and lakes. All freshwater wetted area was included.

### 14.3.3 Management measures

Table 289: Overview of the management actions proposed in the EMP for the South Eastern EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	M	EMP	partially	high
2	M	EMP	fulfilled	high
3	M	EMP	partially	none
<b>Recr. Fishr.</b>				
4	S	EMP	fulfilled	interm

Table 289: (continued)

Action	Life Stage	Planned	Outcome	Impact	
<b>Hydropw. &amp; Obst.</b>					
5	Ensure upstream migration at barriers - assisted migration and stocking	M	EMP	fulfilled	unsure
6	Ensure upstream migration at barriers - existing barriers	M	EMP	partially	unsure
7	Ensure upstream migration at barriers - new potential barriers	M	EMP	fulfilled	unsure
8	Improve water quality - ensure compliance with Water Framework Directive	M	EMP	fulfilled	unsure
9	New turbine installations	S	EMP	fulfilled	unsure
<b>Others</b>					
10	Fish health and biosecurity issues - ensure compliance with Fish Health Directive	M	EMP	fulfilled	unsure

Fisheries closed since 2009. Management measures on fisheries and habitat are being implemented as committed to in EMP. National monitoring plan being implemented as committed to in EMP.

14.3.4 Assessment

Table 290: Summary list impact types that were included in the assessments for the South Eastern EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	included	omitted	absent	omitted	

Table 291: Summary of targets and assessment period for the South Eastern EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			5.9	
EU/ICES targets			5.9	0.418
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 292: Additional information for the South Eastern EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

#### 14.3.5 Progress towards recovery

The fisheries have been closed since 2009 and there is a program on habitat and mitigation of hydropower impact. The Fisheries impact (F) has been reduced to zero and there is no turbine impact for this EMU. The indicators show that B<sub>current</sub> has increased, but that due to past low recruitment, it is still not possible to currently achieve the 40% biomass target.

Table 293: Overview of fishing effort reported in the ICES Data Call for the South Eastern EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		92	16
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008			
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 294: Overview of total catches (commercial + recreational) of eel stages for the South Eastern EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0.32	3.59	3.91
2	2009	0	0.00	0.00	0.00
<b>Post</b>					
3	2010	0	0.00	0.00	0.00
4	2011	0	0.00	0.00	0.00

Table 295: Stock indicators for the South Eastern EMU, the source of the data is indicated in Table 287,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	14.8	8.7	10.1	0.15	0	0.15	0
2 2009	14.8	6.8	6.8	0.00	0	0.00	0
3 2010	14.8	6.8	6.8	0.00	0	0.00	0
4 2011	14.8	6.8	6.8	0.00	0	0.00	0

Table 296: WKEPEMP evaluation of progress toward recovery for the South Eastern EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		yes
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	yes	yes



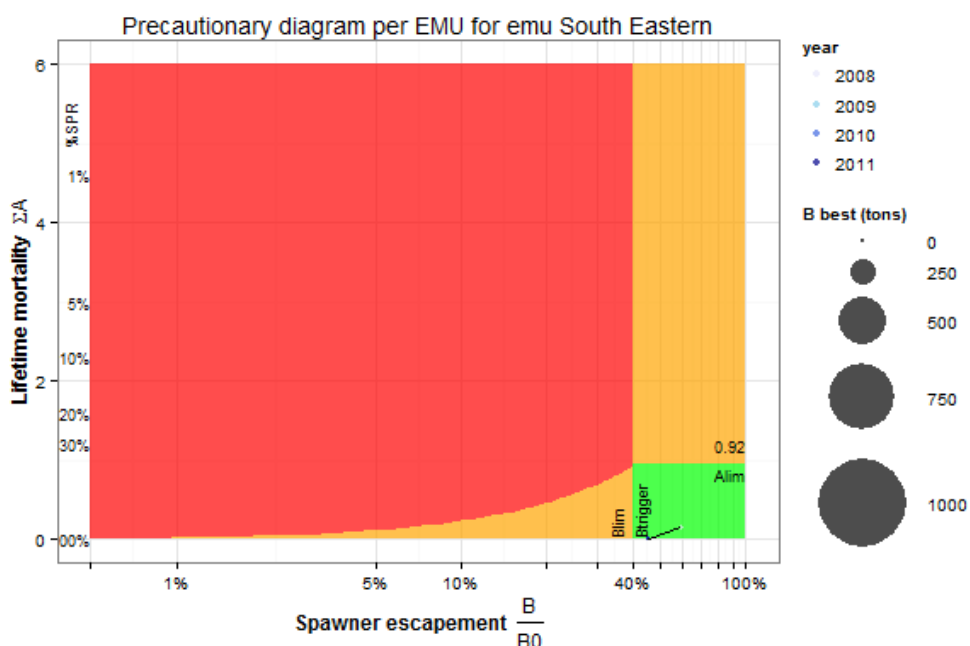


Figure 73: Modified precautionary diagram for the South Eastern EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 14.3.6 Conclusion

This EMU has an eel management plan, approved in 2009, with 2012 progress report. All stock indicators were available though they do not cover estuarine or coastal habitat. All impacts have been considered except indirect anthropogenic effect. All the Management Actions outlined identified for the EMP in the Progress Report have been implemented, though some have been only partially implemented yet. Data and expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement declined from 2008 to 2009-2011 but is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  has been diminished to the lowest possible level. It is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 14.4 South Western

### 14.4.1 Available information

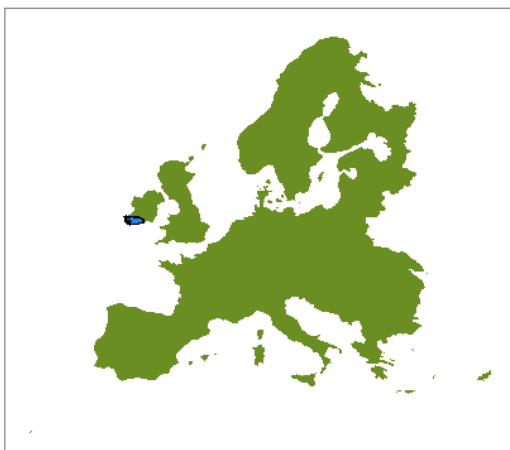


Figure 74: *South Western*, Ireland

Table 297: Sources of information for the South Western EMU

Type of source	Reference
EMP	National Report for Ireland on eel Stock Recovery Plan, December 2008.
EMP approved in: 2012 post-evaluation re- port:	2009 Implementation of Eel Management Plans for Ireland, including the transboundary NWIRBD, June 2012. Dept. of Communications, Energy and Natural Resources.
2013 ICES data-call:	Submitted to ICES on 4 March 2013; Table Stock Indicators ICES to MS 13 FEB 2013 Ireland
Additional sources:	REPORT ON THE STATUS OF THE EEL STOCK IN IRELAND 2009 2012; Report by the Standing Scientific Committee for Eel for Ireland, April 2012

Table 298: Reported stock indicators for South Western

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 299: Source of indicators evaluated for the South Western EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

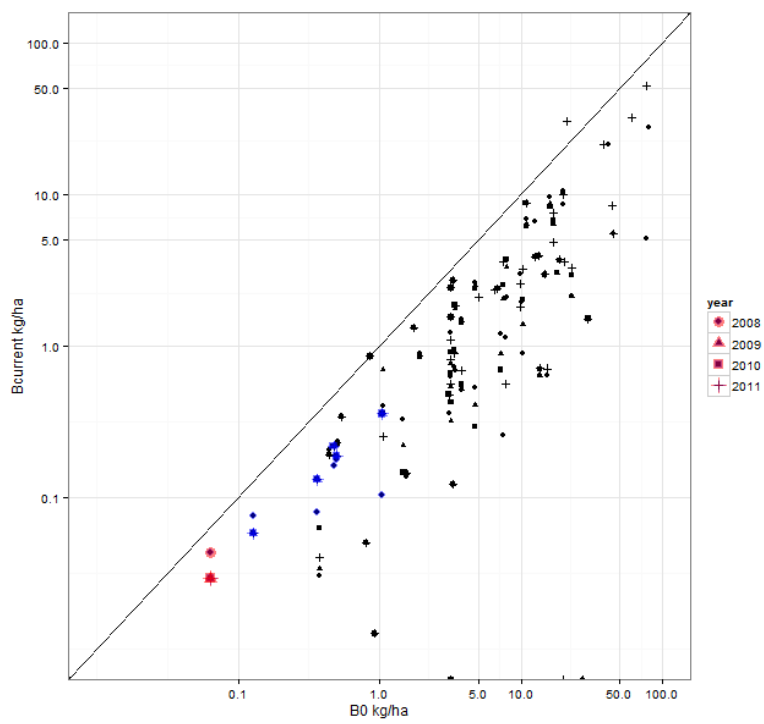


Figure 75:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the South Western EMU are shown in red, those for Ireland are shown in blue.

#### 14.4.2 Habitat coverage of the EMU

Table 300: Habitats assessed in the South Western EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Freshwaters were assessed by combining rivers and lakes. All freshwater wetted area was included.

#### 14.4.3 Management measures

Table 301: Overview of the management actions proposed in the EMP for the South Western EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	M	EMP	partially	high
2	M	EMP	fulfilled	high
3	M	EMP	partially	low
<b>Recr. Fishr.</b>				
4	S	EMP	fulfilled	interm

Table 301: (continued)

Action	Life Stage	Planned	Outcome	Impact
<b>Hydropw. &amp; Obst.</b>				
5	Engineered solutions (turbine design and modification)	S	EMP	partially low
6	Ensure upstream migration at barriers - assisted migration and stocking	M	EMP	fulfilled interm
7	Ensure upstream migration at barriers - existing barriers	M	EMP	partially interm
8	Ensure upstream migration at barriers - new potential barriers	M	EMP	fulfilled interm
9	Improve water quality - ensure compliance with Water Framework Directive	M	EMP	fulfilled low
10	New turbine installations	S	EMP	fulfilled interm
11	Other solutions (e.g. migromat)	S	EMP	not done interm
12	Quantify turbine mortality and morbidity	S	EMP	not done low
13	Trap and Transport	S	EMP	partially interm
<b>Others</b>				
14	Fish health and biosecurity issues - ensure compliance with Fish Health Directive	M	EMP	fulfilled interm

A closure of a large fishery has an important impact on the reduction of sumA. Time constraints prevented a detailed examination of the report to judge the hydropower impact, so the effect has been labelled as unsure, though the reported data show that it has achieved a reduction in sumH.

#### 14.4.4 Assessment

Table 302: Summary list impact types that were included in the assessments for the South Western EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	included	omitted	included	omitted	

Table 303: Summary of targets and assessment period for the South Western EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			9.8	
EU/ICES targets			9.8	0.421
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 304: Additional information for the South Western EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

#### 14.4.5 Progress towards recovery

The fisheries have been closed since 2009 and there is a program on habitat and mitigation of hydropower impact. The Fisheries impact (F) has been reduced to zero and the hydropower impact, already low, has been reduced further. The indicators show that B<sub>current</sub> has increased, and that it is currently achieving the 40 % biomass target.

Table 305: Overview of fishing effort reported in the ICES Data Call for the South Western EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		92	1
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008			
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 306: Overview of total catches (commercial + recreational) of eel stages for the South Western EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	1.06	0	1.06
2	2009	0	0.00	0	0.00
<b>Post</b>					
3	2010	0	0.00	0	0.00
4	2011	0	0.00	0	0.00



Table 307: Stock indicators for the South Western EMU, the source of the data is indicated in Table 299,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	24.5	16.6	17.4	0.01	0.04	0.05	0
2	2009	24.5	11.3	11.6	0.00	0.03	0.03	0
3	2010	24.5	11.3	11.6	0.00	0.03	0.03	0
4	2011	24.5	11.3	11.6	0.00	0.03	0.03	0

Table 308: WKEPEMP evaluation of progress toward recovery for the South Western EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		yes
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no

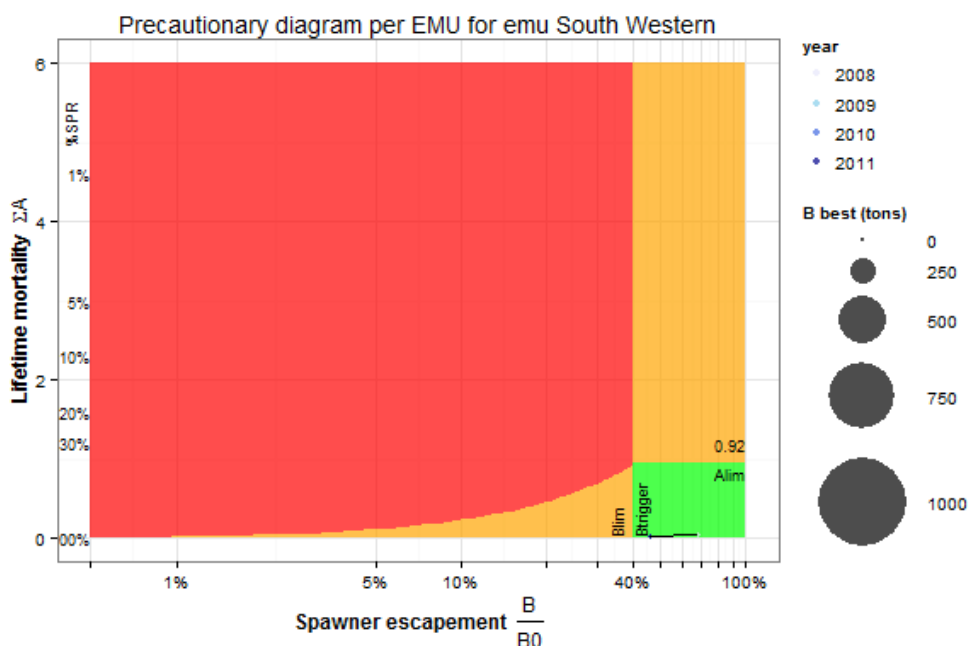


Figure 76: Modified precautionary diagram for the South Western EMU (after wgeel 2012), see section 1.3.2 for more information.

#### 14.4.6 Conclusion

This EMU has an eel management plan, approved in 2009, with 2012 progress report. All stock indicators were available though they do not cover estuarine or coastal habitat. All impacts have been considered except indirect anthropogenic effect. All the Management Actions outlined identified for the EMP in the Progress Report have been implemented, though some have been only partially implemented yet. Data and expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%), though having decreased between 2008 and 2009-2011. Anthropogenic mortality  $\Sigma A$  has been diminished to very low levels. It is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## **14.5 Western**

### ***14.5.1 Available information***

Figure 77: *Western, Ireland*

Table 309: Sources of information for the Western EMU

Type of source	Reference
EMP	National Report for Ireland on eel Stock Recovery Plan, December 2008.
EMP approved in: 2012 post-evaluation re- port:	2009 Implementation of Eel Management Plans for Ireland, including the transboundary NWIRBD, June 2012. Dept. of Communications, Energy and Natural Resources.
2013 ICES data-call:	Submitted to ICES on 4 March 2013; Table Stock Indicators ICES to MS 13 FEB 2013 Ireland
Additional sources:	REPORT ON THE STATUS OF THE EEL STOCK IN IRELAND 2009 2012; Report by the Standing Scientific Committee for Eel for Ireland, April 2012

Table 310: Reported stock indicators for Western

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 311: Source of indicators evaluated for the Western EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

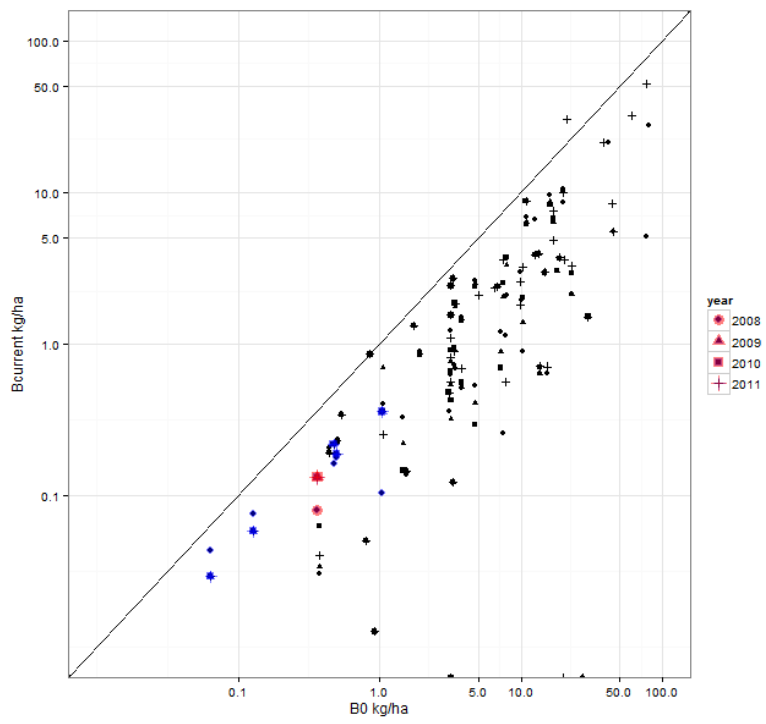


Figure 78: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the Western EMU are shown in red, those for Ireland are shown in blue.

### 14.5.2 Habitat coverage of the EMU

Table 312: Habitats assessed in the Western EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Freshwaters were assessed by combining rivers and lakes. All freshwater wetted area was included.

### 14.5.3 Management measures

Table 313: Overview of the management actions proposed in the EMP for the Western EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Close eel market	M	EMP	partially high
2	Close fishery	M	EMP	fulfilled high
3	Investigating possible diversification for former commercial fishermen	M	EMP	not done none
<b>Rec. Fishr.</b>				
4	Close fishery	S	EMP	fulfilled interm

Table 313: (continued)

Action	Life Stage	Planned	Outcome	Impact	
<b>Hydropw. &amp; Obst.</b>					
5	Ensure upstream migration at barriers - assisted migration and stocking	M	EMP	fulfilled	unsure
6	Ensure upstream migration at barriers - existing barriers	M	EMP	partially	unsure
7	Ensure upstream migration at barriers - new potential barriers	M	EMP	fulfilled	unsure
8	Improve water quality - ensure compliance with Water Framework Directive	M	EMP	fulfilled	unsure
9	New turbine installations	S	EMP	fulfilled	unsure
<b>Others</b>					
10	Fish health and biosecurity issues - ensure compliance with Fish Health Directive	M	EMP	fulfilled	unsure

Fisheries closed since 2009. Management measures on fisheries and habitat are being implemented as committed to in EMP. National monitoring plan being implemented as committed to in EMP.

14.5.4 Assessment

Table 314: Summary list impact types that were included in the assessments for the WesternEMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	included	omitted	omitted	omitted	

Table 315: Summary of targets and assessment period for the Western EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			75.7	
EU/ICES targets			75.7	0.333
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 316: Additional information for the Western EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

#### 14.5.5 Progress towards recovery

The fisheries have been closed since 2009 and there is a program on habitat and mitigation of hydropower impact. The Fisheries impact (F) has been reduced to zero and there is no turbine impact for this EMU. The indicators show that B<sub>current</sub> has increased, but that due to past low recruitment, it is still not possible to currently achieve the 40% biomass target.



Table 317: Overview of fishing effort reported in the ICES Data Call for the Western EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		92	57
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008			
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 318: Overview of total catches (commercial + recreational) of eel stages for the Western EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	13.8	12.41	26.21
2	2009	0	0.0	0.00	0.00
<b>Post</b>					
3	2010	0	0.0	0.00	0.00
4	2011	0	0.0	0.00	0.00

Table 319: Stock indicators for the Western EMU, the source of the data is indicated in Table 311,  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	189.2	41.6	96.9	0.85	0	0.85	0
2 2009	189.2	68.7	68.7	0.00	0	0.00	0
3 2010	189.2	68.7	68.7	0.00	0	0.00	0
4 2011	189.2	68.7	68.7	0.00	0	0.00	0

Table 320: WKEPEMP evaluation of progress toward recovery for the Western EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?	no	
Has the EMU reached the long term target set by the EMP ?	no	
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	yes	yes

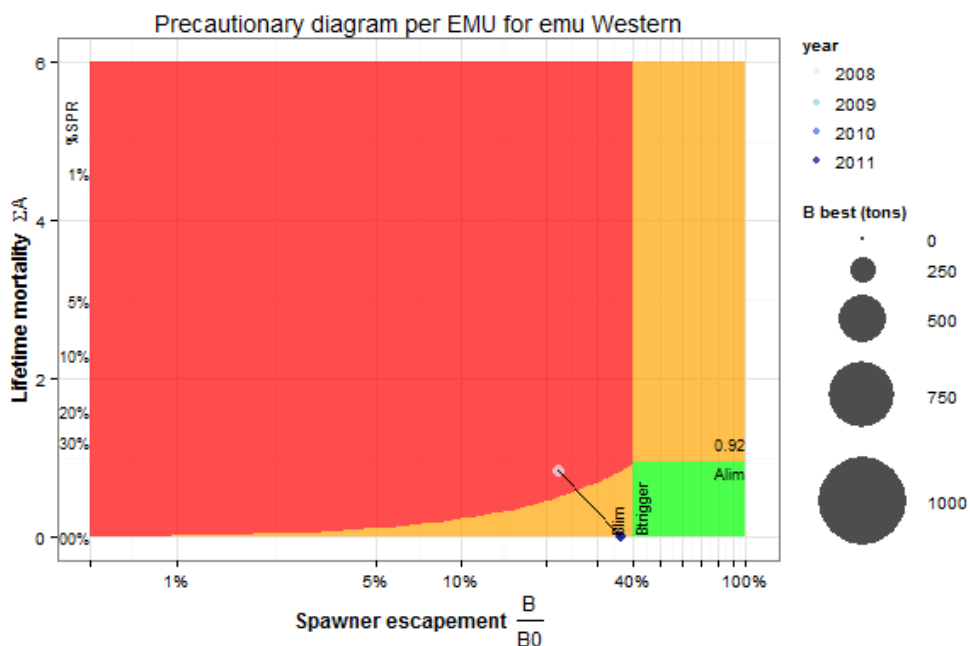


Figure 79: Modified precautionary diagram for the Western EMU (after wgeel 2012), see section 1.3.2 for more information.

### 14.5.6 Conclusion

This EMU has an eel management plan, approved in 2009, with 2012 progress report. All stock indicators were available though they do not cover estuarine or coastal habitat. All Impacts have been considered except indirect anthropogenic effect. All the Management Actions outlined identified for the EMP in the Progress Report have been implemented, though some have been only partially implemented yet. Data and expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%), but is increasing. Anthropogenic mortality  $\Sigma A$  has been diminished to the lowest possible level. It is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 15 Shared between Ireland & Great Britain

### 15.1 North Western

#### 15.1.1 Available information



Figure 80: *North Western*, Ireland

Table 321: Sources of information for the North Western EMU

Type of source	Reference
EMP	National Report for Ireland on Eel Stock Recovery Plan, December 2008.
EMP approved in:	2009
2012 post-evaluation report:	Implementation of Eel Management Plans for Ireland, including the transboundary NWIRBD, June 2012. Dept. of Communications, Energy and Natural Resources.
2013 ICES data-call:	Submitted to ICES on 4 March 2013; Table Stock Indicators ICES to MS 13 FEB 2013 Ireland
Additional sources:	REPORT ON THE STATUS OF THE EEL STOCK IN IRELAND 2009 2012; Report by the Standing Scientific Committee for Eel for Ireland, April 2012

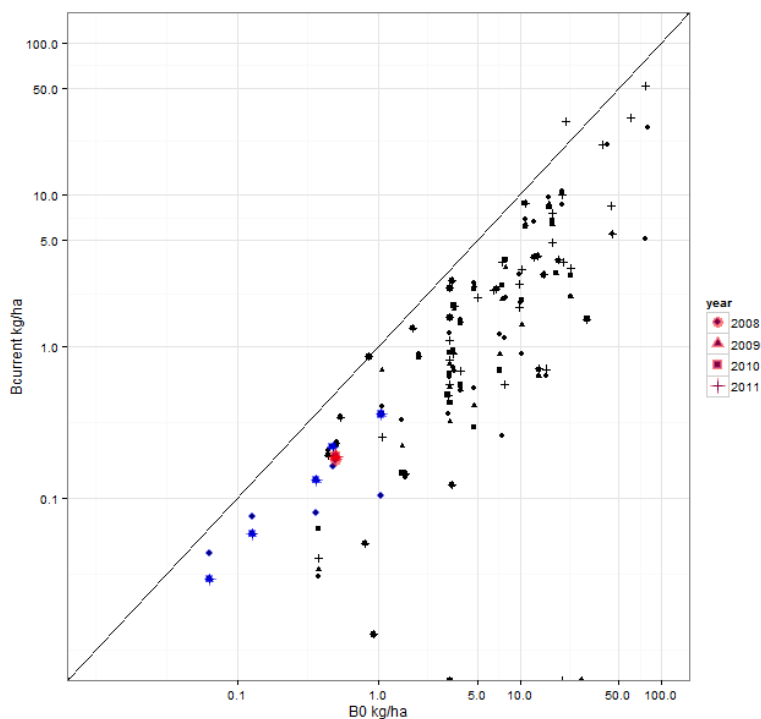


Figure 81:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the North Western EMU are shown in red, those for Ireland are shown in blue.

Table 322: Reported stock indicators for North Western

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 323: Source of indicators evaluated for the North Western EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 15.1.2 Habitat coverage of the EMU

Table 324: Habitats assessed in the North Western EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Freshwaters were assessed by combining rivers and lakes. All freshwater wetted area was included.

### 15.1.3 Management measures

Table 325: Overview of the management actions proposed in the EMP for the North Western EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Close eel market	M	EMP	partially	high
2 Close fishery	M	EMP	fulfilled	high
3 Investigating possible diversification for former commercial fishermen	M	EMP	partially	unsure
4 Removal of fyke net as a fishing engine from N. Ireland statute book	M	EMP	fulfilled	unsure
5 Establishment of a traceability system for all live yellow and silver eels imported and exported	M	EMP	fulfilled	unsure
6 Closure of commercial yellow eel fishery on Lough Erne.	Y	EMP	fulfilled	high
7 Diversification of fishery by employing former fishermen who tender for the Trap and Transport operation	M	EMP	fulfilled	unsure

Table 325: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Rec. Fishr.</b>					
8	Close fishery	S	EMP	fulfilled	interm
9	Ban on the use of rod and line for recreational fishing for eel	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
10	Engineered solutions (turbine design and modification)	S	EMP	partially	unsure
11	Ensure upstream migration at barriers - assisted migration and stocking	M	EMP	fulfilled	unsure
12	Ensure upstream migration at barriers - existing barriers	M	EMP	partially	unsure
13	Ensure upstream migration at barriers - new potential barriers	M	EMP	fulfilled	unsure
14	Improve water quality - ensure compliance with Water Framework Directive	M	EMP	fulfilled	unsure
15	New turbine installations	S	EMP	fulfilled	unsure
16	Other solutions (e.g. migromat)	S	EMP	partially	unsure
17	Quantify turbine mortality and morbidity	S	EMP	partially	knowledge
18	Trap and Transport	S	EMP	partially	high
19	Establishment of Scientific Group to assess potential impacts of new in-river hydroschemes	M	Other	fulfilled	knowledge
<b>Others</b>					
20	Fish health and biosecurity issues - ensure compliance with Fish Health Directive	M	EMP	fulfilled	unsure
21	Monitoring glass eel recruitment at key index sites	G	EMP	fulfilled	knowledge
22	Monitoring of distribution of A.crassus	M	EMP	fulfilled	knowledge
23	Fyke net survey of lower Lough Erne	Y	EMP	fulfilled	knowledge
24	Monitoring of eel stocks throughout the RoI portion of the IRBD by In-land Fisheries Ireland	M	Other	fulfilled	knowledge

A closure of a large fishery has an important impact on the reduction of sumA. Time constraints prevented a detailed examination of the report to judge the hydropower impact, so the effect has been labelled as unsure, though the reported data show that it has achieved a reduction in sumH.

#### 15.1.4 Assessment

Table 326: Summary list impact types that were included in the assessments for the North West-ernEMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	included	omitted	included	omitted	

Table 327: Summary of targets and assessment period for the North Western EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target			54.3	
EU/ICES targets			54.3	0.348
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 328: Additional information for the North Western EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			yes	yes
Is double banking considered ?			yes	yes

### 15.1.5 Progress towards recovery

The fisheries have been closed since 2009 and there is a program on habitat and mitigation of hydropower impact. The Fisheries impact (F) has been reduced to zero, and (H=turbines) reduced. The indicators show that B<sub>current</sub> is increasing a lot, but that due to past low recruitment, it is still not possible to currently achieve the 40 % biomass target.



Table 329: Overview of fishing effort reported in the ICES Data Call for the North Western EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008			39
	2009	0	60	10
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008		365	
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 330: Overview of total catches (commercial + recreational) of eel stages for the North Western EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	30.35	30.35
2	2009	0	0	0.00	0.00
<b>Post</b>					
3	2010	0	0	0.00	0.00
4	2011	0	0	0.00	0.00

Table 331: Stock indicators for the North Western EMU, the source of the data is indicated in Table 323,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	135.8	48.8	103.5	0.58	0.18	0.75	0
2 2009	135.8	51.5	54.3				0
3 2010	135.8	51.5	54.3	0.00	0.05	0.05	0
4 2011	135.8	51.5	54.3	0.00	0.05	0.05	0

Table 332: WKEPEMP evaluation of progress toward recovery for the North Western EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		no
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

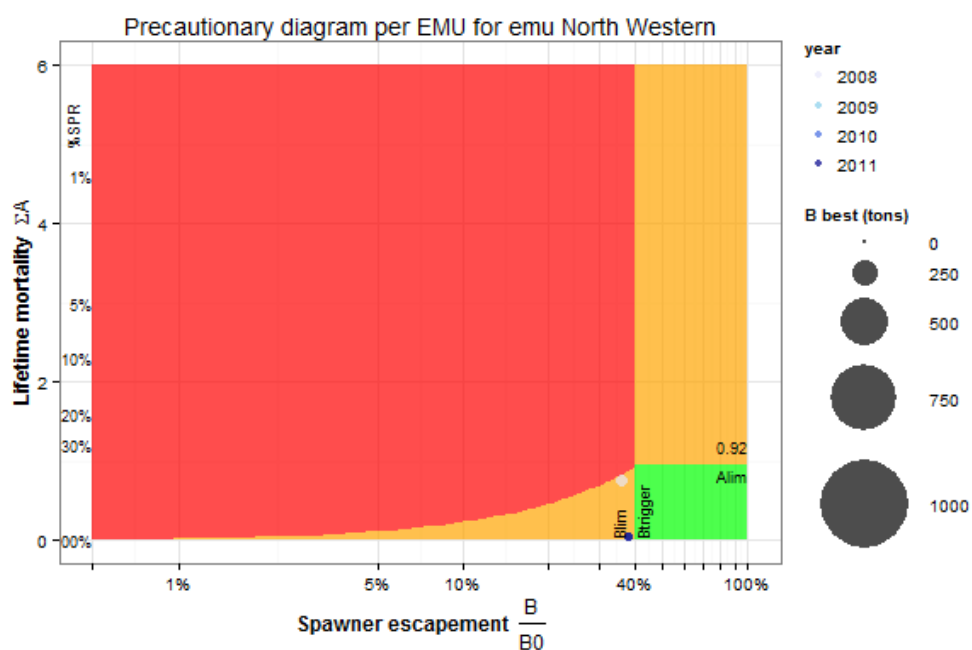


Figure 82: Modified precautionary diagram for the North Western EMU (after wgeel 2012), see section 1.3.2 for more information.

### 15.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with 2012 progress report. All stock indicators were available though they do not cover estuarine or coastal habitat. All Impacts have been considered except indirect anthropogenic effect. All the Management Actions outlined identified for the EMP in the Progress Report have been implemented, though some (hydropower) have been only partially implemented yet. Data and expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16 Great Britain

### 16.1 Anglian

#### 16.1.1 Available information



Figure 83: *Anglian*, United Kingdom

Table 333: Sources of information for the Anglian EMU

Type of source	Reference
EMP	Eel Management plans for the UK, Anglian River Basin District, March 2010
EMP approved in:	2010
2012 post-evaluation report:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 334: Reported stock indicators for Anglian

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

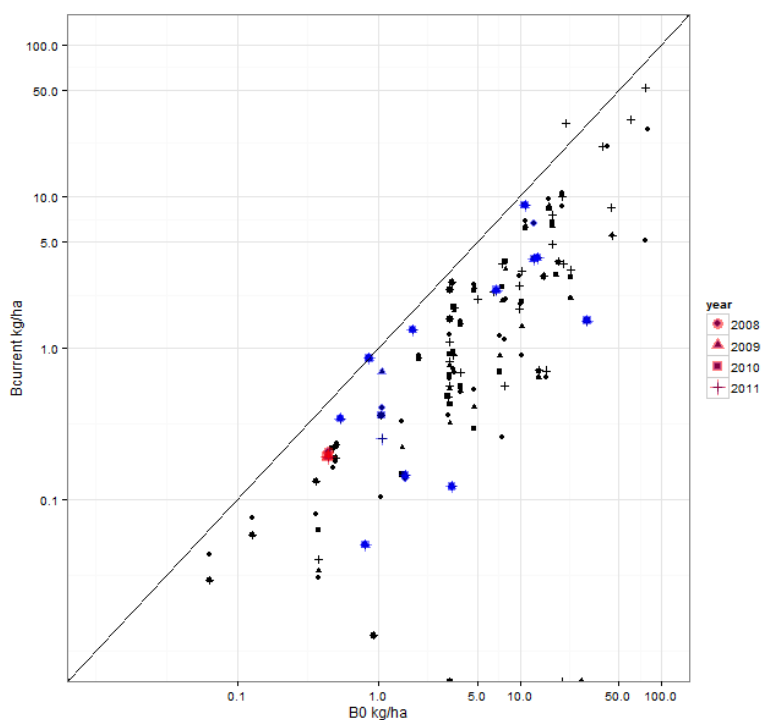


Figure 84:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Anglian EMU are shown in red, those for United Kingdom are shown in blue.

Table 335: Source of indicators evaluated for the Anglian EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.1.2 Habitat coverage of the EMU

Table 336: Habitats assessed in the Anglian EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

### 16.1.3 Management measures

Table 337: Overview of the management actions proposed in the EMP for the Anglian EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Initiate a price monitoring and reporting system for eels less than 12cm long	G	EMP	fulfilled	regulation
2	Reserve at least 35% of eels less than 12cm caught, increasing to 60%, to be marketed for restocking	G	EMP	fulfilled	regulation
3	Initiate a system to ensure the traceability of all live eels imported or exported from UK	M	EMP	fulfilled	regulation
4	If necessary bring in byelaws to limit fisheries and protect stocks	M	EMP	fulfilled	unsure
5	Illegal exploitation of yellow eel and glass eel will be targeted by enforcement teams	M	EMP	partially	unsure
6	Legislation introduced providing new powers to amend, or refuse, permission to fish	M	EMP	fulfilled	unsure

Table 337: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
<b>Hydropw. &amp; Obst.</b>					
10	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
11	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
12	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
13	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	unsure
14	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
15	Provide 48 eel passess	M	EMP	fulfilled	unsure
16	Create priority list for improving eel access	M	EMP	fulfilled	knowledge
17	Assess hydropower applications and recommend screening	M	EMP	fulfilled	knowledge
18	Assess pumping stations and recommend screening	M	EMP	fulfilled	knowledge
19	Assess abstraction points and recommend screening	M	EMP	partially	knowledge
20	Support PhD research projects on barriers, intakes, tidal flaps and gauging stations	M	Other	fulfilled	knowledge
21	Investigate measure for eel passage without deleterious effects for water voles	M	EMP	not done	knowledge
<b>Restocking</b>					
22	Continue stocking Nene study	G	EMP	partially	knowledge
23	Plan and implement further stocking	G	EMP	fulfilled	unsure
24	Produce stocking plan for EMU	G	EMP	not done	unsure
25	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowledge

Table 337: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
26	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	low
27	Develop national communications campaign on the European eel	M	EMP	fulfilled	knowledge
28	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
29	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
30	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
31	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
32	Monitor 562 multi-species e/f sites	M	EMP	fulfilled	knowledge
33	Establish yellow eel e/f survey on one new catchment	Y	EMP	fulfilled	knowledge
34	Continue collection of recruitment data at 9 sites	G	EMP	fulfilled	knowledge
35	Continue to collect silver eel escapement data at 3 sites	S	EMP	fulfilled	knowledge
36	Fyke net silver eels to provide data for specific research projects	S	EMP	fulfilled	knowledge
37	Continue to monitor commercial fishery via catch returns	S	EMP	fulfilled	knowledge
38	Monitor effectiveness of new eel passes	Y	EMP	not done	knowledge
39	Stakeholder engagement to aid EMP implementation	M	EMP	fulfilled	low

Large variety of measures planned and mostly implemented. Too early to make any judgement on how these actions will impact silver eel escapement - need to ensure a monitoring or evaluation process is in place. But most of them are focused on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### 16.1.4 Assessment



Table 338: Summary list impact types that were included in the assessments for the Anglian EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 339: Summary of targets and assessment period for the Anglian EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			49.2	0.916
Assessment period start	1983	2008	2008	2008
Assessment period end	1983	2011	2011	2011

Table 340: Additional information for the Anglian EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

B<sub>0</sub> and B<sub>best</sub> have got the same value but B<sub>0</sub> has been calculated from current data by extrapolation (see ICES data call table, comments). In the 2012 report, B<sub>0</sub> and B<sub>best</sub> still had different values. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production of 2.26 kg/ha based on current data (1983 estimated production 0.73 kg /ha) Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples.

### 16.1.5 Progress towards recovery

Too early to make any judgement, no data are given to allow judgement on progress. But Silver eel escapement is already above 40% target in this EMU.

Table 341: Overview of fishing effort reported in the ICES Data Call for the Anglian EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	54373	365	20
	2009	54373	365	24
	2010	54373	183	24
	2011	54373	254	25
<b>YS rec</b>				
	2008	54373	273	1353614
	2009	54373	272	1495443
	2010	54373	272	1464109
	2011	54373	272	1477572

Table 342: Overview of total catches (commercial + recreational) of eel stages for the Anglian EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	1.97	9.90	11.88
2	2009	0	0.59	6.62	7.21
<b>Post</b>					
3	2010	0	0.74	10.71	11.45
4	2011	0	2.01	16.48	18.48

Table 343: Stock indicators for the Anglian EMU, the source of the data is indicated in Table 335,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	122.9	57.9	122.9	0.09	0.66	0.75	0.007
2	2009	122.9	53.7	122.9	0.15	0.68	0.83	0.005
3	2010	122.9	53.7	122.9	0.15	0.68	0.83	0.015
4	2011	122.9	53.7	122.9	0.15	0.68	0.83	0.011

Table 344: WKEPEMP evaluation of progress toward recovery for the Anglian EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	amber	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?	yes	
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?	no	no

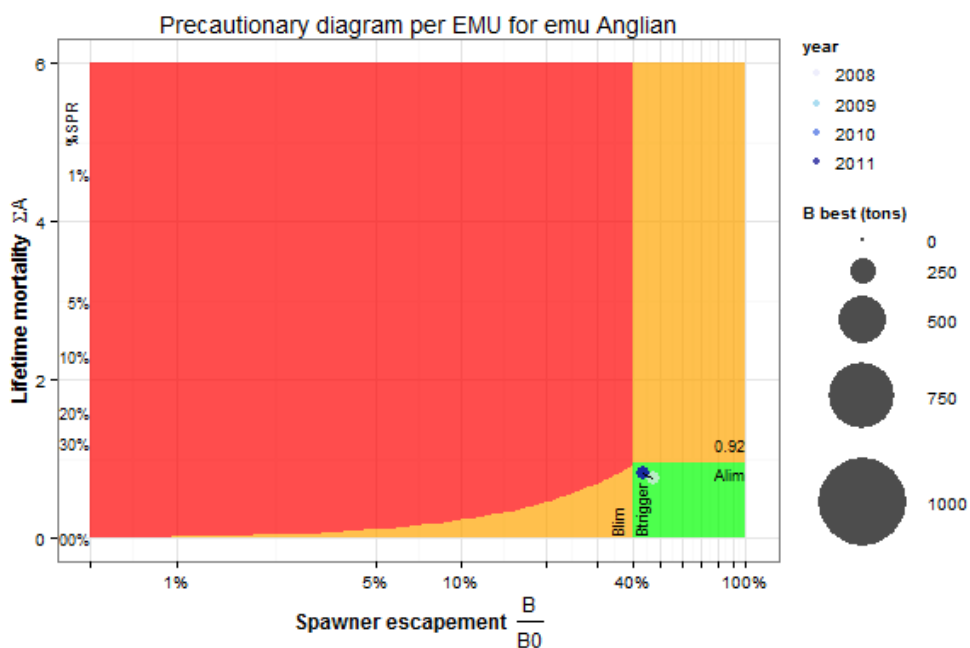


Figure 85: Modified precautionary diagram for the Anglian EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 16.1.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; restocking; barriers; commercial fisheries; hydropower. These impacts were not included: indirect effects; recreational fisheries; predators, though not all may be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Expert judgement was used to evaluate the impact of some actions applied. The impact of other management actions could not be evaluated, either because of missing expertise or information: they applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%) but decreasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), but increasing.

## 16.2 Dee

### 16.2.1 Available information



Figure 86: *Dee*, United Kingdom

Table 345: Sources of information for the Dee EMU

Type of source	Reference
EMP	Eel Management plans for the UK, Dee River Basin District, March 2010
EMP approved in:	2010
2012 post-evaluation report:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 346: Reported stock indicators for Dee

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

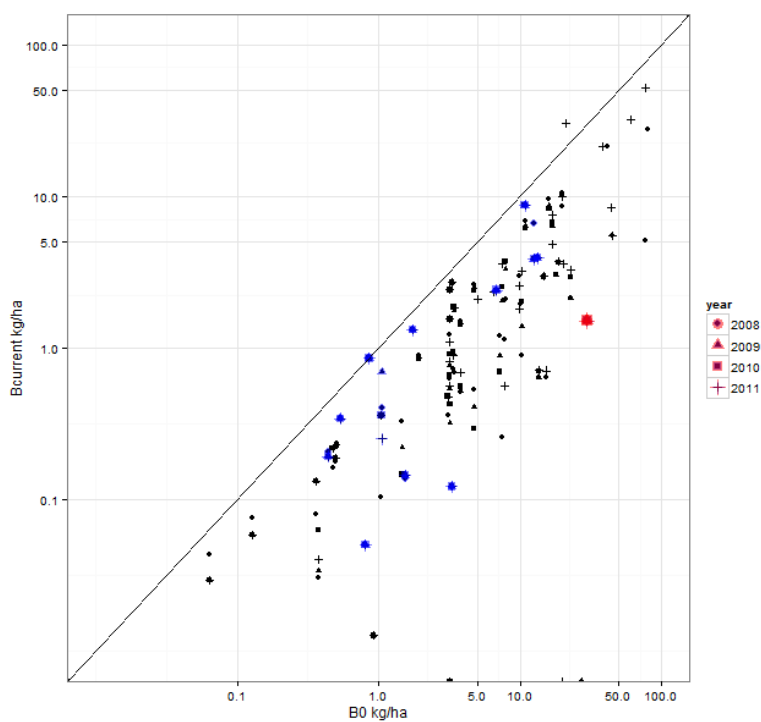


Figure 87:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Dee EMU are shown in red, those for United Kingdom are shown in blue.

Table 347: Source of indicators evaluated for the Dee EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.2.2 Habitat coverage of the EMU

Table 348: Habitats assessed in the Dee EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat Type	Assessed?
Were rivers assessed?	Yes
Were lakes assessed?	Yes
Were estuaries assessed?	Yes
Were lagoons assessed?	Absent
Were marine coastal waters assessed?	No

### 16.2.3 Management measures

Table 349: Overview of the management actions proposed in the EMP for the Dee EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the full-fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				

1	Initiate a price monitoring and reporting system for eels less than 12cm long	G	EMP	fulfilled	regulation
2	Reserve at least 35% of eels less than 12cm caught, increasing to 60%, to be marketed for restocking	G	EMP	fulfilled	regulation
3	Initiate a system to ensure the traceability of all live eels imported or exported from UK	M	EMP	fulfilled	regulation
4	If necessary bring in byelaws to limit fisheries and protect stocks	M	EMP	fulfilled	unsure
5	Illegal exploitation of yellow eel and glass eel will be targeted by enforcement teams	M	EMP	partially	unsure
6	Legislation introduced providing new powers to amend, or refuse, permission to fish	M	EMP	fulfilled	unsure



Table 349: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	unsure
10	Identify areas with scope for habitat improvement under WFD	M	EMP	fulfilled	unsure
11	Use existing consent and works programme to improve eel habitat	M	EMP	fulfilled	unsure
12	Influence ditch management to support eels	M	EMP	fulfilled	unsure
13	Habitat improvement at Pulford	Y	EMP	not done	unsure
<b>Hydropw. &amp; Obst.</b>					
14	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
15	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
16	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
17	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
18	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
19	Design eel passes for gauging stations	M	EMP	fulfilled	unsure
20	Assess flap gate passability in lower reaches of drains	M	EMP	not done	knowledge
21	Install 5 named fish passes	M	EMP	fulfilled	unsure
22	Assess all abstraction points and suggest screening	M	EMP	fulfilled	knowledge
23	Produce priority plan for barrier alleviation	M	EMP	fulfilled	unsure
<b>Restocking</b>					
24	Consider stocking in EMU	G	EMP	fulfilled	unsure
25	Produce stocking plan for Dee	G	EMP	not done	unsure
26	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowledge

Table 349: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
27	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
28	Develop national communications campaign on the European eel	M	EMP	fulfilled	knowledge
29	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
30	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
31	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
32	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
33	Continue to monitor commercial fisheries via import/export data	Y	EMP	fulfilled	knowledge
34	Monitor set of 99 multi-species e/f sites	M	EMP	fulfilled	knowledge
35	Stakeholder engagement to aid EMP implementation	M	EMP	not done	knowledge
36	Establish recruitment monitoring site	G	EMP	not done	knowledge
37	Investigate potential sites for silver eel monitoring	S	EMP	not done	knowledge

High number of management measures were fixed in the EMP and reported on in the 2012 report. But most of them are focused on increasing knowledge and only very few are going to have a direct and immediate impact on either silver eel escapement or reduction of mortality.

#### 16.2.4 Assessment

Table 350: Summary list impact types that were included in the assessments for the Dee EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	omitted	included	omitted	included

Table 351: Summary of targets and assessment period for the Dee EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			168.9	0.116
Assessment period start	1984	2008	2008	2008
Assessment period end	1984	2011	2011	2011

Table 352: Additional information for the Dee EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

Indicator values given in the data call and used here differ from values given in the 2012 report. Mid-term and long-term targets were set but not expressed as biomass or mortality rate. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured.

### 16.2.5 Progress towards recovery

Too early to make any judgement, plan had been approved as late as 2010. No data are given to allow judgement on progress. Current escapement is far below target and no projection is given as when this will be reached.

Table 353: Overview of fishing effort reported in the ICES Data Call for the Dee EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008	10928	365	1
	2009	10928	365	1
	2010	10928	100	1
	2011	10928	100	2
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	14129	365	3
	2009	14129	365	3
	2010	14129	183	2
	2011	14129	254	4
<b>YS rec</b>				
	2008	14129	273	1353614
	2009	14129	272	1495443
	2010	14129	272	1464109
	2011	14129	272	1477572

Table 354: Overview of total catches (commercial + recreational) of eel stages for the Dee EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.003	0.02	0.64	0.66
2	2009	0.001	0.01	0.07	0.08
<b>Post</b>					
3	2010	0.007	0.02	0.05	0.07
4	2011	0.021	0.12	1.08	1.20

Table 355: Stock indicators for the Dee EMU, the source of the data is indicated in Table 347,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	422.3	21.6	24.9	0.03	0.01	0.14	0
2	2009	422.3	21.4	25.1	0.04	0.11	0.16	0
3	2010	422.3	21.4	25.1	0.04	0.11	0.16	0
4	2011	422.3	21.4	25.1	0.04	0.11	0.16	0

Table 356: WKEPEMP evaluation of progress toward recovery for the Dee EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

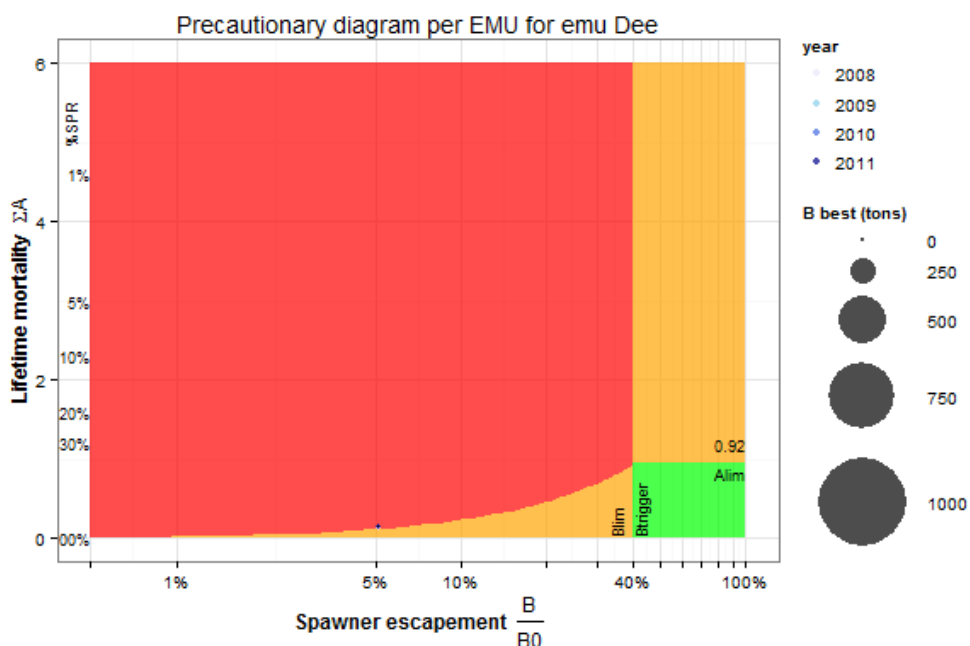


Figure 88: Modified precautionary diagram for the Dee EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 16.2.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Expert judgement was used to evaluate the impact of some actions applied. The impact of other management actions could not be evaluated, either because of missing expertise or information: they applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and not changing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but above the WGEEL2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and increasing.

## 16.3 Humber

### 16.3.1 Available information

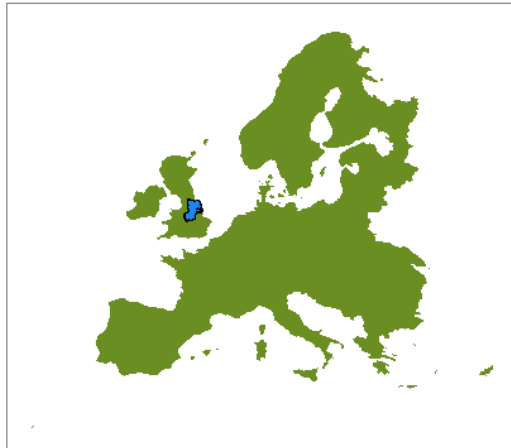


Figure 89: *Humber*, United Kingdom

Table 357: Sources of information for the Humber EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 358: Reported stock indicators for Humber

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

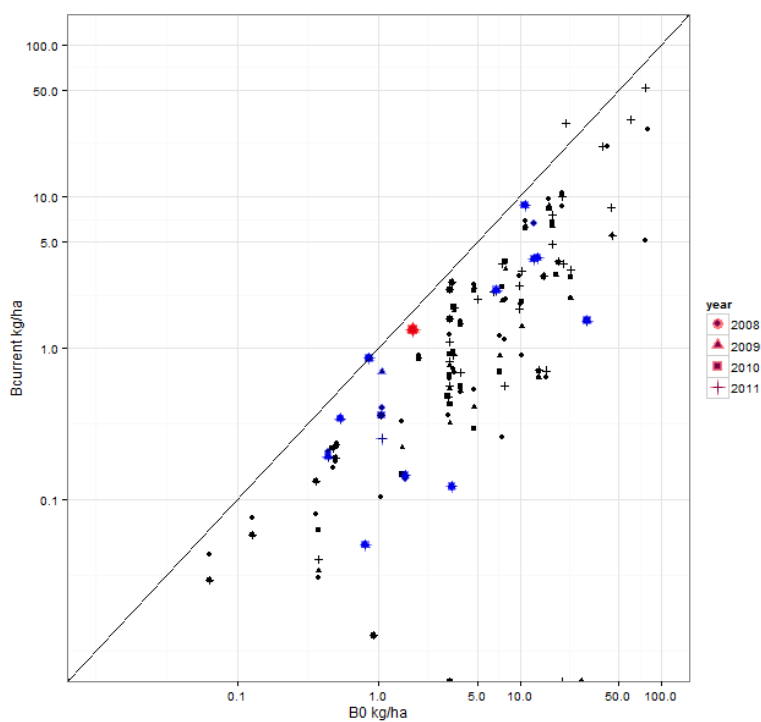


Figure 90:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Humber EMU are shown in red, those for United Kingdom are shown in blue.



Table 359: Source of indicators evaluated for the Humber EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.3.2 Habitat coverage of the EMU

Table 360: Habitats assessed in the Humber EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

### 16.3.3 Management measures

Table 361: Overview of the management actions proposed in the EMP for the Humber EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 361: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
10	Use existing consent and works programme to improve eel habitat	M	EMP	fulfilled	unsure
11	Identify and implement possible measures under WFD programme to improve eel habitat	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
12	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
13	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
14	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
15	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
16	Development of new design technology for eel pass substrate	M	EMP	fulfilled	knowledge
17	Install two eel passes on Humber	M	EMP	fulfilled	unsure
18	Assess tidal flaps and install fish friendly tidal flaps in lower Trent	M	EMP	fulfilled	knowledge
19	Assess barriers to eel migration in EMU	M	EMP	fulfilled	knowledge
20	Conduct feasibility study for eel bypass at Cromwell Weir	M	EMP	fulfilled	knowledge
21	Connect gravel pits to river Tame	Y	EMP	fulfilled	unsure
22	Install passes on Humber	M	EMP	fulfilled	unsure
23	Alleviate Cromwell Weir barrier	Y	EMP	fulfilled	unsure
24	Assess all abstraction points, hydropower locations and pumping stations and recommend screening	M	EMP	partially	knowledge
25	All new fish passes to consider eels	Y	EMP	fulfilled	unsure

Table 361: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
26	Establish programme of stocking including pre- and post- surveys	G	EMP	partially	unsure
27	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowledge

Table 361: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
28	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
29	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
30	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
31	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
32	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
33	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
34	Monitor set of 671 multi-species e/f sites	M	EMP	fulfilled	knowledge
35	Establish 10 site yellow eel monitoring programme on each of Hull and Trent catchments	Y	EMP	fulfilled	unsure
36	Begin monitoring glass eel migration on river Ancholme	G	EMP	fulfilled	knowledge
37	Assess potential use of Ure smolt trap to monitor silver eels	S	EMP	not done	knowledge
38	Monitor effectiveness of new eel passes	Y	EMP	partially	knowledge
39	Continue to monitor commercial fisheries via import/export data	Y	EMP	fulfilled	knowledge
40	Begin monitoring at 2 glass eel sites	G	EMP	fulfilled	knowledge
41	Stakeholder engagement to aid EMP implementation	M	EMP	fulfilled	unsure
42	Implement stocking programme in wider RBD	G	EMP	not done	knowledge

Large variety of measures planned and mostly implemented. Too early to make any judgement on how these actions will impact silver eel escapement - need to ensure a monitoring or evaluation process is in place. But most of them are focused on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### 16.3.4 Assessment

Table 362: Summary list impact types that were included in the assessments for the Humber EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 363: Summary of targets and assessment period for the Humber EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			63.2	0.916
Assessment period start	1983	2008	2008	2008
Assessment period end	1983	2011	2011	2011

Table 364: Additional information for the Humber EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

B<sub>0</sub> and B<sub>best</sub> have got the same value but B<sub>0</sub> has been calculated from current data by extrapolation (see ICES data call table, comments). In the 2012 report, B<sub>0</sub> and B<sub>best</sub> still had different values. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production of 2.73 kg/ha based on current data (1983 estimated production 0.73 kg /ha) Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples.

### 16.3.5 Progress towards recovery

Too early to make any judgement, no data are given to allow judgement on progress. But Silver eel escapement is already above 40% target in this EMU.

Table 365: Overview of fishing effort reported in the ICES Data Call for the Humber EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	57853	365	9
	2009	57853	365	7
	2010	57853	183	7
	2011	57853	254	9
<b>YS rec</b>				
	2008	11815	273	1353614
	2009	11815	272	1495443
	2010	11815	272	1464109
	2011	11815	272	1477572

Table 366: Overview of total catches (commercial + recreational) of eel stages for the Humber EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0.86	1.43	2.29
2	2009	0	0.11	0.41	0.52
<b>Post</b>					
3	2010	0	0.20	3.03	3.23
4	2011	0	0.26	4.86	5.11

Table 367: Stock indicators for the Humber EMU, the source of the data is indicated in Table 359,  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	157.9	119.8	157.9	0.02	0.26	0.28	0.000
2	2009	157.9	119.6	157.9	0.02	0.26	0.28	0.018
3	2010	157.9	119.6	157.9	0.02	0.26	0.28	0.038
4	2011	157.9	119.6	157.9	0.02	0.26	0.28	0.000

Table 368: WKEPEMP evaluation of progress toward recovery for the Humber EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no



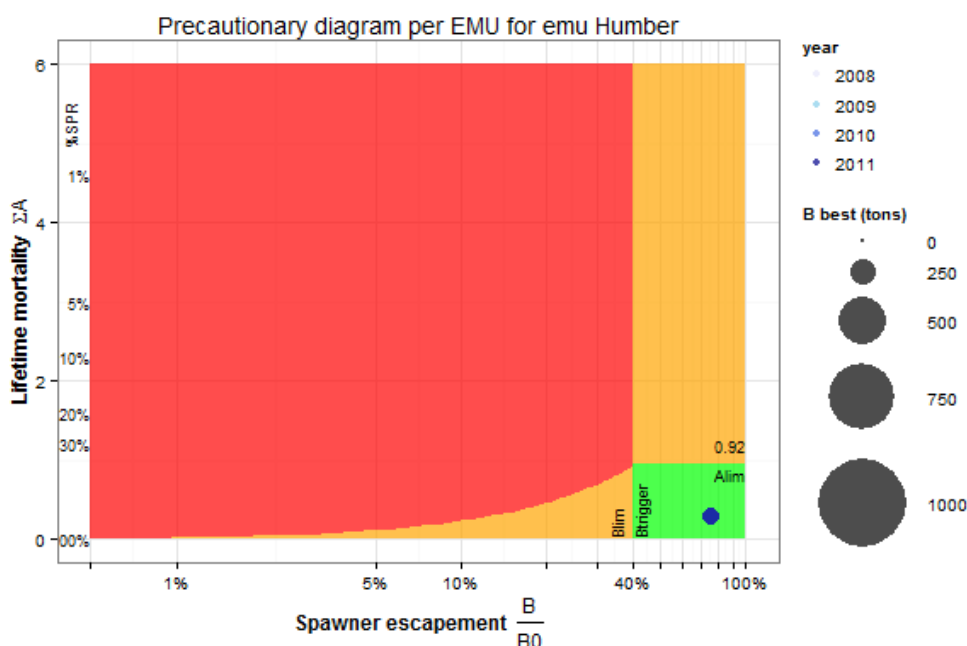


Figure 91: Modified precautionary diagram for the Humber EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.3.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU, except for coastal waters. These impacts were included in the assessment: habitat loss; restocking; barriers; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, but some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Expert judgement was used to evaluate the impact of some actions applied. The impact of other management actions could not be evaluated, either because of missing expertise or information: they applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.4 Neagh Bann

### 16.4.1 Available information



Figure 92: *Neagh Bann*, United Kingdom

Table 369: Sources of information for the Neagh Bann EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 370: Reported stock indicators for Neagh Bann

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

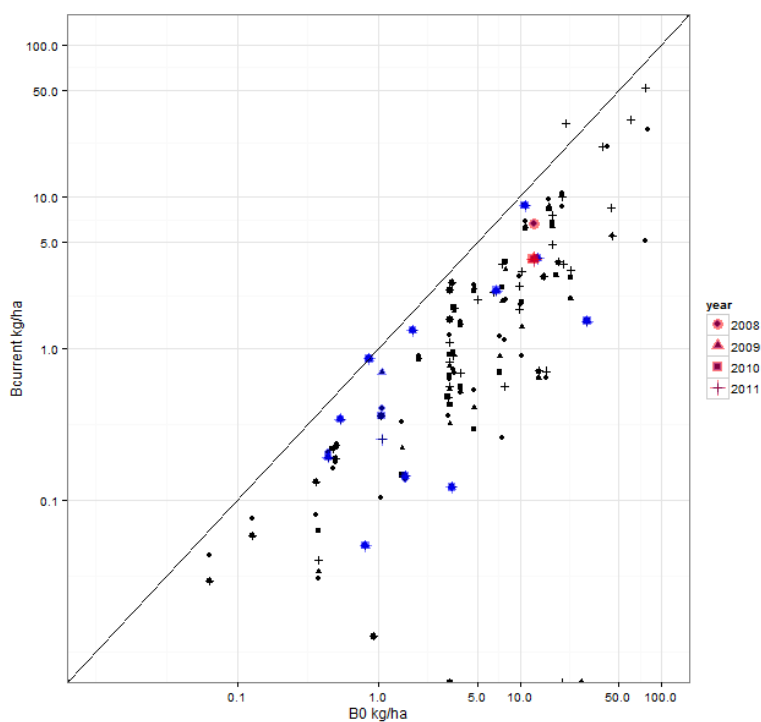


Figure 93:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Neagh Bann EMU are shown in red, those for United Kingdom are shown in blue.

Table 371: Source of indicators evaluated for the Neagh Bann EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.4.2 Habitat coverage of the EMU

Table 372: Habitats assessed in the Neagh Bann EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

### 16.4.3 Management measures

Table 373: Overview of the management actions proposed in the EMP for the Neagh Bann EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Removal of fyke net as a fishing engine from N. Ireland statute book	M	EMP	fulfilled	unsure
2	Establishment of a traceability system for all live yellow and silver eels imported and exported	M	EMP	fulfilled	regulation
3	Harmonisation of minimum landing size to 40cm	Y	EMP	fulfilled	unsure
4	Continued assessment of silver eel weir capture efficiency	S	EMP	fulfilled	unsure
<b>Recr. Fishr.</b>					
5	Ban on the use of rod and line for recreational fishing for eel	M	EMP	fulfilled	unsure
6	Ban recreational rod and line fishery	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
7	Establishment of Scientific Group to			assess potential	impacts of

new in- river hydroschemes	M	Other	fulfilled	knowl- edge
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Table 373: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restock</b>					
8	Restocking 1.25t or approximately 3,750,000 to 2013	G	EMP	partially	high
<b>Others</b>					
9	Regular scientific monitoring of all fisheries and lifestages	G	EMP	fulfilled	knowledge
10	Annual mark-recapture assessment of silver eel escapement from Lough Neagh	S	EMP	fulfilled	knowledge
11	Hydro-acoustic study to verify floy tagging data of silver eel escapement	M	EMP	fulfilled	knowledge
12	PhD investigation of contribution of stocked glass eel	G	EMP	fulfilled	knowledge
13	Monitoring glass eel recruitment at key index sites	G	EMP	fulfilled	knowledge
14	Monitoring of distribution of A.crassus	M	EMP	fulfilled	knowledge

Various management measures were fixed in the EMP and reported on in the 2012 report. But most of them are focussed on increasing knowledge and only very few are going to have a direct and immediate impact on either silver eel escapement or reduction of mortality. Stocking could be able to significantly increase silver eel escapement when implemented in volumes as planned.

#### 16.4.4 Assessment

Table 374: Summary list impact types that were included in the assessments for the Neagh Bann EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 375: Summary of targets and assessment period for the Neagh Bann EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			200	0.708
Assessment period start	1979	2008	2008	2008
Assessment period end	1990	2011	2011	2011

Table 376: Additional information for the Neagh Bann EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

Indicator values given in the data call and used here differ from values given in the 2012 report for B<sub>0</sub>. Value for B<sub>best</sub> higher than for pristine situation is not understood.

#### 16.4.5 Progress towards recovery

Too early to make any judgement, plan had been approved as late as 2010. As to now no positive trend towards target fulfilment. ΣA has been increasing and silver eel escapement dropped since 2008 and is currently significantly below target. Stocking applied may improve silver eel escapement in some years time.



Table 377: Overview of fishing effort reported in the ICES Data Call for the Neagh Bann EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	40000	270	104
	2009	40000	270	90
	2010	40000	270	90
	2011	40000	270	90
<b>YS rec</b>				
	2008	40000	365	
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 378: Overview of total catches (commercial + recreational) of eel stages for the Neagh Bann EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	78	290	368
2	2009	0	88	345	433
<b>Post</b>					
3	2010	0	97	337	434
4	2011	0	73	342	415

Table 379: Stock indicators for the Neagh Bann EMU, the source of the data is indicated in Table 371, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation. ΣA is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for ΣA). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	ΣF	ΣH	ΣA	g.e. Equ.
1 2008	500	264.0	582	1.25	0	1.25	0.433
2 2009	500	154.6	582	1.33	0	1.33	0.217
3 2010	500	154.6	582	1.33	0	1.33	0.996
4 2011	500	154.6	582	1.33	0	1.33	1.035

Table 380: WKEPEMP evaluation of progress toward recovery for the Neagh Bann EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

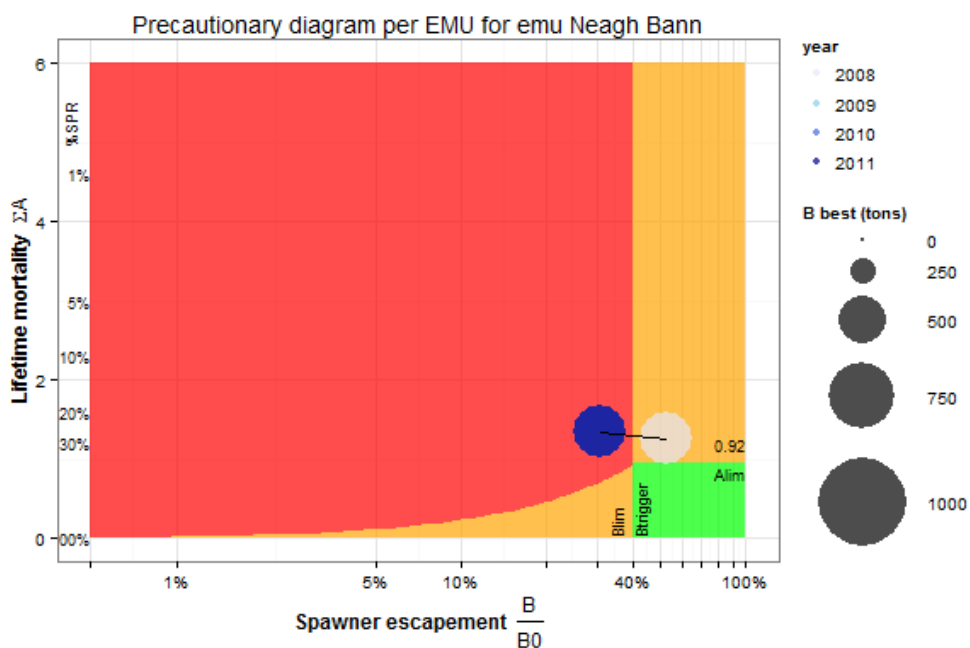


Figure 94: Modified precautionary diagram for the Neagh Bann EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.4.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; indirect effects; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. All of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, one has been only partially implemented. The impact of management actions except stocking could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality ΣA is above the long term limit (ΣA is 0.92) corresponding to the 40% target of the EU Regulation, above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and increasing.

## 16.5 North Eastern

### 16.5.1 Available information



Figure 95: *North Eastern*, United Kingdom

Table 381: Sources of information for the North Eastern EMU

Type of source	Reference
EMP	Eel Management plans for the United Kingdom. Northern Ireland (UK) Eastern River Basin District Defra.
EMP approved in:	2009
2012 post-evaluation report:	Report to the European Commission in line with Article 9 of the Eel Regulation 1100/2007 Implementation of UK Eel Management Plans DEFRA June 2012
2013 ICES data-call:	Table Stock Indicators ICES N Ireland NERBD
Additional sources:	

Table 382: Reported stock indicators for North Eastern

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

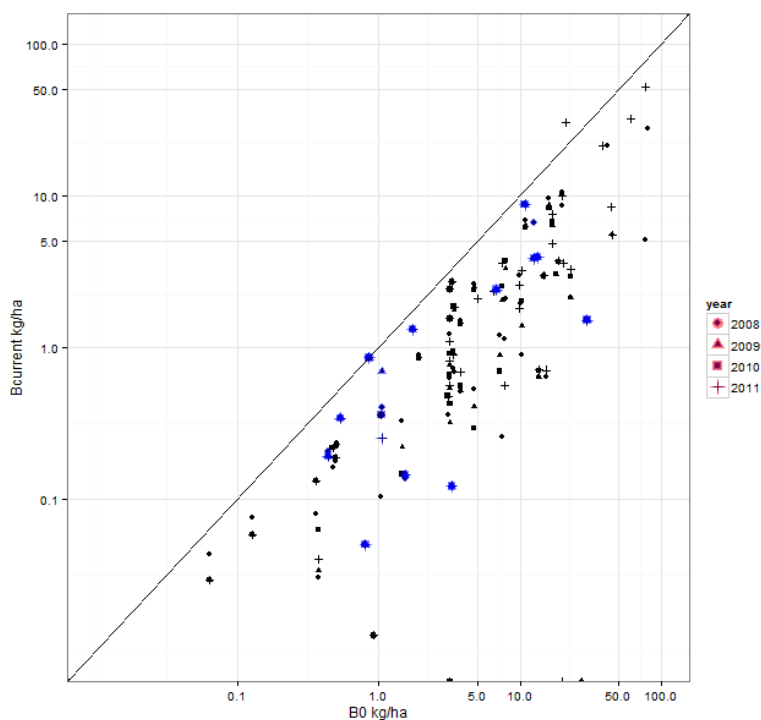


Figure 96: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the North Eastern EMU are shown in red, those for United Kingdom are shown in blue.

Table 383: Source of indicators evaluated for the North Eastern EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.5.2 Habitat coverage of the EMU

Table 384: Habitats assessed in the North Eastern EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	no
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

2 lakes still to be assessed for eel.

### 16.5.3 Management measures

Table 385: Overview of the management actions proposed in the EMP for the North Eastern EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Removal of fyke net as a fishing engine from N. Ireland statute book	M	EMP	fulfilled	unsure
2	Establishment of a traceability system for all live yellow and silver eels imported and exported	M	EMP	fulfilled	unsure
<b>Rec. Fishr.</b>					
3	Ban on the use of rod and line for recreational fishing for eel	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
4	Establishment of Scientific Group to assess potential impacts of new in-river hydroschemes	M	Other	fulfilled	knowledge

Table 385: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
5	Monitoring glass eel recruitment at key index sites	G	EMP	fulfilled	knowl- edge
6	Monitoring of distribution of A.crassus	M	EMP	fulfilled	knowl- edge
7	Monitoring and assessment of any barriers to migration on rivers in this EMU with open access to sea	M	EMP	partially	knowl- edge

The management measures have been implemented and recreational fisheries banned in 2009. The management actions taken (no fyke nets, no rods, no trade of live eel) are set to enforce the protection of eel, however without data it is difficult to give an expertise on their effectiveness.

**16.5.4 Assessment**

Table 386: Summary list impact types that were included in the assessments for the North Eastern EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	omitted	absent	absent	absent	absent	absent



Table 387: Summary of targets and assessment period for the North Eastern EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			1.6	
Assessment period start	2008	0	0	2008
Assessment period end	2011			2011

Table 388: Additional information for the North Eastern EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	NA		
Does double banking apply ?				
Is double banking considered ?				

Given the lack of any fisheries or other impacts other than low recruitment in this EMU, there was no assessment planned originally in this RBD and no indicator for B<sub>current</sub> have been calculated.

#### 16.5.5 Progress towards recovery

Indicators are missing to assess the progress toward recovery.

Table 389: Overview of fishing effort reported in the ICES Data Call for the North Eastern EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	5000	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008	5000	365	
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 390: Overview of total catches (commercial + recreational) of eel stages for the North Eastern EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0	0
2	2009	0	0	0	0
<b>Post</b>					
3	2010	0	0	0	0
4	2011	0	0	0	0

Table 391: Stock indicators for the North Eastern EMU, the source of the data is indicated in Table 383,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	4			0	0	0	0
2	2009	4			0	0	0	0
3	2010	4			0	0	0	0
4	2011	4			0	0	0	0

Table 392: WKEPEMP evaluation of progress toward recovery for the North Eastern EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	no
Is the trend good ?	no	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?	yes	

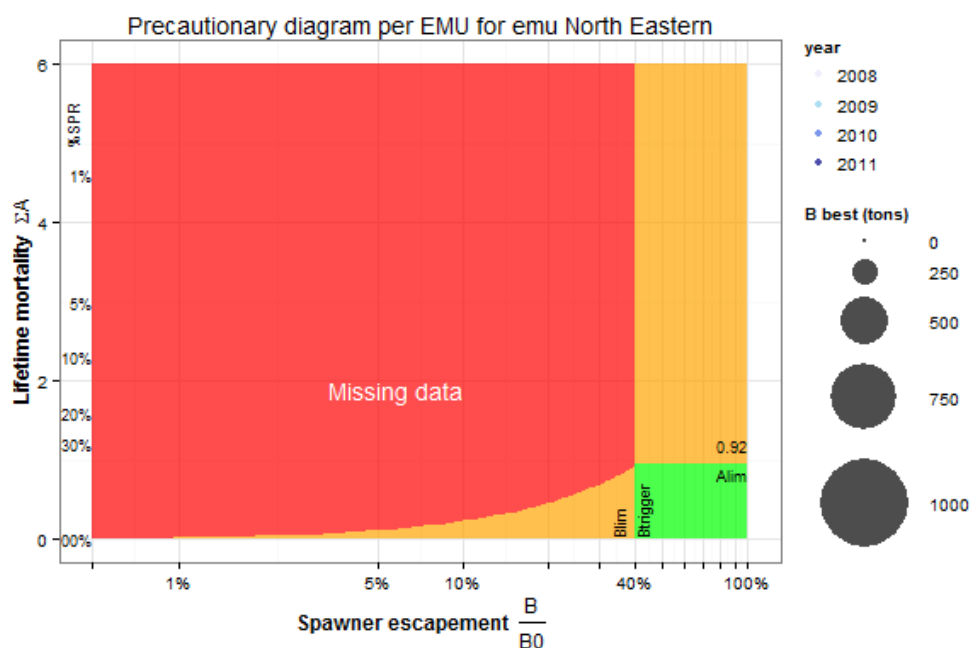


Figure 97: Modified precautionary diagram for the North Eastern EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.5.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_{\text{current}}$  and  $B_{\text{best}}$  are missing. The stock indicators do not cover all of the eel habitats in the EMU: only lakes were assessed. These impacts were included in the assessment: Barriers, habitat and indirect anthropogenic effect. Because the stock does not experience other anthropogenic impacts (e.g. restocking; recreational fisheries; commercial fisheries, hydropower; predators) those were not considered in the assessment. All of the Management Actions outlined in the Progress Report have been implemented, although one only partially yet. No data were identified to evaluate the impact of management actions.

The biomass of current silver eel escapement was not assessed. Anthropogenic mortality  $\Sigma A$  was estimated to be zero.

## 16.6 Northumbria

### 16.6.1 Available information



Figure 98: *Northumbria*, United Kingdom

Table 393: Sources of information for the Northumbria EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

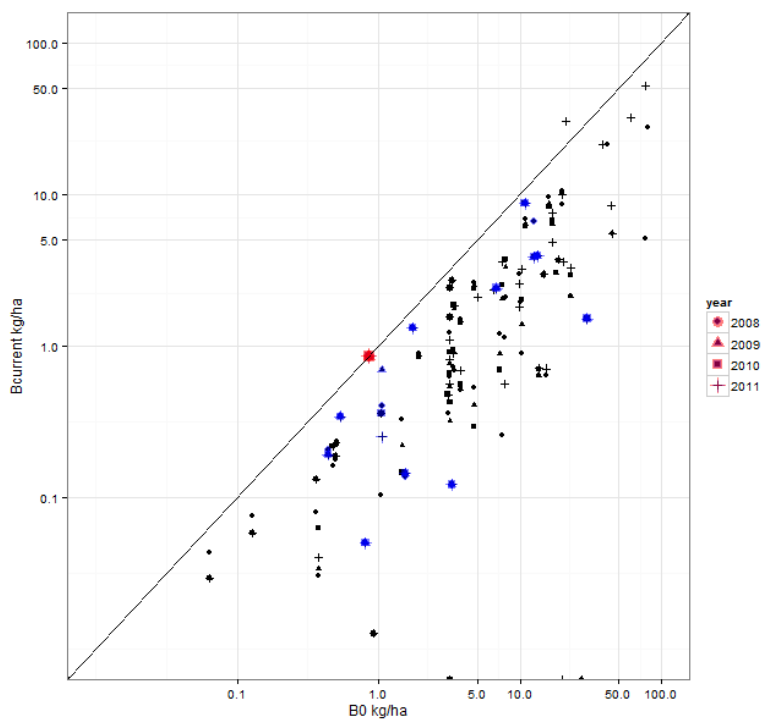


Figure 99:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Northumbria EMU are shown in red, those for United Kingdom are shown in blue.

Table 394: Reported stock indicators for Northumbria

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 395: Source of indicators evaluated for the Northumbria EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.6.2 Habitat coverage of the EMU

Table 396: Habitats assessed in the Northumbria EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

Assessment covers all habitats except coastal waters.

### 16.6.3 Management measures

Table 397: Overview of the management actions proposed in the EMP for the Northumbria EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 397: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
10	Identify and implement possible measures under WFD programme to improve eel habitat	M	EMP	partially	unsure
11	Use existing consent and works programme to improve eel habitat	M	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
12	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
13	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
14	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
15	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
16	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
17	Assess barriers to glass eel and produce action plan for barrier alleviation	G	EMP	not done	knowledge
18	Design and install pass on Humford Dam	M	EMP	fulfilled	unsure
19	Negotiate with British Waterways to install eel pass at tidal limit of Tees	G	EMP	fulfilled	unsure
20	All abstraction points and hydropower locations to be assessed and screening recommended	M	EMP	fulfilled	unsure
21	Improve access on Ross Low, North Low, Ross Nook, Cong Burn and tidal amenity barge	M	Other	fulfilled	unsure
22	Provide eel passes at 3 gauging stations	M	EMP	not done	unsure



Table 397: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
23	Consider stocking in the EMU	G	EMP	fulfilled	unsure
24	Pilot study to test effectiveness of stocking	G	EMP	not done	unsure
25	Establish stocking plan for whole EMU	G	EMP	not done	unsure
26	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowledge

Table 397: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
27	Monitor success of new eel passes	M	EMP	not done	knowledge
28	Stakeholder engagement to aid EMP implementation	M	EMP	fulfilled	unsure
29	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
30	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
31	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
32	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
33	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
34	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
35	Monitor set of 458 multi-species e/f sites	M	EMP	fulfilled	knowledge
36	Establish 10 yellow eel e/f sites on each of the Blyth and the Wear	Y	EMP	fulfilled	knowledge
37	Investigate potential sites to measure recruitment	G	EMP	fulfilled	knowledge
38	Begin glass eel monitoring at two sites	G	EMP	not done	unsure

Large variety of measures planned and mostly implemented. Too early to make any judgement on how these actions will impact silver eel escapement - need to ensure a monitoring or evaluation process is in place. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### 16.6.4 Assessment

Table 398: Summary list impact types that were included in the assessments for the Northumbria EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 399: Summary of targets and assessment period for the Northumbria EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			28.3	0.916
Assessment period start	1983	2008	2008	2008
Assessment period end	1983	2011	2011	2011

Table 400: Additional information for the Northumbria EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

In the 2012 report, B<sub>0</sub> still had a different value compared to data call. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production of 5.98 kg/ha based on current data - Wear (based on 1983 estimate that production was lower than current - see Anglian).

### 16.6.5 Progress towards recovery

Too early to make any judgement, no data are given to allow judgement on progress. But Silver eel escapement is already above 40% target in this EMU.

Table 401: Overview of fishing effort reported in the ICES Data Call for the Northumbria EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	11815	365	2
	2009	11815	365	1
	2010	11815	183	1
	2011	11815	254	0
<b>YS rec</b>				
	2008	11815	273	1353614
	2009	11815	272	1495443
	2010	11815	272	1464109
	2011	11815	272	1477572

Table 402: Overview of total catches (commercial + recreational) of eel stages for the Northumbria EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0.09	0.00	0.09
2	2009	0	0.01	0.04	0.06
<b>Post</b>					
3	2010	0	0.00	0.06	0.06
4	2011	0	0.00	0.00	0.00

Table 403: Stock indicators for the Northumbria EMU, the source of the data is indicated in Table 395,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	70.7	70.3	70.6	0	0	0	0
2 2009	70.7	70.3	70.6	0	0	0	0
3 2010	70.7	70.3	70.6	0	0	0	0
4 2011	70.7	70.3	70.6	0	0	0	0

Table 404: WKEPEMP evaluation of progress toward recovery for the Northumbria EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no

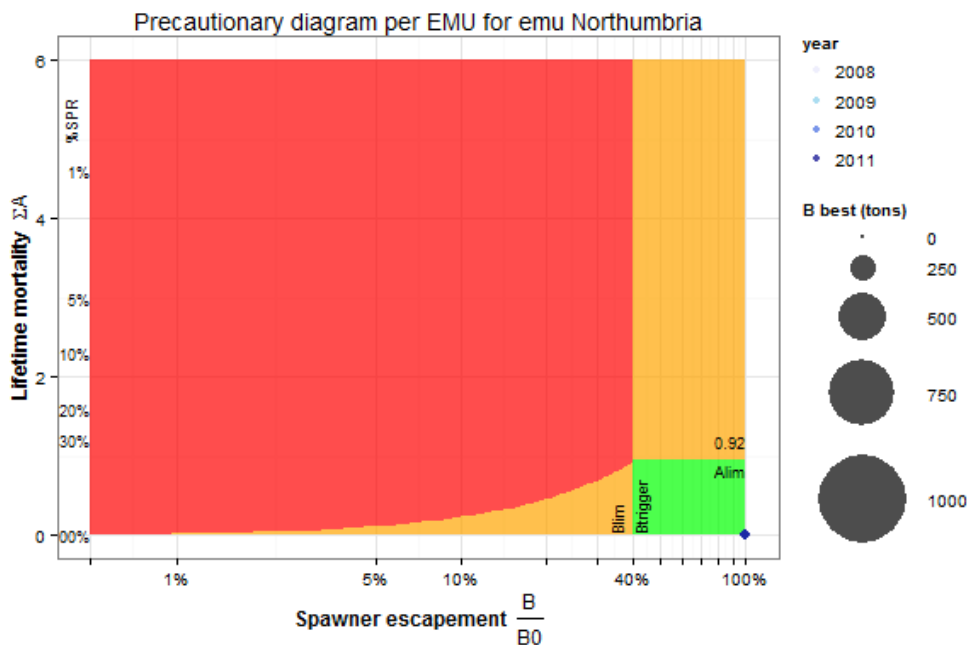


Figure 100: Modified precautionary diagram for the Northumbria EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.6.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and or in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU, except coastal waters. These impacts were included in the assessment: restocking; commercial fisheries; hydropower. These impacts were not included: habitat loss; barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Expert judgement was used to evaluate the impact of some management actions applied. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.7 North West

### 16.7.1 Available information



Figure 101: *North West*, United Kingdom

Table 405: Sources of information for the North West EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 406: Reported stock indicators for North West

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

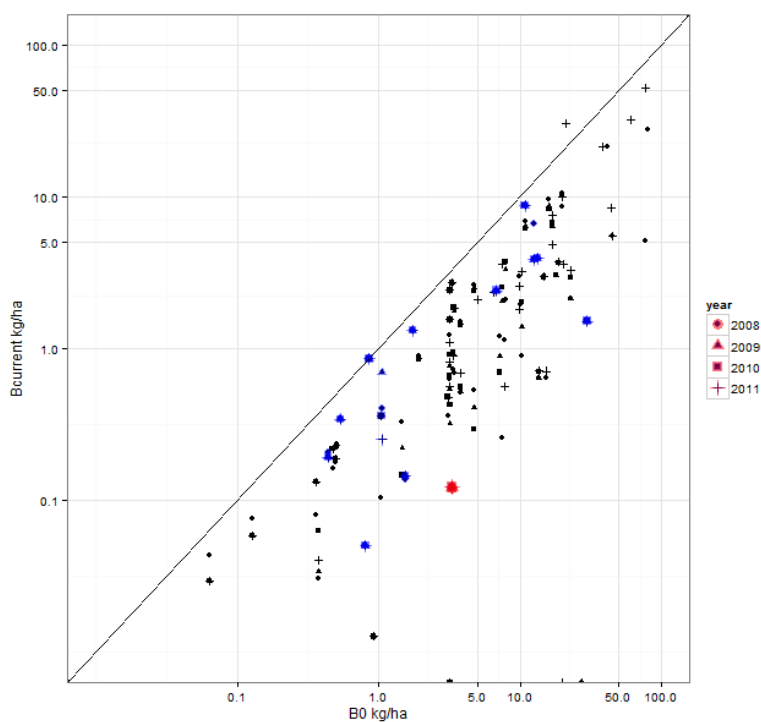


Figure 102:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the North West EMU are shown in red, those for United Kingdom are shown in blue.



Table 407: Source of indicators evaluated for the North West EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B^{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.7.2 Habitat coverage of the EMU

Table 408: Habitats assessed in the North West EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

All habitats were assessed except coastal waters.

### 16.7.3 Management measures

Table 409: Overview of the management actions proposed in the EMP for the North West EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 409: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
10	Identify and implement possible measures under WFD programme to improve eel habitat	M	EMP	fulfilled	unsure

Table 409: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Hydropw. &amp; Obst.</b>					
11	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
12	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
13	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
14	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
15	Development of new design technology for eel pass substrate	M	EMP	fulfilled	knowledge
16	Install 5 new eel passes	M	EMP	fulfilled	unsure
17	Assess obstacles to glass eel migration in the EMU	G	EMP	NA	knowledge
18	Design eel passes on River Sankey, Ditton Brook, Spittle Brook, Whittle Brook	M	EMP	NA	unsure
19	Assess feasibility of passes at 3 weirs on the Mersey	M	EMP	NA	knowledge
20	Produce action plan for alleviating further Mersey obstacles	M	EMP	NA	knowledge
21	Feasibility study of eel passes on weirs of Lune	M	EMP	fulfilled	knowledge
22	Improve fish passage at Yearl (Derwent)	M	EMP	partially	unsure
23	Study barriers to eel movements in Lake District	M	EMP	fulfilled	knowledge
24	Produce priority plan for barrier alleviation	M	EMP	fulfilled	knowledge
25	All fish passage works to consider eels	M	EMP	fulfilled	unsure
26	All abstraction points and hydropower to be assessed and screening recommended	M	EMP	fulfilled	unsure
<b>Restocking</b>					
27	Consider stocking in EMU	G	EMP	fulfilled	knowledge
28	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowledge

Table 409: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
29	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
30	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
31	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
32	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
33	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
34	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
35	Monitor set of 671 multi-species e/f sites	M	EMP	fulfilled	knowledge
36	Establish and fish 10 yellow eel e/f sites on Ellen and Gowy	Y	EMP	fulfilled	unsure
37	Collect eel migration data at Red Barn Dyke	G	EMP	fulfilled	knowledge
38	Investigate status of eel pathogens and contaminants	M	EMP	not done	knowledge
39	Continue to monitor commercial fisheries via import/export data	Y	EMP	fulfilled	knowledge
40	Monitor success of new eel passes	M	EMP	fulfilled	knowledge
41	Stakeholder engagement to aid EMP implementation	M	EMP	fulfilled	unsure
42	Liase with Mersey Life Project	M	EMP	fulfilled	knowledge

High number of management measures were fixed in the EMP and reported on in the 2012 report. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### 16.7.4 Assessment

Table 410: Summary list impact types that were included in the assessments for the North West-EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 411: Summary of targets and assessment period for the North West EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			261.6	0.085
Assessment period start	1979	2008	2008	2008
Assessment period end	1990	2011	2011	2011

Table 412: Additional information for the North West EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

The value given for B<sub>0</sub> in the data call and used here differs from the value given in the 2012 report. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production estimated at 13.98 kg/ha based on SW (excl chalk rivers), Severn and Dee weighted according to area.

#### 16.7.5 Progress towards recovery

Too early to make any judgement, plan had been approved as late as 2010. No data are given to allow judgement on progress. Silver eel escapement has not increased nor anthropogenic mortality decreased yet.

Table 413: Overview of fishing effort reported in the ICES Data Call for the North West EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	26244	365	11
	2009	26244	365	6
	2010	26244	100	9
	2011	26244	100	9
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	46783	365	7
	2009	46783	365	7
	2010	46783	183	6
	2011	46783	254	5
<b>YS rec</b>				
	2008	46783	273	1353614
	2009	46783	272	1495443
	2010	46783	272	1464109
	2011	46783	272	1477572

Table 414: Overview of total catches (commercial + recreational) of eel stages for the North West EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.137	0.26	0.47	
2	2009	0.028	0.08	0.11	
<b>Post</b>					
3	2010	0.043	0.07	0.15	
4	2011	0.123	0.27	1.48	

Table 415: Stock indicators for the North West EMU, the source of the data is indicated in Table 407,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	654	23.7	45.5	0.39	0.26	0.65	0
2	2009	654	24.1	37.3	0.15	0.28	0.44	0
3	2010	654	24.1	37.3	0.15	0.28	0.44	0
4	2011	654	24.1	37.3	0.15	0.28	0.44	0

Table 416: WKEPEMP evaluation of progress toward recovery for the North West EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no



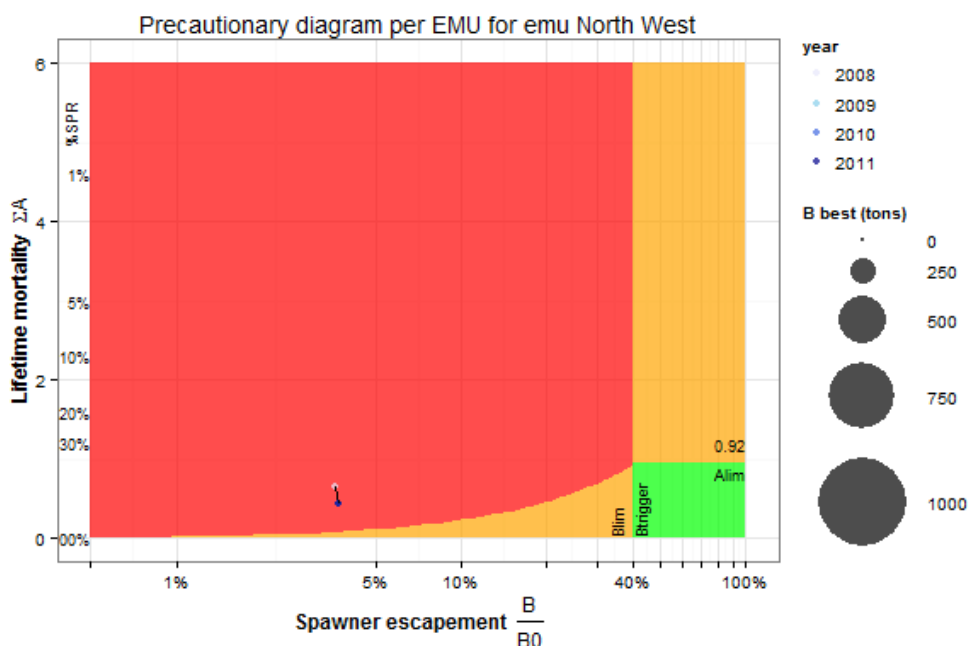


Figure 103: Modified precautionary diagram for the North West EMU (after wgeel2012), see section 1.3.2 for more information.

### 16.7.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: commercial fisheries; hydropower. These impacts were not included: habitat loss; barriers; indirect effects; recreational fisheries; predators. Part of the Management Actions outlined identified for the EMP in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. Expert judgement was used to evaluate the impact of some actions applied. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target) – it is decreasing.

## 16.8 Scotland

### 16.8.1 Available information



Figure 104: *Scotland*, United Kingdom

Table 417: Sources of information for the Scotland EMU

Type of source	Reference
EMP	Scotland River Basin District EMP, Marine Scotland Science/Defra
EMP approved in:	2009
2012 post-evaluation report:	Defra report to EU Commission, 2012
2013 ICES data-call:	
Additional sources:	

Table 418: Reported stock indicators for Scotland

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

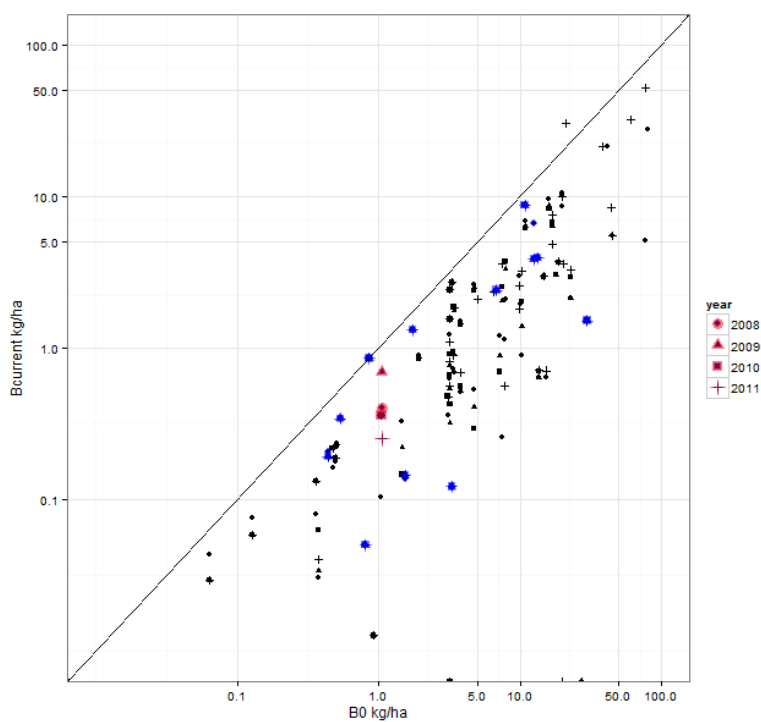


Figure 105:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Scotland EMU are shown in red, those for United Kingdom are shown in blue.

Table 419: Source of indicators evaluated for the Scotland EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.8.2 Habitat coverage of the EMU

Table 420: Habitats assessed in the Scotland EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

Upscaling from three small catchments and just 2 habitat types. These represent a tiny portion of the whole EMU, but cover three distinct altitude bands, and contain both lakes and rivers in approximate relation to Scotland EMP as a whole.

### 16.8.3 Management measures

Table 421: Overview of the management actions proposed in the EMP for the Scotland EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Prohibit fishing without a licence: no licences issued	M	EMP	fulfilled	unsure
2	Target illegal activity by Water Bailiff and Police	M	EMP	fulfilled	unsure
<b>Rec. Fishr.</b>					
3	Prohibit fishing without a licence: 2 licences for catch and release licences issued	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
4	Specific guidance notes for eels for controlled activities under WFD including fish passes.	M	EMP	fulfilled	unsure

Table 421: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
5	Monitoring programmes for yellow and silver eels	M	EMP	fulfilled	knowledge
6	Monitoring programmes for contaminants and Anguillicoloides	M	EMP	fulfilled	knowledge
7	Establishment of elver recruitment monitoring site	Y	undefined	fulfilled	knowledge

All foreseen management measures have been implemented fully.

**16.8.4 Assessment**

Table 422: Summary list impact types that were included in the assessments for the Scotland EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	included	included	absent	absent	included	omitted	

Table 423: Summary of targets and assessment period for the Scotland EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			78.5	0.549
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 424: Additional information for the Scotland EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

Mean production in Scotland RBD just achieved the 40% EU target (40.5%) over the period 2008-2011. Silver eel escapement is measured directly at three sites. Anthropogenic Mortality is not measured, but estimated by making assumption that there is zero production/silver eel escapement from above hydro-power dams or other significant obstructions. Unless barriers are removed/added any changes to ΣA are therefore simply a result of changes in the balance of lost production between the three altitude bands. Calculation of ΣA remained unclear and was not equal to the sum of ΣH + ΣF.

#### 16.8.5 Progress towards recovery

Due to the low anthropogenic pressure, recovery will be almost exclusively dependent on the development of recruitment.

Table 425: Overview of fishing effort reported in the ICES Data Call for the Scotland EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS rec</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0

Table 426: Overview of total catches (commercial + recreational) of eel stages for the Scotland EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0	0
2	2009	0	0	0	0
<b>Post</b>					
3	2010	0	0	0	0
4	2011	0	0	0	0



Table 427: Stock indicators for the Scotland EMU, the source of the data is indicated in Table 419,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	196.3	74.7	102.6		0.27	0.32	0
2 2009	196.3	129.8	175.6	0	0.26	0.30	0
3 2010	196.3	66.9	89.7	0	0.25	0.29	0
4 2011	196.3	47.1	65.2	0	0.28	0.32	0

Table 428: WKEPEMP evaluation of progress toward recovery for the Scotland EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

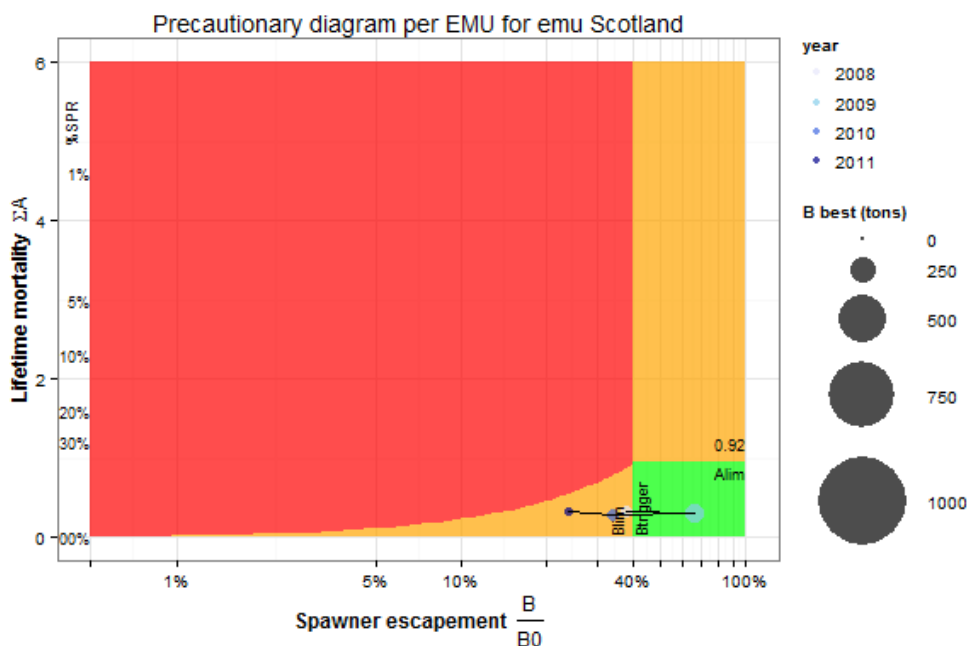


Figure 106: Modified precautionary diagram for the Scotland EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 16.8.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators were derived by extrapolation from small study areas and do not cover all of the eel habitats in the EMU: estuaries, lagoons, marine waters are missing. These impacts were included in the assessment: habitat loss; barriers; indirect effects; hydropower. These impacts were not included: poaching, predators. All of the Management Actions outlined identified for the EMP in the Progress Report have been implemented. Where actions have been implemented, these have all been fully implemented. The impact of management actions could not be evaluated, either because of missing expertise or information.

The biomass of current silver eel escapement is estimated to have no clear trend. It was above the target of the EU Regulation (40%) in 1 year but then below. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.9 Severn

### 16.9.1 Available information



Figure 107: *Severn*, United Kingdom

Table 429: Sources of information for the Severn EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to the EU, 2012
2013 ICES data-call:	
Additional sources:	

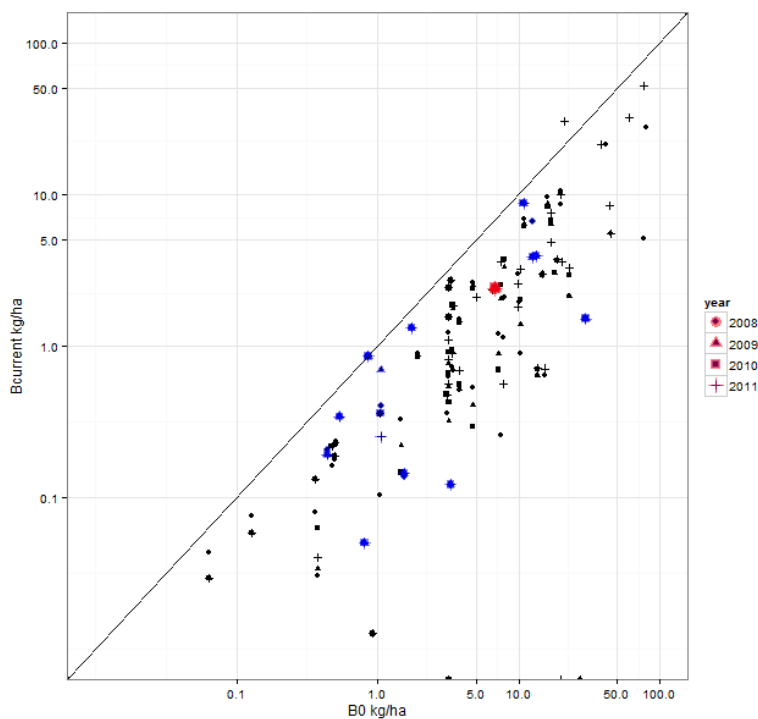


Figure 108:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Severn EMU are shown in red, those for United Kingdom are shown in blue.

Table 430: Reported stock indicators for Severn

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 431: Source of indicators evaluated for the Severn EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.9.2 Habitat coverage of the EMU

Table 432: Habitats assessed in the Severn EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

### 16.9.3 Management measures

Table 433: Overview of the management actions proposed in the EMP for the Severn EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 433: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
10	Identify and implement possible measures under WFD programme to improve eel habitat	M	EMP	fulfilled	knowledge
11	River walkover surveys on all waterbodies failing their WFD classification	M	Other	not done	knowledge
12	Develop guidance for abstraction	M	Other	fulfilled	unsure
13	Install fish-friendly pumps in 2 new pumping stations	M	Other	fulfilled	unsure
14	Use existing consent and works programme to improve eel habitat	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
15	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	knowledge
16	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
17	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
18	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
19	Development of new design technology for eel pass substrate	M	EMP	fulfilled	knowledge
20	Assess habitat and obstructions on Ebbw, Sirhowy and Rhymney	M	EMP	fulfilled	knowledge
21	Produce action plan for barrier alleviation throughout the EMU	M	EMP	fulfilled	knowledge
22	Conduct research into replacement of tidal flaps with structures more suitable for eel passage.	M	EMP	fulfilled	knowledge
23	Monitor effectiveness of any new eel passes in EMU	M	EMP	not done	knowledge

Table 433: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
24	Produce stocking plan for EMU	G	EMP	not done	knowl- edge
25	Carry out pre- and post-stocking surveys	G	EMP	partially	knowl- edge
26	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowl- edge

Table 433: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
27	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
28	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
29	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
30	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
31	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
32	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
33	Monitoring using multi-species e/f	Y	EMP	fulfilled	knowledge
34	Establish 10 site yellow eel specific monitoring programme on Usk	Y	EMP	fulfilled	knowledge
35	Glass eel trapping at two sites	G	EMP	not done	knowledge
36	Assess potential sites for silver eel monitoring	S	EMP	fulfilled	knowledge
37	Continue to monitor commercial fisheries via import/export data	Y	EMP	fulfilled	knowledge
38	Stakeholder engagement to aid EMP implementation	M	EMP	fulfilled	knowledge
39	Fyke netting study of distribution of eels throughout the Caldicot and Wentloog system	Y	Other	fulfilled	knowledge
40	Advise and influence key stakeholders including the Sustainable Eel Group	M	Other	fulfilled	unsure

High number of management measures were fixed in the EMP and reported on in the 2012 report. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### 16.9.4 Assessment



Table 434: Summary list impact types that were included in the assessments for the Severn EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 435: Summary of targets and assessment period for the Severn EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			205.4	0.806
Assessment period start	1983	2008	2008	2008
Assessment period end	1983	2011	2011	2011

Table 436: Additional information for the Severn EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

Indicator values given in the data call and used here differ from values given in the 2012 report. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured.

#### 16.9.5 Progress towards recovery

Too early to make any judgement, plan had been approved as late as 2010. No data are given to allow judgement on progress achieved. 40% target projected to be met in 2032 but silver eel escapement has not increased yet.

Table 437: Overview of fishing effort reported in the ICES Data Call for the Severn EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	54542	365	242
	2009	54542	365	103
	2010	54542	100	191
	2011	54542	100	257
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	75071	365	2
	2009	75071	365	0
	2010	75071	183	1
	2011	75071	254	1
<b>YS rec</b>				
	2008	75071	273	1353614
	2009	75071	272	1495443
	2010	75071	272	1464109
	2011	75071	272	1477572

Table 438: Overview of total catches (commercial + recreational) of eel stages for the Severn EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.554	0.12	0.03	0.14
2	2009	0.111	1.22	0.00	1.22
<b>Post</b>					
3	2010	0.759	0.10	0.15	0.25
4	2011	1.460	0.38	0.35	0.73

Table 439: Stock indicators for the Severn EMU, the source of the data is indicated in Table 431,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	513.5	181.0	254.0	0.30	0.04	0.34	0.000
2 2009	513.5	180.6	236.1	0.23	0.04	0.27	0.000
3 2010	513.5	180.6	236.1	0.23	0.04	0.27	0.000
4 2011	513.5	180.6	236.1	0.23	0.04	0.27	0.039

Table 440: WKEPEMP evaluation of progress toward recovery for the Severn EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

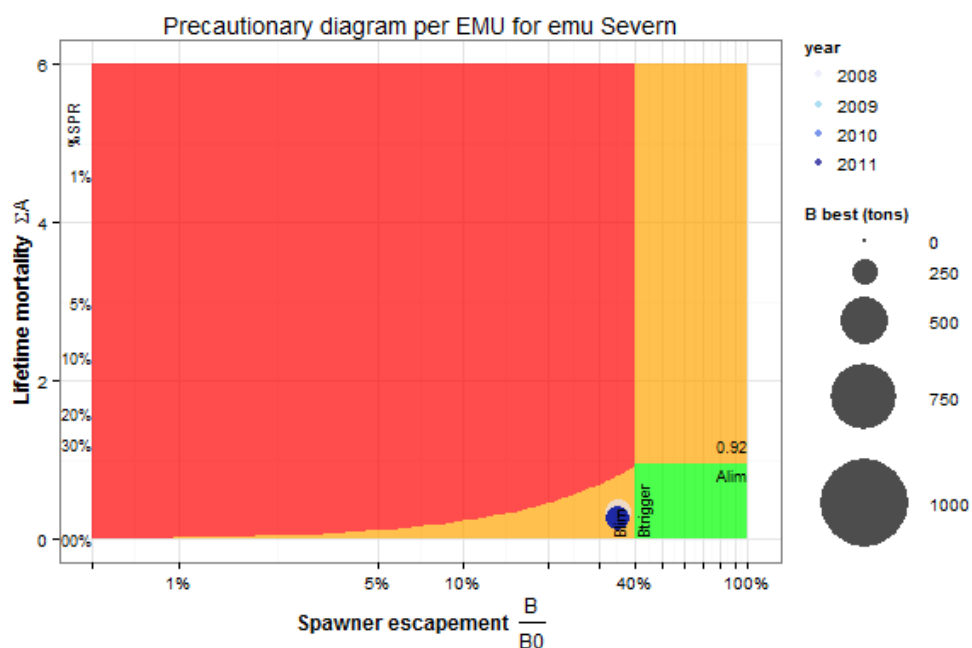


Figure 109: Modified precautionary diagram for the Severn EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.9.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; restocking; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. The impact of management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.10 Solway Tweed

### 16.10.1 Available information



Figure 110: *Solway Tweed*, United Kingdom

Table 441: Sources of information for the Solway Tweed EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 442: Reported stock indicators for Solway Tweed

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

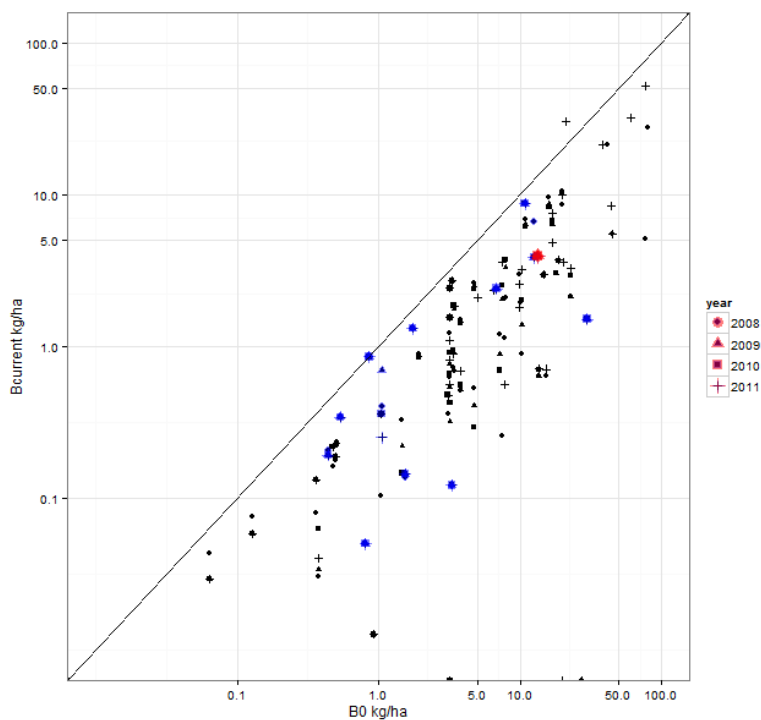


Figure 111:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Solway Tweed EMU are shown in red, those for United Kingdom are shown in blue.

Table 443: Source of indicators evaluated for the Solway Tweed EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.10.2 Habitat coverage of the EMU

Table 444: Habitats assessed in the Solway Tweed EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

### 16.10.3 Management measures



Table 445: Overview of the management actions proposed in the EMP for the Solway Tweed EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Initiate a price monitoring and reporting system for eels less than 12cm long	G	EMP	fulfilled	regulation
2	Reserve at least 35% of eels less than 12cm caught, increasing to 60%, to be marketed for restocking	G	EMP	fulfilled	regulation
3	Initiate a system to ensure the traceability of all live eels imported or exported from UK	M	EMP	fulfilled	regulation
4	If necessary bring in byelaws to limit fisheries and protect stocks	M	EMP	fulfilled	unsure
5	Illegal exploitation of yellow eel and glass eel will be targeted by enforcement teams	M	EMP	partially	unsure
6	Legislation introduced providing new powers to amend, or refuse, permission to fish	M	EMP	fulfilled	unsure
7	Implement regulation of the eel fishery in Scotland, from 2009	M	EMP	fulfilled	unsure
8	Target illegal activity by Water Bailiffs, EA staff and Police	M	EMP	fulfilled	unsure
9	Implement regulation of the eel fishery in Scotland, from 2009	M	EMP	fulfilled	unsure

Table 445: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
10	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
11	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
12	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
13	Improvement work on Border Esk	M	EMP	fulfilled	unsure
14	Implement catchment plans of Eden River Trust	M	Other	fulfilled	unsure
15	Identify and implement possible measures under WFD programme to improve eel habitat	M	EMP	partially	knowledge
16	Use existing consent and works programme to improve eel habitat	M	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
17	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
18	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
19	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
20	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
21	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
22	Install one pass in river Tweed	M	EMP	fulfilled	unsure
23	Install eel pass at Tongland Dam	M	Other	not done	unsure
24	Facilitate eel pass at Lower Clauchrie Burn	M	EMP	fulfilled	unsure
25	Formal assessment of glass eel obstructions, production of action plan	G	EMP	not done	knowledge
26	All abstraction points and hydropower locations to be assessed and screening suggested	M	EMP	partially	unsure
27	All new fish passes to incorporate facility for eel movements	M	EMP	partially	unsure
28	Monitor effectiveness of new eel passes	M	EMP	not done	knowledge
29	Remove obstruction at Milnbie Caul, Annan	M	EMP	not done	knowledge

Table 445: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
30	Further consideration will be given to stocking in English rivers of Solway-Tweed	G	EMP	partially	unsure
31	Produce small stocking plan, incorporating pre- and post-stocking surveys	G	EMP	partially	knowledge
32	Publication of The Eel Manual: Stocking European Eels best practice document	G	EMP	fulfilled	knowledge

Table 445: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
33	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
34	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
35	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
36	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
37	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
38	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
39	Collect multi-species e/f data in EMU	M	EMP	partially	knowledge
40	Establish on yellow eel specific e/f survey in one catchment	Y	EMP	fulfilled	knowledge
41	Seek opportunities to monitor glass eel and silver eel migrations	M	EMP	fulfilled	knowledge
42	Analyse data on historic e/f surveys on River Tweed	Y	EMP	not done	knowledge
43	Seek to investigate A.crassus incidence	Y	EMP	not done	knowledge
44	Raise awareness of eel among angling community and fisheries organisations	M	EMP	fulfilled	knowledge
45	Establish yellow eel monitoring survey on Tweed	Y	EMP	not done	knowledge
46	Continue to monitor commercial fishery from catch returns	Y	EMP	not done	knowledge
47	Stakeholder engagement to aid EMP implementation	M	EMP	not done	unsure

Large variety of measures planned and mostly implemented. Too early to make any judgement on how these actions will impact silver eel escapement - need to ensure a monitoring or evaluation process is in place. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on silver eel escapement.

#### 16.10.4 Assessment

Table 446: Summary list impact types that were included in the assessments for the Solway Tweed EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	included	included	omitted	included

Table 447: Summary of targets and assessment period for the Solway Tweed EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			467.9	0.675
Assessment period start	1979	2008	2008	2008
Assessment period end	1990	2011	2011	2011

Table 448: Additional information for the Solway Tweed EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

Indicator values given in the progress report differ from those in the data call. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Estimated pristine production (13.37) based on 13.98 for Solway and 5.98 for Tweed  $((13.98*35520)+(5.98*2929))/38449$  [For Solway see calculations for West Wales and North West - the Tweed data is taken from Northumbria]

#### 16.10.5 Progress towards recovery

The 40% target is currently not met although there is in principle no fishery and very low anthropogenic mortality. Therefore, progress towards recovery seem to depend entirely on recruitment.

Table 449: Overview of fishing effort reported in the ICES Data Call for the Solway Tweed EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	35519	365	0
	2009	35519	365	1
	2010	35519	183	1
	2011	35519	254	0
<b>YS rec</b>				
	2008	87496	273	1353614
	2009	87496	272	1495443
	2010	87496	272	1464109
	2011	87496	272	1477572

Table 450: Overview of total catches (commercial + recreational) of eel stages for the Solway Tweed EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0	
2	2009	0	0	0	
<b>Post</b>					
3	2010	0	0	0	
4	2011	0	0	0	

Table 451: Stock indicators for the Solway Tweed EMU, the source of the data is indicated in Table 443, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation. ΣA is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for ΣA). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	ΣF	ΣH	ΣA	g.e. Equ.
1	2008	1169.8	345.0	345.0	0	0	0	0
2	2009	1169.8	344.5	344.7	0	0	0	0
3	2010	1169.8	344.5	344.7	0	0	0	0
4	2011	1169.8	344.5	344.7	0	0	0	0

Table 452: WKEPEMP evaluation of progress toward recovery for the Solway Tweed EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	no	
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

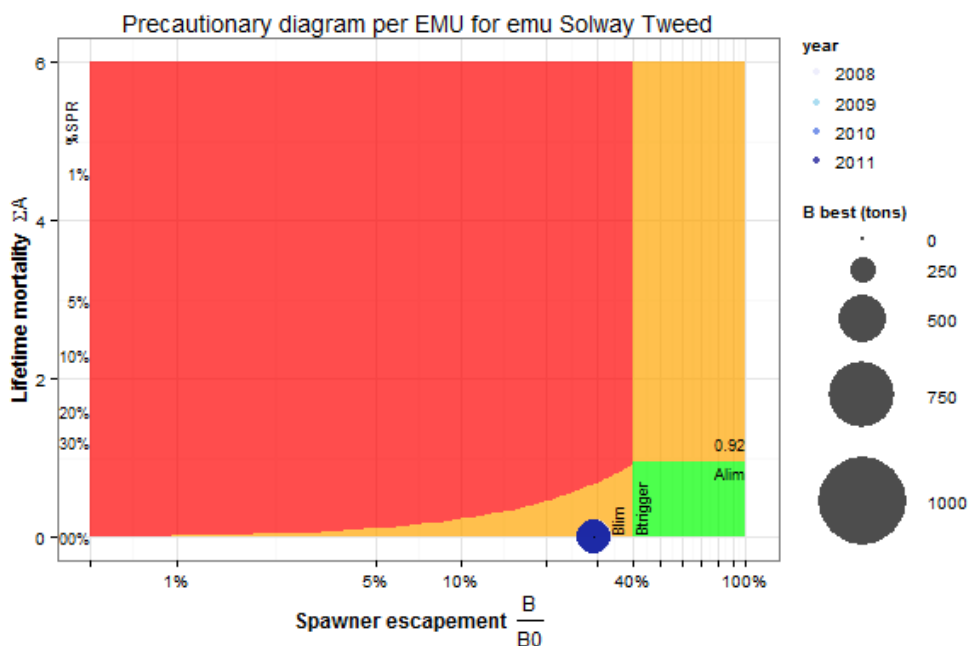


Figure 112: Modified precautionary diagram for the Solway Tweed EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.10.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: barriers; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. The impact of management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is estimated as zero.



## 16.11 South East

### 16.11.1 Available information



Figure 113: *South East*, United Kingdom

Table 453: Sources of information for the South East EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

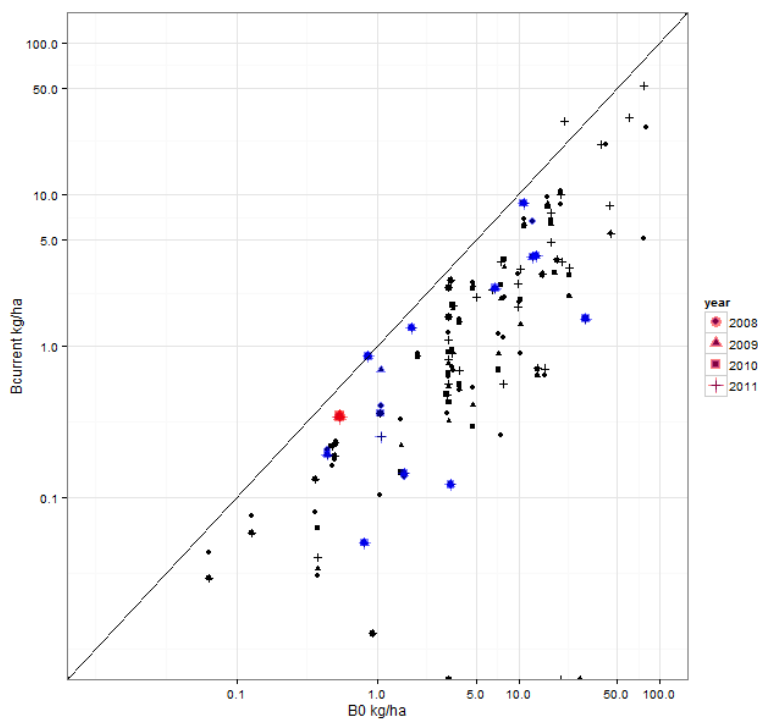


Figure 114:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the South East EMU are shown in red, those for United Kingdom are shown in blue.

Table 454: Reported stock indicators for South East

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 455: Source of indicators evaluated for the South East EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.11.2 Habitat coverage of the EMU

Table 456: Habitats assessed in the South East EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

All habitats in EMU were covered except coastal waters.

### 16.11.3 Management measures

Table 457: Overview of the management actions proposed in the EMP for the South East EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 457: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
10	Identify and implement possible measures under WFD programme to improve eel habitat	M	EMP	fulfilled	unsure
11	Use existing consent and works programme to improve eel habitat	M	EMP	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
12	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
13	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
14	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
15	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	unsure
16	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
17	Install 19 passes in South East RBD	M	EMP	fulfilled	unsure
18	Prioritisation of sites and installation of glass eel passes: Cuckmere, Eastern Rother, Pevensey	G	EMP	fulfilled	unsure
19	Produce action plan for EMU prioritising glass eel barrier alleviation	G	EMP	fulfilled	unsure
20	Develop and install eel passage solutions for tidal flap gates and hatch structures	G	EMP	fulfilled	unsure
21	Produce action plan for barrier alleviation in the EMU	M	EMP	fulfilled	unsure
22	Assess all hydropower locations, abstraction sites and pumping stations, and recommend screening	M	EMP	fulfilled	knowledge
23	Easement of eel passage through tidal flap gates	G	EMP	fulfilled	unsure

Table 457: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
24	Create small scale stocking plan, including pre-and post-stocking surveys	G	EMP	partially	unsure
25	Create stocking plan for EMU	G	EMP	not done	unsure
26	Identify areas for restocking within the RBD	G	EMP	fulfilled	knowledge
27	Publication of The Eel Manual: Stocking European Eels best practice document	G	EMP	fulfilled	knowledge

Table 457: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
28	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
29	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
30	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
31	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
32	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
33	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
34	Monitor 259 multi-species e/f sites	M	EMP	fulfilled	knowledge
35	Establish 10 yellow eel specific electrofishing sites	Y	EMP	fulfilled	unsure
36	Glass eel trapping at 2 sites	G	EMP	not done	knowledge
37	Assess potential sites for silver eel monitoring	S	EMP	fulfilled	knowledge
38	Investigate the use of remote cameras to monitor effectiveness of glass eel passes	G	EMP	not done	knowledge
39	Continue to monitor commercial fishery from catch returns	Y	EMP	fulfilled	knowledge
40	Monitor effectiveness of glass eel passes installed at gauging weirs and any new eel passes	G	EMP	not done	knowledge
41	Stakeholder engagement to aid EMP implementation	M	EMP	fulfilled	unsure
42	MSc project on SE eel populations in association with London Zoo	Y	Other	fulfilled	knowledge
43	Catchment surveys for eel on Cuckmere, Pett Levels and Stour	Y	Other	fulfilled	knowledge
44	Fyke net surveys at Pulborough and Pevensey	Y	Other	fulfilled	knowledge

Large variety of measures planned and mostly implemented. Too early to make any judgement on how these actions will impact silver eel escapement - need to ensure a monitoring or evaluation process is in place. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### **16.11.4 Assessment**

Table 458: Summary list impact types that were included in the assessments for the South East-EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 459: Summary of targets and assessment period for the South East EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			39.2	0.916
Assessment period start	1983	2008	2008	2008
Assessment period end	1983	2011	2011	2011

Table 460: Additional information for the South East EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

B<sub>0</sub> and B<sub>best</sub> have got the same value but B<sub>0</sub> has been calculated from current data by extrapolation (see ICES data call table, comments). In the 2012 report and the EMP, B<sub>0</sub> still had different value. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured and those prevail against fishery mortality. Pristine production of 8.56 kg/ha based on current data (based on 1983 estimate that production was lower than current - see Anglian).

#### 16.11.5 Progress towards recovery

Too early to make any judgement, no data are given to allow judgement on progress. But Silver eel escapement is already above 40% target in this EMU at least when using ICES data call values.



Table 461: Overview of fishing effort reported in the ICES Data Call for the South East EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	11442	365	15
	2009	11442	365	20
	2010	11442	183	22
	2011	11442	254	5
<b>YS rec</b>				
	2008	11442	273	1353614
	2009	11442	272	1495443
	2010	11442	272	1464109
	2011	11442	272	1477572

Table 462: Overview of total catches (commercial + recreational) of eel stages for the South East EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	1.65	0.60	2.25
2	2009	0	3.20	7.03	10.23
<b>Post</b>					
3	2010	0	0.82	1.43	2.25
4	2011	0	0.69	1.88	2.57

Table 463: Stock indicators for the South East EMU, the source of the data is indicated in Table 455, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation. ΣA is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for ΣA). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	ΣF	ΣH	ΣA	g.e. Equ.
1	2008	97.9	63.0	98.0	0.06	0.38	0.44	
2	2009	97.9	62.6	97.9	0.06	0.38	0.45	0
3	2010	97.9	62.6	97.9	0.06	0.38	0.45	0
4	2011	97.9	62.6	97.9	0.06	0.38	0.45	0

Table 464: WKEPEMP evaluation of progress toward recovery for the South East EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no

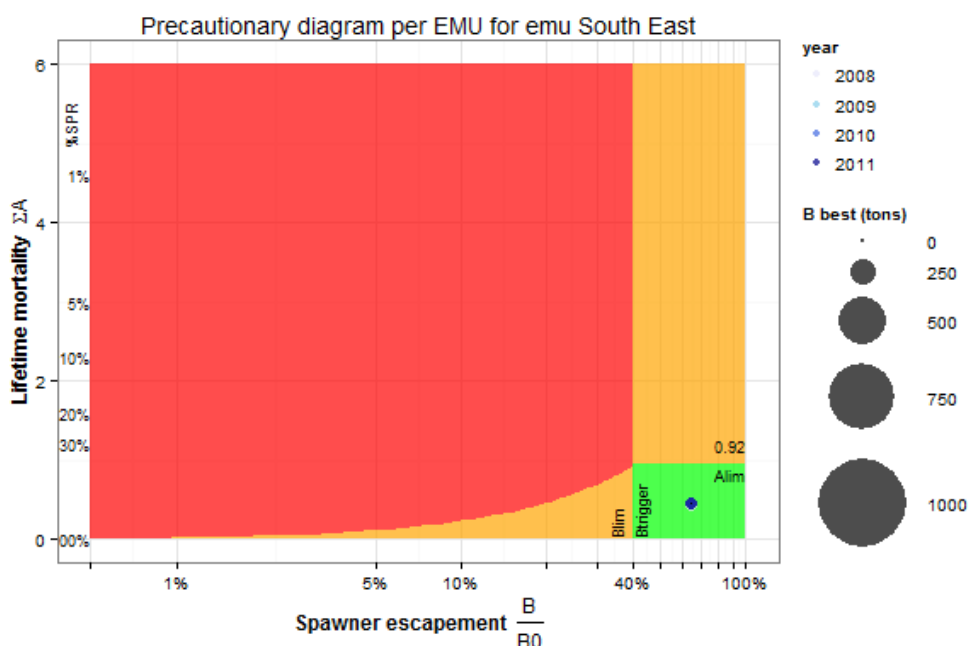


Figure 115: Modified precautionary diagram for the South East EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.11.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. The impact of management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.12 South West

### 16.12.1 Available information



Figure 116: *South West*, United Kingdom

Table 465: Sources of information for the South West EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

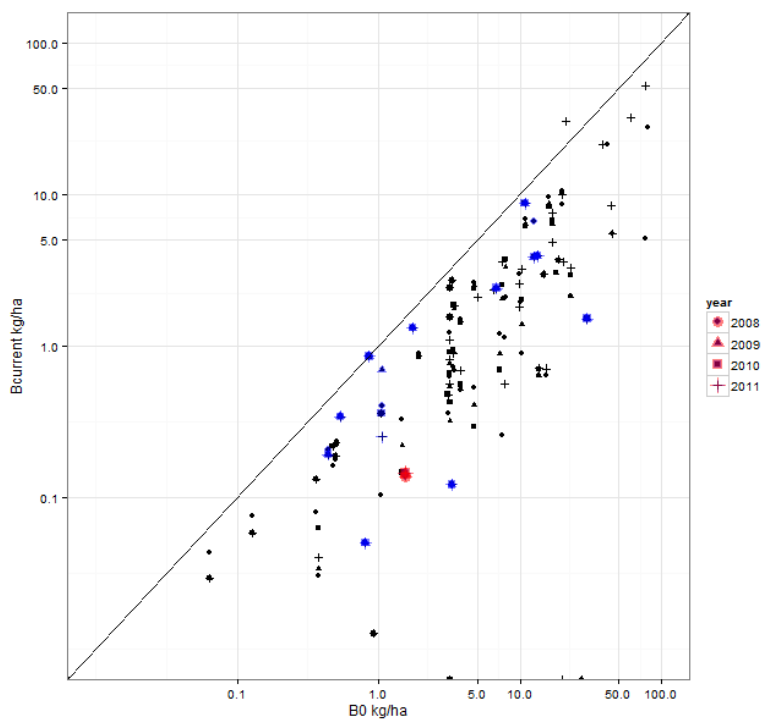


Figure 117:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the South West EMU are shown in red, those for United Kingdom are shown in blue.

Table 466: Reported stock indicators for South West

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 467: Source of indicators evaluated for the South West EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.12.2 Habitat coverage of the EMU

Table 468: Habitats assessed in the South West EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

All habitats in EMU covered in the assessment except coastal waters.

### 16.12.3 Management measures

Table 469: Overview of the management actions proposed in the EMP for the South West EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure
7	M	EMP	fulfilled	knowledge

Table 469: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
8	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
9	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
10	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
11	Improve habitat and access for eel populations according to WFD	M	EMP	fulfilled	unsure
12	Use EA's consenting of works on rivers and still waters and their own works programme to improve eel habitat	M	EMP	fulfilled	unsure

Table 469: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Hydropw. &amp; Obst.</b>					
13	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
14	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
15	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
16	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
17	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
18	Monitor the success of any novel eel passage solutions implemented in the RBD	M	EMP	fulfilled	knowledge
19	Install 17 passes in South West RBD in 2009/2010.	M	EMP	partially	unsure
20	Install eel passes at priority sites, initially targeting those in (EMP)	M	EMP	partially	unsure
21	Assessment and prioritisation of 2011 obstructions to eel migration. Continue to improve eel passage.	M	EMP	fulfilled	unsure
22	Complete the plan of priority actions for facilitating eel passage	M	EMP	fulfilled	unsure
23	Eel passes installed as part of HEP development	M	Other	fulfilled	unsure
24	Identify surface water abstraction points, pumping stations and hydropower installations and quantify impact on eel populations	M	Other	fulfilled	knowledge
25	Investigate and reduce entrainment at 3 pumping stations on the Somerset Levels	M	Other	fulfilled	unsure
26	Identify areas for restocking	G	Other	fulfilled	knowledge



Table 469: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Restocking</b>					
27	Further consideration will be given to stocking	G	EMP	fulfilled	knowledge
28	A stocking plan for the release of glass eels will be produced	G	Other	not done	unsure
29	Undertake pilot study to determine the contribution that stocking makes to the spawning stock	G	Other	not done	knowledge
30	Produce stocking plan for wider RBD	M	Other	not done	knowledge
31	Publication of The Eel Manual: Stocking European Eels best practice document	G	EMP	fulfilled	knowledge

Table 469: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
32	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
33	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
34	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
35	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
36	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
37	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
38	Engage with local IDB to incorporate eel actions into their management of rhyne systems	M	Other	fulfilled	unsure
39	Raise the issue of eel at local fisheries fora	M	Other	fulfilled	unsure
40	The work at Marazion Marsh and Slapton Ley should be continued	Y	Other	fulfilled	unsure
41	EMP Implementation Group convened comprising representatives of the EA teams	M	EMP	fulfilled	unsure
42	The EA will liaise with the South West Wildlife Trusts	M	EMP	fulfilled	unsure
43	Continue monitoring of yellow eel populations	Y	EMP	fulfilled	knowledge
44	Continue monitoring glass eel at Oath Lock and Greylake Sluice	G	EMP	fulfilled	knowledge
45	Implement monitoring of silver eel escapement on the River Huntspill using DIDSON	S	EMP	fulfilled	knowledge
46	Monitor silver eel escapement at one additional location.	S	EMP	not done	knowledge
47	Repeat the Somerset Levels eel trapping study at the same 30+ sites	M	EMP	fulfilled	unsure

High number of management measures were fixed in the EMP and reported on in the 2012 report. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

#### 16.12.4 Assessment

Table 470: Summary list impact types that were included in the assessments for the South West EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 471: Summary of targets and assessment period for the South West EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			238.2	0.214
Assessment period start	1979	2008	2008	2008
Assessment period end	1990	2011	2011	2011

Table 472: Additional information for the South West EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

Indicator values given in the data call and used here differ from values given in the 2012 report. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production based on 1979-1990 data 28.07 kg/ha determined using SMEPII (assumes :14% production from chalk rivers of 82.5 kg/ha the remainder from rain fed rivers at 19.3 kg/ha. Current production estimated at 2.06 kg/ha =((0.138876\*3.58)+((1-0.138876)\*1.82)); Question arises why the glass eel fishing effort has more than doubled after the implementation of EMP actions.

#### 16.12.5 Progress towards recovery

Too early to make any judgement, plan had been approved as late as 2010. No data are given to allow judgement on progress but current ΣA is above the value from 2008. 40% target projected to be met in 2039 but silver eel escapement has not increased nor anthropogenic mortality decreased

yet.

Table 473: Overview of fishing effort reported in the ICES Data Call for the South West EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	8544	365	94
	2009	8544	365	62
	2010	8544	100	65
	2011	8544	100	115
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	35850	365	14
	2009	35850	365	13
	2010	35850	183	13
	2011	35850	254	9
<b>YS rec</b>				
	2008	35850	273	1353614
	2009	35850	272	1495443
	2010	35850	272	1464109
	2011	35850	272	1477572

Table 474: Overview of total catches (commercial + recreational) of eel stages for the South West EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.521	0.55	6.63	7.18
2	2009	0.282	0.30	2.55	2.85
<b>Post</b>					
3	2010	1.079	0.17	2.72	2.89
4	2011	2.033	0.07	3.79	3.86

Table 475: Stock indicators for the South West EMU, the source of the data is indicated in Table 467, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation. ΣA is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for ΣA). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	ΣF	ΣH	ΣA	g.e. Equ.
1 2008	595.5	52.9	118.2	0.62	0.18	0.80	
2 2009	595.5	55.7	141.1	0.77	0.16	0.93	0
3 2010	595.5	55.7	141.1	0.77	0.16	0.93	0
4 2011	595.5	55.7	141.1	0.77	0.16	0.93	0

Table 476: WKEPEMP evaluation of progress toward recovery for the South West EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality (ΣA)	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

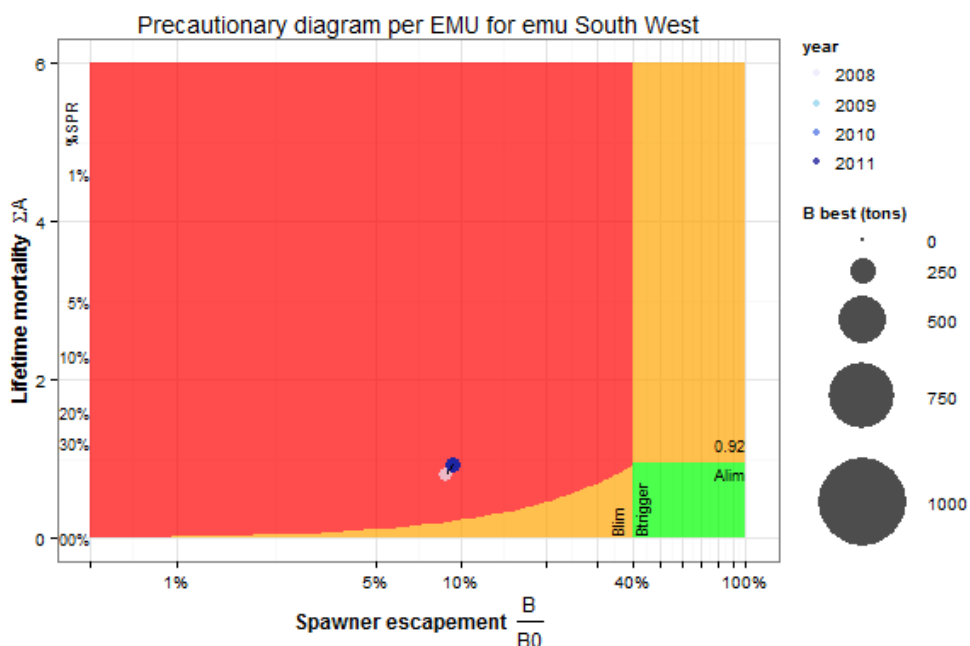


Figure 118: Modified precautionary diagram for the South West EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.12.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, although some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. The impact of management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is far below the target of the EU Regulation (40%) but is estimated to be slightly increasing. Anthropogenic mortality  $\Sigma A$  is slightly above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and is above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.13 Thames

### 16.13.1 Available information



Figure 119: *Thames*, United Kingdom



Table 477: Sources of information for the Thames EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 478: Reported stock indicators for Thames

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

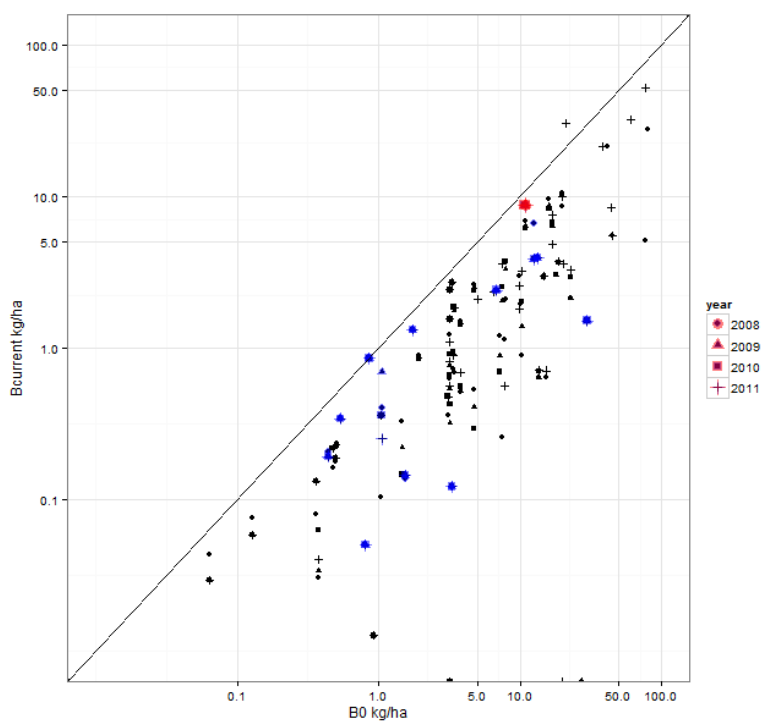


Figure 120:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Thames EMU are shown in red, those for United Kingdom are shown in blue.

Table 479: Source of indicators evaluated for the Thames EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.13.2 Habitat coverage of the EMU

Table 480: Habitats assessed in the Thames EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

All habitats in the EMU were included in the assessment except coastal waters.

### 16.13.3 Management measures

Table 481: Overview of the management actions proposed in the EMP for the Thames EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 481: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
<b>Hydropw. &amp; Obst.</b>					
10	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
11	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
12	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
13	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
14	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
15	Install 15 passes in Thames RBD	M	EMP	fulfilled	unsure
16	Install eel pass at Allington Lock on the River Medway 2010	M	EMP	fulfilled	unsure
17	Ease barriers to eel migration on the Thames, Mole, Wey, Cray and Medway River systems	M	EMP	fulfilled	unsure
18	Install eel pass at Vitbe Sluice on the Cray, via flood defence projects and maintenance works	M	EMP	not done	unsure
<b>Restocking</b>					
19	Publication of The Eel Manual: Stocking European Eels best practice document	G	EMP	fulfilled	knowledge

Table 481: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
20	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
21	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
22	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
23	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
24	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
25	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
26	Continue monitoring of eel populations via multi-species electric fishing surveys and eel-specific surveys	M	EMP	fulfilled	knowledge
27	Install remote monitoring at Allington Lock eel pass	M	EMP	fulfilled	knowledge
28	Continue to gather information on yellow eel density and biomass throughout the RBD	Y	EMP	fulfilled	knowledge
29	Continue eel trapping at four sites to assess recruitment	M	EMP	fulfilled	knowledge
30	Continue to investigate the loss of eels at tidal power stations	M	EMP	fulfilled	knowledge
31	Investigate sites for silver eel monitoring, including the Horton eel trap on the River Colne	S	EMP	fulfilled	knowledge
32	Monitor success of novel eel passage solutions	M	EMP	fulfilled	knowledge
33	Continue to target priority sites for eel passage in the RBD, including the tidal weir at the confluence of the River Wandle with the River Thames	M	EMP	fulfilled	knowledge
34	Complete a thorough assessment of the obstructions and habitat for eels in the Thames RBD	M	EMP	fulfilled	knowledge
35	The Programme of Measures for the Water Framework Directive will be a good opportunity for improving habitat and access for eel populations. All opportunities should be taken to influence waterbodies for the benefit of eel populations	M	EMP	fulfilled	knowledge
36	Use the Environment Agency's consenting of works on rivers and still-waters and their own works	M	EMP	fulfilled	knowledge

programme to improve eel producing  
habitat

Table 481: (continued)

Action	Life Stage	Planned	Outcome	Impact
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Large variety of measures planned and mostly implemented. Too early to make any judgement on how these actions will impact silver eel escapement - need to ensure a monitoring or evaluation process is in place. But most of them are focussed on increasing knowledge and only very few are going to have a direct impact on either silver eel escapement or reduction of mortality.

**16.13.4 Assessment**

Table 482: Summary list impact types that were included in the assessments for the Thames EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 483: Summary of targets and assessment period for the Thames EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			204	0.916
Assessment period start	1983	2008	2008	2008
Assessment period end	1983	2011	2011	2011

Table 484: Additional information for the Thames EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

B<sub>0</sub> and B<sub>best</sub> have got the same value but B<sub>0</sub> has been calculated from current data by extrapolation (see ICES data call table, comments). In the 2012 report, B<sub>0</sub> still had a different value. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production of 11.91 kg/ha based on current data (based on 1983 estimate that production was lower than current - see Anglian).

#### 16.13.5 Progress towards recovery

Too early to make any judgement, no data are given to allow judgement on progress. But Silver eel escapement is already above 40% target in this EMU.



Table 485: Overview of fishing effort reported in the ICES Data Call for the Thames EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	33615	365	10
	2009	33615	365	10
	2010	33615	183	8
	2011	33615	254	6
<b>YS rec</b>				
	2008	42811	273	1353614
	2009	42811	272	1495443
	2010	42811	272	1464109
	2011	42811	272	1477572

Table 486: Overview of total catches (commercial + recreational) of eel stages for the Thames EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0.40	5.55	5.95
2	2009	0	0.12	4.75	4.86
<b>Post</b>					
3	2010	0	0.07	5.66	5.72
4	2011	0	0.51	6.08	6.59

Table 487: Stock indicators for the Thames EMU, the source of the data is indicated in Table 479,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	509.9	410.1	509.7	0.01	0.2	0.22	
2 2009	509.9	411.1	509.7	0.01	0.2	0.22	0
3 2010	509.9	411.1	509.7	0.01	0.2	0.22	0
4 2011	509.9	411.1	509.7	0.01	0.2	0.22	0

Table 488: WKEPEMP evaluation of progress toward recovery for the Thames EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	yes
Has the EMU achieved the most it can without increased recruitment ?	no	no

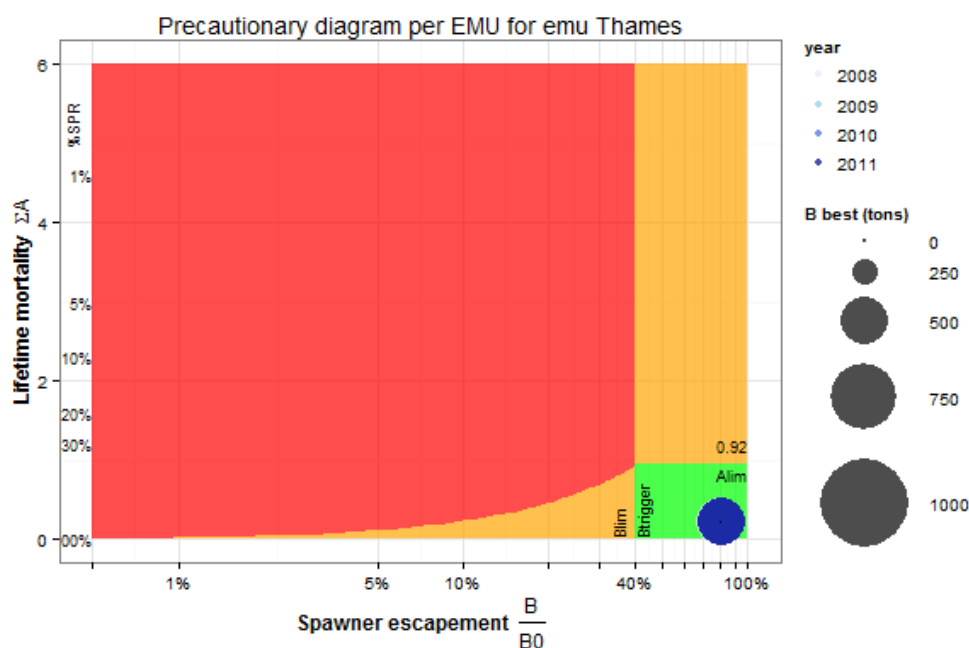


Figure 121: Modified precautionary diagram for the Thames EMU (after wgeel 2012), see section 1.3.2 for more information.

### 16.13.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; restocking; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined identified for the EMP in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. The impact of management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 16.14 Western Wales

### 16.14.1 Available information



Figure 122: *Western Wales*, United Kingdom

Table 489: Sources of information for the Western Wales EMU

Type of source	Reference
EMP	
EMP approved in:	2010
2012 post-evaluation re- port:	Defra report to EU, 2012
2013 ICES data-call:	
Additional sources:	

Table 490: Reported stock indicators for Western Wales

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

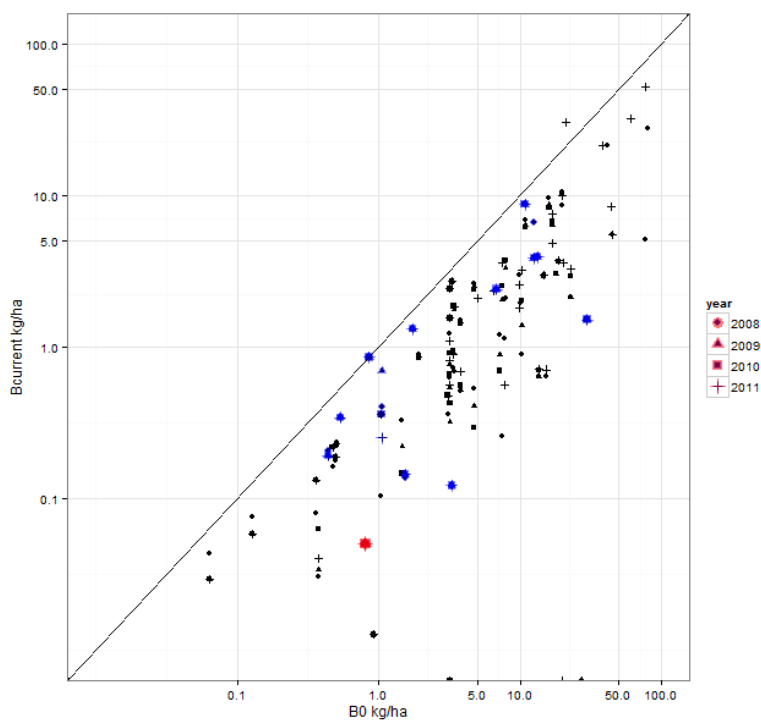


Figure 123:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Western Wales EMU are shown in red, those for United Kingdom are shown in blue.

Table 491: Source of indicators evaluated for the Western Wales EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call

### 16.14.2 Habitat coverage of the EMU

Table 492: Habitats assessed in the Western Wales EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

### 16.14.3 Management measures

Table 493: Overview of the management actions proposed in the EMP for the Western Wales EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	G	EMP	fulfilled	regulation
2	G	EMP	fulfilled	regulation
3	M	EMP	fulfilled	regulation
4	M	EMP	fulfilled	unsure
5	M	EMP	partially	unsure
6	M	EMP	fulfilled	unsure

Table 493: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
7	All new river abstractions must be screened to prevent entrainment of eel	M	EMP	fulfilled	unsure
8	All existing river diversion structures to have screens fitted to prevent eel entrainment	M	EMP	fulfilled	unsure
9	Publication of The Eel Manual: Screening at intakes and outfalls: measures to protect eel	M	EMP	fulfilled	knowledge
<b>Hydropw. &amp; Obst.</b>					
10	Introduction of new legislation to protect the passage of eel	M	EMP	fulfilled	unsure
11	All new impounding structures must incorporate an approved eel pass	M	EMP	fulfilled	unsure
12	All existing and significant barriers to eel passage will have an eel pass retro-fitted	M	EMP	partially	unsure
13	Produce a map of tidal outfall structures and develop a list of priority sites for easing eel passage	M	EMP	fulfilled	knowledge
14	Development of new design technology for eel pass substrate	M	EMP	fulfilled	unsure
15	In 2009/2010 it is proposed to install 4 passes in West Wales RBD	M	EMP	fulfilled	unsure
<b>Restocking</b>					
16	Publication of The Eel Manual: Stocking European Eels best practise document	G	EMP	fulfilled	knowledge



Table 493: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
17	Engagement of key industry sectors through face to face meetings	M	EMP	fulfilled	unsure
18	Develop national communications campaign on the European eel	M	EMP	fulfilled	unsure
19	Assessment of multi-species monitoring data in assessing yellow eel populations	Y	EMP	fulfilled	knowledge
20	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	fulfilled	knowledge
21	Identify all surface water abstraction points, pumping stations and hydropower installations and quantify their impact on eel populations	M	EMP	fulfilled	knowledge
22	Publication of The Eel Manual: Monitoring Elver and eel populations best practice document	M	EMP	fulfilled	knowledge
23	Establish a programme of ten eel specific surveys carried out biennially on at least two river systems	M	EMP	fulfilled	unsure
24	Potential sites for silver eel monitoring will be investigated	S	EMP	fulfilled	knowledge
25	Continue to gather information on yellow eel density and biomass throughout the RBD	Y	EMP	fulfilled	knowledge
26	Glass eel trapping will be carried out at two sites to assess recruitment.	G	EMP	not done	knowledge
27	Illegal exploitation of yellow eel and glass eels will be targeted by enforcement teams	M	EMP	not done	unsure
28	Further development of models to assess compliance with target (RCM and SMEP)	M	EMP	not done	knowledge
29	Monitor success of novel eel passage	M	EMP	not done	knowledge
30	An assessment of the major obstructions to eel migration across the whole Western Wales RBD.	M	EMP	fulfilled	knowledge
31	Input into the Programme of Measures for the Water Framework Directive as a good opportunity for improving habitat and access for eel populations	M	EMP	fulfilled	unsure
32	Use the Environment Agency's consenting of works on rivers and stillwaters and their own works programme to improve eel producing habitat	M	EMP	fulfilled	unsure
33	Identify waterbodies within the Water Framework Directive Ongoing from 2009 Programme of Measures	M	EMP	fulfilled	knowledge

35	with significant opportunities improving eel habitat Produce plan of priority actions for	M	EMP	fulfilled	knowl-
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Table 493: (continued)

Action	Life Stage	Planned	Outcome	Impact
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High number of management measures were fixed in the EMP and reported on in the 2012 report. But most of them are focussed on increasing knowledge and only very few are going to have a direct and immediate impact on either silver eel escapement or reduction of mortality.

**16.14.4 Assessment**

Table 494: Summary list impact types that were included in the assessments for the Western Wales EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	included	omitted	included	omitted	included	omitted	included

Table 495: Summary of targets and assessment period for the Western Wales EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			148.6	0.143
Assessment period start	1979	2008	2008	2008
Assessment period end	1990	2011	2011	2011

Table 496: Additional information for the Western Wales EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			yes	yes

Indicator values given in the data call and used here differ from values given in the 2012 report for B<sub>0</sub>. Biased towards river samples of resident eel to assess the status of stock - lakes, estuaries and large section of rivers not sampled but extrapolated from river samples. Impact of non-fishery anthropogenic factors estimated as opposed to measured. Pristine production estimated at 13.98 kg/ha based on SW (excl chalk rivers), Severn and Dee weighted according to area.

#### 16.14.5 Progress towards recovery

Too early to make any judgement, plan had been approved as late as 2010. No data are given to allow judgement on progress except that ΣA has been decreasing. Current escapement is far below target and no projection is given as when this will be reached. Silver eel escapement has not increased yet due to the fact that actions taken will need up to 15 years to show their impact. But ΣA is very small and B<sub>current</sub> almost equals B<sub>best</sub>. Therefore, recovery mainly depends on recruitment in future.

Table 497: Overview of fishing effort reported in the ICES Data Call for the Western Wales EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	13475	365	4
	2009	13475	365	0
	2010	13475	100	1
	2011	13475	100	1
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008	26569	365	2
	2009	26569	365	2
	2010	26569	183	5
	2011	26569	254	3
<b>YS rec</b>				
	2008	26569	273	1353614
	2009	26569	272	1495443
	2010	26569	272	1464109
	2011	26569	272	1477572

Table 498: Overview of total catches (commercial + recreational) of eel stages for the Western Wales EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.006	0.01	0.12	0.13
2	2009	0.000	0.04	0.02	0.06
<b>Post</b>					
3	2010	0.002	0.01	0.35	0.35
4	2011	0.004	0.01	0.25	0.26

Table 499: Stock indicators for the Western Wales EMU, the source of the data is indicated in Table 491,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	371.4	23.0	27.2	0.09	0.08	0.17	0
2 2009	371.4	23.1	25.4	0.01	0.08	0.09	0
3 2010	371.4	23.1	25.4	0.01	0.08	0.09	0
4 2011	371.4	23.1	25.4	0.01	0.08	0.09	0

Table 500: WKEPEMP evaluation of progress toward recovery for the Western Wales EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?	amber	
Has the EMU reached the long term target set by the EMP ?	amber	
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

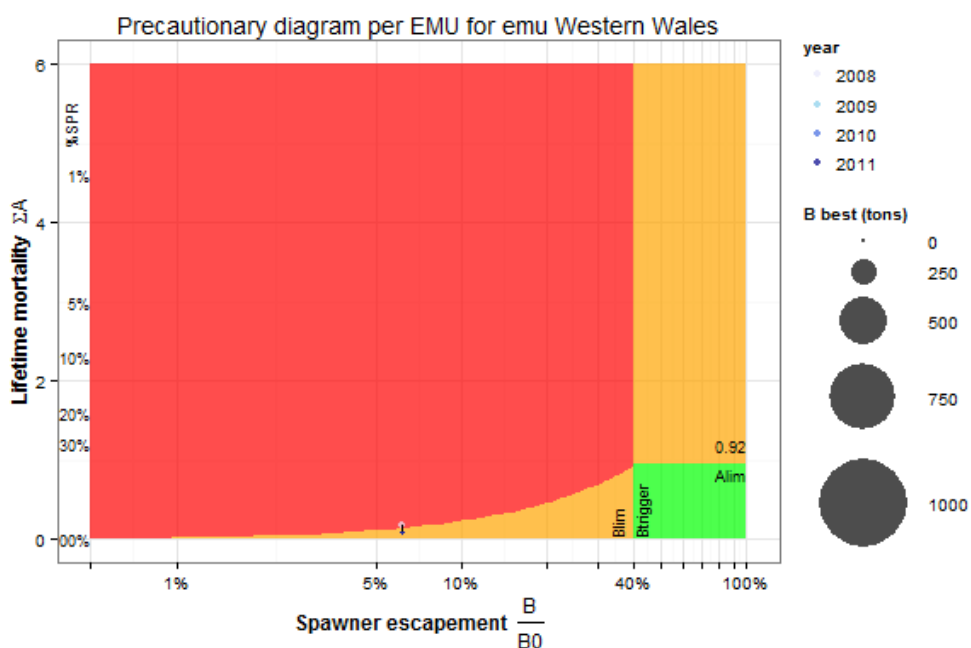


Figure 124: Modified precautionary diagram for the Western Wales EMU (after WGEEL 2012), see section 1.3.2 for more information.

**16.14.6 Conclusion**

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. All stock indicators were available. The stock indicators cover all the eel habitats in the EMU except coastal waters. These impacts were included in the assessment: habitat loss; indirect effects; commercial fisheries; hydropower. These impacts were not included: barriers; indirect effects; recreational fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is far below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17 France

### 17.1 Adour

#### 17.1.1 Available information

Figure 125: *Adour*, France

Table 501: Sources of information for the Adour EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en uvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x)<U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemoa.irstea.fr/cemoa/PUB00036398">cemoa.irstea.fr/cemoa/PUB00036398</a> .



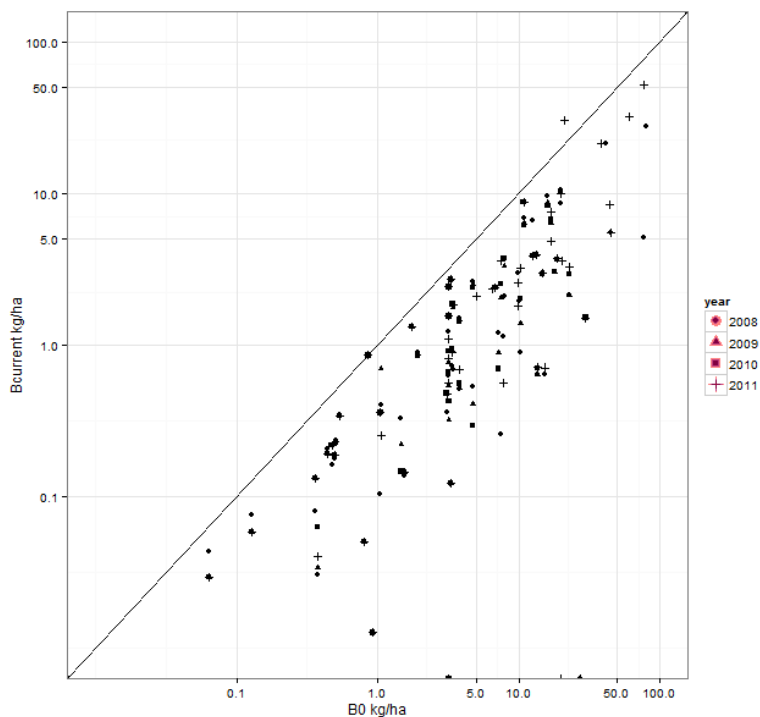


Figure 126:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Adour EMU are shown in red, those for France are shown in blue.

Table 502: Reported stock indicators for Adour

Name	Pre	Post
$B_{current}$	yes	no
$B_{best}$	no	no
$B_0$	no	no
$\Sigma A$	yes	no
$\Sigma F$	no	no
$\Sigma H$	yes	no

Table 503: Source of indicators evaluated for the Adour EMU

Stock indicator	Source
$B_0$	EMP
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2013 ICES data-call

### 17.1.2 Habitat coverage of the EMU

Table 504: Habitats assessed in the Adour EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.1.3 Management measures

Table 505: Overview of the management actions proposed in the EMP for the Adour EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Supervise and implement a glass eel fishing quota in maritime and inland waterway	G	EMP	fulfilled	unsure
2	Introduce a community license for every glass eel fishermen	G	EMP	fulfilled	unsure
3	Reduce glass eel fishing season duration to 5 months (and suppress weekly fishing closure)	G	EMP	fulfilled	none
4	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled	low
5	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
6	Ban silver eel fishery	S	EMP	fulfilled	low
7	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	unsure
8	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	unsure
9	Define the landing stations	U	EMP	partially	unsure
10	Implement measures to assure the traceability	M	EMP	fulfilled	regulation
<b>Recr. Fishr.</b>					
11	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
12	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	unsure
13	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
14	Introduce night fishing banned	Y	EMP	fulfilled	unsure
15	Implement a reporting of catches	Y	EMP	partially	knowledge
16	Implement a survey of catches	Y	EMP	not done	knowledge

Table 505: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
17	Establish a PCB plan	U	EMP	partially	unsure
18	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
19	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
20	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
21	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
22	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
23	Demolish or mitigate obstacles	U	EMP	partially	unsure
24	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Restocking</b>					
25	Reserve a certain % of glass eel caught for restocking	G	EMP	fulfilled	regulation
26	Implement a glass eel restocking program 5-10% of glass eel catches	G	EMP	fulfilled	unsure
27	Implement a monitoring and assessment restocking program	U	EMP	fulfilled	knowledge
<b>Others</b>					
28	Establish contacts with other states members	U	EMP	not done	none
29	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
30	EDA model development	M	EMP	fulfilled	knowledge
31	Development of a population dynamic model	U	EMP	partially	knowledge
32	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
33	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
34	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures have been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of the single measures in many cases could not be assessed here due to a lack of information.

**17.1.4 Assessment**

Table 506: Summary list impact types that were included in the assessments for the Adour EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included		

Table 507: Summary of targets and assessment period for the Adour EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 508: Additional information for the Adour EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

### 17.1.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 509: Overview of fishing effort reported in the ICES Data Call for the Adour EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011		151	
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		365	
	2009		209	
	2010		178	
	2011		149	
<b>YS rec</b>				
	2008		365	
	2009		209	
	2010		178	
	2011		149	

Table 510: Overview of total catches (commercial + recreational) of eel stages for the Adour EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	6.743	0	1.30	
2	2009	0.217	0	0.46	
<b>Post</b>					
3	2010	1.079	0		
4	2011	2.289	0		

Table 511: Stock indicators for the Adour EMU, the source of the data is indicated in Table 503,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		220.7			0.03	2.48	
2 2009		184.1			0.03	2.76	
3 2010							
4 2011							

Table 512: WKEPEMP evaluation of progress toward recovery for the Adour EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		



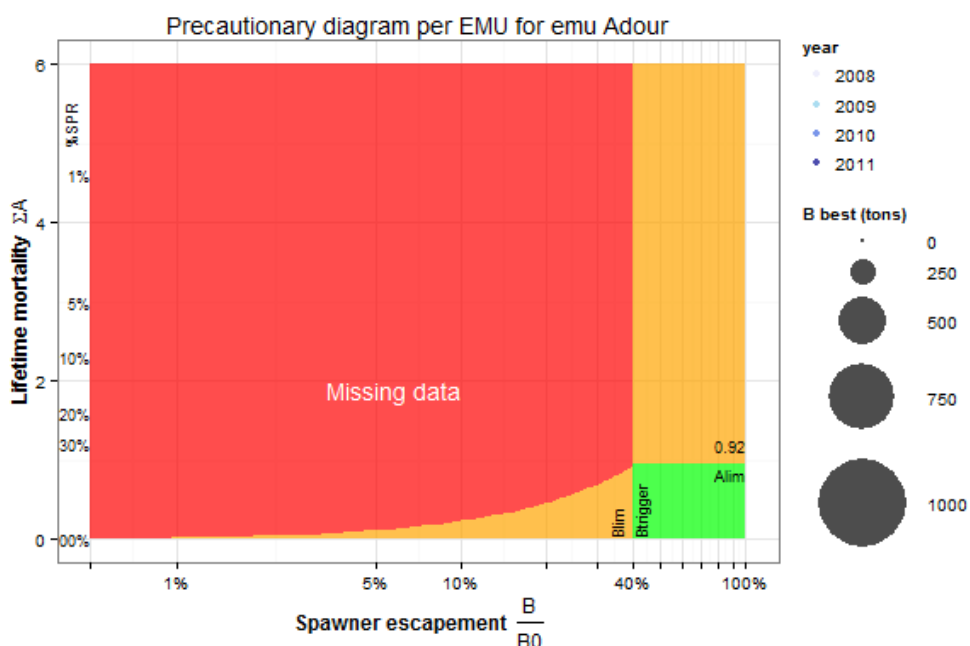


Figure 127: Modified precautionary diagram for the Adour EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 17.1.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes and marine waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement was estimated to be decreasing from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and is above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.2 Artois-Picardie

### 17.2.1 Available information



Figure 128: *Artois-Picardie*, France

Table 513: Sources of information for the Artois-Picardie EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x)<U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 514: Reported stock indicators for Artois-Picardie

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 515: Source of indicators evaluated for the Artois-Picardie EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

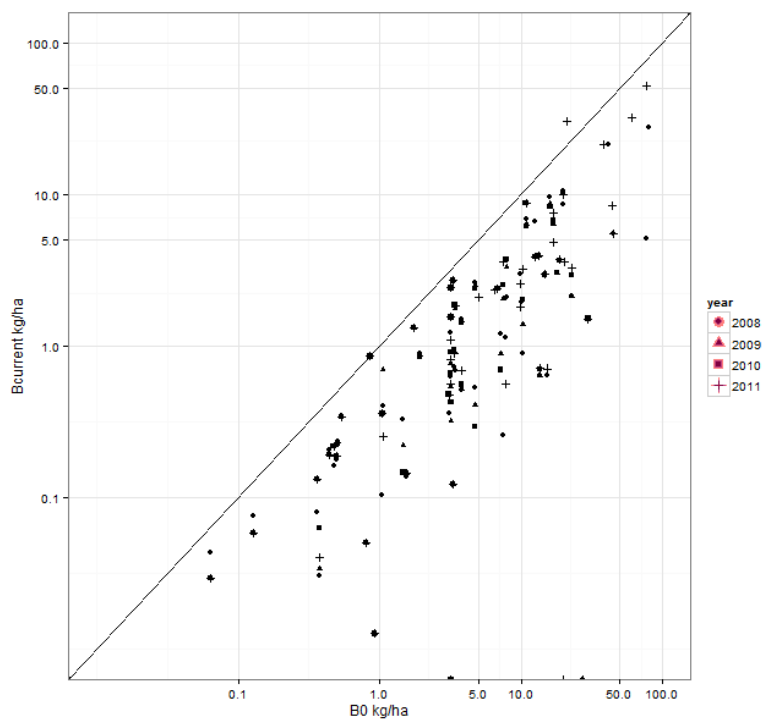


Figure 129:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Artois-Picardie EMU are shown in red, those for France are shown in blue.

### 17.2.2 Habitat coverage of the EMU

Table 516: Habitats assessed in the Artois-Picardie EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.2.3 Management measures

Table 517: Overview of the management actions proposed in the EMP for the Artois-Picardie EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Supervise and implement a glass eel fishing quota in maritime and inland waterway	G	EMP	fulfilled	unsure
2	Introduce a community license for every glass eel fishermen	G	EMP	fulfilled	unsure
3	Reduce glass eel fishing season duration to 5 months (and suppress weekly fishing closure)	G	EMP	fulfilled	none
4	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled	interm
5	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
6	Ban silver eel fishery	S	EMP	fulfilled	unsure
7	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	low
8	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	low
9	Define the landing stations	U	EMP	partially	unsure
10	Implement measures to assure the traceability	M	EMP	fulfilled	regulation
<b>Recr. Fishr.</b>					
11	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
12	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	low
13	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
14	Introduce night fishing banned	Y	EMP	fulfilled	unsure
15	Implement a reporting of catches	Y	EMP	partially	knowledge
16	Implement a survey of catches	Y	EMP	not done	knowledge

Table 517: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
17	Establish a PCB plan	U	EMP	partially	unsure
18	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
19	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
20	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
21	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	unsure
22	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
23	Demolish or mitigate obstacles	U	EMP	partially	unsure
24	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Restocking</b>					
25	Reserve a certain % of glass eel caught for restocking	G	EMP	fulfilled	regulation
26	Implement a glass eel restocking program 5-10% of glass eel catches	G	EMP	fulfilled	unsure
27	Implement a monitoring and assessment restocking program	U	EMP	fulfilled	knowledge
<b>Others</b>					
28	Establish contacts with other states members	U	EMP	fulfilled	none
29	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
30	EDA model development	M	EMP	fulfilled	knowledge
31	Development of a population dynamic model	U	EMP	partially	knowledge
32	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
33	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
34	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of single measures in many cases could not be assessed here due to a lack of information.

### 17.2.4 Assessment

Table 518: Summary list impact types that were included in the assessments for the Artois-Picardie EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included		



Table 519: Summary of targets and assessment period for the Artois-Picardie EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 520: Additional information for the Artois-Picardie EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

### 17.2.5 Progress towards recovery

There have no indicators been reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 521: Overview of fishing effort reported in the ICES Data Call for the Artois-Picardie EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011		74	
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		365	
	2009		212	
	2010		181	
	2011		150	
<b>YS rec</b>				
	2008		365	
	2009		212	
	2010		181	
	2011		150	

Table 522: Overview of total catches (commercial + recreational) of eel stages for the Artois-Picardie EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.409	0	1.5	
2	2009		0		
<b>Post</b>					
3	2010	0.480	0		
4	2011	0.278	0		

Table 523: Stock indicators for the Artois-Picardie EMU, the source of the data is indicated in Table 515,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		95.9			0.01	2.48	
2 2009		80.0			0.01	2.76	
3 2010							
4 2011							

Table 524: WKEPEMP evaluation of progress toward recovery for the Artois-Picardie EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

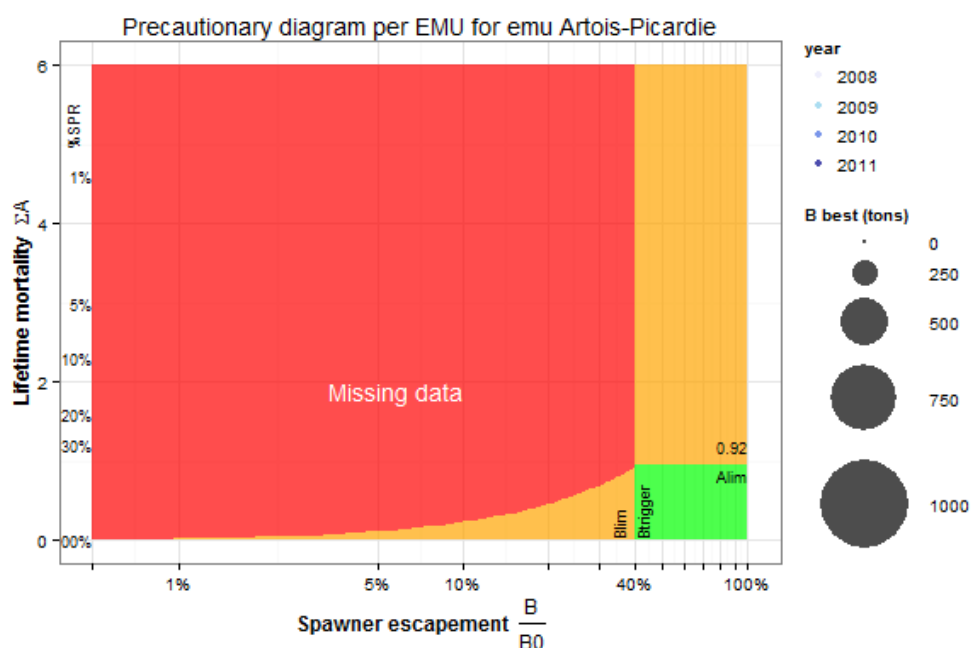


Figure 130: Modified precautionary diagram for the Artois-Picardie EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.2.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes and marine coastal waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement was estimated to be decreasing from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.3 Bretagne

### 17.3.1 Available information

Figure 131: *Bretagne*, France

Table 525: Sources of information for the Bretagne EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x) <U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 526: Reported stock indicators for Bretagne

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 527: Source of indicators evaluated for the Bretagne EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

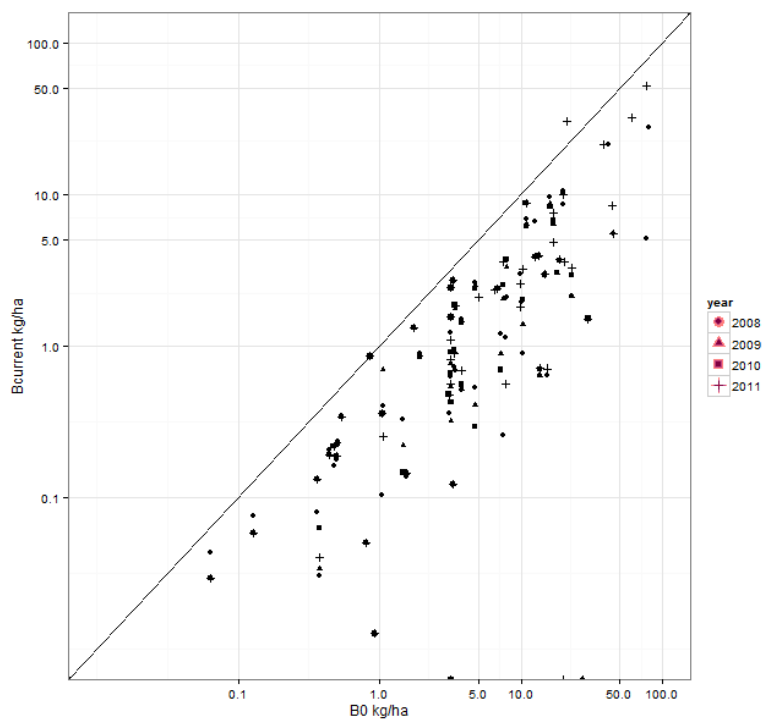


Figure 132:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Bretagne EMU are shown in red, those for France are shown in blue.

### 17.3.2 Habitat coverage of the EMU

Table 528: Habitats assessed in the Bretagne EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) cover rivers and estuaries. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.\*

### 17.3.3 Management measures



Table 529: Overview of the management actions proposed in the EMP for the Bretagne EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Supervise and implement a glass eel fishing quota in maritime and inland waterway	G	EMP	fulfilled	unsure
2	Introduce a community license for every glass eel fishermen	G	EMP	fulfilled	unsure
3	Reduce glass eel fishing season duration to 5 months (and suppress weekly fishing closure)	G	EMP	fulfilled	none
4	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled	low
5	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
6	Ban silver eel fishery	S	EMP	fulfilled	low
7	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	unsure
8	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	unsure
9	Define the landing stations	U	EMP	partially	unsure
10	Implement measures to assure the traceability	M	EMP	fulfilled	regulation
<b>Recr. Fishr.</b>					
11	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
12	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	low
13	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
14	Introduce night fishing banned	Y	EMP	fulfilled	unsure
15	Implement a reporting of catches	Y	EMP	partially	knowledge
16	Implement a survey of catches	Y	EMP	not done	knowledge

Table 529: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
17	Establish a PCB plan	U	EMP	partially	unsure
18	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
19	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
20	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
21	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
22	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
23	Demolish or mitigate obstacles	U	EMP	partially	unsure
24	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Restocking</b>					
25	Reserve a certain % of glass eel caught for restocking	G	EMP	fulfilled	regulation
26	Implement a glass eel restocking program 5-10% of glass eel catches	G	EMP	fulfilled	unsure
27	Implement a monitoring and assessment restocking program	U	EMP	fulfilled	knowledge
<b>Others</b>					
28	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
29	EDA model development	M	EMP	fulfilled	knowledge
30	Development of a population dynamic model	U	EMP	partially	knowledge
31	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
32	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
33	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of the single measures in many cases could not be assessed here due to a lack of information.

#### 17.3.4 Assessment

Table 530: Summary list impact types that were included in the assessments for the Bretagne EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included	absent	

Table 531: Summary of targets and assessment period for the Bretagne EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 532: Additional information for the Bretagne EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

### 17.3.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 533: Overview of fishing effort reported in the ICES Data Call for the Bretagne EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011		150	
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		365	
	2009		213	
	2010		184	
	2011		152	
<b>YS rec</b>				
	2008		365	
	2009		213	
	2010		184	
	2011		152	

Table 534: Overview of total catches (commercial + recreational) of eel stages for the Bretagne EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	5.864	0	1.8	
2	2009		0		
<b>Post</b>					
3	2010		0		
4	2011		0		

Table 535: Stock indicators for the Bretagne EMU, the source of the data is indicated in Table 527,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		269.6			0.02	2.48	
2 2009		224.5			0.02	2.76	
3 2010							
4 2011							

Table 536: WKEPEMP evaluation of progress toward recovery for the Bretagne EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

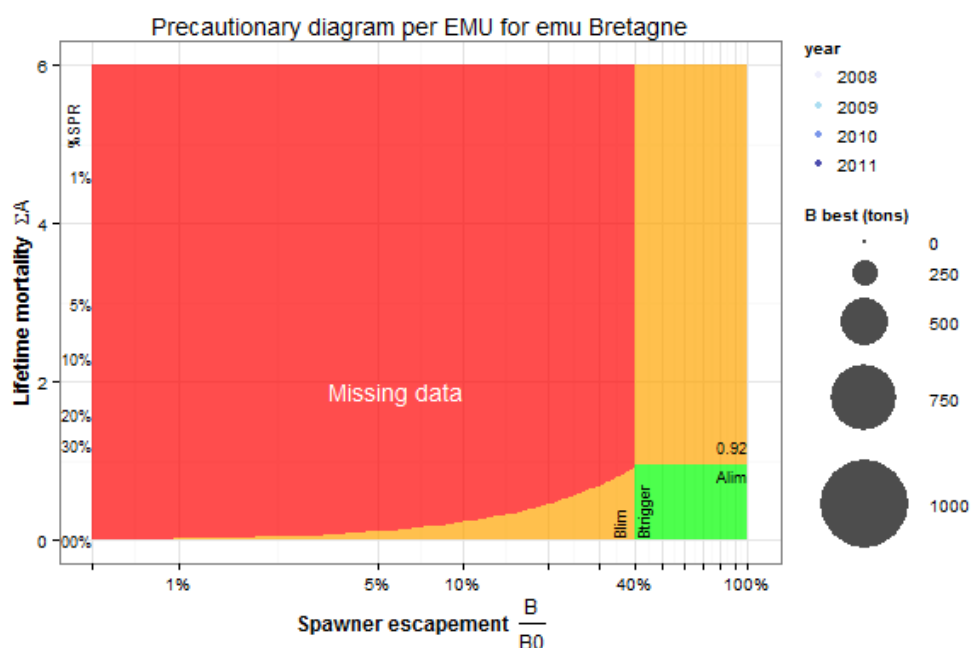


Figure 133: Modified precautionary diagram for the Bretagne EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.3.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes and marine coastal waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement was estimated to be decreasing from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.4 Corse

### 17.4.1 Available information

Figure 134: Corse, France

Table 537: Sources of information for the Corse EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x) <U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 538: Reported stock indicators for Corse

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 539: Source of indicators evaluated for the Corse EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call



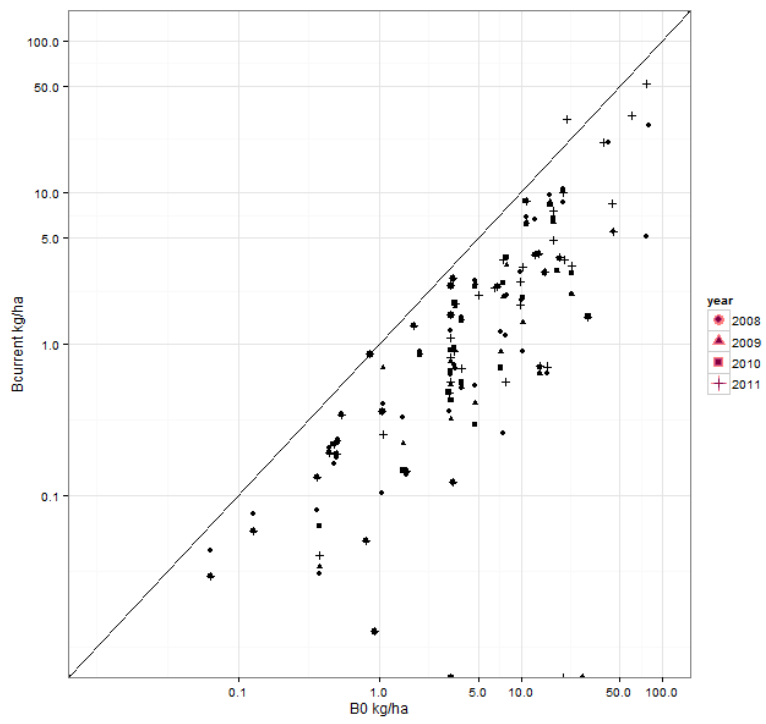


Figure 135:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Corse EMU are shown in red, those for France are shown in blue.

### 17.4.2 Habitat coverage of the EMU

Table 540: Habitats assessed in the Corse EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.4.3 Management measures

Table 541: Overview of the management actions proposed in the EMP for the Corse EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
2	Ban silver eel fishery	S	EMP	fulfilled	low
3	Introduce yellow and silver eel fishing season closure in the maritime domain	M	EMP	fulfilled	low
4	Introduce an specific license for fishing in the marine domain	M	EMP	fulfilled	unsure
5	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	unsure
6	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	unsure
7	Define the landing stations	U	EMP	partially	unsure
8	Implement measures to assure the traceability	M	EMP	fulfilled	regulation

Table 541: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Rec. Fishr.</b>					
9	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
10	Introduce night fishing banned	Y	EMP	fulfilled	unsure
11	Implement a reporting of catches	Y	EMP	partially	knowl- edge
12	Implement a survey of catches	Y	EMP	not done	knowl- edge
<b>Habitat</b>					
13	Establish a PCB plan	U	EMP	partially	unsure
14	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowl- edge
15	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
16	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowl- edge
17	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowl- edge
18	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
19	Demolish or mitigate obstacles	U	EMP	partially	unsure
20	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowl- edge
<b>Others</b>					
21	Collect electrofishing data before 1980	U	EMP	fulfilled	knowl- edge
22	EDA model development	M	EMP	fulfilled	knowl- edge
23	Development of a population dynamic model	U	EMP	partially	knowl- edge
24	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
25	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowl- edge
26	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowl- edge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of single measures in many cases could not be assessed here due to a lack of information.

#### 17.4.4 Assessment

Table 542: Summary list impact types that were included in the assessments for the Corse EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	absent	included		absent	included	included		

Table 543: Summary of targets and assessment period for the Corse EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 544: Additional information for the Corse EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

#### 17.4.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 545: Overview of fishing effort reported in the ICES Data Call for the Corse EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		365	
	2009		274	
	2010		274	
	2011		274	
<b>YS rec</b>				
	2008		365	
	2009		210	
	2010		180	
	2011		152	

Table 546: Overview of total catches (commercial + recreational) of eel stages for the Corse EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0		31	
2	2009	0			
<b>Post</b>					
3	2010	0			
4	2011	0			

Table 547: Stock indicators for the Corse EMU, the source of the data is indicated in Table 539,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		74.8			0.01	2.48	
2 2009		62.3			0.01	2.76	
3 2010							
4 2011							

Table 548: WKEPEMP evaluation of progress toward recovery for the Corse EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

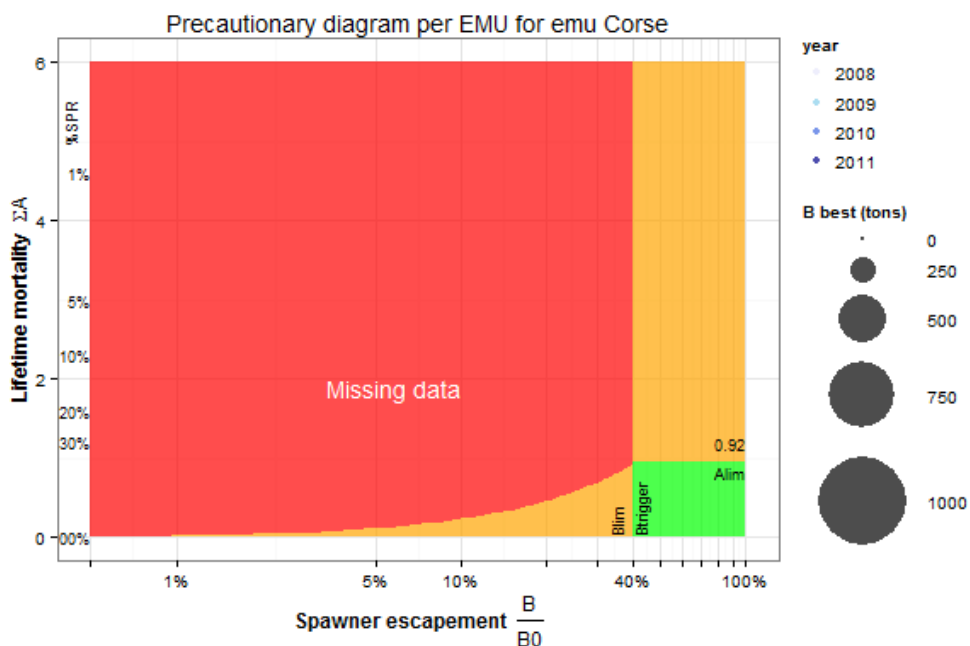


Figure 136: Modified precautionary diagram for the Corse EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.4.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes, lagoons and marine waters had not been assessed. These impacts were included in the assessment: barriers; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; commercial fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement was estimated to be decreasing from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.5 Garonne

### 17.5.1 Available information

Figure 137: *Garonne*, France



Table 549: Sources of information for the Garonne EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x) <U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 550: Reported stock indicators for Garonne

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 551: Source of indicators evaluated for the Garonne EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

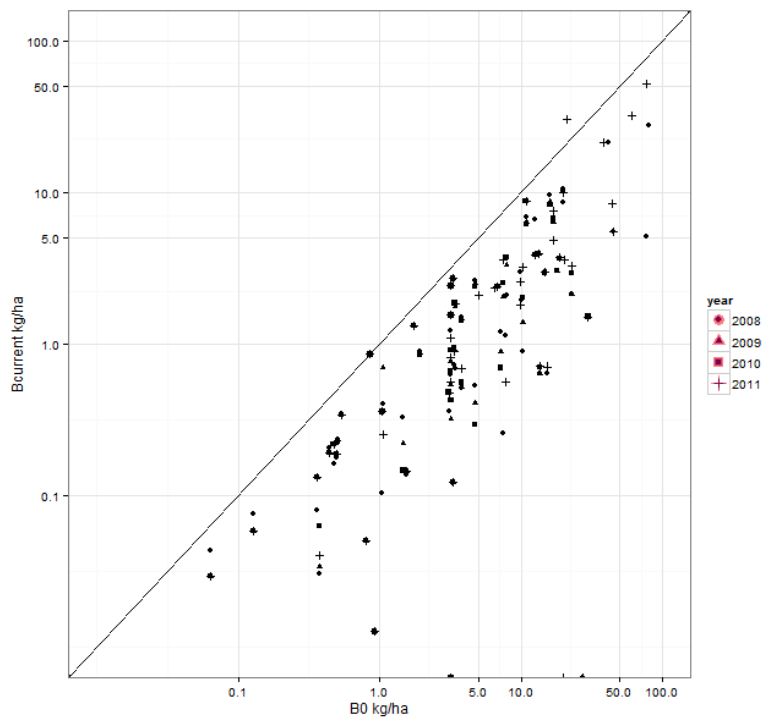


Figure 138:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Garonne EMU are shown in red, those for France are shown in blue.

### 17.5.2 Habitat coverage of the EMU

Table 552: Habitats assessed in the Garonne EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	no
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries, but Gironde estuary. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.5.3 Management measures

Table 553: Overview of the management actions proposed in the EMP for the Garonne EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Supervise and implement a glass eel fishing quota in maritime and inland waterway	G	EMP	fulfilled	unsure
2	Introduce a common license for every glass eel fishermen	G	EMP	fulfilled	unsure
3	Reduce glass eel fishing season duration to 5 months (and suppress weekly fishing closure)	G	EMP	fulfilled	none
4	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled	low
5	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
6	Ban silver eel fishery	S	EMP	fulfilled	low
7	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	unsure
8	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	unsure
9	Define the landing stations	U	EMP	partially	unsure
10	Implement measures to assure the traceability	M	EMP	fulfilled	regulation
<b>Recr. Fishr.</b>					
11	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
12	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	unsure
13	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
14	Introduce night fishing banned	Y	EMP	fulfilled	unsure
15	Implement a reporting of catches	Y	EMP	partially	knowledge
16	Implement a survey of catches	Y	EMP	not done	knowledge

Table 553: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
17	Implement SDAGE (WFD) (2010-2015)	U	EMP	partially	unsure
18	Establish a PCB plan	U	EMP	partially	unsure
19	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
<b>Hydropw. &amp; Obst.</b>					
20	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
21	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
22	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
23	Demolish or mitigate obstacles	U	EMP	partially	unsure
24	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Restocking</b>					
25	Reserve a certain % of glass eel caught for restocking	G	EMP	fulfilled	regulation
26	Implement a glass eel restocking program 5-10% of glass eel catches	G	EMP	fulfilled	unsure
27	Implement a monitoring and assessment restocking program	U	EMP	fulfilled	knowledge
<b>Others</b>					
28	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
29	EDA model development	M	EMP	fulfilled	knowledge
30	Development of a population dynamic model	U	EMP	partially	knowledge
31	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
32	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
33	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of single measures in many cases could not be assessed here due to a lack of information.

#### 17.5.4 Assessment

Table 554: Summary list impact types that were included in the assessments for the Garonne EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included		

Table 555: Summary of targets and assessment period for the Garonne EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 556: Additional information for the Garonne EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

### 17.5.5 Progress towards recovery

There have no indicators been reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 557: Overview of fishing effort reported in the ICES Data Call for the Garonne EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011		151	
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		365	
	2009		213	
	2010		182	
	2011		152	
<b>YS rec</b>				
	2008		365	
	2009		213	
	2010		182	
	2011		152	

Table 558: Overview of total catches (commercial + recreational) of eel stages for the Garonne EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	18.758		30.30	
2	2009	0.143		15.07	
<b>Post</b>					
3	2010	6.449			
4	2011	5.588			

Table 559: Stock indicators for the Garonne EMU, the source of the data is indicated in Table 551,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		513.4			0.03	2.48	
2 2009		428.8			0.03	2.76	
3 2010							
4 2011							

Table 560: WKEPEMP evaluation of progress toward recovery for the Garonne EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		



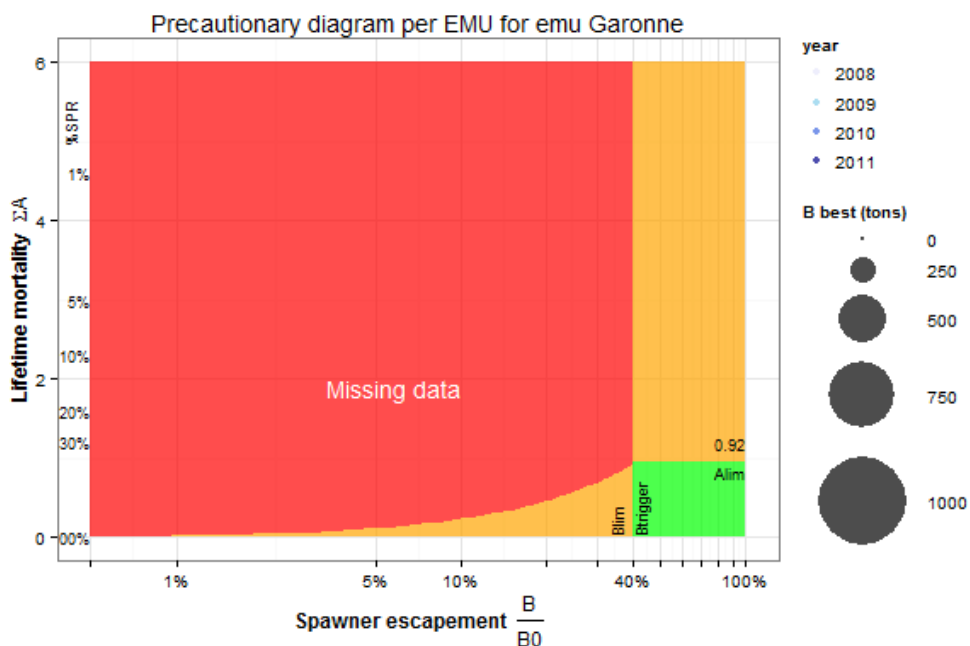


Figure 139: Modified precautionary diagram for the Garonne EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.5.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes, estuaries and marine coastal waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement was estimated to be decreasing from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  is increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.6 Loire

### 17.6.1 Available information

Figure 140: *Loire*, France

Table 561: Sources of information for the Loire EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x) <U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 562: Reported stock indicators for Loire

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 563: Source of indicators evaluated for the Loire EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

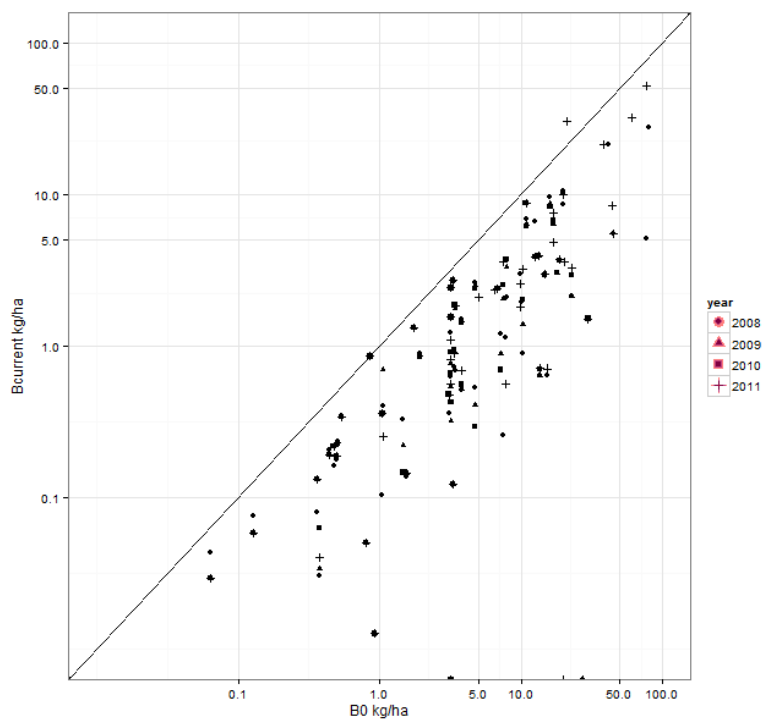


Figure 141:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Loire EMU are shown in red, those for France are shown in blue.

### 17.6.2 Habitat coverage of the EMU

Table 564: Habitats assessed in the Loire EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.6.3 Management measures

Table 565: Overview of the management actions proposed in the EMP for the Loire EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Supervise and implement a glass eel fishing quota in maritime and inland waterway	G	EMP	fulfilled	unsure
2	Introduce a common license for every glass eel fishermen	G	EMP	fulfilled	unsure
3	Reduce glass eel fishing season duration to 5 months (and suppress weekly fishing closure)	G	EMP	fulfilled	none
4	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled	low
5	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
6	Limit silver eel fishing areas	S	EMP	fulfilled	unsure
7	Introduce a silver eel fishery season closure	S	EMP	fulfilled	unsure
8	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	unsure
9	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	unsure
10	Define the landing stations	U	EMP	partially	unsure
11	Implement measures to assure the traceability	M	EMP	fulfilled	regulation
<b>Rec. Fishr.</b>					
12	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
13	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	unsure
14	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
15	Introduce night fishing banned	Y	EMP	fulfilled	unsure
16	Implement a reporting of catches	Y	EMP	partially	knowledge
17	Implement a survey of catches	Y	EMP	not done	knowledge

Table 565: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
18	Establish a PCB plan	U	EMP	partially	unsure
19	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
20	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
21	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
22	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
23	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
24	Demolish or mitigate obstacles	U	EMP	partially	unsure
25	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Restocking</b>					
26	Reserve a certain % of glass eel caught for restocking	G	EMP	fulfilled	regulation
27	Implement a glass eel restocking program 5-10% of glass eel catches	G	EMP	fulfilled	unsure
28	Implement a monitoring and assessment restocking program	U	EMP	fulfilled	knowledge
<b>Others</b>					
29	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
30	EDA model development	M	EMP	fulfilled	knowledge
31	Development of a population dynamic model	U	EMP	partially	knowledge
32	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
33	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
34	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of single measures in many cases could not be assessed here due to a lack of information.

#### 17.6.4 Assessment

Table 566: Summary list impact types that were included in the assessments for the Loire EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included		

Table 567: Summary of targets and assessment period for the Loire EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 568: Additional information for the Loire EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

#### 17.6.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.



Table 569: Overview of fishing effort reported in the ICES Data Call for the Loire EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011		147	
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		365	
	2009		211	
	2010		182	
	2011		151	
<b>YS rec</b>				
	2008		365	
	2009		211	
	2010		182	
	2011		151	

Table 570: Overview of total catches (commercial + recreational) of eel stages for the Loire EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	46.132	25.39	32.30	
2	2009	1.270	12.85	12.68	
<b>Post</b>					
3	2010	27.875			
4	2011	19.084	11.45		

Table 571: Stock indicators for the Loire EMU, the source of the data is indicated in Table 563,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		415.3			0.01	2.48	
2 2009		342.9			0.01	2.76	
3 2010							
4 2011							0.74

Table 572: WKEPEMP evaluation of progress toward recovery for the Loire EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

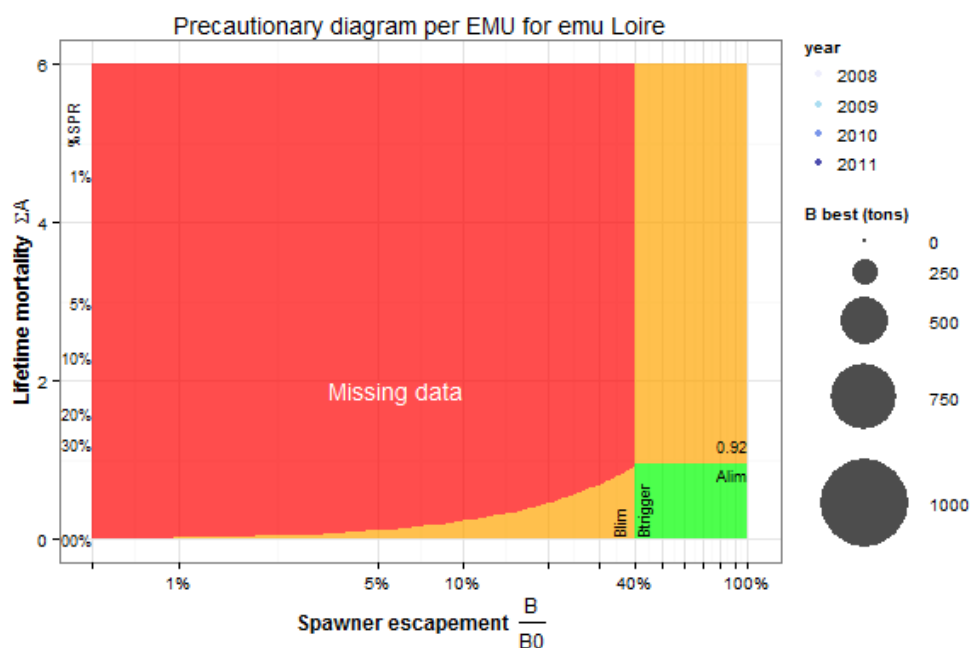


Figure 142: Modified precautionary diagram for the Loire EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.6.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes and marine coastal waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement was estimated to be decreasing from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  is estimated to be increasing slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.7 Meuse

### 17.7.1 Available information

Figure 143: *Meuse*, France

Table 573: Sources of information for the Meuse EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x)<U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 574: Reported stock indicators for Meuse

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 575: Source of indicators evaluated for the Meuse EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

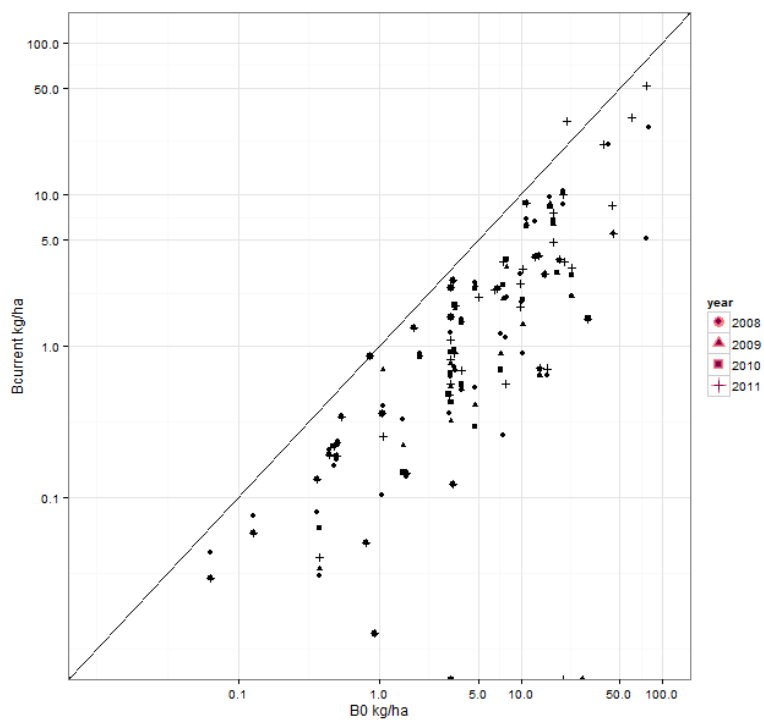


Figure 144:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Meuse EMU are shown in red, those for France are shown in blue.

### 17.7.2 Habitat coverage of the EMU

Table 576: Habitats assessed in the Meuse EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

The GIS layer used (RHT) covers rivers. Lakes are not included but is very marginal in this EMU. Data used are however electrofishing. Results on big rivers are extrapolation.

### 17.7.3 Management measures

Table 577: Overview of the management actions proposed in the EMP for the Meuse EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	M	EMP	fulfilled	none
2	S	EMP	fulfilled	low
3	M	EMP	fulfilled	none
4	M	EMP	partially	none
5	U	EMP	partially	unsure
6	M	EMP	fulfilled	regulation

Table 577: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Rec. Fishr.</b>					
7	Introduce ban glass eel fishery	G	EMP	fulfilled	none
8	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	none
9	Introduce night fishing banned	Y	EMP	fulfilled	none
10	Implement a reporting of catches	Y	EMP	partially	knowledge
11	Implement a survey of catches	Y	EMP	not done	knowledge
<b>Habitat</b>					
12	Establish a PCB plan	U	EMP	partially	unsure
13	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
14	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
15	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
16	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
17	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
18	Demolish or mitigate obstacles	U	EMP	partially	unsure
19	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Others</b>					
20	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
21	EDA model development	M	EMP	fulfilled	knowledge
22	Development of a population dynamic model	U	EMP	partially	knowledge
23	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
24	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
25	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of the single measures in many cases could not be assessed here due to a lack of information.



**17.7.4 Assessment**

Table 578: Summary list impact types that were included in the assessments for the Meuse EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	absent	included		absent	included	included		

Table 579: Summary of targets and assessment period for the Meuse EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 580: Additional information for the Meuse EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

#### 17.7.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 581: Overview of fishing effort reported in the ICES Data Call for the Meuse EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008		0	
	2009		0	
	2010		0	
	2011		0	
<b>G rec.</b>				
	2008		0	
	2009		0	
	2010		0	
	2011		0	
<b>YS com</b>				
	2008		365	
	2009			
	2010			
	2011		153	
<b>YS rec</b>				
	2008		365	
	2009			
	2010			
	2011		153	

Table 582: Overview of total catches (commercial + recreational) of eel stages for the Meuse EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0	
2	2009	0	0	0	
<b>Post</b>					
3	2010	0	0	0	
4	2011	0	0	0	

Table 583: Stock indicators for the Meuse EMU, the source of the data is indicated in Table 575,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B^u$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		0.8			0.57	2.48	
2 2009		0.7			0.57	2.76	
3 2010							
4 2011							

Table 584: WKEPEMP evaluation of progress toward recovery for the Meuse EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

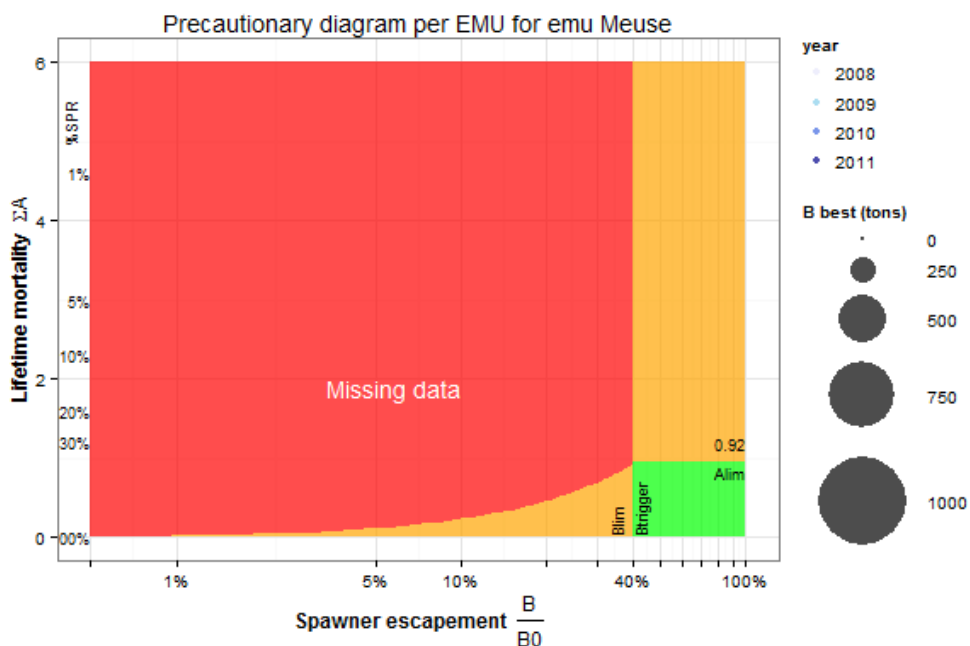


Figure 145: Modified precautionary diagram for the Meuse EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.7.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes had not been assessed. These impacts were included in the assessment: barriers; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; commercial fisheries; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement decreased from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.8 Rhin

### 17.8.1 Available information

Figure 146: *Rhin*, France

Table 585: Sources of information for the Rhin EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x)<U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemaadoc.irstea.fr/cemoa/PUB00036398">cemaadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 586: Reported stock indicators for Rhin

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 587: Source of indicators evaluated for the Rhin EMU

Stock indicator	Source
B <sub>0</sub>	EMP
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

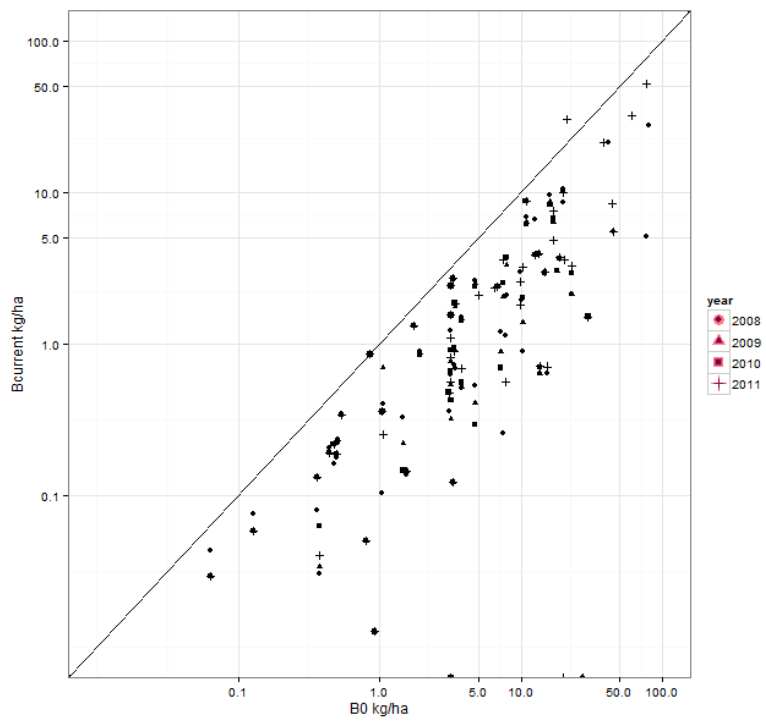


Figure 147:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Rhin EMU are shown in red, those for France are shown in blue.



### 17.8.2 Habitat coverage of the EMU

Table 588: Habitats assessed in the Rhin EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

The GIS layer used (RHT) covers rivers. Lakes are not included but is very marginal in this EMU. Data used are however electrofishing. Results on big rivers are extrapolation.

### 17.8.3 Management measures

Table 589: Overview of the management actions proposed in the EMP for the Rhin EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled low
2	Ban silver eel fishery	S	EMP	fulfilled low
3	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled none
4	Introduce a buying out plan for fresh water fishermen	M	EMP	partially low
5	Define the landing stations	U	EMP	partially unsure
6	Implement measures to assure the traceability	M	EMP	fulfilled unsure

Table 589: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Rec. Fishr.</b>					
7	Introduce ban glass eel fishery	G	EMP	fulfilled	none
8	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	unsure
9	Introduce night fishing banned	Y	EMP	fulfilled	unsure
10	Implement a reporting of catches	Y	EMP	partially	knowledge
11	Implement a survey of catches	Y	EMP	not done	knowledge
<b>Habitat</b>					
12	Establish a PCB plan	U	EMP	partially	unsure
13	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
14	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
15	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
16	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
17	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
18	Demolish or mitigate obstacles	U	EMP	partially	unsure
19	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Others</b>					
20	Establish contacts with other states members	U	EMP	fulfilled	unsure
21	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
22	EDA model development	M	EMP	fulfilled	knowledge
23	Development of a population dynamic model	U	EMP	partially	knowledge
24	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	unsure
25	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
26	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of the single measures in many

cases could not be assessed here due to a lack of information.

**17.8.4 Assessment**

Table 590: Summary list impact types that were included in the assessments for the Rhin EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	absent	included		absent	included	included		

Table 591: Summary of targets and assessment period for the Rhin EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 592: Additional information for the Rhin EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

#### 17.8.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 593: Overview of fishing effort reported in the ICES Data Call for the Rhin EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008		0	
	2009		0	
	2010		0	
	2011		0	
<b>G rec.</b>				
	2008		0	
	2009		0	
	2010		0	
	2011		0	
<b>YS com</b>				
	2008		365	
	2009			
	2010			
	2011		153	
<b>YS rec</b>				
	2008		365	
	2009			
	2010			
	2011		153	

Table 594: Overview of total catches (commercial + recreational) of eel stages for the Rhin EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0.7	
2	2009	0	0		
<b>Post</b>					
3	2010	0	0		
4	2011	0	0		

Table 595: Stock indicators for the Rhin EMU, the source of the data is indicated in Table 587,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		2.3			0.22	2.48	
2 2009		2.0			0.22	2.76	
3 2010							
4 2011							

Table 596: WKEPEMP evaluation of progress toward recovery for the Rhin EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

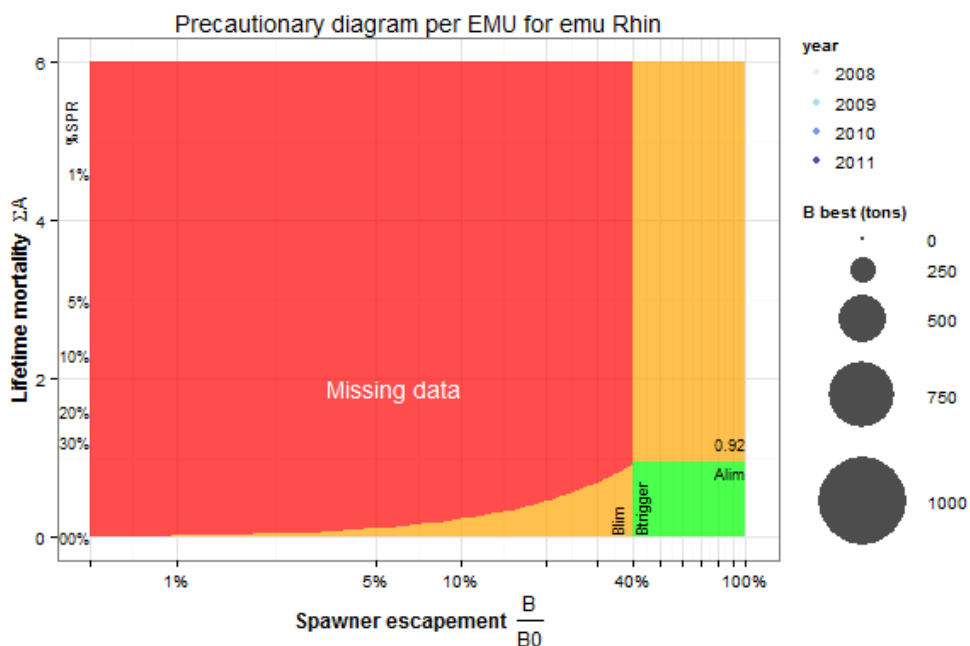


Figure 148: Modified precautionary diagram for the Rhin EMU (after wgeel2012), see section 1.3.2 for more information.

### 17.8.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes had not been assessed. These impacts were included in the assessment: barriers; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; commercial fisheries, predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement decreased from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 17.9 Rhone Mediterranee

### 17.9.1 Available information



Figure 149: *Rhone Mediterranee*, France



Table 597: Sources of information for the Rhone Mediterranee EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x)<U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemadoc.irstea.fr/cemoa/PUB00036398">cemadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 598: Reported stock indicators for Rhone Mediterranee

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 599: Source of indicators evaluated for the Rhone Mediterranee EMU

Stock indicator	Source
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

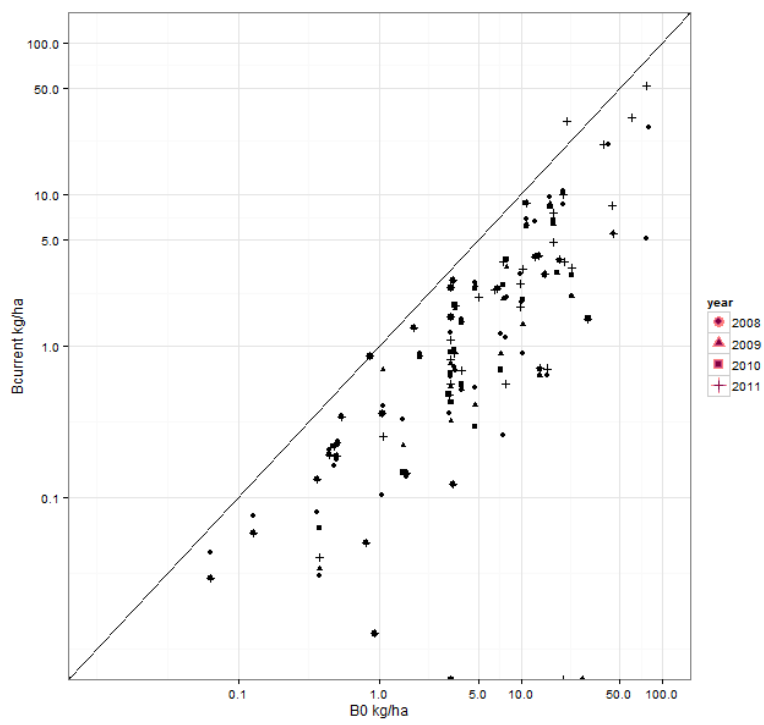


Figure 150:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Rhone Mediterranee EMU are shown in red, those for France are shown in blue.

### 17.9.2 Habitat coverage of the EMU

Table 600: Habitats assessed in the Rhone Mediterranean EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries. Lakes are not included but are very marginal in this EMU. The contribution of marine coastal waters is unknown. The Lagoons productions should be high. Data used are however limited to electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.9.3 Management measures

Table 601: Overview of the management actions proposed in the EMP for the Rhone Mediterranean EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Introduce ban glass eel fishery	G	EMP	fulfilled	none
2	Limit silver eel fishing areas	S	EMP	fulfilled	unsure
3	Introduce a silver eel fishery season closure	S	EMP	fulfilled	interm
4	Introduce yellow and silver eel fishing season closure in the maritime domain	M	EMP	fulfilled	interm
5	Introduce an specific license for fishing in the marine domain	M	EMP	fulfilled	unsure
6	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	high
7	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	low
8	Define the landing stations	U	EMP	partially	low
9	Implement measures to assure the traceability	M	EMP	fulfilled	regulation

Table 601: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Rec. Fishr.</b>					
10	Introduce ban glass eel fishery	G	EMP	fulfilled	none
11	Introduce night fishing banned	Y	EMP	fulfilled	low
12	Implement a reporting of catches	Y	EMP	partially	knowl- edge
13	Implement a survey of catches	Y	EMP	not done	knowl- edge
<b>Habitat</b>					
14	Establish a PCB plan	U	EMP	partially	unsure
15	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowl- edge
16	Implement SDAGE (2010-2015) (WFD)	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
17	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowl- edge
18	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowl- edge
19	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
20	Demolish or mitigate obstacles	U	EMP	partially	unsure
21	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowl- edge
<b>Others</b>					
22	Collect electrofishing data before 1980	U	EMP	fulfilled	knowl- edge
23	EDA model development	M	EMP	fulfilled	knowl- edge
24	Development of a population dynamic model	U	EMP	partially	knowl- edge
25	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
26	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowl- edge
27	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowl- edge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of a single measures could not, in many cases, be assessed here due to a lack of information.

#### 17.9.4 Assessment

Table 602: Summary list impact types that were included in the assessments for the Rhone Mediterranee EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included		

Table 603: Summary of targets and assessment period for the Rhone Mediterranee EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 604: Additional information for the Rhone Mediterranee EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ A has been reported to all EMU which is not accurate. The Mediterranean lagoons were not included in the assessment.

### 17.9.5 Progress towards recovery

There have been no biomass or mortality indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 605: Overview of fishing effort reported in the ICES Data Call for the Rhone Mediterranean EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		365	
	2009		274	
	2010		274	
	2011		274	
<b>YS rec</b>				
	2008		365	
	2009		210	
	2010		180	
	2011		152	

Table 606: Overview of total catches (commercial + recreational) of eel stages for the Rhone Mediterranean EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	241	294.5	
2	2009	0			
<b>Post</b>					
3	2010	0			
4	2011	0			

Table 607: Stock indicators for the Rhone Mediterranee EMU, the source of the data is indicated in Table 599,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		639.1			0.05	2.48	
2 2009		533.1			0.05	2.76	
3 2010							
4 2011							

Table 608: WKEPEMP evaluation of progress toward recovery for the Rhone Mediterranee EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

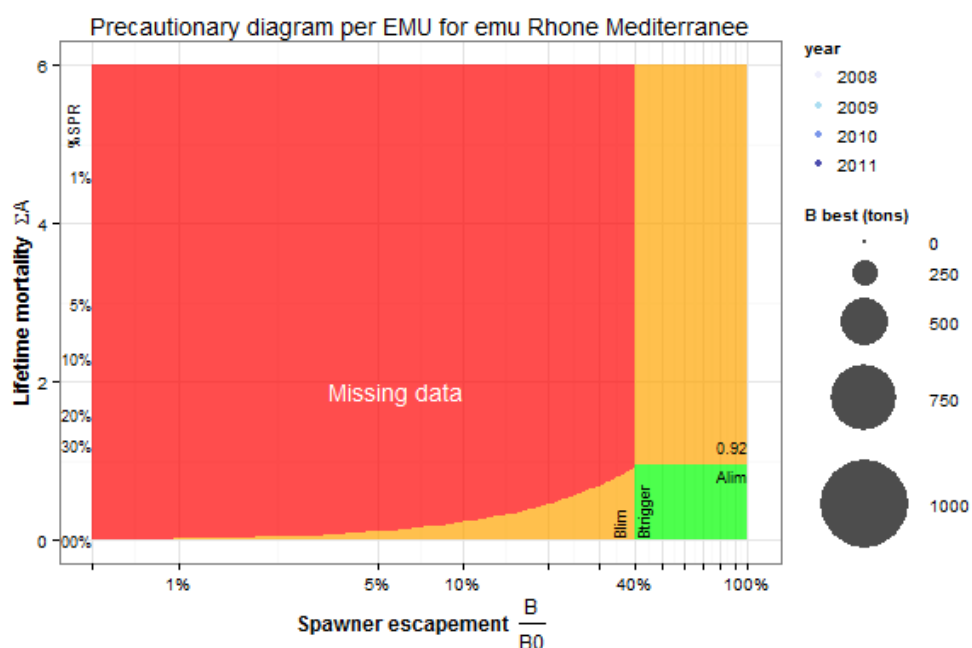


Figure 151: Modified precautionary diagram for the Rhone Mediterranee EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.9.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes, lagoons and marine waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement decreased from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).



## 17.10 Seine-Normandie

### 17.10.1 Available information



Figure 152: *Seine-Normandie*, France

Table 609: Sources of information for the Seine-Normandie EMU

Type of source	Reference
EMP	Ministère de l'écologie, de l'énergie, du développement durable et de la mer, ONEMA, Ministère de l'alimentation, de l'agriculture et de la pêche, 2010. Plan de gestion anguille de la France. Application du règlement R(CE) n°1100/2007. Volet National. 3 février 2010. 120p + 2 appendix and EMU EMP.
EMP approved in:	2010
2012 post-evaluation report:	Plan de gestion anguille de la France. Rapport de mise en œuvre - juin 2012. Article 9 du R (CE) n°1100/2007
2013 ICES data-call:	
Additional sources:	Jouanin, C., Briand, C., Beaulaton, L., and Lambert, P. 2012. Eel Density Analysis (EDA2.x)<U+202F>: un modèle statistique pour estimer l'échappement des anguilles argentées ( <i>Anguilla anguilla</i> ) dans un réseau hydrographique. IRSTEA, Bordeaux, FRANCE, 114p. Available at <a href="http://cemadoc.irstea.fr/cemoa/PUB00036398">cemadoc.irstea.fr/cemoa/PUB00036398</a> .

Table 610: Reported stock indicators for Seine-Normandie

Name	Pre	Post
B <sub>current</sub>	yes	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	yes	no
ΣF	no	no
ΣH	yes	no

Table 611: Source of indicators evaluated for the Seine-Normandie EMU

Stock indicator	Source
B <sub>current</sub>	2012 post-evaluation report
ΣA	2013 ICES data-call

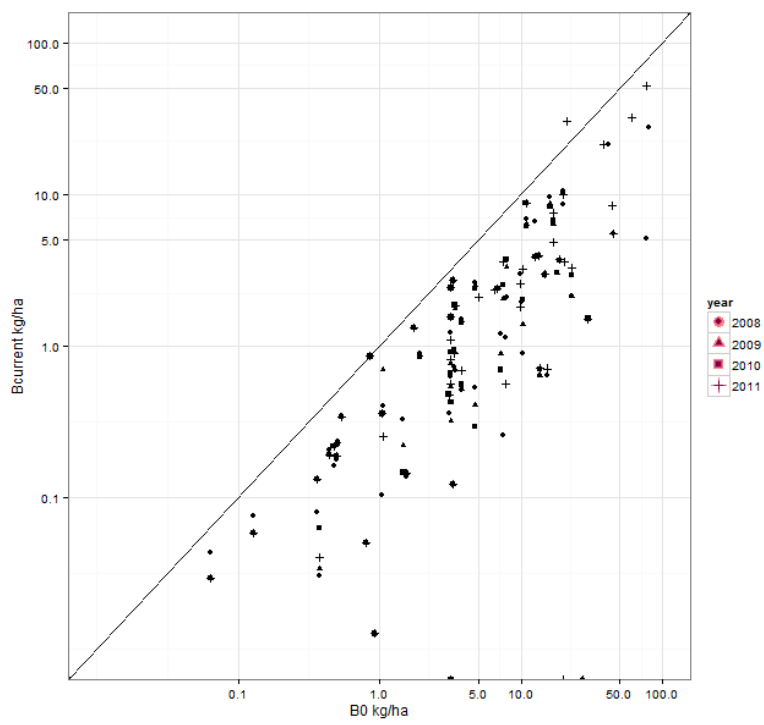


Figure 153:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Seine-Normandie EMU are shown in red, those for France are shown in blue.

### 17.10.2 Habitat coverage of the EMU

Table 612: Habitats assessed in the Seine-Normandie EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

The GIS layer used (RHT) covers rivers and estuaries. Lakes are not included but is very marginal in this EMU. The contribution of marine coastal waters is unknown. Data used are however electrofishing. Results on big rivers and estuaries are extrapolation.

### 17.10.3 Management measures

Table 613: Overview of the management actions proposed in the EMP for the Seine-Normandie EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Supervise and implement a glass eel fishing quota in maritime and inland waterway	G	EMP	fulfilled	unsure
2	Introduce a common license for every glass eel fishermen	G	EMP	fulfilled	unsure
3	Reduce glass eel fishing season duration to 5 months (and suppress weekly fishing closure)	G	EMP	fulfilled	unsure
4	Introduce fishing season closure for yellow and silver eel fishery	M	EMP	fulfilled	low
5	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
6	Ban silver eel fishery	S	EMP	fulfilled	low
7	Introduce a buying out plan for marine fishermen	M	EMP	fulfilled	unsure
8	Introduce a buying out plan for fresh water fishermen	M	EMP	partially	low
9	Define the landing stations	U	EMP	partially	unsure
10	Implement measures to assure the traceability	M	EMP	fulfilled	regulation
<b>Recr. Fishr.</b>					
11	Introduce ban glass eel fishery	G	EMP	fulfilled	unsure
12	Introduce fishing season closure for yellow eel	Y	EMP	fulfilled	unsure
13	Introduce a common licensing system and number of fishermen limitation for yellow eel	Y	EMP	partially	unsure
14	Introduce night fishing banned	Y	EMP	fulfilled	unsure
15	Implement a reporting of catches	Y	EMP	partially	knowledge
16	Implement a survey of catches	Y	EMP	not done	knowledge

Table 613: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>					
17	Establish a PCB plan	U	EMP	partially	unsure
18	Improve knowledge of the irrigation pressure, their impact on the hydrology of rivers and drought severe	U	EMP	partially	knowledge
<b>Hydropw. &amp; Obst.</b>					
19	Creation of a reference document of obstacles to migration	U	EMP	fulfilled	knowledge
20	Fix and apply a national approach assessment of the passability of obstacles to eel migration	U	EMP	fulfilled	knowledge
21	Classify all streams located in ZAP eel under Article L. 214-17 in 2010 (obligation of obstacles mitigation)	U	EMP	partially	unsure
22	Demolish or mitigate obstacles	U	EMP	partially	unsure
23	Conduct an R and D program on obstacles and eels	U	EMP	fulfilled	knowledge
<b>Restocking</b>					
24	Reserve a certain % of glass eel caught for restocking	G	EMP	fulfilled	regulation
25	Implement a glass eel restocking program 5-10% of glass eel catches	G	EMP	fulfilled	unsure
26	Implement a monitoring and assessment restocking program	U	EMP	fulfilled	knowledge
<b>Others</b>					
27	Collect electrofishing data before 1980	U	EMP	fulfilled	knowledge
28	EDA model development	M	EMP	fulfilled	knowledge
29	Development of a population dynamic model	U	EMP	partially	knowledge
30	Implement a sanitary agreement for eel dealers	U	EMP	fulfilled	none
31	Implement a eel specific network of electrofishing stations	Y	EMP	fulfilled	knowledge
32	Implement eel rivers index "recruitment and escapement survey"	M	EMP	partially	knowledge

A high number of management measures has been planned and implemented, at least partially. They are directed towards the commercial and recreational fishery, habitat improvements, reducing hydropower mortality and increasing knowledge. However, the effect of the single measures in many cases could not be assessed here due to a lack of information.

#### 17.10.4 Assessment

Table 614: Summary list impact types that were included in the assessments for the Seine-Normandie EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	included		included	included	included		

Table 615: Summary of targets and assessment period for the Seine-Normandie EMU. Blank cell indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start		1987	1987	1987
Assessment period end		2009	2009	2009

Table 616: Additional information for the Seine-Normandie EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'down-stream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

B<sub>current</sub> has been calculated from yellow eel densities, on the hydrographical network. The historical series of catch could not be separated at the EMU level, hence a similar Σ has been reported to all EMU which is not accurate.

#### 17.10.5 Progress towards recovery

There have been no indicators reported after 2009. It is hence not possible to draw conclusions on the progress towards the recovery of the stock.

Table 617: Overview of fishing effort reported in the ICES Data Call for the Seine-Normandie EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011		135	
<b>G rec.</b>				
	2008	0	0	0
	2009	0	0	0
	2010	0	0	0
	2011	0	0	0
<b>YS com</b>				
	2008		365	
	2009		212	
	2010		181	
	2011		150	
<b>YS rec</b>				
	2008		365	
	2009		212	
	2010		181	
	2011		150	

Table 618: Overview of total catches (commercial + recreational) of eel stages for the Seine-Normandie EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.766	0	0.80	
2	2009		0	0.12	
<b>Post</b>					
3	2010	4.095	0		
4	2011	3.619	0		



Table 619: Stock indicators for the Seine-Normandie EMU, the source of the data is indicated in Table 611,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after Wgeel 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008		342.3			0.05	2.48	
2 2009		286.2			0.05	2.76	
3 2010							
4 2011							

Table 620: WKEPEMP evaluation of progress toward recovery for the Seine-Normandie EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	yes	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

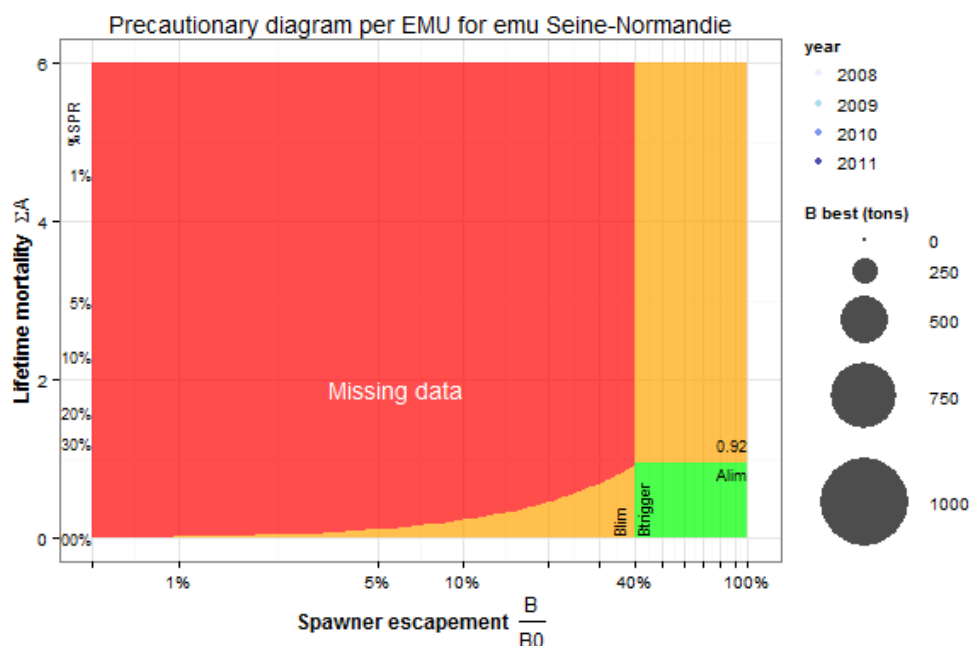


Figure 154: Modified precautionary diagram for the Seine-Normandie EMU (after wgeel 2012), see section 1.3.2 for more information.

### 17.10.6 Conclusion

This EMU has an eel management plan, approved in 2010 with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. Not all of the stock indicators have been reported:  $B_0$  and  $B_{best}$  are missing. Yet, estimates for these indicators are available on the country level. The stock indicators cover all the eel habitats in the EMU. However, lakes and marine coastal waters had not been assessed. These impacts were included in the assessment: barriers; commercial fisheries; recreational fisheries; hydropower. These impacts were not included: habitat loss; restocking; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented. In most cases, expert judgement was used to evaluate the impact of actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Habitat.

The biomass of current silver eel escapement decreased from 2008 to 2009. No recent estimate was provided. Since no value for  $B_0$  is given for the EMU-level, this cannot be compared to the 40%-target, but likely is below the target. Anthropogenic mortality  $\Sigma A$  increased slightly from 2008 to 2009. No recent estimate was provided. It was above the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, and above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

### 17.11 France all country

Some data are only available at the French level, the following diagram has been built according to it's own scale size.

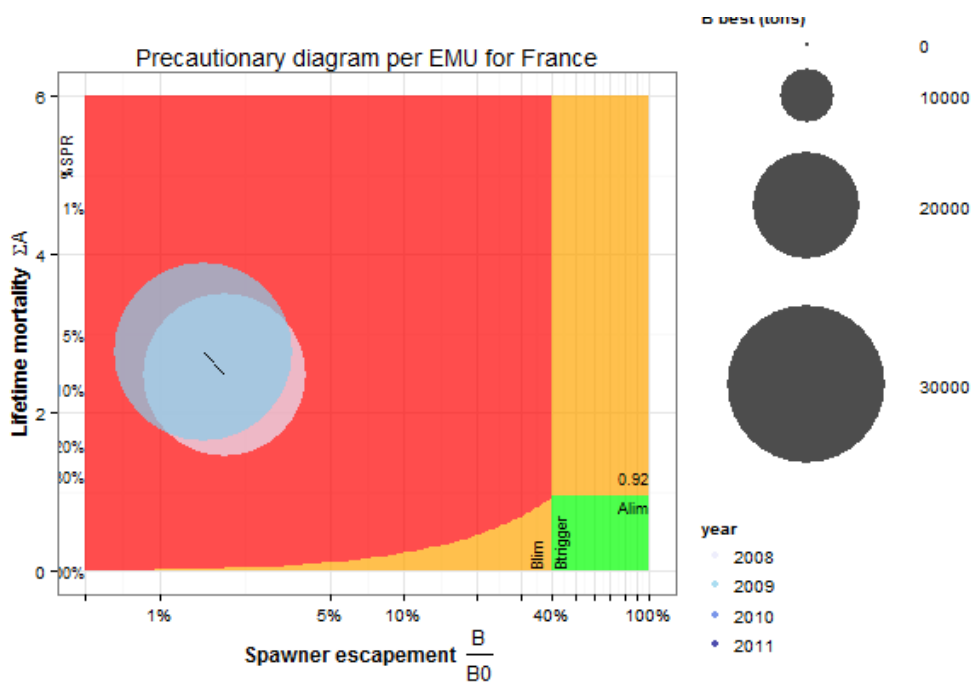


Figure 155: Modified precautionary diagram for France (after WGEEL 2012), see section 1.3.2 for more information. The figure has been build according to a point size larger than the standard (max = 30 000 instead of 1000)

## 18 Spain

General comment for all Spanish EMUs. Filling in values for the methods used and the type of anthropogenic impact assessed requires a knowledge of the Spanish language which the experts assessing the Spanish EMUs did not possess.

### 18.1 Andalusia

#### 18.1.1 Available information

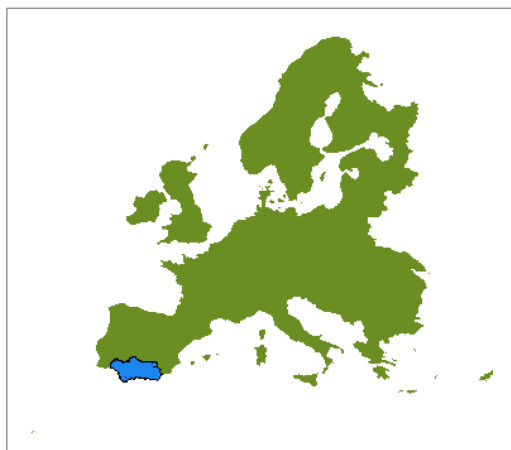
Figure 156: *Andalusia, Spain*

Table 621: Sources of information for the Andalusia EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. Plan de Gestión de la Anguila de la Comunidad Autónoma de Andalucía. Junta de Andalucía
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de Andalucía. Junta de Andalucía . Consejería de Argicultura , Pesca y Medio Ambiente
2013 ICES data-call:	
Additional sources:	

Table 622: Reported stock indicators for the Andalusia EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	no	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	no	yes
ΣH	no	no

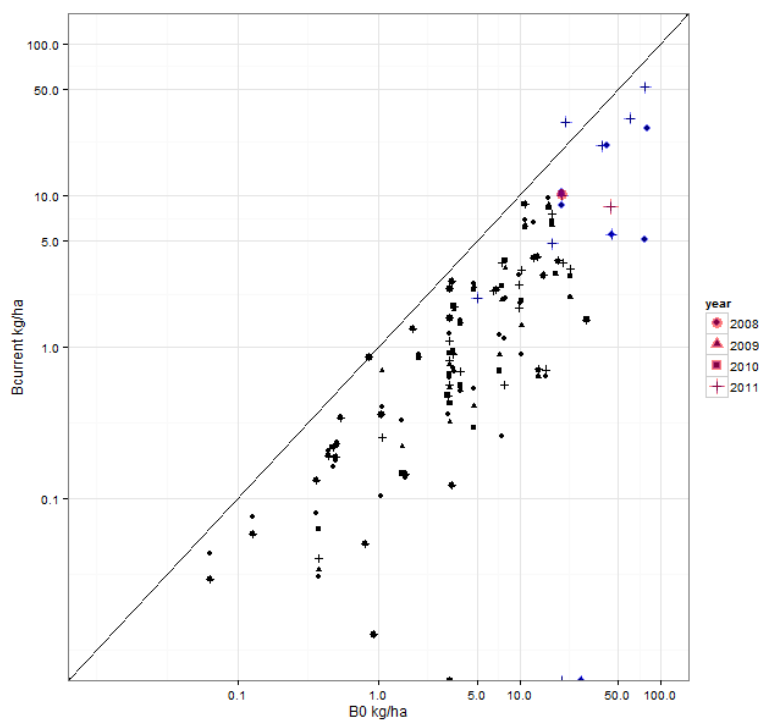


Figure 157: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the Andalusia EMU are shown in red, those for Spain are shown in blue.

Table 623: Source of indicators evaluated for the Andalusia EMU

Stock indicator	Source
B <sub>0</sub>	2012 post-evaluation report
B <sub>best</sub>	2012 post-evaluation report
B <sub>current</sub>	2012 post-evaluation report
ΣA	2012 post-evaluation report

### 18.1.2 Habitat coverage of the EMU

Table 624: Habitats assessed in the Andalusia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	Yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

Includes the total surface of Cuencas Atlánticas de Andalucía and Cuencas Mediterráneas de Andalucía RBDs and almost all the area of the Guadalquivir RBD, only the most upper part is missing. Low lake surface area so have assumed that the area production rate is for rivers only.

### 18.1.3 Management measures

Table 625: Overview of the management actions proposed in the EMP for the Andalusia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Introduce total closed fishery	M	EMP	fulfilled	unsure
2	Introduce total closed fishery	G	EMP	fulfilled	unsure
3	Poaching control	U	undefined	partially	unsure
<b>Habitat</b>					
4	Introduce eel passes	U	EMP	partially	unsure
5	Overall improvement	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
6	Trap and transport	U	EMP	no info.	unsure
<b>Predatr.</b>					
7	Predator control	U	EMP	partially	unsure
<b>Restocking</b>					
8	Stock pregrown eel	U	EMP	fulfilled	low
<b>Others</b>					
9	Scientific studies	U	EMP	partially	none



The implementation of fishery bans for the EMU cannot be evaluated in terms of its contribution to a stock recovery since there is neither information on previous fishery mortality nor on enforcement and control of the ban. The amount of eels used for restocking (20 kg) will have only minor impact. There is no information on the progress of other measures (river continuity, predator control, ...).

**18.1.4 Assessment**

Table 626: Summary list impact types that were included in the assessments for the Andalusia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	absent	omitted	absent	

Table 627: Summary of targets and assessment period for the Andalusia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			2225	0.232
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 628: Additional information for the Andalusia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending on the slope of the river.  $B_{best} = B_{current} + \text{Fishing mortality}$ . Productivity reference: B<sub>current</sub>: silver eel kg/ha production obtained for some areas by electrofishing and silvering rate measurements, and extrapolation to the other areas, and using expert advice for wetlands. B<sub>0</sub>: Fluvial: 20 kg/ha, wetlands: 50 kg/ha.

### 18.1.5 Progress towards recovery

From the data available, there is little progress toward recovery. The major factor for a relatively low B<sub>current</sub> relative to B<sub>0</sub> seems to be the restricted habitat area until the first impassable dam. No progress has yet been made to increase river continuity and therefore the accessible habitat area.

Table 629: Overview of fishing effort reported in the ICES Data Call for the Andalusia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 630: Overview of total catches (commercial + recreational) of eel stages for the Andalusia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010	0			
4	2011	0		0	

Table 631: Stock indicators for the Andalusia EMU, the source of the data is indicated in Table 623,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	3735.1	626.1					
2 2009							
3 2010							
4 2011	5562.5	562.7	610.4	0.08			0.019

Table 632: WKEPEMP evaluation of progress toward recovery for the Andalusia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?	no	no

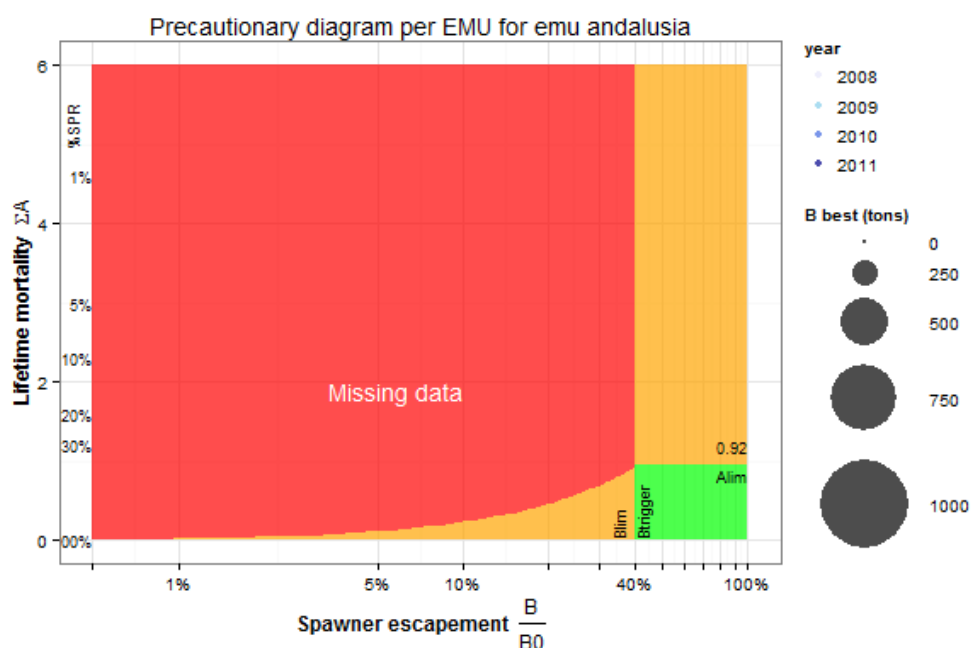


Figure 158: Modified precautionary diagram for the Andalusia EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.1.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma A$  is missing. The stock indicators do not cover all of the eel habitats in the EMU: marine waters are missing. These impacts were included in the assessment: commercial fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, although some may not be relevant to local conditions. Part of the Management Actions identified in the Progress Report have been implemented. Where actions have been implemented, some have been fully implemented, but others only partially implemented. No data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  was not estimated either in the report or in the ICES Data Call. It can therefore not be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.2 Asturias

### 18.2.1 Available information

Figure 159: *Asturias*, Spain

Table 633: Sources of information for the Asturias EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA delprincipado de Asturias
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión del principado de Asturias. Gobierno del Principado de Asturias
2013 ICES data-call:	
Additional sources:	

Table 634: Reported stock indicators for Asturias

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

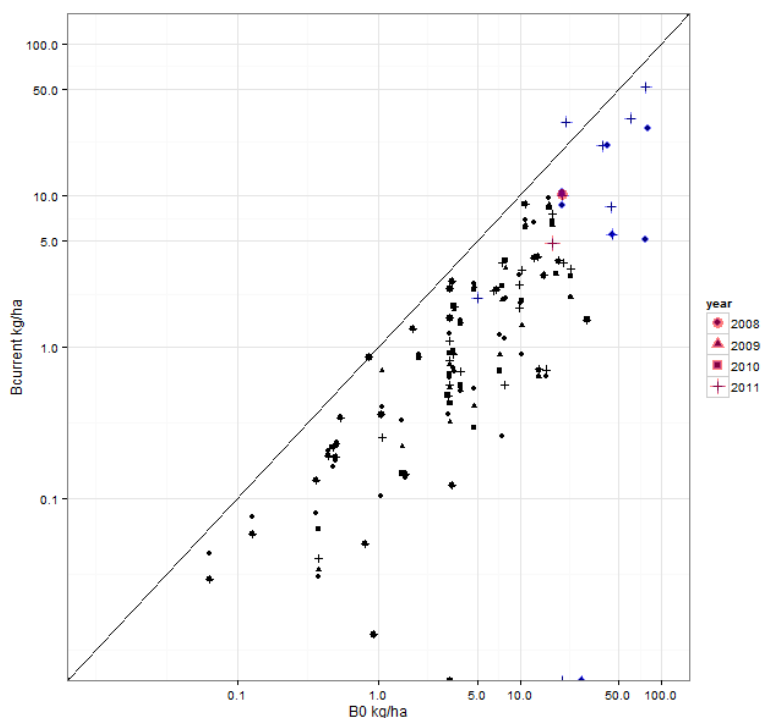


Figure 160:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Asturias EMU are shown in red, those for Spain are shown in blue.

Table 635: Source of indicators evaluated for the Asturias EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report



### 18.2.2 Habitat coverage of the EMU

Table 636: Habitats assessed in the Asturias EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	Yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

Includes a part of Cuenca HidrogrÁfica del CantÁbrico. All the community is included in this RBD. Low lake surface area so we assume the area production rate is for rivers.

### 18.2.3 Management measures

Table 637: Overview of the management actions proposed in the EMP for the Asturias EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduce fishing effort	G	EMP	partially unsure
2	Reserve of the caught for stocking	G	EMP	fulfilled regulation
<b>Rec. Fishr.</b>				
3	Introduce closed fishery	M	EMP	fulfilled unsure
<b>Habitat</b>				
4	Demolish obstacles	U	EMP	partially unsure
5	Introduce eel passes	U	EMP	partially unsure
6	Improve longitudinal connectivity	G	EMP	partially unsure
7	Improve water quality	G	undefined	fulfilled unsure
<b>Hydropw. &amp; Obst.</b>				
8	Introduce sonic barrier	U	EMP	partially unsure
<b>Predatr.</b>				
9	Predator control	U	EMP	partially unsure

The reduction of the fishing effort of the commercial fishery and the ban of recreational fisheries might have an effect in the near future. However, convincing evidence of enforcement and control could not be found in the report. Another major factor for a low  $B_{current}$  relative to  $B_0$  seems to be the restricted habitat area until the first impassable dam. No progress has yet been made to increase river continuity and therefore the accessible habitat area.

**18.2.4 Assessment**

Table 638: Summary list impact types that were included in the assessments for the Asturias EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	absent	

Table 639: Summary of targets and assessment period for the Asturias EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>curr</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			25.6	0.45
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 640: Additional information for the Asturias EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity references: B<sub>current</sub> fluvial: silver eel kg/ha production obtained for some areas by electrofishing and silvering rate measurements, and extrapolation to the rest of areas. Estuaries: applied a conversion factor to fluvial productivity . B<sub>0</sub>: big rivers 20 kg/ha, small rivers 8.6 kg/ha, estuaries from big rivers: 20.8 kg/ha, estuaries from small rivers 8.8kg/ha.

### 18.2.5 Progress towards recovery

The provided data do not allow a statement on the progress toward recovery.

Table 641: Overview of fishing effort reported in the ICES Data Call for the Asturias EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008		150	250
	2009		150	264
	2010		120	252
	2011		120	225
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			1
	2009			1
	2010			1
	2011			1

Table 642: Overview of total catches (commercial + recreational) of eel stages for the Asturias EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	2.379	0.16		
2	2009	0.749	0.14		
<b>Post</b>					
3	2010	2.612	1.17		
4	2011	2.067	0.25		

Table 643: Stock indicators for the Asturias EMU, the source of the data is indicated in Table 635,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	46.1	16.5					0.012
2 2009							0.000
3 2010							0.018
4 2011	64.0	12.6	159.1	2.54			0.024

Table 644: WKEPEMP evaluation of progress toward recovery for the Asturias EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		no

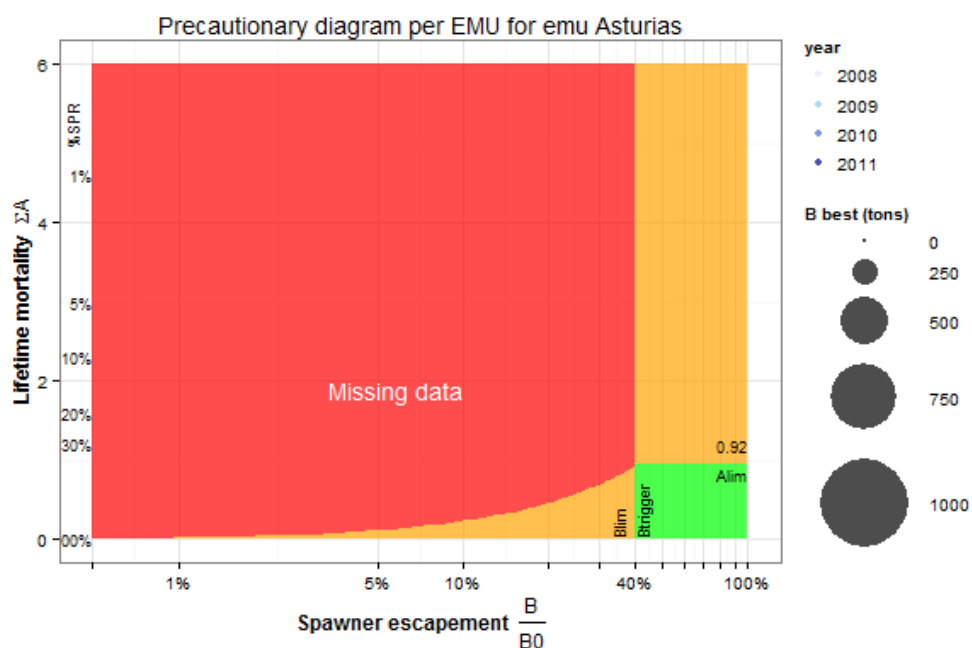


Figure 161: Modified precautionary diagram for the Asturias EMU (after WGEEL 2012), see section 1.3.2 for more information.

## 18.2.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma A$  is missing. The stock indicators do not cover all of the eel habitats in the EMU: marine waters are missing. These impacts were included in the assessment: commercial fisheries; recreational fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; hydropower; predators, although some might not have been appropriate given local conditions. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, some have all been fully implemented, whereas others have only been implemented partially. No data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%), and decreasing. Anthropogenic mortality  $\Sigma A$  was not estimated either in the report or in the ICES Data Call. It cannot therefore be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.3 Balearic Islands

### 18.3.1 Available information



Figure 162: *Balearic Islands, Spain*

Table 645: Sources of information for the Balearic Islands EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Illes Balears. Govern des Illes Balears
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de Illes Balears. Govern des Illes Balears
2013 ICES data-call:	
Additional sources:	NA

Table 646: Reported stock indicators for Balearic Islands

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

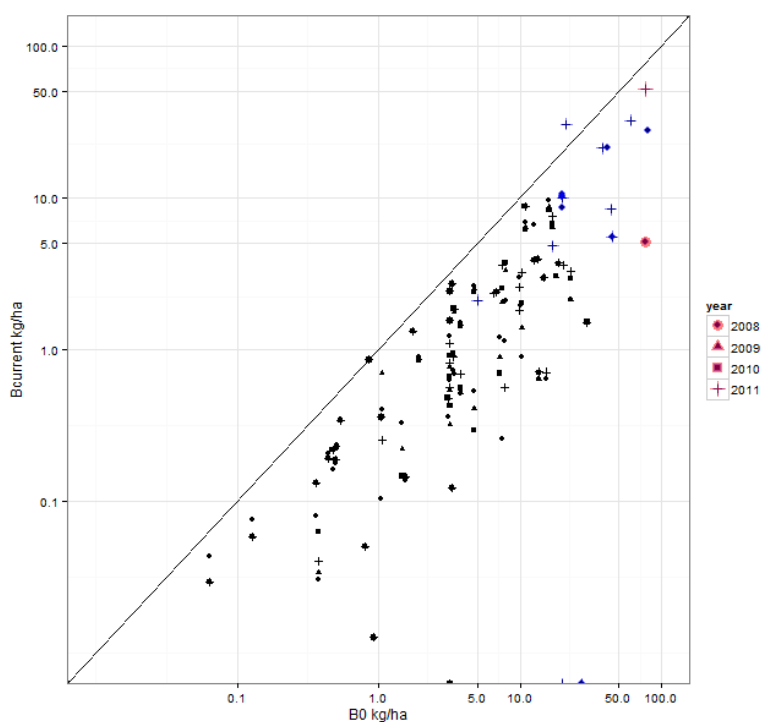


Figure 163:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Balearic Islands EMU are shown in red, those for Spain are shown in blue.



Table 647: Source of indicators evaluated for the Balearic Islands EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 18.3.2 Habitat coverage of the EMU

Table 648: Habitats assessed in the Balearic Islands EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	absent
Were lakes assessed ?	absent
Were estuaries assessed ?	absent
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

All the community is included in the Illes Balears RBD. There are no lakes or real rivers

### 18.3.3 Management measures

Table 649: Overview of the management actions proposed in the EMP for the Balearic Islands EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	M	EMP	fulfilled	high
2	M	EMP	fulfilled	unsure
<b>Habitat</b>				
3	U	undefined	fulfilled	unsure
4	U	EMP	partially	unsure

Significant progress has been made by introducing a fishing quota for European eel and by introducing minimum landing sizes leading to reduced total landings from >2 t in 2008 to 650 kg in 2011.

### 18.3.4 Assessment

Table 650: Summary list impact types that were included in the assessments for the Balearic Islands EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	absent	omitted	included	included	absent	absent	

Table 651: Summary of targets and assessment period for the Balearic Islands EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			132.4	0.916
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 652: Additional information for the Balearic Islands EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. The wetted area correspond to lagoons. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity reference: B<sub>current</sub> lagoons from Cardona et al 2002. B<sub>0</sub>: Productivity reference: Apply a conversion factor to B<sub>current</sub> based on the historical CPUE decrease.

### 18.3.5 Progress towards recovery

Significant progress has been made with an almost 10 fold increase of B<sub>current</sub> from 2008 to 2011.

Table 653: Overview of fishing effort reported in the ICES Data Call for the Balearic Islands EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			41
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 654: Overview of total catches (commercial + recreational) of eel stages for the Balearic Islands EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		2.14		
2	2009				
<b>Post</b>					
3	2010				
4	2011		0.65		

Table 655: Stock indicators for the Balearic Islands EMU, the source of the data is indicated in Table 647,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	330.9	21.7					
2 2009							
3 2010							
4 2011	330.9	220.6	222.7	0.01			

Table 656: WKEPEMP evaluation of progress toward recovery for the Balearic Islands EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		yes
Has the EMU achieved the most it can without increased recruitment ?		no

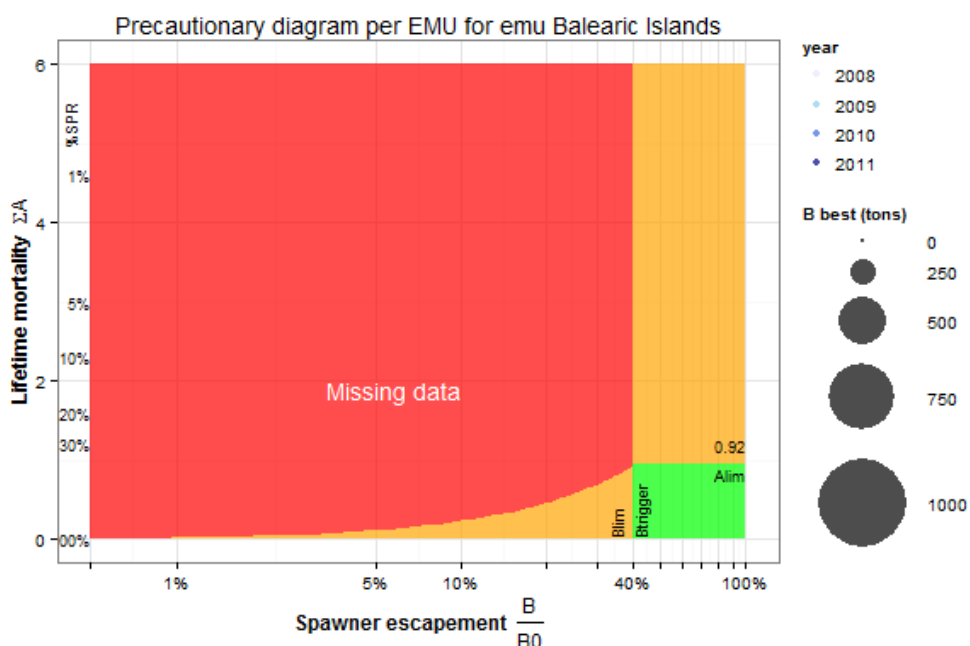


Figure 164: Modified precautionary diagram for the Balearic Islands EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.3.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators do cover all of the eel habitats in the EMU, given there are no natural inland freshwater habitats. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: restocking; indirect effects; predators, though not all may be relevant given local conditions. Hydropower and barriers do not apply. All of the Management Actions identified in the Progress Report have been implemented, some fully and some partially. Data were identified to evaluate the impact of management actions applied to Fisheries. No data were identified to evaluate the impact of management actions applied to Restocking, Habitat or Others.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  was not estimated either in the report or in the ICES Data Call. It can therefore not be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.4 Basque Country

### 18.4.1 Available information



Figure 165: *Basque Country, Spain*

Table 657: Sources of information for the Basque Country EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA del País Vasco, October 2010
EMP approved in: 2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de País Vasco. Gobierno Vasco, Diputación de Gipuzkoa and URA
2013 ICES data-call: Additional sources:	

Table 658: Reported stock indicators for Basque Country

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

Table 659: Source of indicators evaluated for the Basque Country EMU

Stock indicator	Source
$B_0$	2013 ICES data-call
$B_{best}$	2013 ICES data-call
$B_{current}$	2013 ICES data-call
$\Sigma A$	2013 ICES data-call



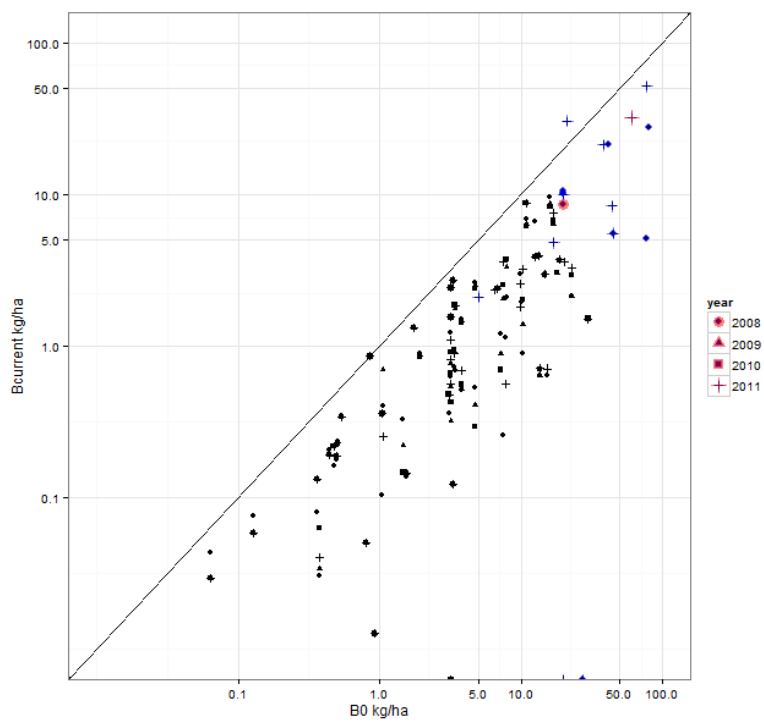


Figure 166:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Basque Country EMU are shown in red, those for Spain are shown in blue.

### 18.4.2 Habitat coverage of the EMU

Table 660: Habitats assessed in the Basque Country EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	Yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

Includes the total surface of Cuenca Interiores del Pañs Vasco and partially Cuenca Hidrográfica del Cantábrico. Low lake surface area so we assume area production rate is for rivers.

### 18.4.3 Management measures

Table 661: Overview of the management actions proposed in the EMP for the Basque Country EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Rec. Fishr.</b>					
1	Reduce fishing effort	G	EMP	fulfilled	unsure
2	Introduce fishing quota	G	EMP	fulfilled	unsure
3	Introduce closed fishery	M	EMP	fulfilled	none
<b>Habitat</b>					
4	Demolish obstacles	U	undefined	partially	none
5	Improve water quality	U	EMP	partially	none
<b>Others</b>					
6	Scientific studies	M	EMP	partially	knowl- edge
7	Scientific studies	U	undefined	not done	interm
8	Scientific studies	U	EMP	fulfilled	knowl- edge
9	Scientific studies	U	EMP	fulfilled	knowl- edge

Management measures include habitat improvement, research and measures that reduce the impact of recreational fishing (professional fishing is not present in the EMU) on the stock. Measures for recreational fishers include closed areas, quota and reducing fishing efforts in other ways. Not clear if this pertains to glass eel fisheries only or also includes yellow eel and silver eel fisheries. Not

clear how the 60% for restocking is monitored/implemented.

**18.4.4 Assessment**

Table 662: Summary list impact types that were included in the assessments for the Basque Country EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	omitted	omitted	omitted	included	omitted	absent	

Table 663: Summary of targets and assessment period for the Basque Country EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			98	0.916
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 664: Additional information for the Basque Country EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity reference: B<sub>current</sub> fluvial: silver eel kg/ha production obtained for some areas by electrofishing and silvering rate measurements, and extrapolation to the other areas; B<sub>current</sub> estuary: assume average area production rate from the lowest sampling point in the river in those rivers with silver eel production for current productions and the highest one for the pristine production. B<sub>0</sub>: Productivity reference: Fluvial: 20 kg/ha, estuaries: 82.7 kg/ha (maximum actual value in the lowest sampling point of Basque rivers).

#### 18.4.5 Progress towards recovery

Knowledge about the eel and eel fisheries in the area is improving. Not clear on progress.

Table 665: Overview of fishing effort reported in the ICES Data Call for the Basque Country EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008		75	410
	2009		75	394
	2010		75	396
	2011		75	408
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 666: Overview of total catches (commercial + recreational) of eel stages for the Basque Country EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	1.205	0	0	
2	2009				
<b>Post</b>					
3	2010				
4	2011	0.376	0	0	

Table 667: Stock indicators for the Basque Country EMU, the source of the data is indicated in Table 659,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	28.7	12.2					
2 2009							
3 2010							
4 2011	245.0	129.0	179	0.33			0.051

Table 668: WKEPEMP evaluation of progress toward recovery for the Basque Country EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		yes
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		yes
Has the EMU achieved the most it can without increased recruitment ?		no

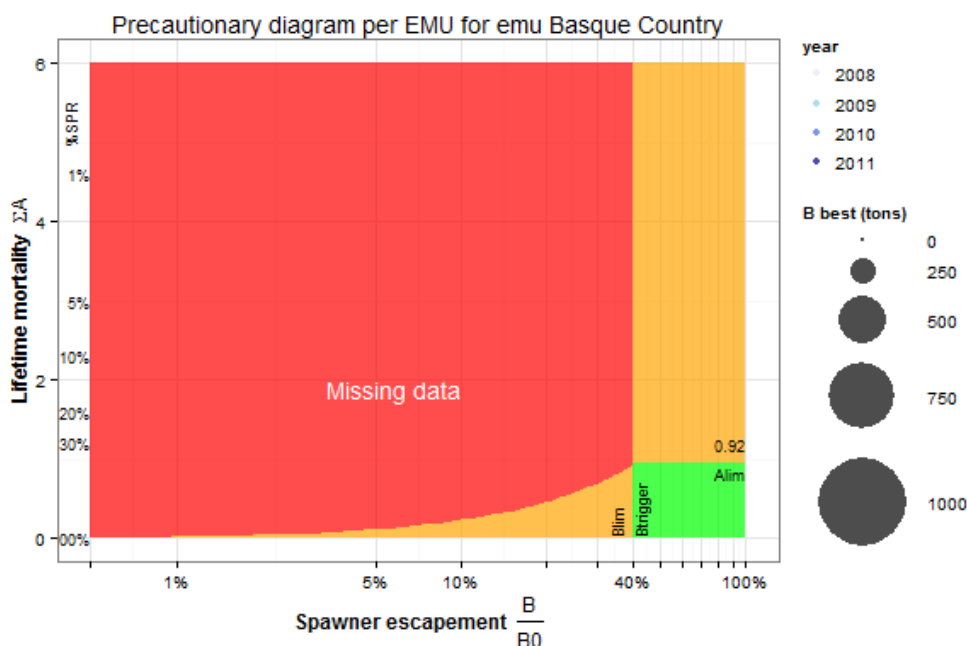


Figure 167: Modified precautionary diagram for the Basque Country EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.4.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. This evaluation used the information in the 2012 progress report and email information from the country report. Not all of the stock indicators have been reported: Calculations of  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators do not cover all of the eel habitats in the EMU: marine waters are missing. These impacts were included in the assessment: habitat loss; barriers; recreational fisheries (commercial fisheries even for glass eel is absent). These impacts were not included: restocking; indirect effects; commercial fisheries; hydropower; predators, although not all may be relevant given local conditions. Part of the Management Actions identified in the Progress Report have been implemented. Actions are mainly on improving knowledge about the EMU, its standing biomass, eel population composition, and eel productivity. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Others. The impact of other management actions could not be evaluated, either because of missing expertise or information: this applied to Fisheries, Hydropower, Restocking and Habitat.

The biomass of current silver eel escapement is above the target of the EU Regulation (40%). The anthropogenic mortality  $\Sigma A$  was not available from the Progress Report or the ICES Data Call. Therefore it is not possible to compare against the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.5 Cantabria

### 18.5.1 Available information

Figure 168: *Cantabria*, Spain



Table 669: Sources of information for the Cantabria EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Cantabria
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de cantabria. Gobierno de Cantabria
2013 ICES data-call:	
Additional sources:	

Table 670: Reported stock indicators for Cantabria

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	no	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	no	yes
ΣH	no	no

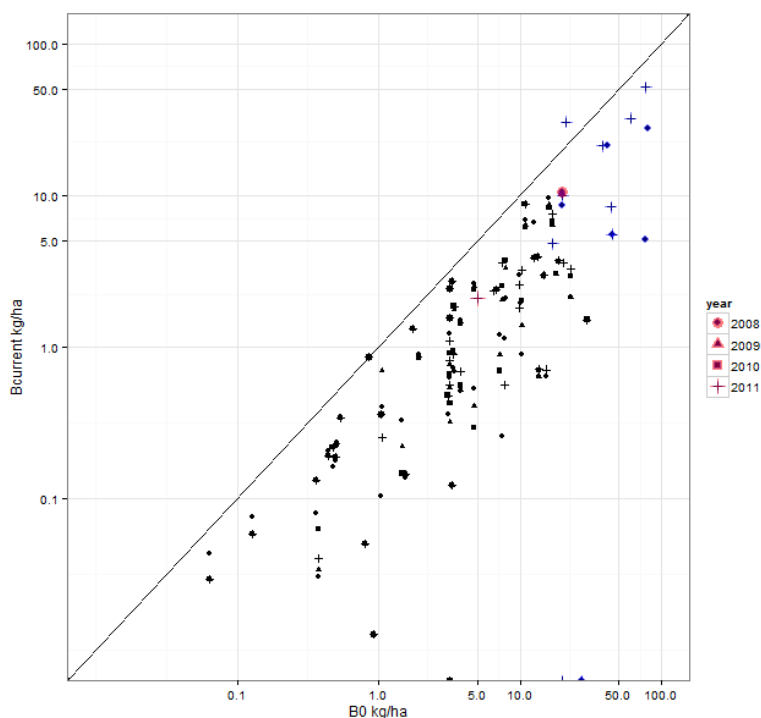


Figure 169: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the Cantabria EMU are shown in red, those for Spain are shown in blue.

Table 671: Source of indicators evaluated for the Cantabria EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 18.5.2 Habitat coverage of the EMU

Table 672: Habitats assessed in the Cantabria EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	Yes
Were lakes assessed ?	absent
Were estuaries assessed ?	no
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

Includes a part of Cuenca HidrogrÁfica del CantÁbrico. All the community is included in this RBD. Low lake surface area so we assume area production rate is for rivers.

### 18.5.3 Management measures

Table 673: Overview of the management actions proposed in the EMP for the Cantabria EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Reduce fishing effort	G	EMP	fulfilled	unsure
2	Reserve of the caught for stocking	G	EMP	fulfilled	regulation
<b>Rec. Fishr.</b>					
3	Reduce fishing basins	G	EMP	fulfilled	unsure
4	Introduce fishing quota	G	EMP	fulfilled	unsure
5	Introduce closed fishery	M	EMP	fulfilled	unsure
<b>Habitat</b>					
6	Improve longitudinal conectivity	U	EMP	not done	unsure
7	Program of habitat improvement	U	EMP	not done	unsure
<b>Others</b>					
8	Scientific studies	U	Other	fulfilled	unsure

The reduction of the fishing effort of the commercial fishery and the introduction of bans and quotas for recreational fisheries had already an effect on glass eel landings and might have increased effects in the near future. However, convincing evidence of enforcement and control could not be found in the report. No progress has yet been made to increase river continuity and habitat quality.

#### 18.5.4 Assessment

Table 674: Summary list impact types that were included in the assessments for the Cantabria EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	omitted	omitted	omitted	included	included	omitted	absent	

Table 675: Summary of targets and assessment period for the Cantabria EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			3.9	0.306
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 676: Additional information for the Cantabria EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity references: B<sub>current</sub> fluvial: silver eel production obtained by a conversion factor (5%) from yellow eel density (electrofishing). B<sub>0</sub>: Productivity reference: Fluvial: Applied a conversion factor to B<sub>current</sub>.

### 18.5.5 Progress towards recovery

The stock indicators as given in the report are doubtful with B<sub>best</sub> being 3 times higher than B<sub>0</sub>. B<sub>current</sub> and B<sub>0</sub> seem to be significantly underestimated by not taking into account transitional waters and by calculating silver eel escapement based on yellow eel surveys (after applying a 5% conversion factor). The obtained productivity values are very low compared to neighbouring EMUs (i.e. Basque Country) or other Atlantic regions in France. Given these data discrepancies comments on progress toward recovery would be premature.

Table 677: Overview of fishing effort reported in the ICES Data Call for the Cantabria EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008		180	
	2009		180	
	2010		90	
	2011		90	5
<b>G rec.</b>				
	2008			
	2009			
	2010			35
	2011			64
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 678: Overview of total catches (commercial + recreational) of eel stages for the Cantabria EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.382	0	0	
2	2009				
<b>Post</b>					
3	2010				
4	2011	0.057	0	0	

Table 679: Stock indicators for the Cantabria EMU, the source of the data is indicated in Table 671,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	38.7	6.4					
2 2009							
3 2010							
4 2011	9.7	1.3	28.1	3.08			0.005

Table 680: WKEPEMP evaluation of progress toward recovery for the Cantabria EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes	
Is the trend good ?	no		
Has the EMU reached the target set for 2012 in the EMP ?			
Has the EMU reached the long term target set by the EMP ?			
Has the EMU reached the EU/wgeel 2012 target ?			no
Has the EMU achieved the most it can without increased recruitment ?			no

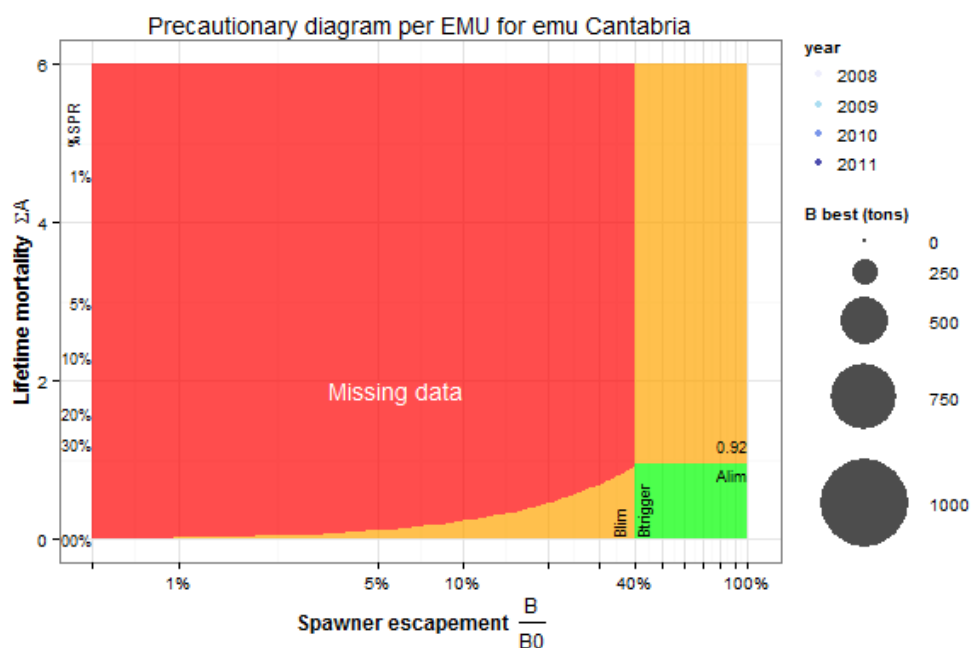


Figure 170: Modified precautionary diagram for the Cantabria EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.5.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators do not cover all of the eel habitats in the EMU: transitional and marine waters are missing. These impacts were included in the assessment: commercial fisheries; recreational fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; hydropower; predators, although not all may be relevant given local conditions. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, these have all been fully implemented, although there is no information about enforcement and control. Data were identified to evaluate the impact of management actions applied to Glass Eel Fisheries. No data were identified to evaluate the impact of management actions applied to other Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and decreasing. Anthropogenic mortality  $\Sigma A$  was not estimated either in the report or in the ICES data call. It cannot be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.



## 18.6 Castilla-La Mancha

### 18.6.1 Available information

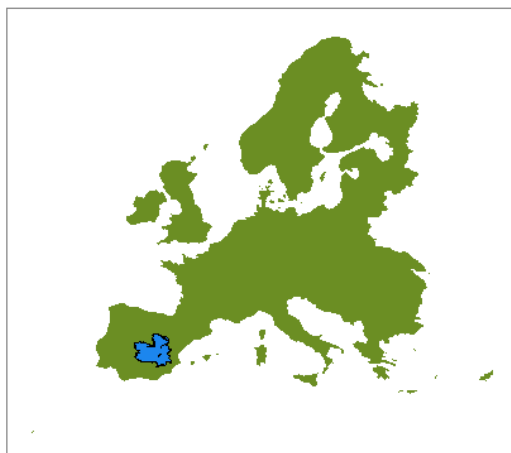


Figure 171: *Castilla-La Mancha*, Spain

Table 681: Sources of information for the Castilla-La Mancha EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Castilla-La Mancha. Dirección General de Montes y Espacios Naturales Consejería de Agricultura October 2010
EMP approved in: 2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de Castilla-La Mancha. Dirección General de Montes y Espacios Naturales Consejería de Agricultura
2013 ICES data-call: Additional sources:	

Table 682: Reported stock indicators for Castilla-La Mancha

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

Table 683: Source of indicators evaluated for the Castilla-La Mancha EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

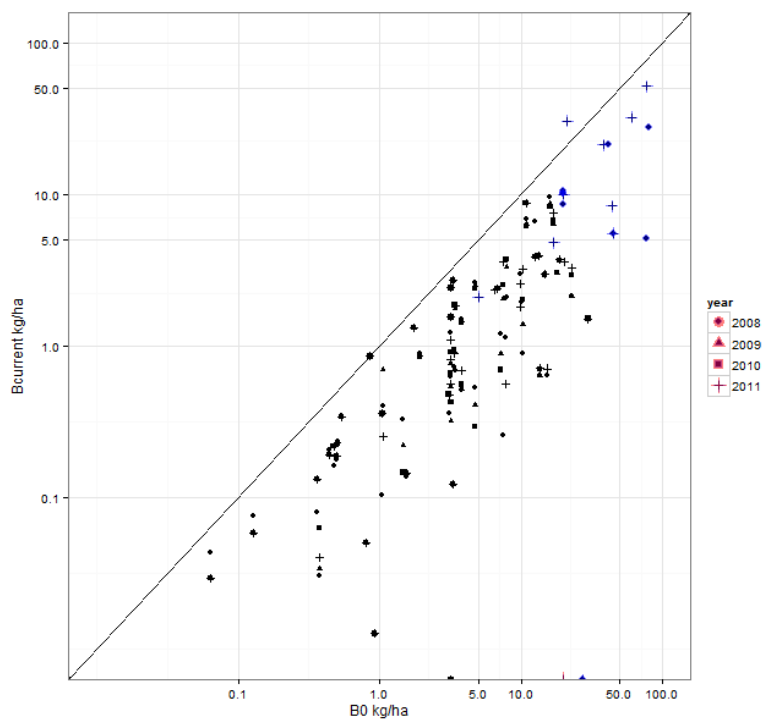


Figure 172:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Castilla-La Mancha EMU are shown in red, those for Spain are shown in blue.

### 18.6.2 Habitat coverage of the EMU

Table 684: Habitats assessed in the Castilla-La Mancha EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

This is an inner community, without actual eel population due to the presence of impassable dams in the coast. Includes a part of the Ucar RBD

### 18.6.3 Management measures

Table 685: Overview of the management actions proposed in the EMP for the Castilla-La Mancha EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Habitat</b>				
1 Discharge control	U	EMP	fulfilled	unsure
<b>Restocking</b>				
2 Stock pregrown eel	U	EMP	no info.	unsure
<b>Others</b>				
3 Scientific studies	U	EMP	partially	unsure
4 Establish collaboration measures with hydropower stations	U	EMP	no info.	unsure

There is no information yet upon the initiation or progress of any management measures.

### 18.6.4 Assessment

Table 686: Summary list impact types that were included in the assessments for the Castilla-La Mancha EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	absent	absent	absent	absent	absent	absent	

Table 687: Summary of targets and assessment period for the Castilla-La Mancha EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			9.4	0
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 688: Additional information for the Castilla-La Mancha EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity references: B<sub>current</sub> fluvial: = no actual eel population. B<sub>0</sub>: Productivity reference: Fluvial: 20Kg/ha.

### 18.6.5 Progress towards recovery

No progress has yet been made.

Table 689: Overview of fishing effort reported in the ICES Data Call for the Castilla-La Mancha EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0
<b>YS com</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0
<b>YS rec</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0

Table 690: Overview of total catches (commercial + recreational) of eel stages for the Castilla-La Mancha EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0	
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 691: Stock indicators for the Castilla-La Mancha EMU, the source of the data is indicated in Table 683,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	11.5	0					
2 2009							
3 2010							
4 2011	23.5	0	0	0			

Table 692: WKEPEMP evaluation of progress toward recovery for the Castilla-La Mancha EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		yes

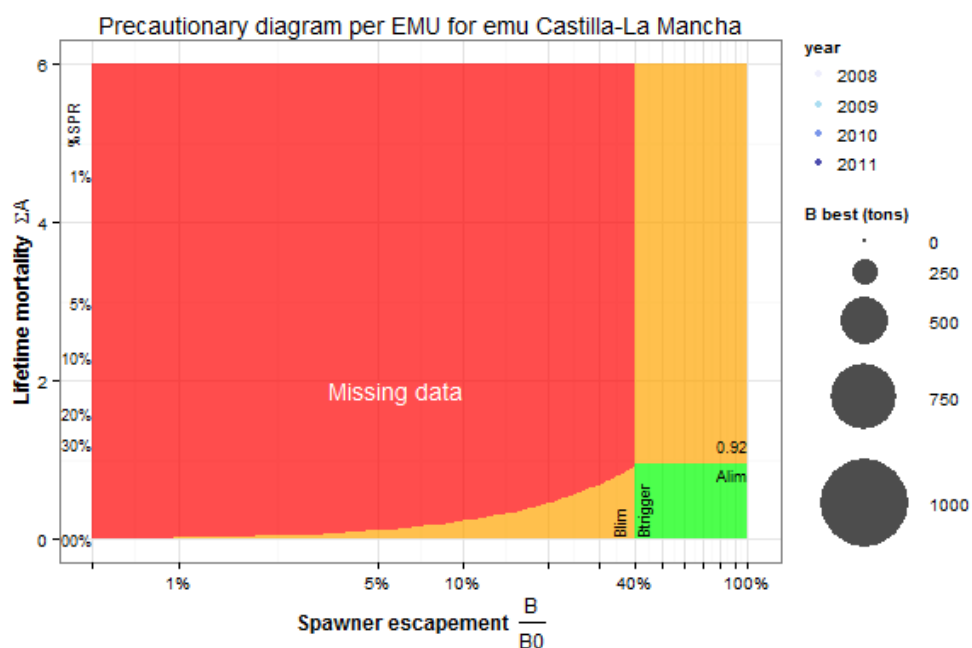


Figure 173: Modified precautionary diagram for the Castilla-La Mancha EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.6.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. However, with  $B_{\text{current}}$  and  $B_{\text{best}}$  being set to 0, this is irrelevant. The stock indicators obviously cover all of the eel habitats in the EMU. Assessment of  $B_0$  is based on the potential habitat. Some of the Management Actions identified for the EMP in the Progress Report have been implemented, and fully or partially.

The biomass of current silver eel escapement is estimated to be zero, and below the target of the EU Regulation (40%).



## 18.7 Catalonia

### 18.7.1 Available information

Figure 174: *Ebro*, Spain

Table 693: Sources of information for the Ebro EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Catalunya. Generalitat de Catalunya October 2010
EMP approved in: 2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de de Catalunya. Generalitat de Catalunya
2013 ICES data-call: Additional sources:	

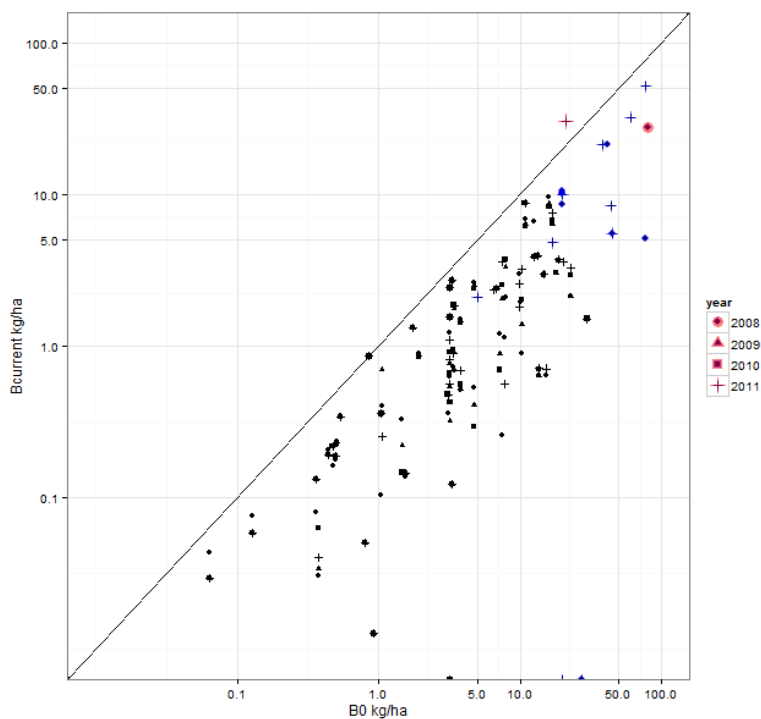


Figure 175:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Ebro EMU are shown in red, those for Spain are shown in blue.

Table 694: Reported stock indicators for the Ebro EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

Table 695: Source of indicators evaluated for the Ebro EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 18.7.2 Habitat coverage of the EMU

Table 696: Habitats assessed in the Ebro EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

Includes a part of the Ebro RBD and Catalunya Inner basin RBD. Low lake surface area so we assume the area production rate is for rivers.

### 18.7.3 Management measures

Table 697: Overview of the management actions proposed in the EMP for the Ebro EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Reduce fishing effort	G	EMP	fulfilled	unsure
2	Introduce closed fishery	M	EMP	fulfilled	unsure
3	Reserve of the caught for stocking	U	EMP	fulfilled	regulation
<b>Rec. Fishr.</b>					
4	Catch and release	M	EMP	fulfilled	unsure
<b>Habitat</b>					
5	Overall improvement	U	EMP	fulfilled	unsure
<b>Predatr.</b>					
6	Predator control	U	EMP	fulfilled	unsure
<b>Others</b>					
7	Scientific studies	U	EMP	fulfilled	unsure
8	Scientific studies	U	undefined	fulfilled	unsure

The introduction of closures for commercial fisheries and the reduction of fishing effort did not yet have any effect on total landings with an increase in glass eel landings from 524 kg in 2008 to 1527 kg in 2011 as well as an increase in yellow and silver eel landings from 12 t in 2010 to more than

18 t in 2011. For other measures, like predator control or habitat improvement, no data are yet available.

**18.7.4 Assessment**

Table 698: Summary list impact types that were included in the assessments for the Ebro EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	absent	omitted	absent	

Table 699: Summary of targets and assessment period for the Ebro EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			343.5	0.134
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 700: Additional information for the Ebro EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity references: B<sub>current</sub> fluvial: = silver eel production obtained by a conversion factor from yellow eel density (electrofishing), B<sub>current</sub> lagoons - see the Balearic Islands reference.

B<sub>0</sub>: Productivity reference: Fluvial: 20Kg/ha, for lagoons see the Balearic Islands reference.

#### 18.7.5 Progress towards recovery

Stock indicators remain constant despite an increase in total landings. Therefore no progress toward recovery can be seen.

Table 701: Overview of fishing effort reported in the ICES Data Call for the Ebro EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 702: Overview of total catches (commercial + recreational) of eel stages for the Ebro EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.524			
2	2009				
<b>Post</b>					
3	2010				
4	2011	1.527	18.55		

Table 703: Stock indicators for the Ebro EMU, the source of the data is indicated in Table 719,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	858.8	46.1					
2 2009							
3 2010							
4 2011	858.8	50.4	159.5	1.15			0.001

Table 704: WKEPEMP evaluation of progress toward recovery for the Ebro EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		no

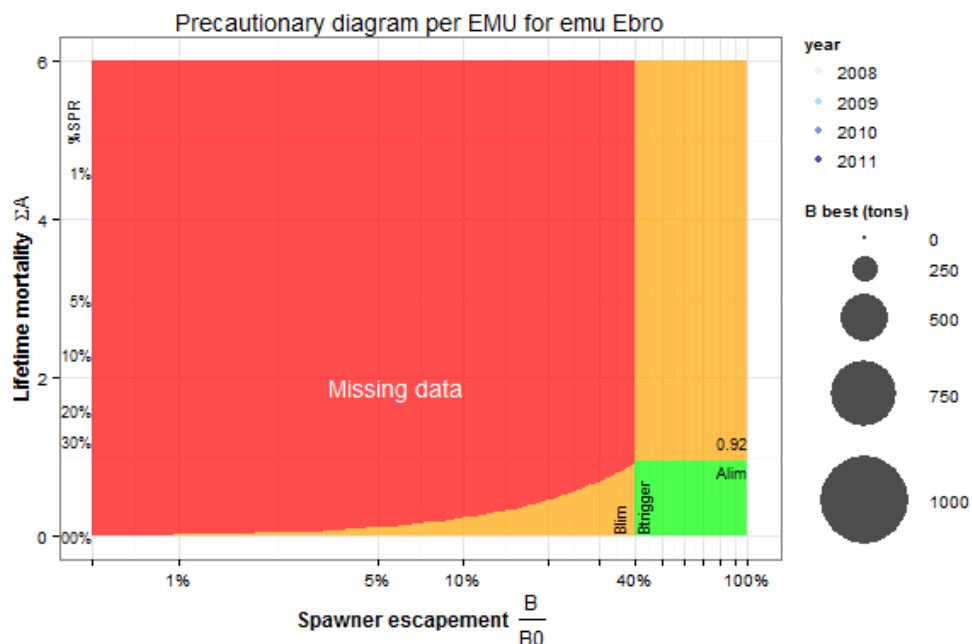


Figure 176: Modified precautionary diagram for the Ebro EMU (after wgeel2012), see section 1.3.2 for more information.

### 18.7.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators do not cover all of the eel habitats in the EMU: marine waters are missing. These impacts were included in the assessment: habitat loss; commercial fisheries. These impacts were not included: restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, although some may not be relevant because of local conditions. All of the Management Actions identified in the Progress Report have been fully implemented. No data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  was not estimated either in the report or in the ICES Data Call. It cannot be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.



## 18.8 Galicia

### 18.8.1 Available information

Figure 177: *Galicia*, Spain

Table 705: Sources of information for the Galicia EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Galicia. Xunta de Galicia.
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de Galicia. Xunta de Galicia.
2013 ICES data-call:	
Additional sources:	

Table 706: Reported stock indicators for Galicia

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

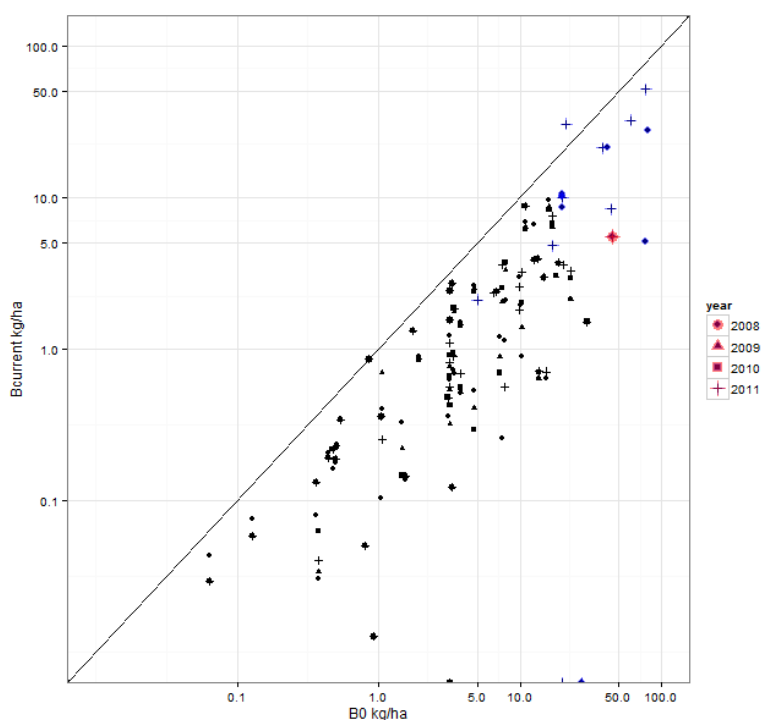


Figure 178:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Galicia EMU are shown in red, those for Spain are shown in blue.

Table 707: Source of indicators evaluated for the Galicia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 18.8.2 Habitat coverage of the EMU

Table 708: Habitats assessed in the Galicia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	no

Includes Galician coast RBD. Low lake surface area so we assume area production rate is for rivers only.

### 18.8.3 Management measures

Table 709: Overview of the management actions proposed in the EMP for the Galicia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact	
<b>Com. Fishr.</b>					
1	Introduce closed fishery	G	EMP	fulfilled	unsure
2	Reduce fishing effort	M	EMP	fulfilled	unsure
3	Introduce Regulation of the fishery	M	EMP	fulfilled	unsure
4	Introduce minimum size	M	EMP	fulfilled	unsure
<b>Rec. Fishr.</b>					
5	Introduce total closed fishery	G	EMP	fulfilled	unsure
6	Introduce closed fishery	M	EMP	fulfilled	unsure
<b>Habitat</b>					
7	Improve water quality	U	EMP	partially	unsure
8	Recovery plan of endemic species	U	Other	fulfilled	unsure
<b>Hydropw. &amp; Obst.</b>					
9	Temporal disconnection	U	EMP	partially	unsure
10	Inventory of obstacles	U	EMP	fulfilled	none

The introduction of closures for commercial and recreational fisheries, of minimum landing sizes and other regulations did not yet have a significant effect on total yellow and silver eel landings (32,8 t in 2008, 31,9 t in 2011). For other measures, like habitat improvement, no data are yet available.

**18.8.4 Assessment**

Table 710: Summary list impact types that were included in the assessments for the Galicia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	absent	omitted	absent	

Table 711: Summary of targets and assessment period for the Galicia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			52.1	0.16
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 712: Additional information for the Galicia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river.  $B_{best} = B_{current} + \text{Fishing mortality}$ . Productivity references: stock abundance surveys

#### 18.8.5 Progress towards recovery

Stock indicators as well as total landings remain constant despite the introduction of fishery regulations. Therefore no progress toward recovery can be seen.

Table 713: Overview of fishing effort reported in the ICES Data Call for the Galicia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		365	
	2009		365	
	2010		270	
	2011		270	
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 714: Overview of total catches (commercial + recreational) of eel stages for the Galicia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				32.8
2	2009				
<b>Post</b>					
3	2010				
4	2011				31.9

Table 715: Stock indicators for the Galicia EMU, the source of the data is indicated in Table 707,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	130.3	9.1					
2 2009							
3 2010							
4 2011	130.3	9.1	60.4	1.89			

Table 716: WKEPEMP evaluation of progress toward recovery for the Galicia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		no



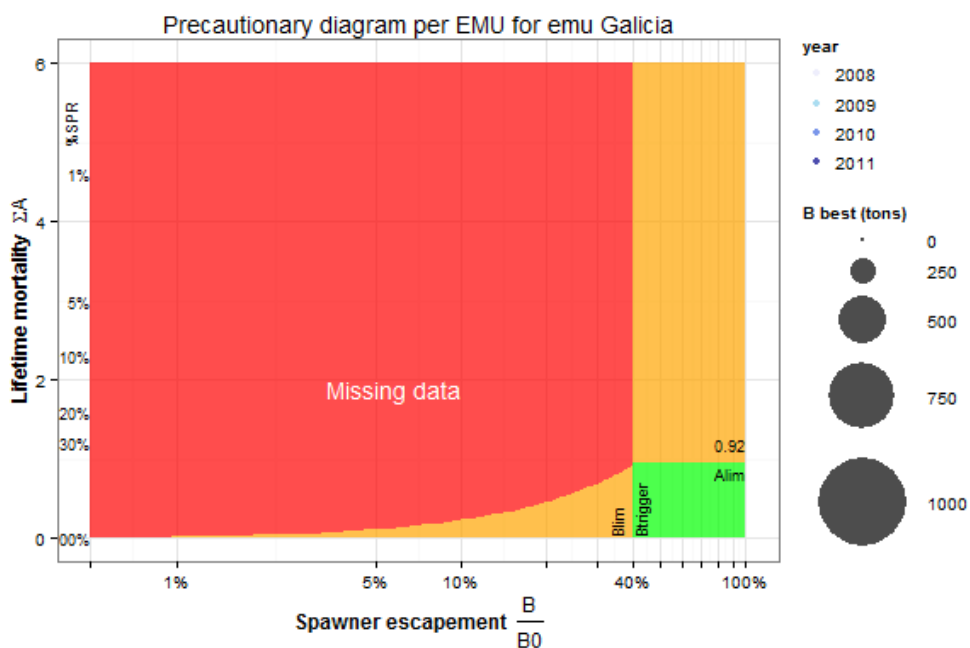


Figure 179: Modified precautionary diagram for the Galicia EMU (after wgeel 2012), see section 1.3.2 for more information.

**18.8.6 Conclusion**

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators do not cover all of the eel habitats in the EMU: marine waters are missing. These impacts were included in the assessment: habitat loss; commercial fisheries. These impacts were not included: restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, although some may not be relevant because of local conditions. All of the Management Actions identified in the Progress Report have been implemented, some fully and others only partially. No data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others. Data are insufficient to see a trend in silver eel escapement.

Biomass of silver eel escapement is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  was not reported. It cannot be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.9 Spain Inner

### 18.9.1 Available information

Figure 180: *Ebro*, Spain

Table 717: Sources of information for the Ebro EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España.
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente.
2013 ICES data-call:	
Additional sources:	

Table 718: Reported stock indicators for the Ebro EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	no	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	yes	yes
ΣH	no	no

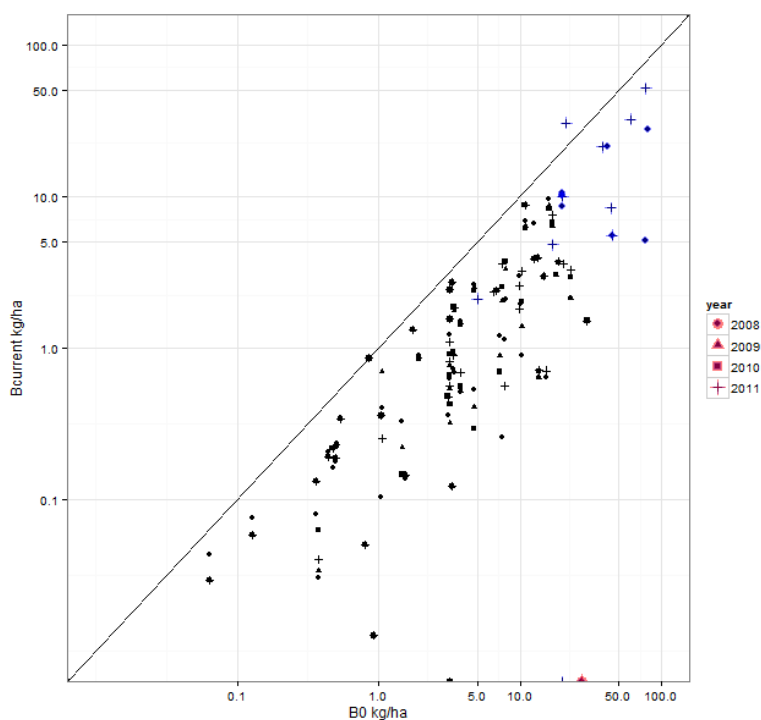


Figure 181: B<sub>0</sub> and B<sub>current</sub> in kg/ha. The indicators for the Ebro EMU are shown in red, those for Spain are shown in blue.

Table 719: Source of indicators evaluated for the Ebro EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 18.9.2 Habitat coverage of the EMU

Table 720: Habitats assessed in the Ebro EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

It includes the RBDS of the Spanish inner communities except from Navarra and Castilla la Mancha.

### 18.9.3 Management measures

Table 721: Overview of the management actions proposed in the EMP for the Ebro EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduce fishing effort	M	EMP	fulfilled interm
2	Reserve of the caught for stocking	G	EMP	no info. interm
<b>Rec. Fishr.</b>				
3	Catch and release	M	EMP	fulfilled low
<b>Habitat</b>				
4	Improve longitudinal connectivity	U	EMP	partially unsure
5	Overall improvement	U	EMP	no info. high
<b>Predatr.</b>				
6	Predator control	U	EMP	partially low

### 18.9.4 Assessment

Table 722: Summary list impact types that were included in the assessments for the Ebro EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	absent	absent	absent	absent	absent	absent	

Table 723: Summary of targets and assessment period for the Ebro EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			968.1	0
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 724: Additional information for the Ebro EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity references: B<sub>current</sub> fluvial: = 0, no actual eel population. B<sub>0</sub>: Productivity reference: Fluvial: 20 Kg/ha.

#### 18.9.5 Progress towards recovery

No progress has yet been made.

Table 725: Overview of fishing effort reported in the ICES Data Call for the Ebro EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0
<b>G rec.</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0
<b>YS com</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0
<b>YS rec</b>				
	2008	0	0	0
	2009			
	2010			
	2011	0	0	0

Table 726: Overview of total catches (commercial + recreational) of eel stages for the Ebro EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	0	0	
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 727: Stock indicators for the Ebro EMU, the source of the data is indicated in Table 719,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	2420.2	0		0			
2 2009							
3 2010							
4 2011	2420.2	0	0	0			

Table 728: WKEPEMP evaluation of progress toward recovery for the Ebro EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		yes



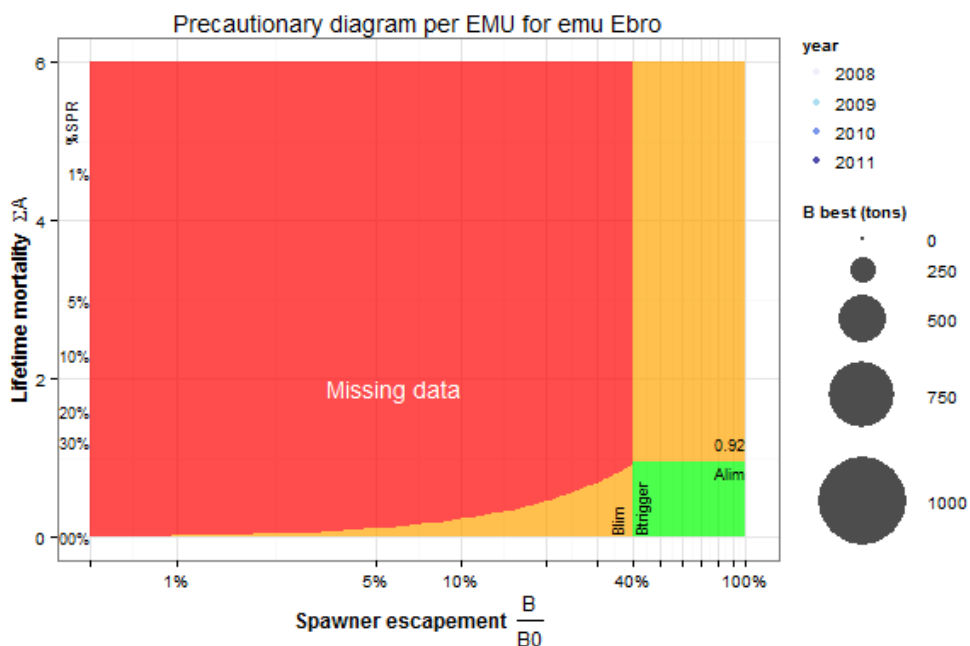


Figure 182: Modified precautionary diagram for the Ebro EMU (after wgeel2012), see section 1.3.2 for more information.

**18.9.6 Conclusion**

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing, however with  $B_{current}$  and  $B_{best}$  being set to 0 this is irrelevant. The stock indicators obviously cover all of the eel habitats in the EMU. Assessment of  $B_0$  is based on the potential habitat.

The biomass of current silver eel escapement is zero, and is below the target of the EU Regulation (40%).

## 18.10 Murcia

### 18.10.1 Available information

Figure 183: *Murcia*, Spain

Table 729: Sources of information for the Murcia EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Valencia. Comunitat Valenciana October 2010
EMP approved in: 2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de de la Comunita Valenciana. Comunitat Valenciana
2013 ICES data-call: Additional sources:	

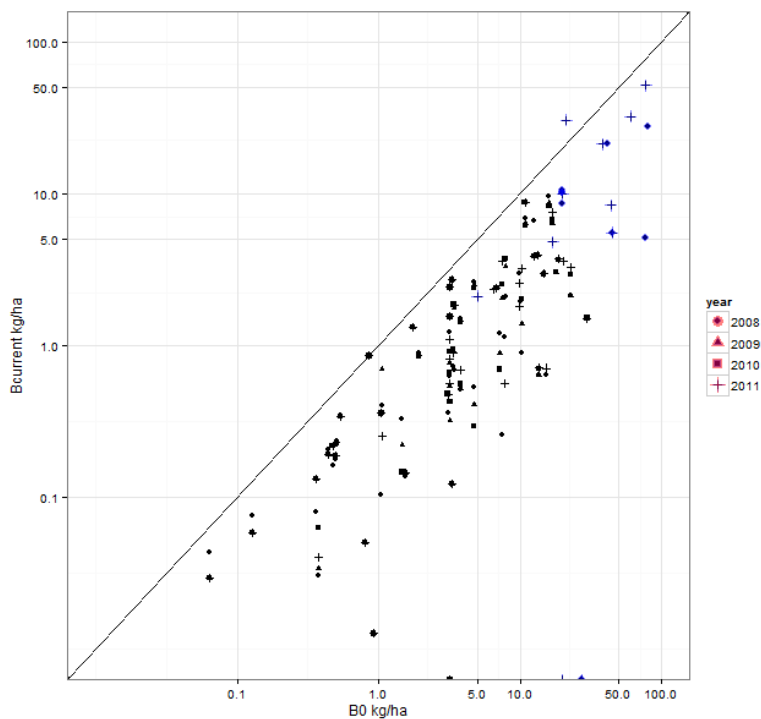


Figure 184:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Murcia EMU are shown in red, those for Spain are shown in blue.

Table 730: Reported stock indicators for Murcia

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

Table 731: Source of indicators evaluated for the Murcia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 18.10.2 Habitat coverage of the EMU

Table 732: Habitats assessed in the Murcia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

Includes a part of the Segura RBD. Low lake surface area so we assume area production rate is for rivers only.

### 18.10.3 Management measures

Table 733: Overview of the management actions proposed in the EMP for the Murcia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Introduce minimum size	M	EMP	fulfilled unsure
2	Reduce fishing effort	M	EMP	fulfilled unsure

The reduction of the fishing effort of the commercial fishery and the introduction of minimum landing sizes already have an effect on total landings and might have an even increased effect in the near future. No other measures have been proposed.

### 18.10.4 Assessment

Table 734: Summary list impact types that were included in the assessments for the Murcia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	absent	omitted	absent	

Table 735: Summary of targets and assessment period for the Murcia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			52.1	0.16
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 736: Additional information for the Murcia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity references: Mar menor lagoon: Based on fishery and survey data (0.82kg/ha): Fluvial, productivity reference: 0, no current eel population. B<sub>0</sub>: Mar menor lagoon: Apply a conversion factor to the current biomass based on the the historical CPUE decrease ( 1.62 kg/ha). Fluvial productivity: = productivity reference 20 kg/ha.

### 18.10.5 Progress towards recovery

The stock indicators given in the report are difficult to understand because B<sub>best</sub> is more than 2 times higher than B<sub>0</sub>. B<sub>current</sub> and B<sub>0</sub> seem to be significantly underestimated. Given these

data discrepancies comments on progress toward recovery would be premature.

Table 737: Overview of fishing effort reported in the ICES Data Call for the Murcia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		365	
	2009		365	
	2010		270	
	2011		270	
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 738: Overview of total catches (commercial + recreational) of eel stages for the Murcia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				32.8
2	2009				
<b>Post</b>					
3	2010				
4	2011				31.9

Table 739: Stock indicators for the Murcia EMU, the source of the data is indicated in Table 731, B<sub>current</sub> is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	B <sub>0</sub>	B <sub>current</sub>	B <sub>best</sub>	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	858.8	50.4					
2 2009							
3 2010							
4 2011	858.8	50.4	159.5	1.15			

Table 740: WKEPEMP evaluation of progress toward recovery for the Murcia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		no



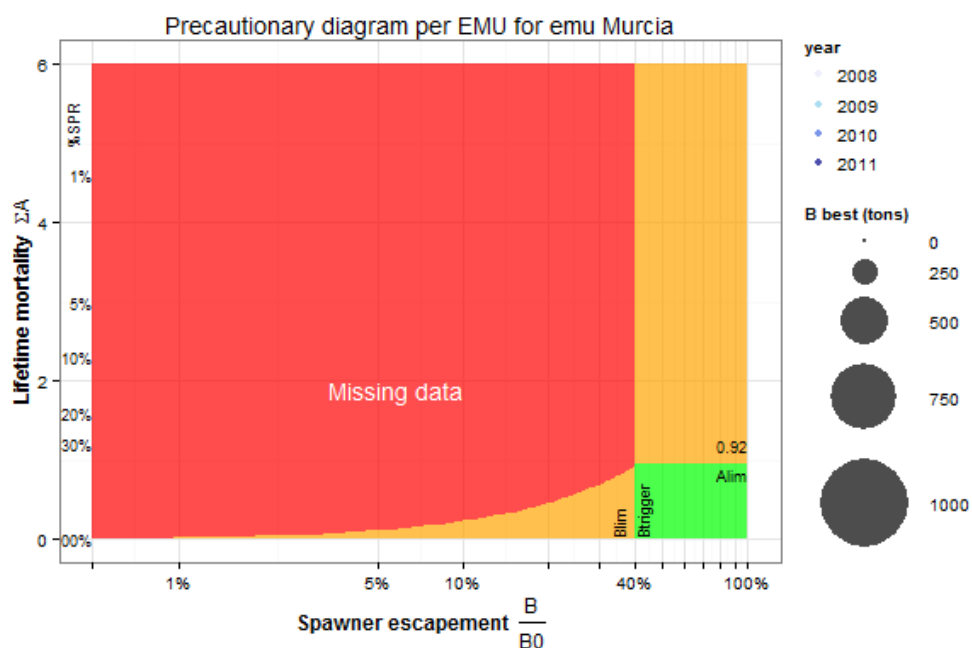


Figure 185: Modified precautionary diagram for the Murcia EMU (after weel 2012), see section 1.3.2 for more information.

### 18.10.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators do not cover all of the eel habitats in the EMU: at least marine waters are missing. These impacts were included in the assessment: commercial fisheries. These impacts were not included: habitat loss; restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, although some may not be relevant to local conditions. All of the Management Actions outlined in the Progress Report have been fully implemented, although there is no information about enforcement and control. Data were identified to evaluate the impact of management actions applied to Fisheries. No data were identified to evaluate the impact of management actions applied to Hydropower, Restocking, Habitat or Others.

The biomass of current silver eel escapement is below the target of the EU Regulation (40%) and not changing. Anthropogenic mortality  $\Sigma A$  was not reported. It cannot be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.11 Navarra

### 18.11.1 Available information



Figure 186: *Navarra*, Spain

Table 741: Sources of information for the Navarra EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Castilla-La Mancha.D irection General de Montes y Espacios Naturales Consejería de Agricultura October 2010
EMP approved in: 2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de Castilla-La Mancha.D irection General de Montes y Espacios Naturales Consejería de Agricultura
2013 ICES data-call: Additional sources:	

Table 742: Reported stock indicators for Navarra

Name	Pre	Post
$B_{current}$	no	yes
$B_{best}$	no	yes
$B_0$	no	no
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

Table 743: Source of indicators evaluated for the Navarra EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

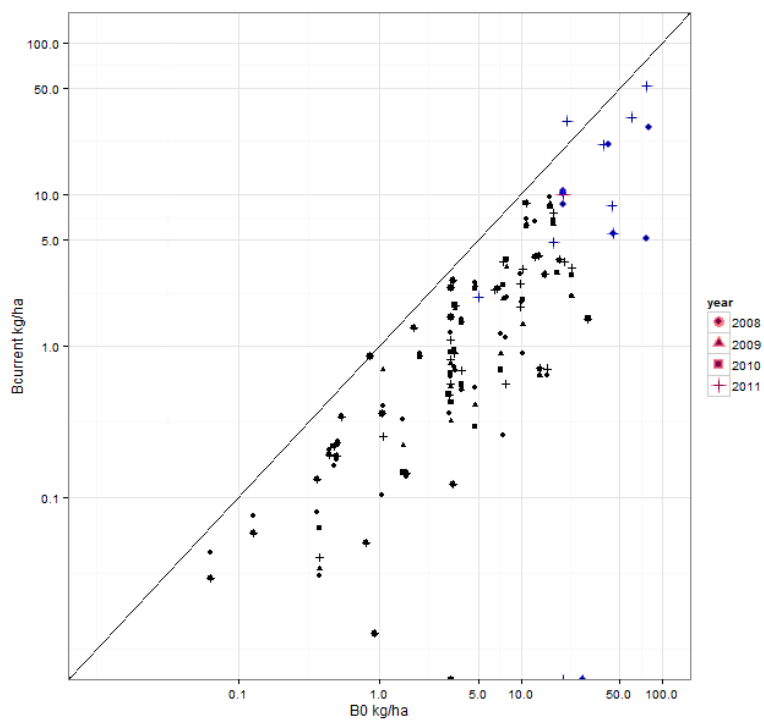


Figure 187:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Navarra EMU are shown in red, those for Spain are shown in blue.

### 18.11.2 Habitat coverage of the EMU

Table 744: Habitats assessed in the Navarra EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

It was not included in 2008 EMP. It is an inner community. The plan includes a part of the Bidasoa international river.

### 18.11.3 Management measures

Table 745: Overview of the management actions proposed in the EMP for the Navarra EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Introduce closed fishery	M	EMP	fulfilled	unsure
<b>Recr. Fishr.</b>				
2 Introduce closed fishery	M	EMP	fulfilled	unsure
<b>Habitat</b>				
3 Improve longitudinal connectivity	U	undefined	partially	unsure
<b>Restocking</b>				
4 Stock pregrown eel	S	EMP	fulfilled	unsure

The introduction of closures for commercial and recreational fisheries may have an effect in the near future, which cannot yet be assessed due to missing data on previous commercial and recreational landings. The major factor for a relatively low  $B_{current}$  compared to  $B_0$  seems to be the restricted habitat area until the first impassable dam. No progress has yet been made to increase river continuity and therefore the accessible habitat area.

### 18.11.4 Assessment

Table 746: Summary list impact types that were included in the assessments for the Navarra EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	absent	absent	absent	absent	absent	absent	

Table 747: Summary of targets and assessment period for the Navarra EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			2.2	0.916
Assessment period start	2011	2011	2011	
Assessment period end	2011	2011	2011	

Table 748: Additional information for the Navarra EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity reference: B<sub>current</sub> fluvial: = silver eel kg/ha production obtained for some areas by electrofishing and silvering rate measurements and extrapolation to the rest of areas B<sub>0</sub>: Productivity reference: Fluvial: 20 Kg/ha.

#### 18.11.5 Progress towards recovery

Stock indicators are only given for the 2011 report. Therefore no conclusions on the progress toward recovery can be drawn.

Table 749: Overview of fishing effort reported in the ICES Data Call for the Navarra EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 750: Overview of total catches (commercial + recreational) of eel stages for the Navarra EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 751: Stock indicators for the Navarra EMU, the source of the data is indicated in Table 743,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008							
2 2009							0.005
3 2010							0.005
4 2011	5.4	2.3	2	0			

Table 752: WKEPEMP evaluation of progress toward recovery for the Navarra EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )		
Is the stock indicator quantified ?	no	yes	
Is the trend good ?			
Has the EMU reached the target set for 2012 in the EMP ?			
Has the EMU reached the long term target set by the EMP ?			
Has the EMU reached the EU/wgeel 2012 target ?			yes
Has the EMU achieved the most it can without increased recruitment ?			no



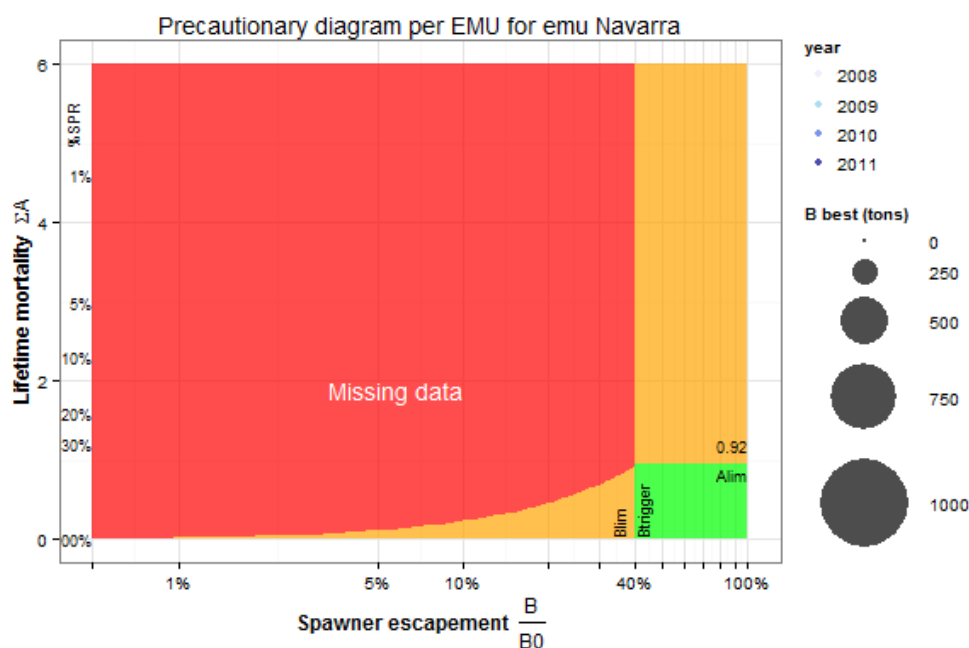


Figure 188: Modified precautionary diagram for the Navarra EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.11.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators cover all of the eel habitats in the EMU. These impacts were included in the assessment: habitat loss. These impacts were not included: commercial fisheries; restocking; barriers; indirect effects; recreational fisheries; hydropower; predators, although some of these might not be relevant given local conditions. All of the Management Actions outlined in the Progress Report have been implemented, though some only partially. No data were identified to evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

Due to missing data, no estimate of changes in the biomass of silver eel escapement can be made, but escapement is above the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  was not reported so cannot be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 18.12 Valencia

### 18.12.1 Available information

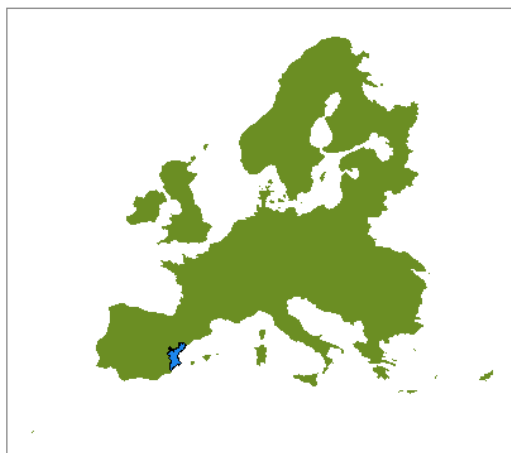


Figure 189: *Valencia*, Spain

Table 753: Sources of information for the Valencia EMU

Type of source	Reference
EMP	Plan de gestión de la anguila europea en España. Ministerio de Medio Ambiente, y Medio Rural y Marino del Gobierno de España. PGA de la CA de Valencia. Comunitat Valenciana
EMP approved in:	October 2010
2012 post-evaluation report:	Informe post-evaluación de los planes de gestión de la anguila europea de ESPAÑA. July 2012. Ministerio de Agricultura, alimentación y Medio ambiente. Post-evaluación del plan de gestión de la anguila europea de de la Comunitat Valenciana. Comunitat Valenciana
2013 ICES data-call:	
Additional sources:	

Table 754: Reported stock indicators for the Valencia EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	no	yes
$B_0$	yes	yes
$\Sigma A$	no	no
$\Sigma F$	no	yes
$\Sigma H$	no	no

Table 755: Source of indicators evaluated for the Valencia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

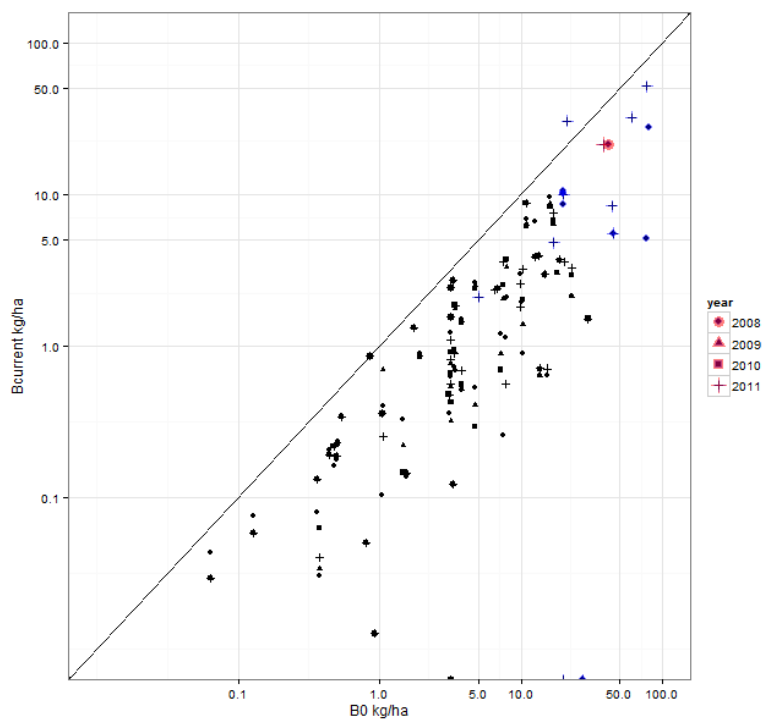


Figure 190:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Valencia EMU are shown in red, those for Spain are shown in blue.

### 18.12.2 Habitat coverage of the EMU

Table 756: Habitats assessed in the Valencia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

Includes a part of the Jucar RBD. Low lake surface area so we assume area production rate is for rivers only.

### 18.12.3 Management measures

Table 757: Overview of the management actions proposed in the EMP for the Valencia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1 Poaching control	G	EMP	partially	high
<b>Recr. Fishr.</b>				
2 Introduce closed fishery	M	EMP	fulfilled	unsure
<b>Habitat</b>				
3 Stablish protected areas	M	EMP	fulfilled	unsure
4 Overall improvement	U	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>				
5 Put grids in turbines, maintain off- shoot channels	U	EMP	partially	unsure
<b>Restocking</b>				
6 Adjust percentage of catches for stocking	G	EMP	partially	regulation
7 Stocking fee increase	M	EMP	fulfilled	unsure
8 Reserve of the caught	M	EMP	partially	regulation

Table 757: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
9	Scientific studies	U	undefined	partially	none
10	Scientific studies	U	EMP	partially	none

The introduction of closures for recreational fisheries and poaching controls for commercial fisheries may have an effect in the future but cannot yet be assessed due to missing data on previous commercial and recreational landings. However, so far, glass eel landings significantly increased from 163 kg in 2008 to 255 kg in 2011, while yellow and silver eel landings decreased only slightly from 10 t in 2008 to 8.5 t in 2011. Stocking of 1.8 kg (2010) and 6.6 kg (2011) of glass eel equivalents appears insignificant. No progress has yet been made to increase river continuity and therefore the accessible habitat area.

**18.12.4 Assessment**

Table 758: Summary list impact types that were included in the assessments for the Valencia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	absent	

Table 759: Summary of targets and assessment period for the Valencia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets			279.2	0.916
Assessment period start	2008	2011	2008	
Assessment period end	2011	2011	2011	

Table 760: Additional information for the Valencia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	no	no	no	no
Does double banking apply ?			no	no
Is double banking considered ?			no	no

The approach has been to multiply the current or the pristine habitat \* the current or pristine productivity. Current habitat includes the area from the river mouth until the first impassable dam. Pristine habitat is from the river mouth until the first natural impassable obstacle, or to a determinate height depending of the slope of the river. B<sub>best</sub>: B<sub>current</sub> + Fishing mortality. Productivity reference: B<sub>current</sub> fluvial and estuary: Using a reference productivity value from Rhone management plan, B<sub>current</sub> lagoons, Balearic Island's reference. B<sub>0</sub>: Productivity reference: fluvial and estuary: Using a reference productivity value from Rhone management plan, lagoons Balearic Island's reference.

#### 18.12.5 Progress towards recovery

Based on the applied method to calculate the indicators, the progress toward recovery cannot be assessed for the Valencia EMU. Productivity estimates are based upon data of the French river Rhone and Balearic lagoons multiplied by the potential habitat surface. This calculation will not change in the near future and is inappropriate for a critical evaluation of the eel management plan. In addition, the applied 30% silvering rate seems very unlikely, considering that the Valencia EMU consists mainly of lowland rivers, transitional waters and lagoons, where silvering tends to be lower. However, to prove this, own survey data are crucial. While all other Spanish EMUs used own survey-based data to calculate B<sub>current</sub>, no such data are available for the Valencia EMU.

Table 761: Overview of fishing effort reported in the ICES Data Call for the Valencia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			4
	2009			4
	2010			4
	2011			4

Table 762: Overview of total catches (commercial + recreational) of eel stages for the Valencia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0.163	10.11		
2	2009	0.116	15.36		
<b>Post</b>					
3	2010	0.166	10.66		
4	2011	0.255	8.48		



Table 763: Stock indicators for the Valencia EMU, the source of the data is indicated in Table 755,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	698	385.2					0.017
2 2009							0.008
3 2010							0.002
4 2011	698	385.2	428	0.11			0.007

Table 764: WKEPEMP evaluation of progress toward recovery for the Valencia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		yes
Has the EMU achieved the most it can without increased recruitment ?		no

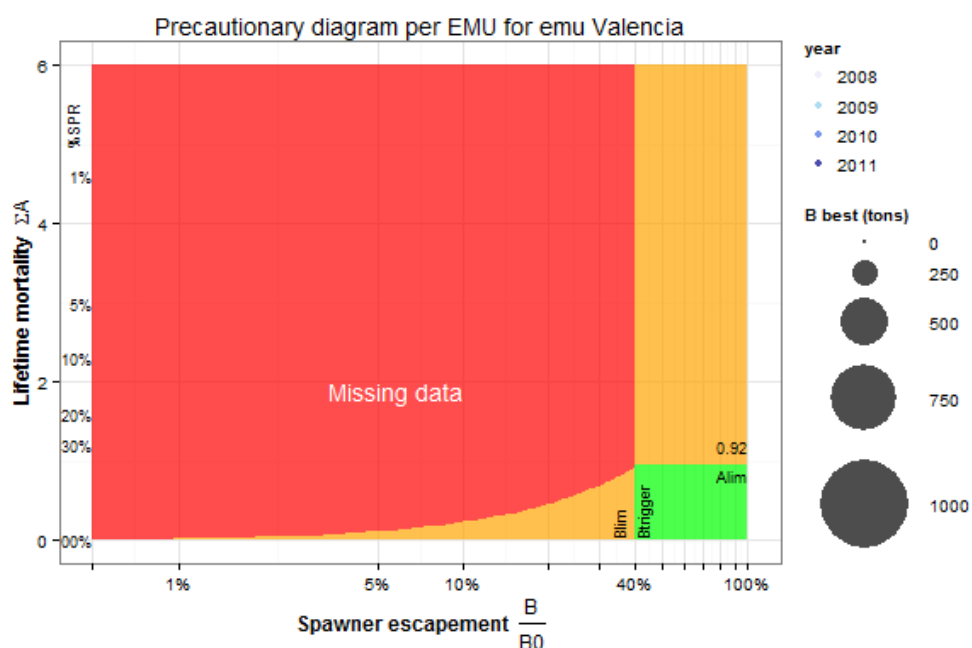


Figure 191: Modified precautionary diagram for the Valencia EMU (after wgeel 2012), see section 1.3.2 for more information.

### 18.12.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report and in the ICES Data Call. However, a proper evaluation would be only possible after translation of the report, which was not provided to the evaluator. Not all of the stock indicators have been reported:  $\Sigma H$  and  $\Sigma A$  are missing. The stock indicators cover all of the eel habitats in the EMU, but are doubtful due to a calculation not based on survey data. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: restocking; barriers; indirect effects; hydropower; predators, although some may not be relevant because of local conditions. All of the Management Actions outlined in the Progress Report have been implemented, but some have only be partly implemented. No data were identified to properly evaluate the impact of management actions applied to Fisheries, Hydropower, Restocking, Habitat or Others.

Due to missing data, no estimate of changes in the biomass of silver eel escapement can be made but it is above the target of the EU Regulation (40%). However due to the lack of own data, the indicators are doubtful. Anthropogenic mortality  $\Sigma A$  was not reported and therefore cannot be compared to the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation.

## 19 Portugal

### 19.0.7 Available information

Table 765: Reported stock indicators for Portugal

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

### 19.0.8 Habitat coverage of the EMU

Table 766: Habitats assessed in the Portugal EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	?
Were lakes assessed ?	?
Were estuaries assessed ?	?
Were lagoons assessed ?	?
Were marine coastal waters assessed ?	?

### 19.0.9 Management measures

Table 767: Overview of the management actions proposed in the EMP for the Portugal EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Restrict eel fishery to the defined professional fishing areas in freshwater jurisdiction	M	EMP	fulfilled	unsure
2	Introduce fishing quota in freshwater jurisdiction	M	EMP	partially	unsure
3	Introduce a maximum number of gears per fisherman in freshwater jurisdiction	M	EMP	partially	unsure
4	Introduce mandatory reporting of catches in freshwater jurisdiction	M	EMP	fulfilled	none
5	License renewal conditioned to the obligation of delivering catch reports from the previous season (freshwater)	M	EMP	fulfilled	none
6	Introduce a specific license for eel fishing in freshwater jurisdiction	M	EMP	not done	none
7	Introduce closed fishery in marine water jurisdiction in October, November and December	M	EMP	fulfilled	unsure
8	Reduce number licenses in marine water jurisdiction	M	EMP	fulfilled	unsure
9	Monitor catches	M	EMP	partially	none
<b>Rec. Fishr.</b>					
10	Forbbid recreational eel fishery in freshwater and marine waters jurisdiction	M	EMP	partially	unsure
11	Introduce closed fishery in freshwater jurisdiction in October, November and December	M	EMP	fulfilled	unsure
<b>Habitat</b>					
12	Improve water quality	M	EMP	partially	unsure
<b>Hydropw. &amp; Obst.</b>					
13	Demolish obstacles	U	EMP	partially	unsure

Table 767: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
14	Ensure monitoring and control of glass eel poaching	G	EMP	no info.	unsure
15	Eradicate illegal fishing	G	EMP	partially	unsure

**19.0.10 Assessment**

**19.0.11 Progress towards recovery**

Table 768: Overview of fishing effort reported in the ICES Data Call for the Portugal EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 769: Overview of total catches (commercial + recreational) of eel stages for the Portugal EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 770: Stock indicators for the Portugal EMU – none provided.

1	2008			
2	2009			
3	2010			
4	2011			

Table 771: WKEPEMP evaluation of progress toward recovery for the Portugal EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	no no
Is the trend good ?	
Has the EMU reached the target set for 2012 in the EMP ?	
Has the EMU reached the long term target set by the EMP ?	
Has the EMU reached the EU/wgeel 2012 target ?	
Has the EMU achieved the most it can without increased recruitment ?	

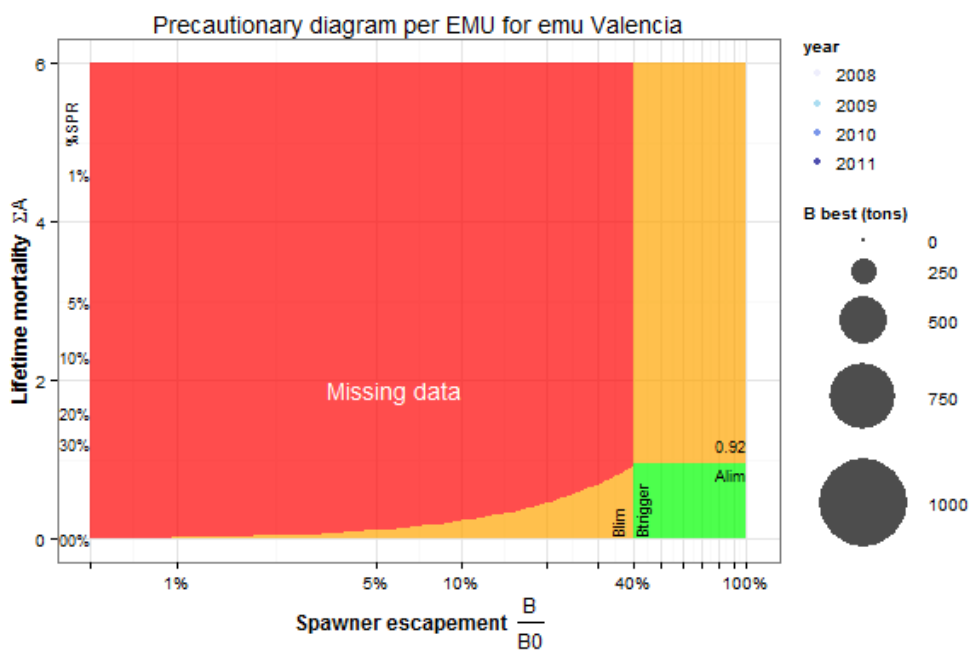


Figure 192: Modified precautionary diagram for the Portugal EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 19.0.12 Conclusion

This EMU has an eel management plan, approved in 2011, with a 2012 progress report. This evaluation used the information in the 2012 progress report. No stock indicators have been reported. No impacts have been assessed. Part of the Management Actions outlined in the Progress Report have been implemented, some of which only partially implemented. No data were identified to evaluate the impact of management actions. Expert judgement was used to evaluate the impact of actions. There are no biomass or mortality indicators so we cannot assess progress.

## 20 Italy

### General comment about the data reported for Italy

The 2012 Progress Report presents EMP estimates of stock indicators and targets (Table 3.15), and updated indicators & targets (Table 3.23) - the difference between the two is relatively small. However, for the ICES Data Call, yet another update is presented, deviating considerably. It is not clear to the workshop what caused the differences. In the Data Call, detailed indicators were reported for all 20 EMUs in Italy; the 2012 Progress Report, however, indicates that only 9 EMUs have an (approved) EMP, and data are reported only for those 9 EMUs. It is not clear to the workshop where the remaining estimates come from, what field data have been used, and to what extent indicators for those 11 EMUs actually reflect local data. We evaluated the 9 EMUs, as reported in the 2012 Progress report. However, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy. Noting that mortality by EMU in 2011 - as reported in the ICES data call - varies from 0.28 to 4.98 (or even infinite), the question arises how informative national indicators are for the state of the stock. Moreover, the 11 EMUs without an (approved) EMP seem to cover areas of low & high anthropogenic impacts - the value of national indicators covering less than half of the EMUs is dubious.

### 20.1 Emilia-Romagna

#### 20.1.1 Available information

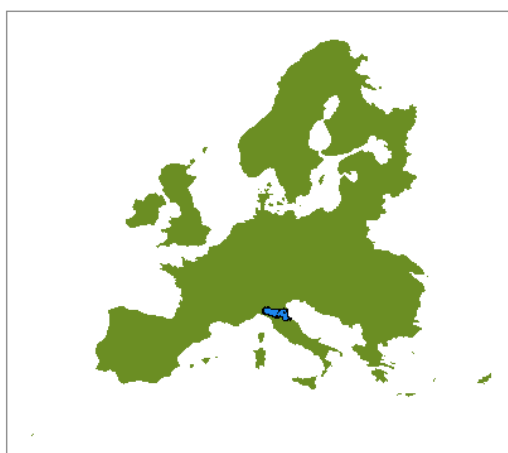


Figure 193: *Emilia-Romagna*, Italy

Table 772: Sources of information for the Emilia-Romagna EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07



EMP approved in: 2009  
 2012 post-evaluation re- Ministero delle Politiche Agricole Alimentari e Forestali (MI-  
 port: PAAF) 2012. Rapporto Annuale Italia (art. 9)  
 2013 ICES data-call:  
 Additional sources:

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Table 773: Reported stock indicators for the Emilia-Romagna EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

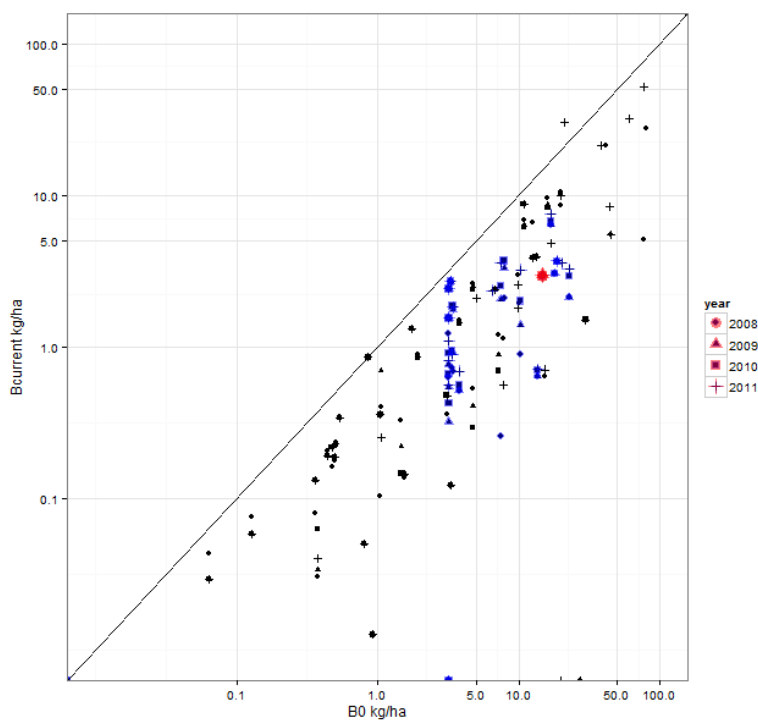


Figure 194:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Emilia-Romagna EMU are shown in red, those for Italy are shown in blue.

Table 774: Source of indicators evaluated for the Emilia-Romagna EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 20.1.2 Habitat coverage of the EMU

Rivers, estuaries and coastal areas have not explicitly been covered in the 2012 report, but their relevance appears to be quite restricted.

Table 775: Habitats assessed in the Emilia-Romagna EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	absent

### 20.1.3 Management measures

Table 776: Overview of the management actions proposed in the EMP for the Emilia-Romagna EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduction by 40- 100%	M	EMP	fulfilled high
2	Eel<12cm fisheries closed	M	EMP	fulfilled unsure
<b>Rec. Fishr.</b>				
3	Reduced	M	EMP	not done unsure
<b>Restocking</b>				
4	Restocked	M	EMP	not appl. high

The commercial fishery is said to have been reduced by 40-100% (Table 2.2), depending on the habitat type. Landings in lagoons, however, have increased over the years from 6500 kg to 8738 kg, while effort has gone down slightly (Table 3.2); lagoons make more than half of the total for this EMU.

### 20.1.4 Assessment

Table 777: Summary list impact types that were included in the assessments for the Emilia-Romagna EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. =

Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

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Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
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Table 778: Summary of targets and assessment period for the Emilia-Romagna EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	$B_0$	$B_{best}$	$B_{current}$	$\Sigma A$
EMP 2012 target			45.8	
EMP long term target				
EU/ICES targets			183.3	0.402
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 779: Additional information for the Emilia-Romagna EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'down-stream' or vice versa.

Question	$B_0$	$B_{best}$	$B_{current}$	$\Sigma A$
Does restocking affect the indicator?	NA	NA		
Does double banking apply ?				
Is double banking considered ?				

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.1.5 Progress towards recovery

Escaping biomass  $B_{current}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012.

Table 780: Overview of fishing effort reported in the ICES Data Call for the Emilia-Romagna EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 781: Overview of total catches (commercial + recreational) of eel stages for the Emilia-Romagna EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		26.97	6.74	
2	2009		24.83	8.17	
<b>Post</b>					
3	2010		25.39	8.59	
4	2011		24.44	8.32	

Table 782: Stock indicators for the Emilia-Romagna EMU, the source of the data is indicated in Table 774,  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	458.2	78.8	117.7	0.84	-0.44	0.40	0.02
2	2009	458.2	81.4	117.7	0.80	-0.43	0.37	0.03
3	2010	458.2	79.2	117.7	0.81	-0.41	0.40	0.03
4	2011	458.2	80.4	117.7	0.79	-0.41	0.38	0.03

Table 783: WKEPEMP evaluation of progress toward recovery for the Emilia-Romagna EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		yes
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

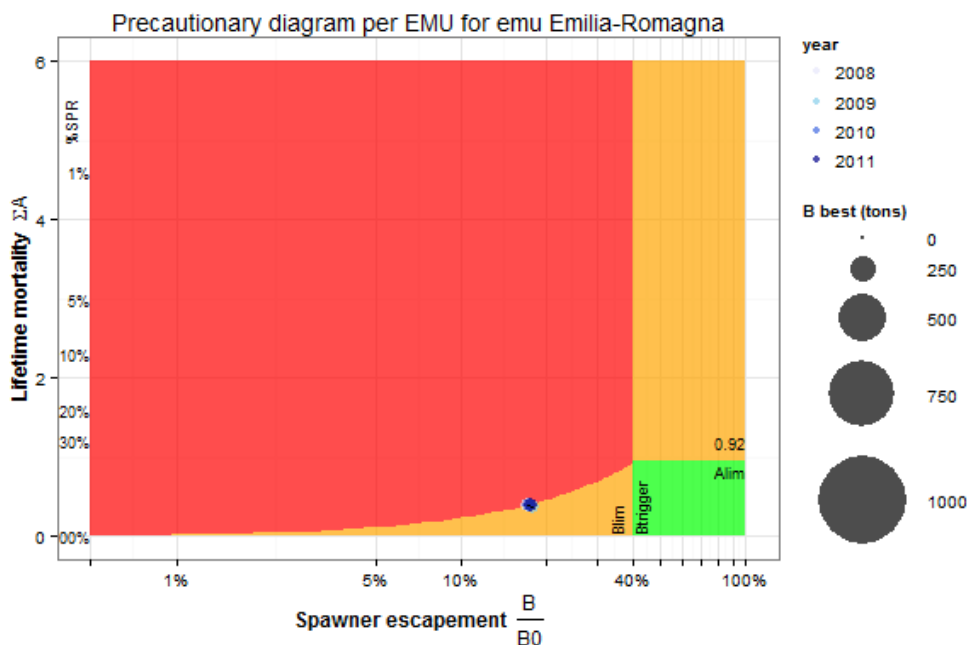


Figure 195: Modified precautionary diagram for the Emilia-Romagna EMU (after wgeel 2012), see section 1.3.2 for more information.

**20.1.6 Conclusion**

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. The stock indicators cover all major eel habitats in the EMU; lakes, estuaries and coastal areas were not included, but that part of the stock might be negligible. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Restocking was not implemented, and fishing restrictions did not have the expected effect on the landings. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the biomass of current silver eel escapement is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).



## 20.2 Frioli-Venezia-Giulia

### 20.2.1 Available information



Figure 196: *Frioli-Venezia-Giulia*, Italy

Table 784: Sources of information for the Frioli-Venezia-Giulia EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 785: Reported stock indicators for Frioli-Venezia-Giulia

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

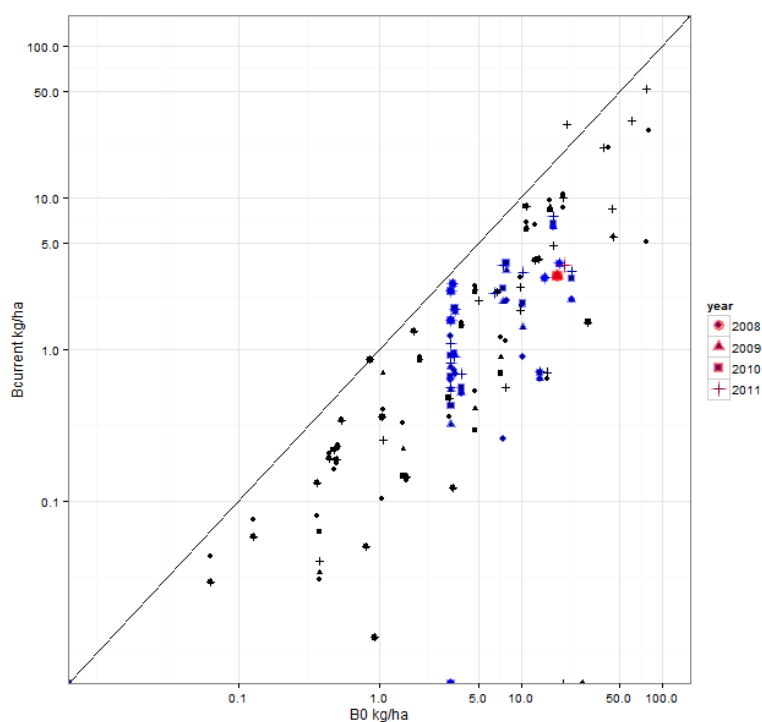


Figure 197:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Frioli-Venezia-Giulia EMU are shown in red, those for Italy are shown in blue.

Table 786: Source of indicators evaluated for the Frioli-Venezia-Giulia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

## 20.2.2 Habitat coverage of the EMU

Table 787: Habitats assessed in the Frioli-Venezia-Giulia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	absent

## 20.2.3 Management measures

Table 788: Overview of the management actions proposed in the EMP for the Frioli-Venezia-Giulia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Rec. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfillment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduction by 33%	M	EMP	fulfilled high
2	Eel<12cm fisheries closed	M	EMP	not done none
<b>Rec. Fishr.</b>				
3	Reduction by 75%	M	EMP	fulfilled high
<b>Restocking</b>				
4	Restocked	M	EMP	not done high

The commercial fishing effort is significantly reduced, but only in 2011. Reported landings (Table 3.3), however, have increased, to a peak in 2010, and a high level in 2011. It is unclear what causes this apparent discrepancy.

## 20.2.4 Assessment

Table 789: Summary list impact types that were included in the assessments for the Frioli-Venezia- Giulia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	omitted	

Table 790: Summary of targets and assessment period for the Frioli-Venezia-Giulia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			29.3	
EMP long term target				
EU/ICES targets			117.2	0.393
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 791: Additional information for the Frioli-Venezia-Giulia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
the indicator?	ΣA	Does restocking affect	
Does double banking apply ?	NA	NA	
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

**20.2.5 Progress towards recovery**

Table 792: Overview of fishing effort reported in the ICES Data Call for the Frioli-Venezia-Giulia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 793: Overview of total catches (commercial + recreational) of eel stages for the Frioli-Venezia-Giulia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		7.23	2.23	
2	2009		7.23	2.23	
<b>Post</b>					
3	2010		15.84	2.12	
4	2011		7.66	3.83	

Escaping biomass  $B_{current}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.

Table 794: Stock indicators for the Frioli-Venezia-Giulia EMU, the source of the data is indicated in Table 786,  $B_{\text{current}}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{\text{current}}$	$B_{\text{best}}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	293	47.9	74.8	0.87	-0.43	0.45	0.0
2	2009	293	47.9	74.8	0.87	-0.43	0.45	0.0
3	2010	293	48.0	74.8	0.83	-0.38	0.44	0.1
4	2011	293	50.3	74.8	0.77	-0.38	0.40	0.3

Table 795: WKEPEMP evaluation of progress toward recovery for the Frioli-Venezia-Giulia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		yes
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

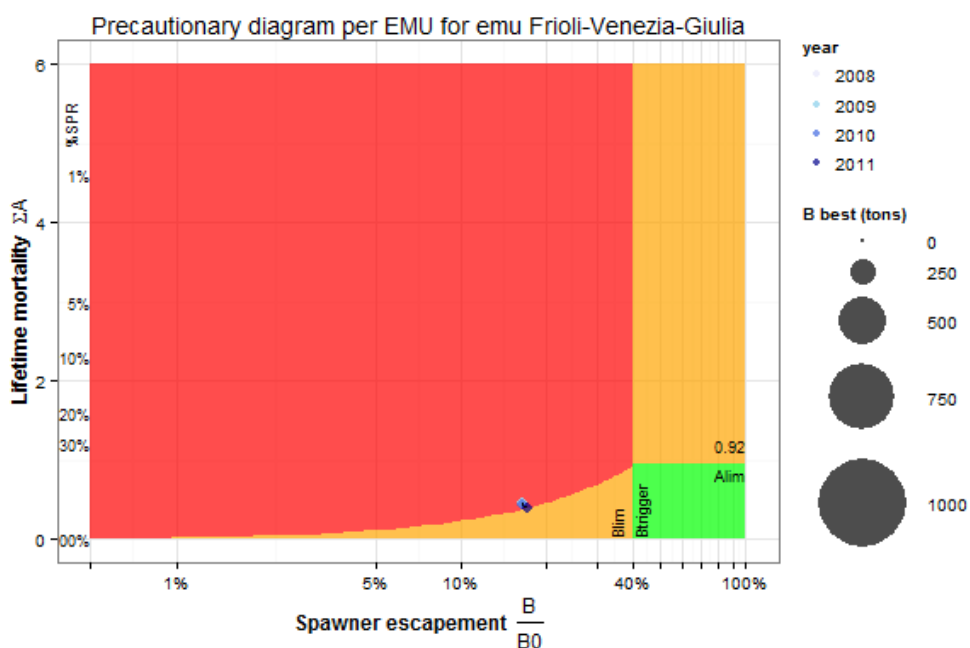


Figure 198: Modified precautionary diagram for the Frioli-Venezia-Giulia EMU (after wgeel 2012), see section 1.3.2 for more information.

### 20.2.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU; rivers, lakes, estuaries and coastal areas were not included, but that part of the stock might be negligible. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Restocking was not implemented, and fishing restrictions did not have the expected effect on the landings. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the biomass of current silver eel escapement is below the target of the EU Regulation (40%) but slightly increasing. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target), and decreasing.



## 20.3 Lazio

### 20.3.1 Available information

Figure 199: *Lazio*, Italy

Table 796: Sources of information for the Lazio EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 797: Reported stock indicators for Lazio

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	yes	yes
ΣF	yes	yes
ΣH	yes	yes

Table 798: Source of indicators evaluated for the Lazio EMU

Stock indicator	Source
B <sub>0</sub>	2012 post-evaluation report
B <sub>best</sub>	2012 post-evaluation report
B <sub>current</sub>	2012 post-evaluation report
ΣA	2012 post-evaluation report

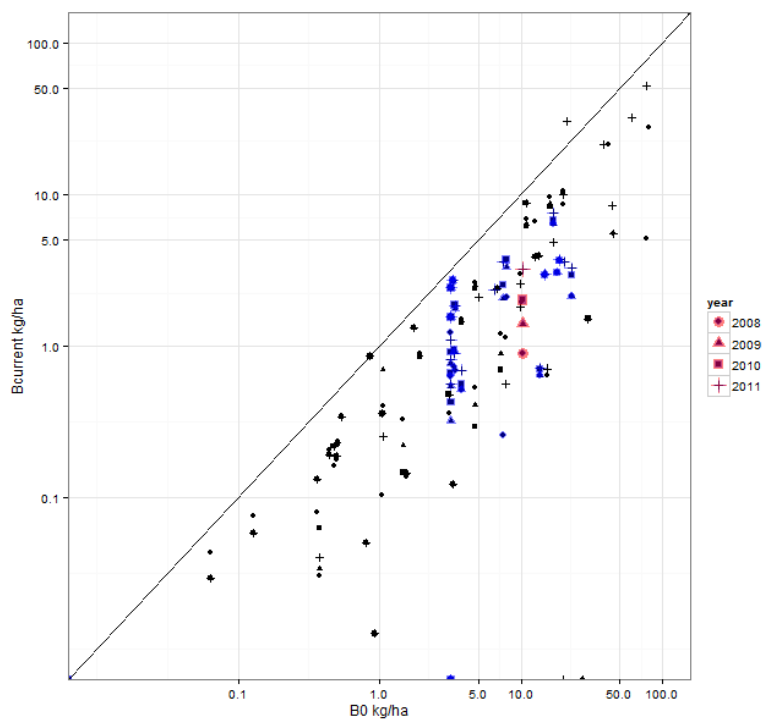


Figure 200:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Lazio EMU are shown in red, those for Italy are shown in blue.

### 20.3.2 Habitat coverage of the EMU

Table 799: Habitats assessed in the Lazio EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	absent

Estuaries and coastal areas have not explicitly been covered in the 2012 report, but their relevance appears to be quite restricted.

### 20.3.3 Management measures

Table 800: Overview of the management actions proposed in the EMP for the Lazio EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Fisheries closure by 4 months (reduction by 25%)	M	EMP	fulfilled low
2	Eel <12cm fisheries quoted	M	EMP	fulfilled unsure
<b>Recr. Fishr.</b>				
3	Fisheries closure by 4 months (reduction by 25%)	M	EMP	fulfilled low
<b>Restocking</b>				
4	Restocking	M	EMP	fulfilled high

The commercial fishing season has been reduced by 25% - apparently, the season was unrestricted before. It is unclear in what months the season has been reduced, or what effect of this reduction can be expected. Effort has not changed much (Table 3.2), but landings (Table 3.3) have declined by 80%. These trends do not correspond, which is not understood by the workshop.

### 20.3.4 Assessment

Table 801: Summary list impact types that were included in the assessments for the Lazio EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	omitted	omitted	included	included	omitted	omitted	

Table 802: Summary of targets and assessment period for the Lazio EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			7.1	
EMP long term target				
EU/ICES targets			28.4	0.353
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 803: Additional information for the Lazio EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
	ΣA	Does restocking affect	
the indicator?	NA	NA	
Does double banking apply ?			
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

### 20.3.5 Progress towards recovery

Table 804: Overview of fishing effort reported in the ICES Data Call for the Lazio EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational

fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 805: Overview of total catches (commercial + recreational) of eel stages for the Lazio EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		15.01	39.82	
2	2009		12.23	34.00	
<b>Post</b>					
3	2010		16.35	14.35	
4	2011		5.92	5.13	

Escaping biomass  $B_{\text{current}}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.

Table 806: Stock indicators for the Lazio EMU, the source of the data is indicated in Table 798,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	71.1	3.0	32.5	2.55	-0.18	2.37	0.09
2	2009	71.1	4.8	32.5	2.15	-0.22	1.92	0.10
3	2010	71.1	6.8	32.5	1.56	0.00	1.56	0.03
4	2011	71.1	10.9	32.5	0.99	0.10	1.09	0.07

Table 807: WKEPEMP evaluation of progress toward recovery for the Lazio EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		yes
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

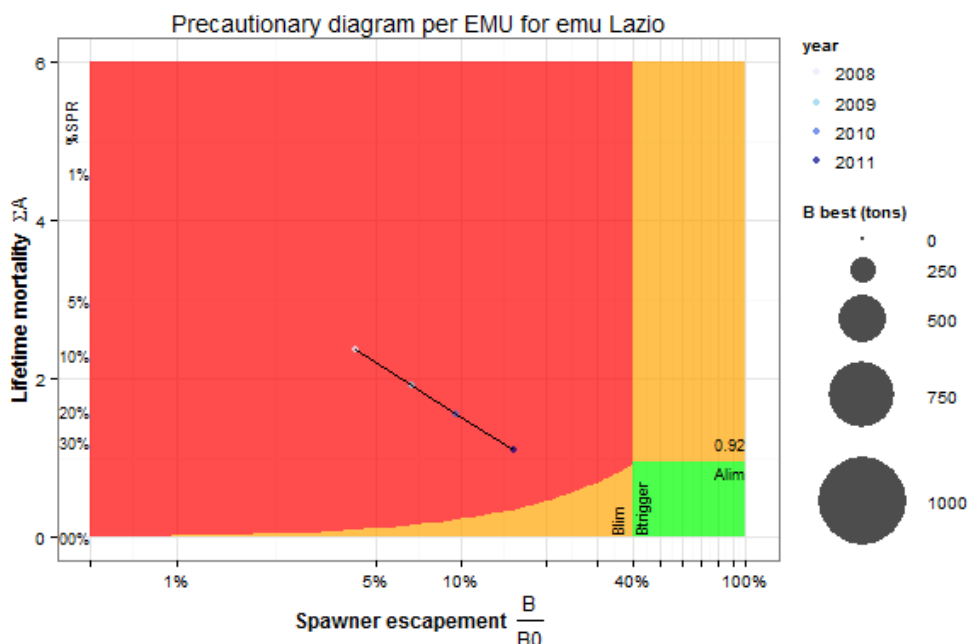


Figure 201: Modified precautionary diagram for the Lazio EMU (after wgeel 2012), see section 1.3.2 for more information.

### 20.3.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU; estuaries and coastal areas were not included, but that part of the stock might be negligible. These impacts were included in the assessment: habitat loss; restocking; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. All of the Management Actions outlined identified for the EMP in the Progress Report have been implemented. Where actions have been implemented, some have been only partially implemented: only 10% of the planned restocking has been done. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the biomass of current silver eel escapement is estimated to be slightly increasing but it is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target): it is estimated to be declining.





## 20.4 Lombardia

### 20.4.1 Available information

Figure 202: *Lombardia*, Italy

Table 808: Sources of information for the Lombardia EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 809: Reported stock indicators for the Lombardia EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

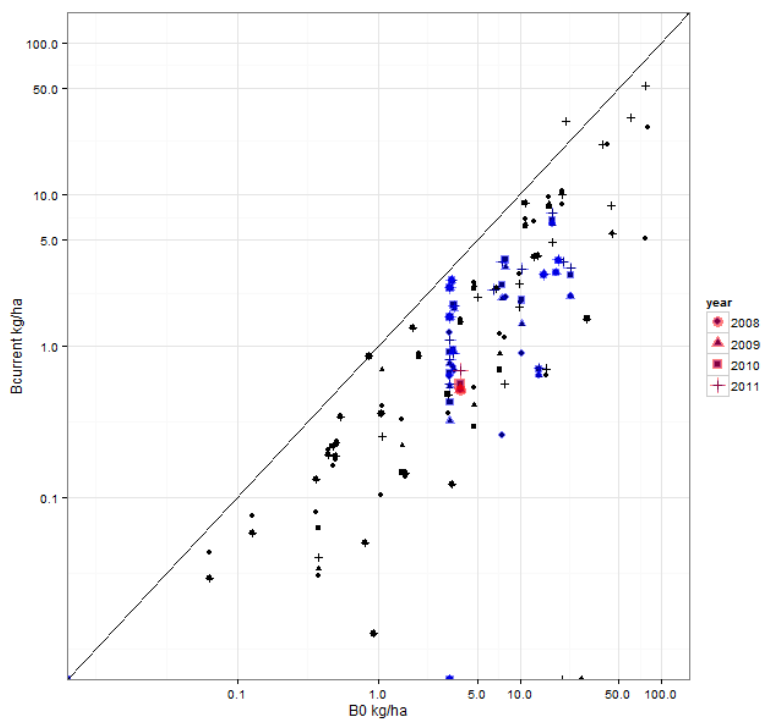


Figure 203:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Lombardia EMU are shown in red, those for Italy are shown in blue.

Table 810: Source of indicators evaluated for the Lombardia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 20.4.2 Habitat coverage of the EMU

Table 811: Habitats assessed in the Lombardia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

Rivers, and lakes included; others less relevant.

### 20.4.3 Management measures

Table 812: Overview of the management actions proposed in the EMP for the Lombardia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b> 1 Fisheries closure by 3 months (reduction by 25%?)	M	EMP	fulfilled	high
<b>Recr. Fishr.</b> 2 Reduced	M	EMP	not done	unsure
<b>Hydropw. &amp; Obst.</b> 3 Fish passes construction	M	EMP	fulfilled	unsure
<b>Predatr.</b> 4 Reduction of catfish	M	EMP	not done	unsure
<b>Restocking</b> 5 Restocked	M	EMP	not done	high

The commercial fishing effort is significantly reduced, but only in 2011. Reported landings (Table 3.3) have declined accordingly.

### 20.4.4 Assessment

Table 813: Summary list impact types that were included in the assessments for the Lombard- dia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	omitted	

Table 814: Summary of targets and assessment period for the Lombardia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			6.6	
EMP long term target				
EU/ICES targets			26.2	0.149
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 815: Additional information for the Lombardia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
the indicator?	NA	NA	
Does double banking apply ?			ΣA Does restocking affect
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.4.5 Progress towards recovery

Table 816: Overview of fishing effort reported in the ICES Data Call for the Lombardia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec

= recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		155	71
	2009		155	71
	2010		155	71
	2011		10	30
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 817: Overview of total catches (commercial + recreational) of eel stages for the Lombardia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008	0	2.02	2.02	
2	2009	0	2.00	2.00	
<b>Post</b>					
3	2010	0	2.91	0.36	
4	2011	0	0.53	0.11	

Escaping biomass  $B_{current}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.

Table 818: Stock indicators for the Lombardia EMU, the source of the data is indicated in Table 810,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL

2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	65.6	3.2	10.9	2.86	-1.63	1.24	0.04
2 2009	65.6	3.2	10.9	2.86	-1.63	1.24	0.06
3 2010	65.6	3.4	10.9	2.86	-1.71	1.16	0.05
4 2011	65.6	4.3	10.9	0.04	0.89	0.94	0.01

Table 819: WKEPEMP evaluation of progress toward recovery for the Lombardia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		no
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no



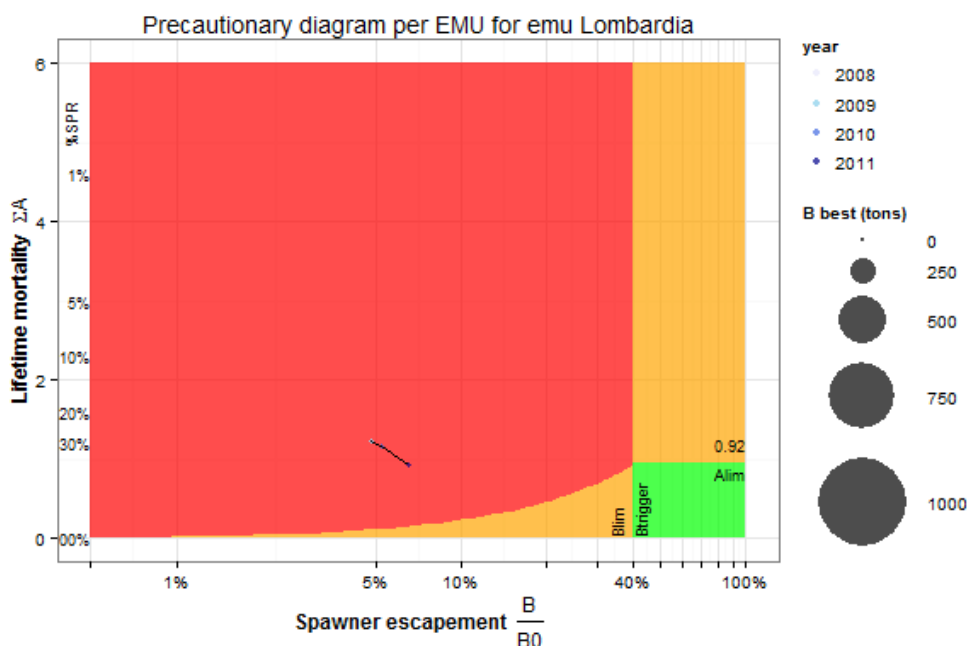


Figure 204: Modified precautionary diagram for the Lombardia EMU (after WGEEL 2012), see section 1.3.2 for more information.

**20.4.6 Conclusion**

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU; rivers, lakes, estuaries and coastal areas were not included, but that part of the stock might be negligible. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Restocking was not implemented, and fishing restrictions did not have the expected effect on the landings. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: biomass of current silver eel escapement is estimated to be slightly increasing but is below the target of the EU Regulation (40%). Anthropogenic mortality  $\Sigma A$  is estimated to be declining and is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but it is above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 20.5 Puglia

### 20.5.1 Available information

Figure 205: *Puglia, Italy*

Table 820: Sources of information for the Puglia EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 821: Reported stock indicators for the Puglia EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 822: Source of indicators evaluated for the Puglia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

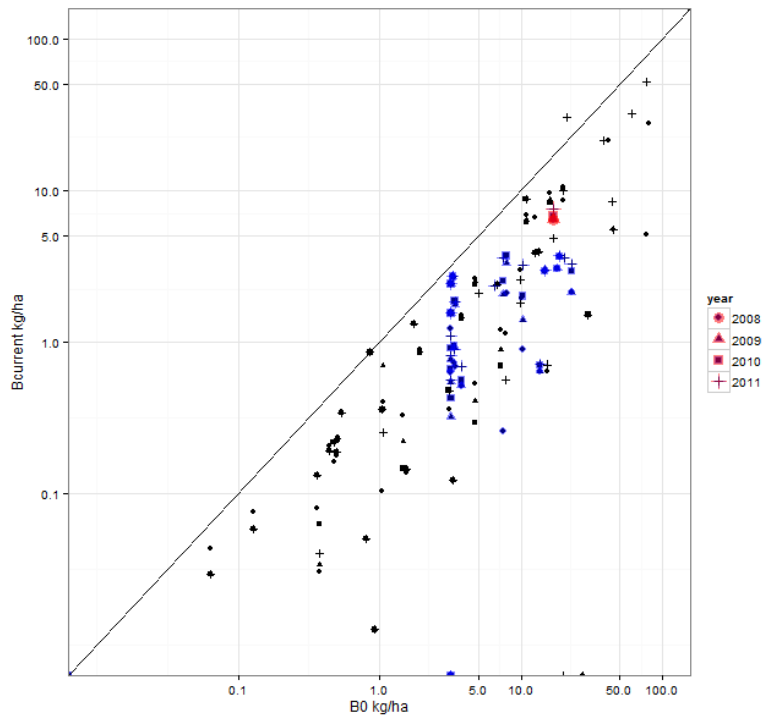


Figure 206:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Puglia EMU are shown in red, those for Italy are shown in blue.

### 20.5.2 Habitat coverage of the EMU

Table 823: Habitats assessed in the Puglia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	absent
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	absent

Rivers, and lagoons included; others irrelevant.

### 20.5.3 Management measures

Table 824: Overview of the management actions proposed in the EMP for the Puglia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduction of effort	M	EMP	fulfilled high
2	Reduction of gear size (mesh?)	M	EMP	not done NA
<b>Rec. Fishr.</b>				
3	Reduced	M	EMP	not done NA

The commercial fishing effort is significantly reduced, especially in 2011. Reported landings (Table 3.3) have declined accordingly.

### 20.5.4 Assessment

Table 825: Summary list impact types that were included in the assessments for the Puglia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	omitted	

Table 826: Summary of targets and assessment period for the Puglia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			40	
EMP long term target				
EU/ICES targets			159.9	0.513
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 827: Additional information for the Puglia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
	ΣA Does restocking affect		
the indicator?	NA	NA	
Does double banking apply ?			
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.5.5 Progress towards recovery

Table 828: Overview of fishing effort reported in the ICES Data Call for the Puglia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational

fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		120	63
	2009		120	63
	2010		91	63
	2011		84	79
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 829: Overview of total catches (commercial + recreational) of eel stages for the Puglia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		13.22	19.97	
2	2009		14.89	23.64	
<b>Post</b>					
3	2010		7.42	4.69	
4	2011		5.12	3.33	

Escaping biomass  $B_{\text{current}}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.

Table 830: Stock indicators for the Puglia EMU, the source of the data is indicated in Table 822,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL

2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	399.8	76.4	130.5	0.52	0.02	0.53	0
2 2009	399.8	76.3	130.5	0.52	0.02	0.54	0
3 2010	399.8	80.0	130.5	0.47	0.02	0.49	0
4 2011	399.8	89.5	130.5	0.36	0.01	0.38	0

Table 831: WKEPEMP evaluation of progress toward recovery for the Puglia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		yes
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no



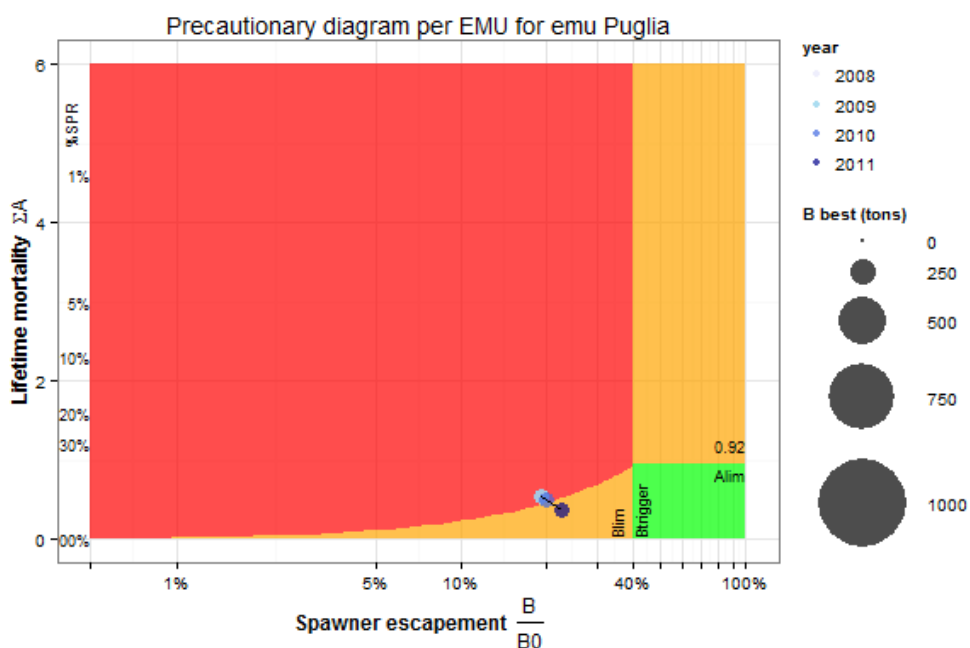


Figure 207: Modified precautionary diagram for the Puglia EMU (after wgeel 2012), see section 1.3.2 for more information.

### 20.5.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU; rivers, lakes, estuaries and coastal areas were not included, but that part of the stock might be negligible. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined identified for the EMP in the Progress Report have been implemented. Restocking was not implemented, and fishing restrictions did not have the expected effect on the landings. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  is estimated to be declining and below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation, but it is above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## 20.6 Sardinia

### 20.6.1 Available information

Figure 208: *Sardinia*, Italy

Table 832: Sources of information for the Sardinia EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 833: Reported stock indicators for the Sardinia EMU

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

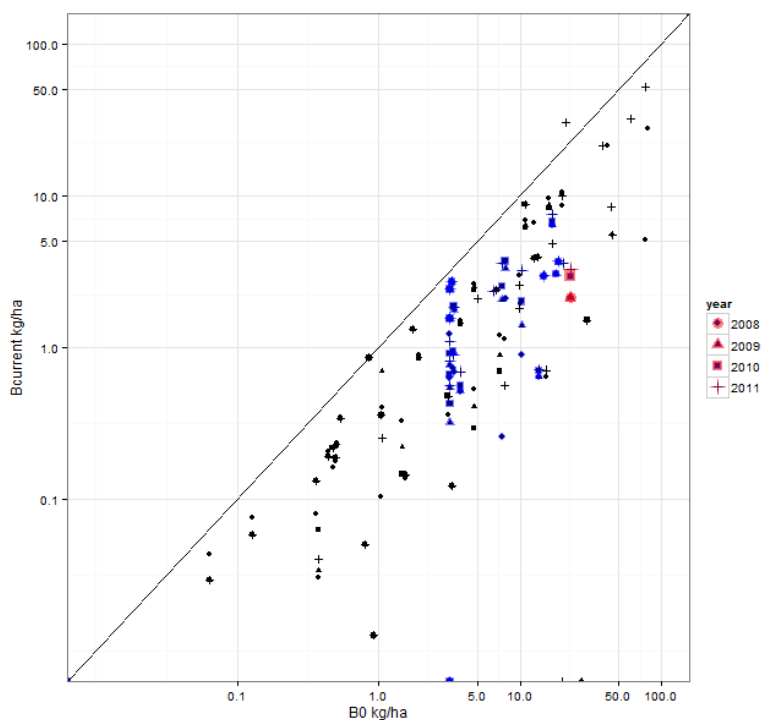


Figure 209:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Sardinia EMU are shown in red, those for Italy are shown in blue.

Table 834: Source of indicators evaluated for the Sardinia EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

### 20.6.2 Habitat coverage of the EMU

Table 835: Habitats assessed in the Sardinia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	absent
Were estuaries assessed ?	absent
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	absent

Rivers, and lagoons included; others less relevant.

### 20.6.3 Management measures

Table 836: Overview of the management actions proposed in the EMP for the Sardinia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Closed season 7 months	M	EMP	unknown interm
2	Limitation of gear/ha=reduction of effort?	M	EMP	unknown high
<b>Rec. Fishr.</b>				
3	Closed season 7 months	M	EMP	unknown interm
4	Limitation of gear/ha=reduction of effort?	M	EMP	unknown unsure

The commercial fishing effort is significantly reduced from 2007 to 2010, but in managed lagoons, it has increased back again in 2011. Reported landings (Table 3.3) do not follow this trend. The reason for this unexpected result, is unclear to the workshop.

### 20.6.4 Assessment

Table 837: Summary list impact types that were included in the assessments for the Sardinia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	omitted	

Table 838: Summary of targets and assessment period for the Sardinia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			21	
EMP long term target				
EU/ICES targets			84.2	0.303
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 839: Additional information for the Sardinia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
	ΣA Does restocking affect		
the indicator?	NA	NA	
Does double banking apply ?			
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.6.5 Progress towards recovery

Table 840: Overview of fishing effort reported in the ICES Data Call for the Sardinia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec =

recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 841: Overview of total catches (commercial + recreational) of eel stages for the Sardinia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		28.15	83.76	
2	2009		28.97	75.41	
<b>Post</b>					
3	2010		28.73	25.54	
4	2011		19.16	19.27	

Escaping biomass  $B_{\text{current}}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.

Table 842: Stock indicators for the Sardinia EMU, the source of the data is indicated in Table 834,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	210.4	18.3	97.3	1.62	0.05	1.67	0
2 2009	210.4	18.1	97.3	1.64	0.05	1.68	0
3 2010	210.4	25.2	97.3	1.30	0.05	1.35	0
4 2011	210.4	27.8	97.3	1.21	0.05	1.25	0

Table 843: WKEPEMP evaluation of progress toward recovery for the Sardinia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		yes
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no



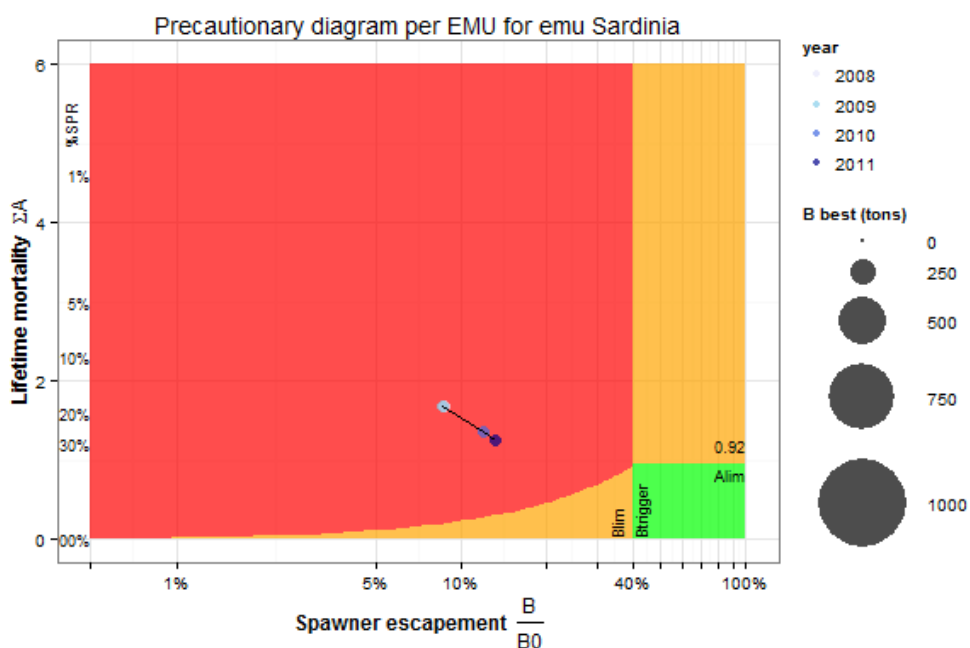


Figure 210: Modified precautionary diagram for the Sardinia EMU (after wgeel 2012), see section 1.3.2 for more information.

### 20.6.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU; rivers, lakes, estuaries and coastal areas were not included, but that part of the stock might be negligible. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Restocking was not implemented, and fishing restrictions did not have the expected effect on the landings. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing. Anthropogenic mortality  $\Sigma A$  is estimated to be declining and is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation but above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).



## 20.7 Toscana

### 20.7.1 Available information

Figure 211: *Toscana*, Italy

Table 844: Sources of information for the Toscana EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per langulla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 845: Reported stock indicators for Toscana

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 846: Source of indicators evaluated for the Toscana EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

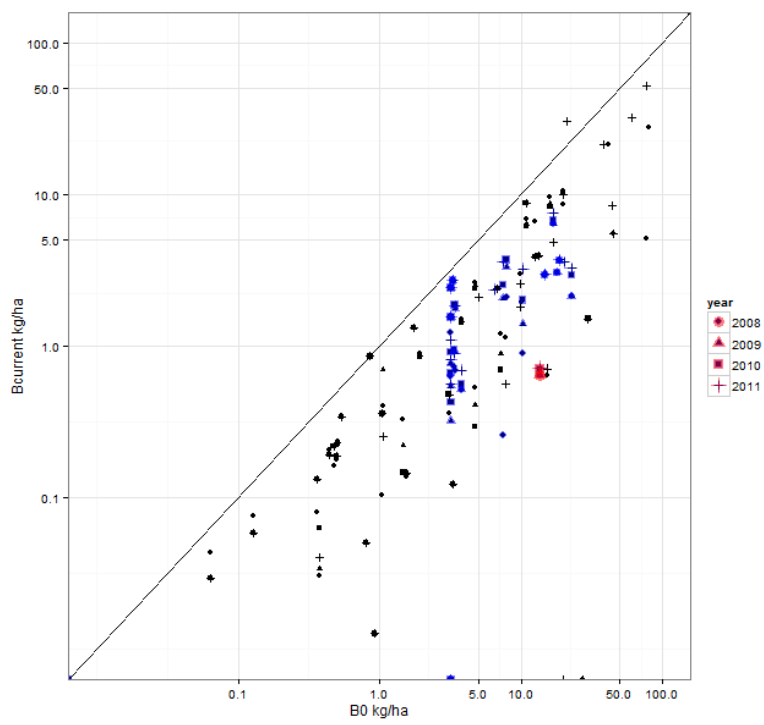


Figure 212:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Toscana EMU are shown in red, those for Italy are shown in blue.

### 20.7.2 Habitat coverage of the EMU

Table 847: Habitats assessed in the Toscana EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	no
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	absent

Rivers, lakes and lagoons included; others less relevant.

### 20.7.3 Management measures

Table 848: Overview of the management actions proposed in the EMP for the Toscana EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduction by 10- 25%	M	EMP	fulfilled high
2	Eel <12cm fisheries quoted	M	EMP	fulfilled NA
<b>Rec. Fishr.</b>				
3	Obligation release of caught silver eel	S	EMP	fulfilled unsure
<b>Restocking</b>				
4	Restocked	M	EMP	partially high

The commercial fishing effort in lagoons is reduced; in lakes and rivers, effort went down to zero in 2010, but came back to 5% in 2011. The reported landings more or less follow these trends.

### 20.7.4 Assessment

Table 849: Summary list impact types that were included in the assessments for the Toscana EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	included	omitted	omitted	included	included	omitted	omitted	

Table 850: Summary of targets and assessment period for the Toscana EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			7.5	
EMP long term target				
EU/ICES targets			30.2	0.081
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 851: Additional information for the Toscana EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
	ΣA	Does restocking affect	
the indicator?	NA	NA	
Does double banking apply ?			
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.7.5 Progress towards recovery

Table 852: Overview of fishing effort reported in the ICES Data Call for the Toscana EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec =

recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		118	
	2009		118	
	2010		104	
	2011		148	
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 853: Overview of total catches (commercial + recreational) of eel stages for the Toscana EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		25.10	20.29	
2	2009		25.10	20.31	
<b>Post</b>					
3	2010		35.70	13.40	
4	2011		30.82	14.48	

Escaping biomass  $B_{current}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.



Table 854: Stock indicators for the Toscana EMU, the source of the data is indicated in Table 846,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL

2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

	year	Biomass (t)			Mortality			Restocked (t)
		$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1	2008	75.4	2.4	34.7	2.56	0.11	2.67	0.000
2	2009	75.4	2.4	34.7	2.56	0.11	2.67	0.000
3	2010	75.4	2.6	34.7	2.44	0.14	2.57	0.000
4	2011	75.4	2.7	34.7	2.44	0.13	2.57	0.035

Table 855: WKEPEMP evaluation of progress toward recovery for the Toscana EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		no
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	no	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

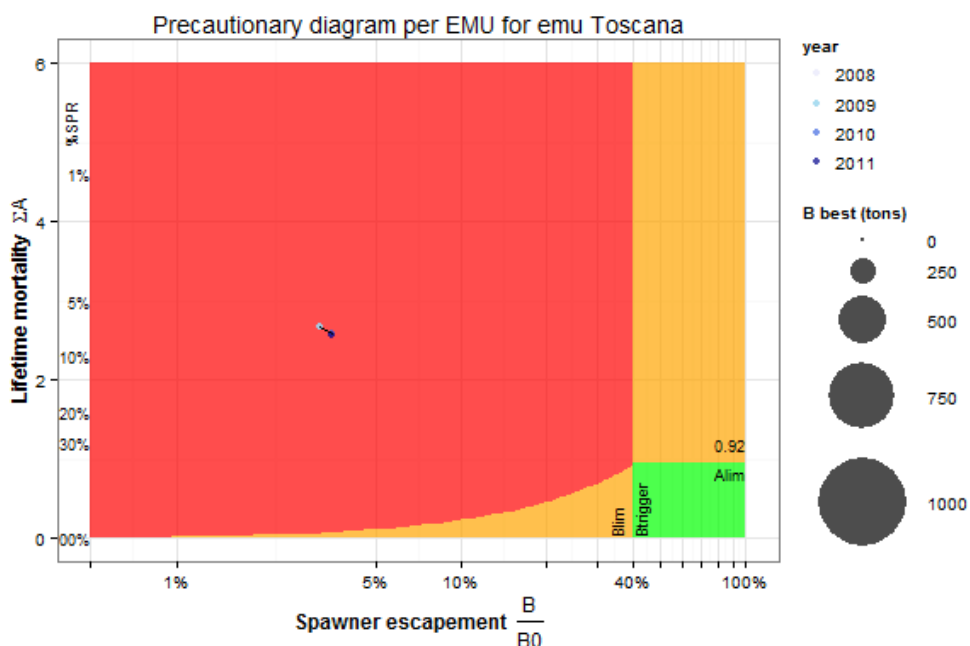


Figure 213: Modified precautionary diagram for the Toscana EMU (after wgeel 2012), see section 1.3.2 for more information.

### 20.7.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries, restocking. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Restocking was not implemented, and fishing restrictions did not have the expected effect on the landings. Where actions have been implemented, some have been only partially implemented. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing slightly. Anthropogenic mortality  $\Sigma A$  is declining and is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation but is above the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

## **20.8 Umbria**

### **20.8.1 Available information**

Figure 214: *Umbria*, Italy

Table 856: Sources of information for the Umbria EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 857: Reported stock indicators for the Umbria EMU

Name	Pre	Post
B <sub>current</sub>	yes	yes
B <sub>best</sub>	yes	yes
B <sub>0</sub>	yes	yes
ΣA	no	no
ΣF	yes	yes
ΣH	no	no

Table 858: Source of indicators evaluated for the Umbria EMU

Stock indicator	Source
B <sub>0</sub>	2012 post-evaluation report
B <sub>best</sub>	2012 post-evaluation report
B <sub>current</sub>	2012 post-evaluation report
ΣA	2012 post-evaluation report

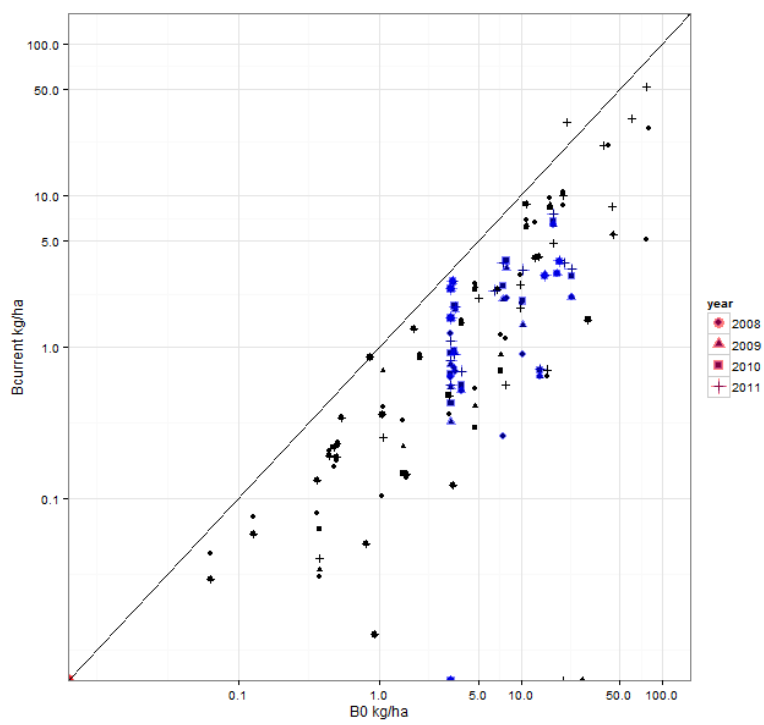


Figure 215:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Umbria EMU are shown in red, those for Italy are shown in blue.

### 20.8.2 Habitat coverage of the EMU

Table 859: Habitats assessed in the Umbria EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	no
Were estuaries assessed ?	absent
Were lagoons assessed ?	absent
Were marine coastal waters assessed ?	absent

Rivers included; lakes are not.

### 20.8.3 Management measures

Table 860: Overview of the management actions proposed in the EMP for the Umbria EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b> 1 Silver eel fishing closed	S	EMP	fulfilled	none
<b>Recr. Fishr.</b> 2 Silver eel fishing closed	S	EMP	fulfilled	none
<b>Restocking</b>				

Closure of the silver eel fishery has led to a corresponding reduction in the reported silver eel landings (Table 3.3), but the reported yellow eel landings have been increasing by the same amount. Total landings have slightly increased. Additionally, reported fishing effort (Table 3.2) has increased to 387% of its 2007 value! It seems highly unlikely that the ban on silver eel has any effect.

### 20.8.4 Assessment

Table 861: Summary list impact types that were included in the assessments for the Umbria EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	omitted	

Table 862: Summary of targets and assessment period for the Umbria EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target			0	
EMP long term target				
EU/ICES targets			0	
Assessment period start	2008	2008	2008	
Assessment period end	2011	2011	2011	

Table 863: Additional information for the Umbria EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>
the indicator?	NA	NA	
Does double banking apply ?			
Is double banking considered ?			

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.8.5 Progress towards recovery

Table 864: Overview of fishing effort reported in the ICES Data Call for the Umbria EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec =

recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008		90	33
	2009		90	33
	2010		145	33
	2011		175	28
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 865: Overview of total catches (commercial + recreational) of eel stages for the Umbria EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		1.81	5.52	
2	2009		1.83	5.59	
<b>Post</b>					
3	2010		0.00	7.32	
4	2011		0.00	7.85	

Escaping biomass  $B_{\text{current}}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed



Table 866: Stock indicators for the Umbria EMU, the source of the data is indicated in Table 858,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	0	0	0	0			0.02
2 2009	0	0	0	0			0.05
3 2010	0	0	0	0			0.02
4 2011	0	0	0	0			0.00

Table 867: WKEPEMP evaluation of progress toward recovery for the Umbria EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	no	yes
Is the trend good ?		no
Has the EMU reached the target set for 2012 in the EMP ?		no
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		no
Has the EMU achieved the most it can without increased recruitment ?		yes

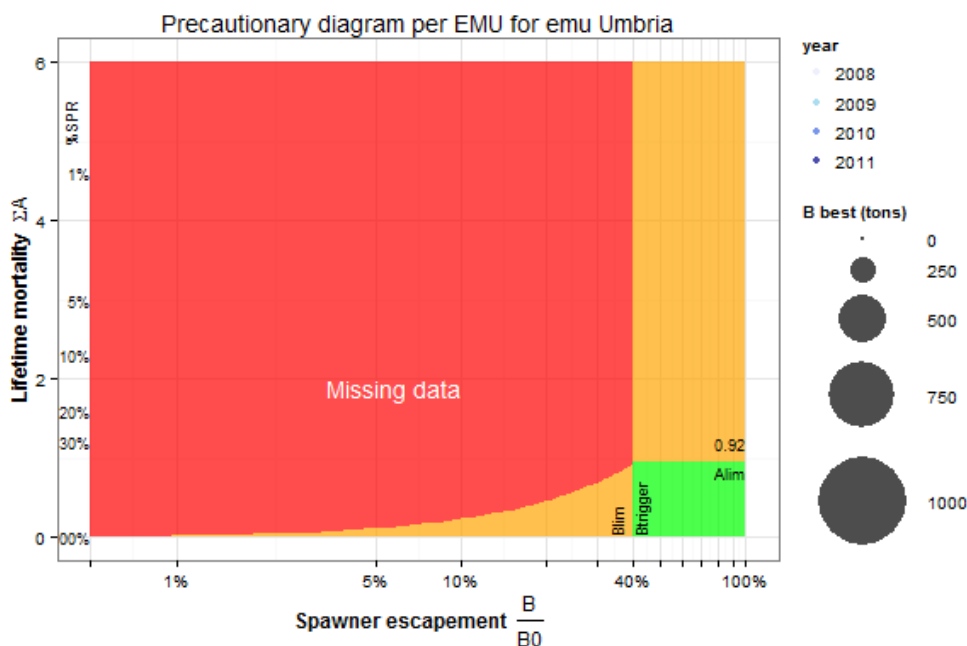


Figure 216: Modified precautionary diagram for the Umbria EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 20.8.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; hydropower; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Fishing restrictions (ban on silver eel) did not have any effect. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or information: the applied to Habitat or Others.

The biomass indicators show zero escapement, and no anthropogenic mortality was reported. Neither indicator can therefore be judged against targets.

## **20.9 Veneto**

### **20.9.1 Available information**



Figure 217: Veneto, Italy

Table 868: Sources of information for the Veneto EMU

Type of source	Reference
EMP	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2008. Piano Nazionale di Gestione (PNG) per languilla in Italia Reg. (CE) 1100/07
EMP approved in:	2009
2012 post-evaluation report:	Ministero delle Politiche Agricole Alimentari e Forestali (MI-PAAF) 2012. Rapporto Annuale Italia (art. 9)
2013 ICES data-call:	
Additional sources:	

Table 869: Reported stock indicators for Veneto

Name	Pre	Post
$B_{current}$	yes	yes
$B_{best}$	yes	yes
$B_0$	yes	yes
$\Sigma A$	yes	yes
$\Sigma F$	yes	yes
$\Sigma H$	yes	yes

Table 870: Source of indicators evaluated for the Veneto EMU

Stock indicator	Source
$B_0$	2012 post-evaluation report
$B_{best}$	2012 post-evaluation report
$B_{current}$	2012 post-evaluation report
$\Sigma A$	2012 post-evaluation report

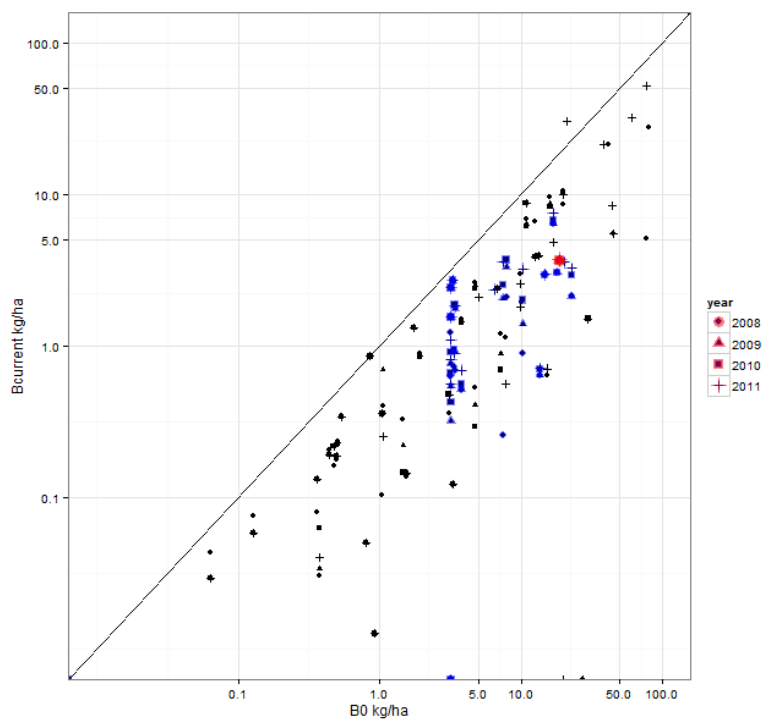


Figure 218:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Veneto EMU are shown in red, those for Italy are shown in blue.

### 20.9.2 Habitat coverage of the EMU

Table 871: Habitats assessed in the Veneto EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	yes
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	absent

### 20.9.3 Management measures

Table 872: Overview of the management actions proposed in the EMP for the Veneto EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Reduction by 25%	M	EMP	unsure NA
2	Quotas for silver eel	S	EMP	unsure low
3	Eel < 12cm fisheries closed	M	EMP	not done NA
<b>Recr. Fishr.</b>				
4	Reduced	M	EMP	not done unsure
<b>Hydropw. &amp; Obst.</b>				
5	Transportation of silver eel	S	EMP	unsure NA
<b>Restocking</b>				
6	Restocked	M	EMP	not done high

Fishing effort (Table 3.2) in lagoons has been reduced in 2010, but returned to former values in 2011. Fishing effort in rivers has been reduced in 2011. Reported landings (Table 3.3) in lagoons peaked in 2010, and declined in 2011 to 50%, despite the return to high effort. Reported landings in rivers remained stable, despite the major reduction in effort. It is unclear to the workshop why the trends in landings did not follow the trends in efforts. Overall, the effort reductions have not (yet) shown a significant effect.

#### 20.9.4 Assessment

Table 873: Summary list impact types that were included in the assessments for the Veneto EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects

= Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
included	absent	omitted	omitted	included	included	omitted	omitted	

Table 874: Summary of targets and assessment period for the Veneto EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	$B_0$	$B_{best}$	$B_{current}$	$\Sigma A$
EMP 2012 target			177.3	
EMP long term target				
EU/ICES targets			709.3	0.443
Assessment period start	2008	2008	2008	2008
Assessment period end	2011	2011	2011	2011

Table 875: Additional information for the Veneto EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	$B_0$	$B_{best}$	$B_{current}$	$\Sigma A$
Does restocking affect the indicator?	NA	NA		
Does double banking apply ?				
Is double banking considered ?				

The workshop could not explain the large differences between the stock indicators and targets provided in the 2012 Progress Report and the ICES Data Call. Furthermore, although the 2012 Progress Report does provide information by EMU, stock indicators (especially mortalities) are only reported for the whole of Italy: the value of national indicators covering less than half of the EMUs is dubious.

#### 20.9.5 Progress towards recovery

Escaping biomass  $B_{current}$  is increasing, and mortality  $\Sigma A$  has been reduced - but neither is within the long-term limits. The EMP indicates that management measures will be implemented in a stepwise manner, reaching 10% of  $B_0$  by 2012 - which is reached indeed.



Table 876: Overview of fishing effort reported in the ICES Data Call for the Veneto EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 877: Overview of total catches (commercial + recreational) of eel stages for the Veneto EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008		28.00	14.44	
2	2009		25.68	15.80	
<b>Post</b>					
3	2010		38.71	17.65	
4	2011		24.02	9.67	

Table 878: Stock indicators for the Veneto EMU, the source of the data is indicated in Table 870,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL

2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008	1773.1	339.0	452.2	0.38	-0.08	0.29	0.015
2 2009	1773.1	338.4	452.2	0.39	-0.10	0.30	0.010
3 2010	1773.1	340.3	452.2	0.36	-0.07	0.29	0.010
4 2011	1773.1	342.9	452.2	0.21	0.07	0.28	0.080

Table 879: WKEPEMP evaluation of progress toward recovery for the Veneto EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B) mortality ( $\Sigma A$ )	
Is the stock indicator quantified ?	yes	yes
Is the trend good ?	yes	yes
Has the EMU reached the target set for 2012 in the EMP ?		yes
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?	yes	no
Has the EMU achieved the most it can without increased recruitment ?	no	no

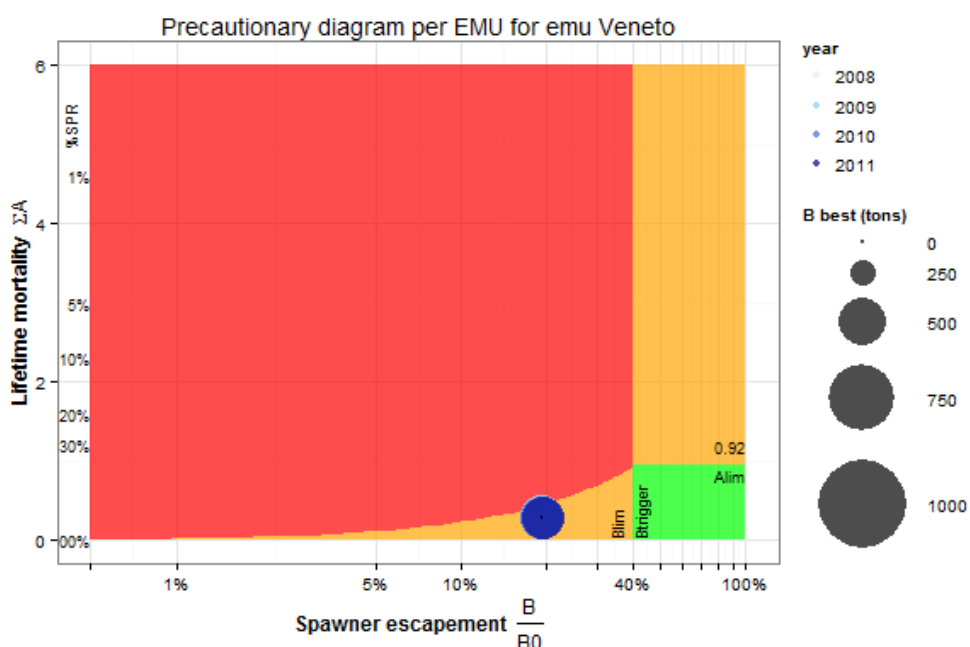


Figure 219: Modified precautionary diagram for the Veneto EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 20.9.6 Conclusion

This EMU has an eel management plan, approved in 2009, with a 2012 progress report. This evaluation used the information in the 2012 progress report. Although some stock indicators were reported for the country as a whole, those reported for this EMU cover all major eel habitats in the EMU. These impacts were included in the assessment: habitat loss; commercial fisheries; recreational fisheries. These impacts were not included: barriers; indirect effects; predators, though some may not be locally relevant. Part of the Management Actions outlined in the Progress Report have been implemented. Fishing restrictions (effort reductions) did not have a clear effect. Data were identified to evaluate the impact of management actions applied to Fisheries, Restocking for the country as a whole. The impact of other management actions could not be evaluated, either because of missing expertise or

information: the applied to Habitat or Others.

According to the stock indicators reported in the Data Call, and without understanding their difference from those provided in the Progress Report: the the biomass of current silver eel escapement is below the target of the EU Regulation (40%) but increasing slightly. Anthropogenic mortality  $\Sigma A$  is below the long term limit ( $\Sigma A$  is 0.92) corresponding to the 40% target of the EU Regulation and below the WGEEL 2012 limit allowing restoration of the whole stock (proportional decrease in limit mortality below the long term biomass target).

### 20.10 Italy all country

Some data are only available at the Italian level, the following diagram has been built according to it's own scale size

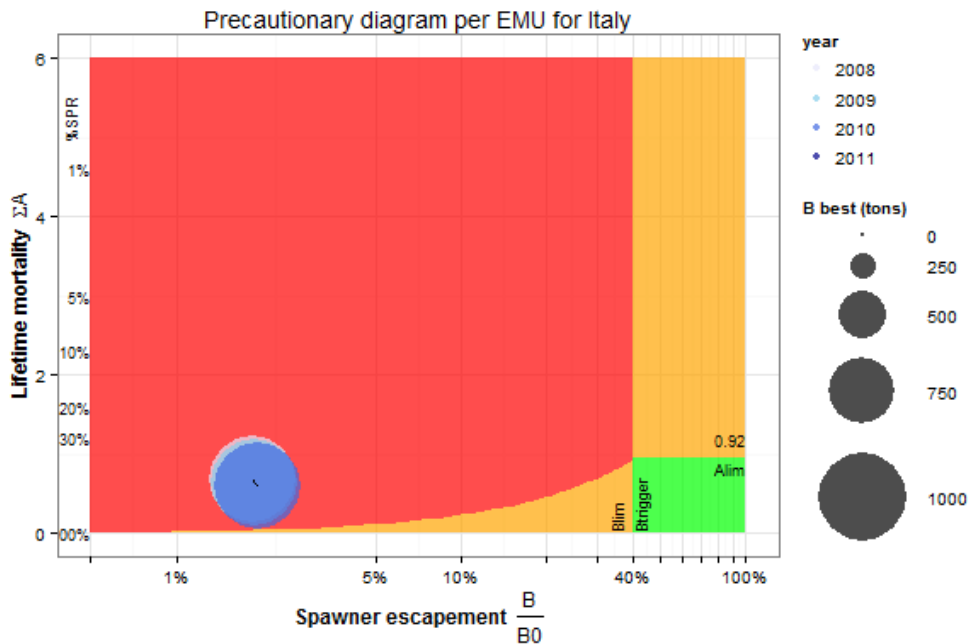


Figure 220: Modified precautionary diagram for Italy (after WGEEL 2012), see section 1.3.2 for more information. The figure corresponds to the sum of all Italian EMU's.

## 21 Greece

### 21.1 Central Greece- Aegean Islands

#### 21.1.1 Available information

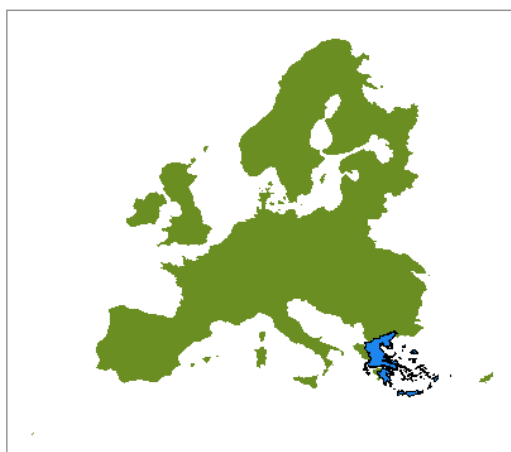


Figure 221: *Central Greece - Aegean Islands, Greece*

Table 880: Sources of information for the Central Greece - Aegean Islands EMU

Type of source	Reference
EMP	Hellenic eel management plan in accordance with council regulation (EC) No 1100/2007
EMP approved in:	2010
2012 post-evaluation report:	NA
2013 ICES data-call:	NA
Additional sources:	NA

Table 881: Reported stock indicators for Central Greece - Aegean Islands

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

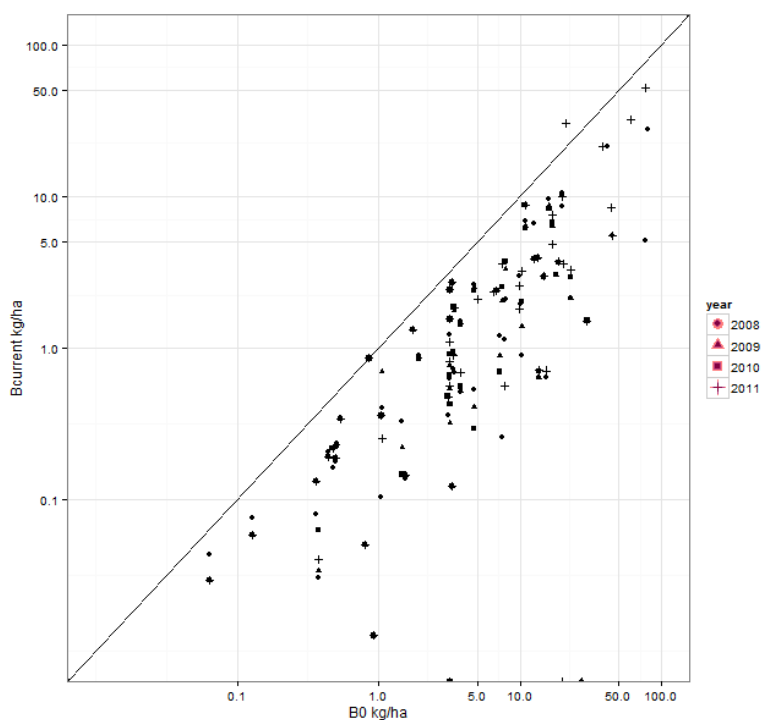


Figure 222:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Central Greece - Aegean Islands EMU are shown in red, those for Greece are shown in blue.

Table 882: Source of indicators evaluated for the Central Greece - Aegean Islands EMU

Stock indicator	Source
$B_0$	no input
$B_{best}$	no input
$B_{current}$	no input
$\Sigma A$	no input

### 21.1.2 Habitat coverage of the EMU

The Central Eastern Continental Greece and the Islands of the Aegean Sea are indicated as EMU-04 in the EMP submitted by Greece. It is comprised of 35 Prefectures and 8 Regions. The landings of the EMU-04 are zero.

Table 883: Habitats assessed in the Central Greece - Aegean Islands EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	no
Were lakes assessed ?	no
Were estuaries assessed ?	no
Were lagoons assessed ?	no
Were marine coastal waters assessed ?	no

### 21.1.3 Management measures

Table 884: Overview of the management actions proposed in the EMP for the Central Greece - Aegean Islands EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Release 30% of the lagoon catches in the open sea	M	EMP	partially low
2	Additional decrease of fishing mortality	M	EMP	not done low
<b>Others</b>				
3	A consistent reporting system for fishing effort and landings	M	EMP	not done knowledge
4	Develop an ecosystem typology based on eel survival and migration	M	EMP	not done knowledge
5	Establish specific indices for the evaluation of the management effectiveness	M	EMP	not done knowledge
6	Raising awareness of the state of the stock	M	EMP	not done low
7	Pilot studies for restocking actions	M	EMP	partially knowledge
8	Typology and effectiveness of technical actions to open migration routes	M	EMP	not done knowledge

### 21.1.4 Assessment

Table 885: Summary list impact types that were included in the assessments for the Central Greece - Aegean Islands EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm.

= Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	omitted	omitted	omitted	omitted	omitted	omitted	omitted	

Table 886: Summary of targets and assessment period for the Central Greece - Aegean Islands EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start				
Assessment period end				

Table 887: Additional information for the Central Greece - Aegean Islands EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	NA	NA
Does double banking apply ?			no	no
Is double banking considered ?			NA	NA

No indicators are provided

### 21.1.5 Progress towards recovery

We have no indicators available. Among the EMP management measures directly affecting anthropogenic mortalities, only the release programme has been implemented. The progress toward recovery might be minor if any.



Table 888: Overview of fishing effort reported in the ICES Data Call for the Central Greece - Aegean Islands EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 889: Overview of total catches (commercial + recreational) of eel stages for the Central Greece - Aegean Islands EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 890: Stock indicators for the Central Greece - Aegean Islands EMU, the source of the data is indicated in Table 882,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008							
2 2009							
3 2010							
4 2011							

Table 891: WKEPEMP evaluation of progress toward recovery for the Central Greece - Aegean Islands EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	no	no
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

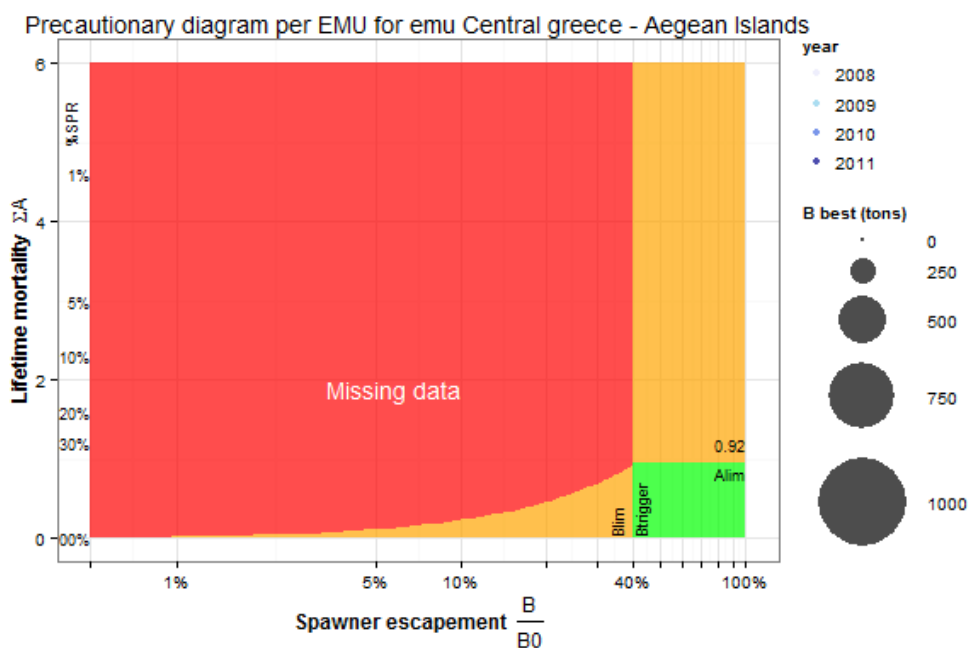


Figure 223: Modified precautionary diagram for the Central Greece - Aegean Islands EMU (after WGEEL 2012), see section 1.3.2 for more information.

### 21.1.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. No indicators have been available. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, these have been only partially implemented.. Given the available information the progress toward recovery should be minor if any. It is not possible to compare against the limits or the targets.

## 21.2 Eastern Macedonia

### 21.2.1 Available information



Figure 224: *Eastern Macedonia, Greece*

Table 892: Sources of information for the Eastern Macedonia EMU

Type of source	Reference
EMP	
EMP approved in:	2009
2012 post-evaluation report:	
2013 ICES data-call:	
Additional sources:	

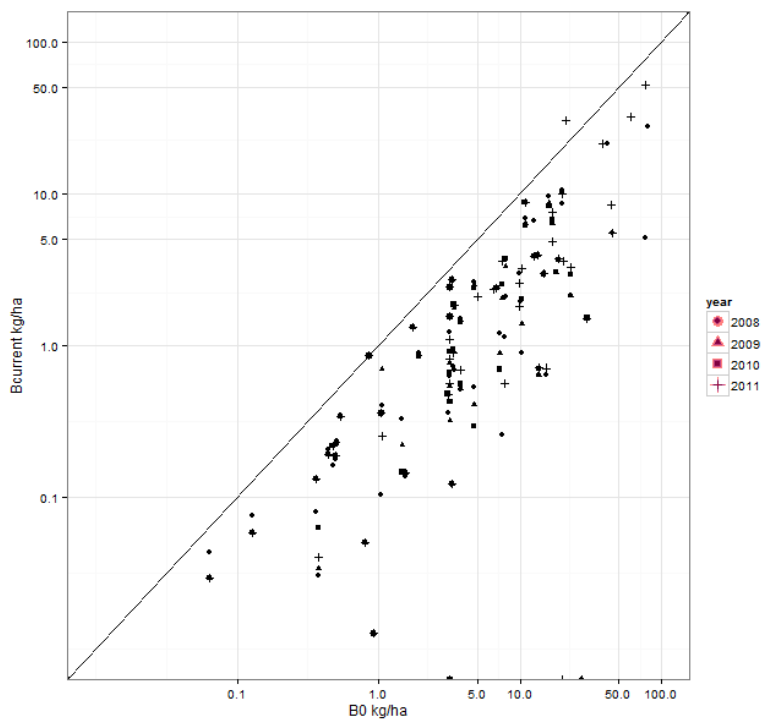


Figure 225:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Eastern Macedonia EMU are shown in red, those for Greece are shown in blue.

Table 893: Reported stock indicators for the Eastern Macedonia EMU

Name	Pre	Post
$B_{current}$	no	no
$B_{best}$	no	no
$B_0$	no	no
$\Sigma A$	no	no
$\Sigma F$	no	no
$\Sigma H$	no	no

Table 894: Source of indicators evaluated for the Eastern Macedonia EMU

Stock indicator	Source
$B_0$	no input
$B_{best}$	no input
$B_{current}$	no input
$\Sigma A$	no input

### 21.2.2 Habitat coverage of the EMU

Table 895: Habitats assessed in the Eastern Macedonia EMU, yes = present and included in the assessment, no = present but not included in the assessment, absent = not present in this EMU.

Habitat type	Assessed ?
Were rivers assessed ?	no
Were lakes assessed ?	yes
Were estuaries assessed ?	yes
Were lagoons assessed ?	yes
Were marine coastal waters assessed ?	no

The East Macedonia and Thrace EMU is indicated as EMU-03 in the EMP submitted by Greece. It is comprised of 4 Prefectures and 1 Region and is located on the North Eastern part of the country. It comprises 24% of the total Hellenic lagoons surface area and 9% of the lakes surface area.

### 21.2.3 Management measures

Table 896: Overview of the management actions proposed in the EMP for the Eastern Macedonia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>				
1	Release 30% of the lagoon catches in the open sea	M	EMP	partially low
2	Additional decrease of fishing mortality	M	EMP	not done low

Table 896: (continued)

	Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>					
3	A consistent reporting system for fishing effort and landings	M	EMP	not done	knowledge
4	Develop an ecosystem typology based on eel survival and migration	M	EMP	not done	knowledge
5	Establish specific indices for the evaluation of the management effectiveness	M	EMP	not done	knowledge
6	Raising awareness of the state of the stock	M	EMP	not done	low
7	Pilot studies for restocking actions	M	EMP	partially	knowledge
8	Typology and effectiveness of technical actions to open migration routes	M	EMP	not done	knowledge

**21.2.4 Assessment**

Table 897: Summary list impact types that were included in the assessments for the Eastern Macedonia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. anthr. effects	Fishery comm.	Fishery recr.	Hydrop.	Predat.	Anything else?
omitted	absent	omitted	omitted	omitted	absent	omitted	omitted	

Table 898: Summary of targets and assessment period for the Eastern Macedonia EMU. Blank cells indicate no information. See paragraph 1.2.2 for details.

Target/period	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
EMP 2012 target				
EMP long term target				
EU/ICES targets				
Assessment period start				
Assessment period end				

Table 899: Additional information for the Eastern Macedonia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	NA	NA
Does double banking apply ?			no	no
Is double banking considered ?			no	no

No indicators are provided.

### 21.2.5 Progress towards recovery

We have no indicators available. Among the EMP management measures addressing anthropogenic mortalities, only the release programme have been implemented. The progress toward recovery might be minor if any.



Table 900: Overview of fishing effort reported in the ICES Data Call for the Eastern Macedonia EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 901: Overview of total catches (commercial + recreational) of eel stages for the Eastern Macedonia EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 902: Stock indicators for the Eastern Macedonia EMU, the source of the data is indicated in Table 894,  $B_{current}$  is colour coded according to whether it is greater than (green) or less than (red) the biomass target set by the EU Regulation.  $\Sigma A$  is colour coded according to whether it is less than (green) or greater than (red) the mortality target equivalent to the biomass target (after WGEEL 2012 for  $\Sigma A$ ). The amount of restocked eel is presented in glass eel equivalents, to standardize for eel ongrown before restocking.

year	Biomass (t)			Mortality			Restocked (t)
	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.
1 2008							
2 2009							
3 2010							
4 2011							

Table 903: WKEPEMP evaluation of progress toward recovery for the Eastern Macedonia EMU. Expressed in terms of whether targets have been achieved or the EMU is progressing towards their achievement. Green = targets achieved or progressing towards achievement, red = targets not achieved and not progressing towards achievement, amber = no data. See paragraph 1.3.1 for more details.

Question	Anthropogenic Biomass (B)	mortality ( $\Sigma A$ )
Is the stock indicator quantified ?	no	no
Is the trend good ?		
Has the EMU reached the target set for 2012 in the EMP ?		
Has the EMU reached the long term target set by the EMP ?		
Has the EMU reached the EU/wgeel 2012 target ?		
Has the EMU achieved the most it can without increased recruitment ?		

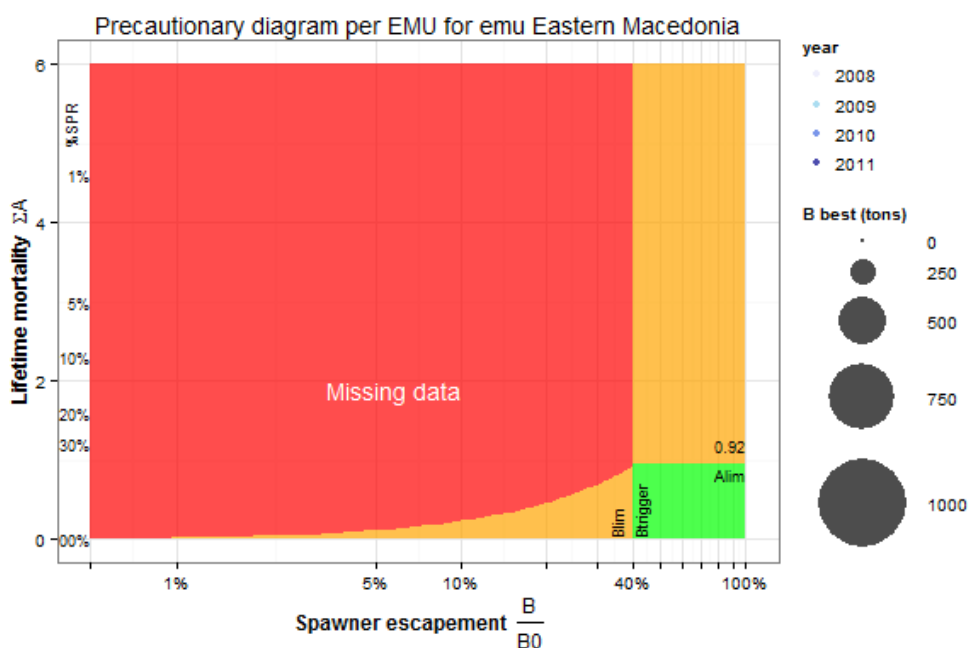


Figure 226: Modified precautionary diagram for the Eastern Macedonia EMU (after wgeel 2012), see section 1.3.2 for more information.

### 21.2.6 Conclusion

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. No indicators were available. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, these have been only partially implemented. Given the available information the progress toward recovery should be minor if any. It is not possible to compare against the limits or the targets.

## 21.3 North Western

### 21.3.1 Available information



Figure 227: North Western, Greece

Table 904: Source of information for emu: North Western EMU

EMP - Hellenic eel management plan in accordance with council regulation (EC) No 1100/2007

Table 905: Reported stock indicators for North Western

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

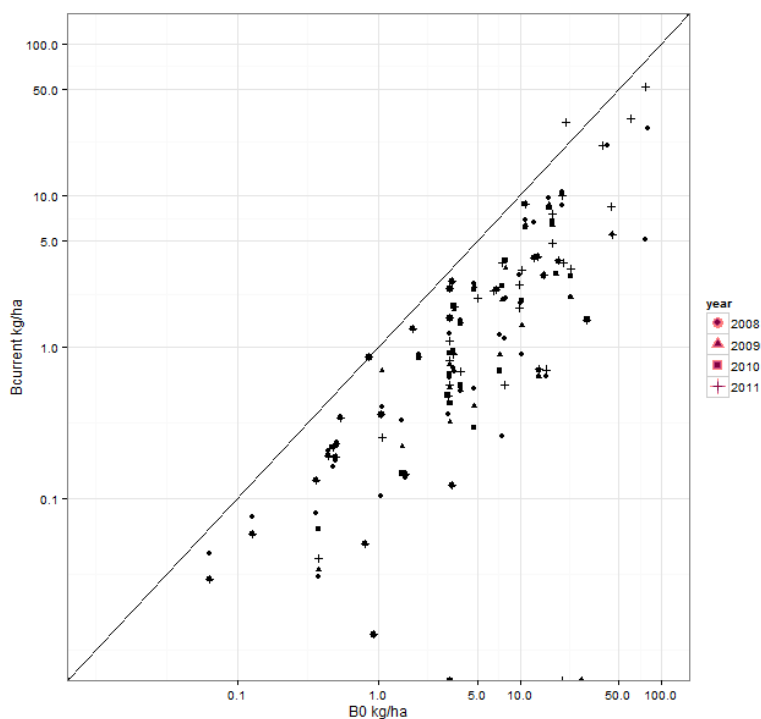


Figure 228:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the North Western EMU are shown in red, those for Greece are shown in blue.

Table 906: Source of indicator for the North Western EMU

Stock indicator	Source
$B_0$	no input
$B_{best}$	no input
$B_{current}$	no input
$\Sigma A$	no input

### 21.3.2 Habitat coverage of the EMU

Table 907: Habitats assessed in the North Western EMU.

no data
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The North Western Greece EMU is indicated as EMU-01 in the EMP submitted by Greece. It is comprised of Prefectures, 3 Regions. It comprises 70% of the total Hellenic lagoons surface area and 45% of the lakes surface area.

### 21.3.3 Management measures

Table 908: Overview of the management actions proposed in the EMP for the Eastern Macedonia EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fish-

eries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Release 30% of the lagoon catches in the open sea	M	EMP	partially	low
2	Additional decrease of fishing mortality	M	EMP	not done	low

Table 908: *(continued)*

Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>				

3	A consistent reporting system for fishing effort and landings	M	EMP	not done	knowl- edge
4	Develop an ecosystem typology based on eel survival and migration	M	EMP	not done	knowl- edge
5	Establish specific indices for the evaluation of the management effectiveness	M	EMP	not done	knowl- edge
6	Raising awareness of the state of the stock	M	EMP	not done	low
7	Pilot studies for restocking actions	M	EMP	partially	knowl- edge
8	Typology and effectiveness of technical actions to open migration routes	M	EMP	not done	knowl- edge



**21.3.4 Assessment**

Table 909: Summary list impact types that were included in the assessments for the Eastern Macedonia EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. Anthr. effects	Fishery Comm.	Fishery Rec.	Hydrop.	Predat	Anything else
Omitted	Omitted	Absent	Omitted	Omitted	Absent	Absent	Omitted	

Table 910: Summary of targets and assessment period for North Western EMU.

no data
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Table 911: Additional information for the Eastern Macedonia EMU, regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	NA	NA
Does double banking apply ?			no	no
Is double banking considered ?			no	no

### 21.3.5 Progress towards recovery

Table 912: Overview of fishing effort reported in the ICES Data Call for the North Western EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	Year	Area	Day	Number
<b>G com.</b>				
	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS com</b>				
	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>				
	2008			
	2009			
	2010			
	2011			

Table 913: Overview of total catches (commercial + recreational) of eel stages for the North Western EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 914: Stock indicators for the North Western EMU – none provided.

1	2008				
2	2009				
3	2010				
4	2011				

Table 915: WKEPEMP evaluation of progress toward recovery for the North Western EMU.

no data
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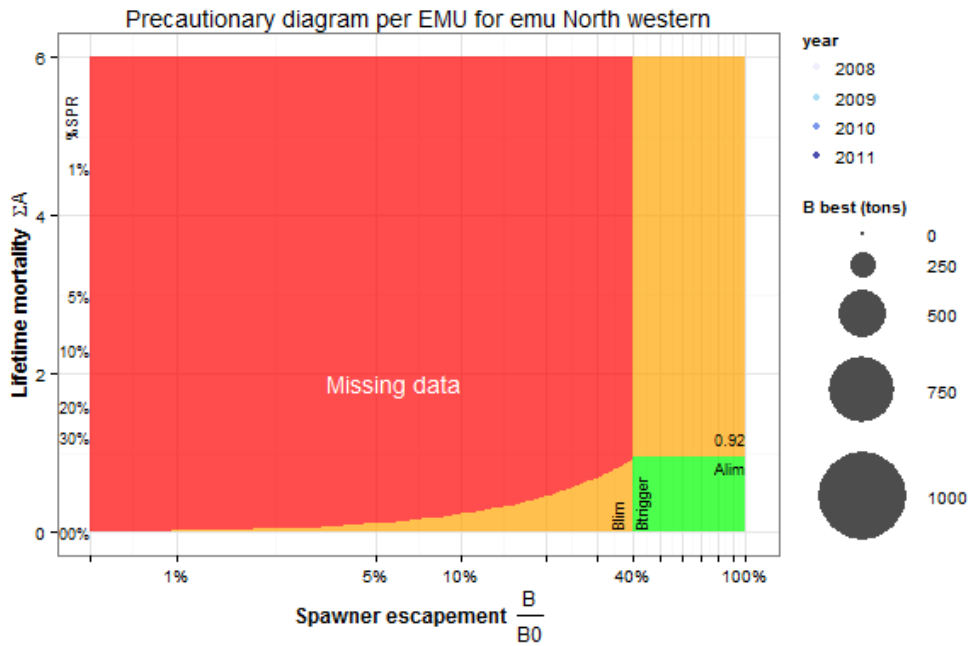


Figure 229: Modified precautionary diagram for the North Western EMU (after WGEEL 2012), see section 1.3.2 for more information.

**21.3.6 Conclusion**

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. No indicators have been available. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, these have been only partially implemented. Given the available information the progress toward recovery should be minor if any. It is not possible to compare against the limits or the targets.

## 21.4 Western Peloponnesos

### 21.4.1 Available information



Figure 230: *Western Peloponnesos*,  
Greece

Table 916: Source of information for emu: Western Peloponnesos EMU

no data
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EMP - Hellenic eel management plan in accordance with council regulation (EC) No 1100/2007

Table 917: Reported stock indicators for Western Peloponnesos

Name	Pre	Post
B <sub>current</sub>	no	no
B <sub>best</sub>	no	no
B <sub>0</sub>	no	no
ΣA	no	no
ΣF	no	no
ΣH	no	no

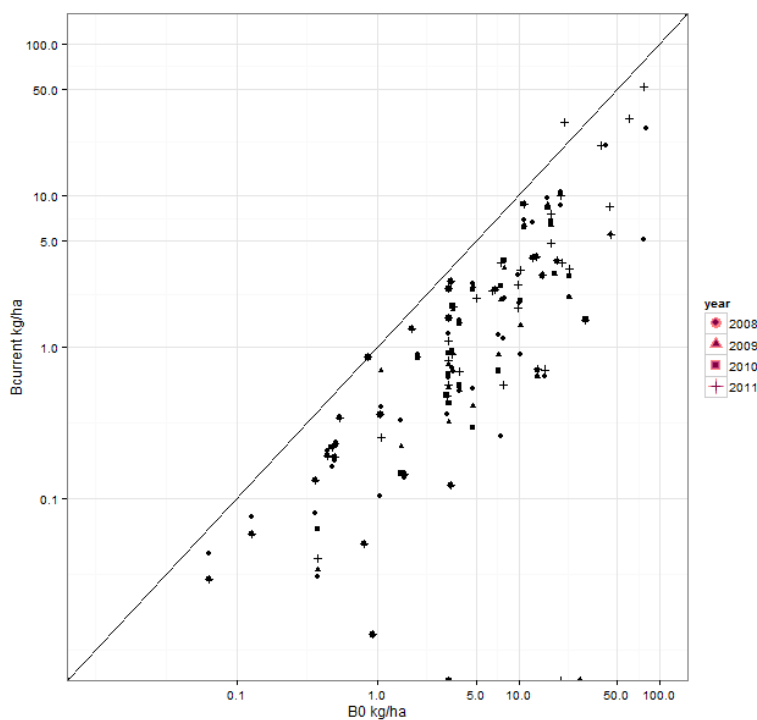


Figure 231:  $B_0$  and  $B_{current}$  in kg/ha. The indicators for the Western Peloponnesos EMU are shown in red, those for Greece are shown in blue.

Table 918: Source of indicator for the Western Peloponnesos EMU

Stock indicator	Source
$B_0$	no input
$B_{best}$	no input
$B_{current}$	no input
$\Sigma A$	no input

### 21.4.2 Habitat coverage of the EMU

Table 919: Habitats assessed in the Western Peloponnesos EMU.

no data
---------

The Western Peloponnesos EMU is indicated as EMU-02 in the EMP submitted by Greece. It comprises by 5 Prefectures and 2 Regions. It comprises 5% of the total Hellenic lagoons surface area and 3% of the lakes surface area.

### 21.4.3 Management measures

Table 920: Overview of the management actions proposed in the EMP for the Western Peloponnesos EMU, grouped according to Action Type: Commercial Fisheries (Com. Fishr.); Recreational Fisheries (Recr. Fishr.); Hydropower, Pumps and Obstacles (Hydropw. Obst.); Restocking (Restock.); and Others (Other). Life stage G = glass, Y = yellow, S = silver, M = mixed. Colours according to the fulfilment of action (outcome) and impact. Outcome: not done = not started or failed to be implemented, no info. = no information, partially = partially implemented, not appl. = not applicable in this EMU.

	Action	Life Stage	Planned	Outcome	Impact
<b>Com. Fishr.</b>					
1	Release 30% of the lagoon catches in the open sea	M	EMP	partially	low
2	Additional decrease of fishing mortality	M	EMP	not done	low

Table 908: *(continued)*

Action	Life Stage	Planned	Outcome	Impact
<b>Others</b>				



3	A consistent reporting system for fishing effort and landings	M	EMP	not done	knowl- edge
4	Develop an ecosystem typology based on eel survival and migration	M	EMP	not done	knowl- edge
5	Establish specific indices for the evaluation of the management effectiveness	M	EMP	not done	knowl- edge
6	Raising awareness of the state of the stock	M	EMP	not done	low
7	Pilot studies for restocking actions	M	EMP	partially	knowl- edge
8	Typology and effectiveness of technical actions to open migration routes	M	EMP	not done	knowl- edge

**21.4.4 Assessment**

Table 921: Summary list impact types that were included in the assessments for the Western Peloponnesos EMU. Habitat = Habitat loss; Restock.= Restocking (an expected positive impact); Indir. anthr. Effects = Indirect anthropogenic effects (e.g. change in water quality); Fishery comm. = Commercial fisheries; Fishery recr. = Recreational fisheries; Hydrop. = Hydropower; Predat. = Predation by cormorants, seals, etc; Anything else? = any other significant impacts. Absent = impact not present in this EMU; Included = impact included and assessed; Omitted = impact present but not assessed; Minor = impact present and not assessed but of minor importance to eel in that EMU, for details see paragraph 1.2.1.

Habitat	Restock.	Barriers	Indir. Anthr. effects	Fishery Comm.	Fishery Rec.	Hydrop.	Predat	Anything else
Omitted	Absent	Absent	Absent	Omitted	Absent	Absent	Omitted	

=====  
=====

Table 922: Summary of targets and assessment period for Western Peloponnesos.

no data
---------

Table 923: Additional information for Western Peloponnesos., regarding whether or not restocking or double banking influence the assessments. Double banking refers to the circumstance where silver eel leaving one EMU are then included in the assessment for another EMU 'downstream'.

Question	B <sub>0</sub>	B <sub>best</sub>	B <sub>current</sub>	ΣA
Does restocking affect the indicator?	NA	NA	NA	NA
Does double banking apply ?			no	no
Is double banking considered ?			no	no

#### 21.4.5 Progress towards recovery

Table 924: Overview of fishing effort reported in the ICES Data Call for the Western Peloponnesos EMU, by eel life stage: G = Glass, YS = Yellow and Silver combined, com = commercial fishery, rec = recreational fishery. Units presented in ha for area, days or fishermen numbers. Values kept constant during the assessment are in orange, missing values are in grey.

	year	Area	Day	Number
<b>G com.</b>	2008			
	2009			
	2010			
	2011			
<b>G rec.</b>	2008			
	2009			
	2010			
	2011			
<b>YS com</b>	2008			
	2009			
	2010			
	2011			
<b>YS rec</b>	2008			
	2009			
	2010			
	2011			

Table 925: Overview of total catches (commercial + recreational) of eel stages for the Western Peloponnesos EMU, for the years just before (Pre) and since the implementation of the EMP (Post), life stage: G = Glass, Y = Yellow, S = Silver, YS = Yellow and Silver combined. Catches are presented in tons.

	Year	G	S	Y	YS
<b>Pre</b>					
1	2008				
2	2009				
<b>Post</b>					
3	2010				
4	2011				

Table 926: Stock indicators for the Western Peloponnesos EMU – none provided

1	2008								
2	2009								
3	2010								
4	2011								
	year	$B_0$	$B_{current}$	$B_{best}$	$\Sigma F$	$\Sigma H$	$\Sigma A$	g.e. Equ.	

Table 927: WKEPEMP evaluation of progress toward recovery for the Western Peloponnesos EMU.

no data
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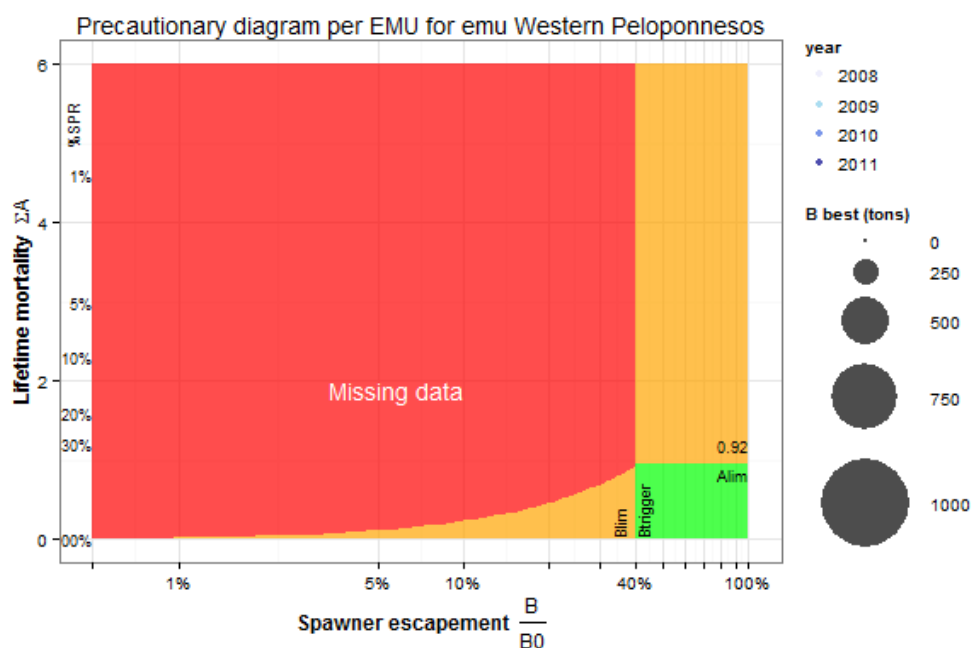


Figure 232: Modified precautionary diagram for the Western Peloponnesos EMU (after WGEEL 2012) see section 1.3.2 for more information.

### 21.4.6 Conclusions

This EMU has an eel management plan, approved in 2010, with a 2012 progress report. No indicators have been available. Part of the Management Actions outlined in the Progress Report have been implemented. Where actions have been implemented, these have been only partially implemented. Given to these available information the progress toward recovery should be minor if any. It is not possible to compare against the limits or the targets.

**Annex B: List of participants**

<b>NAME</b>	<b>ADDRESS</b>	<b>PHONE/FAX</b>	<b>E-MAIL</b>
Michael Andersen	Danish Fishermen's Association Fredericia Nordensvej 3 Taulov 7000 Fredericia Denmark	Phone +45 70 10 9645 Fax Cell: +45 4026 5040	ma@dkfisk.dk
Laurent Beaulaton	ONEMA 5, square Félix Nadar "Le Nadar" Hall C 94300 Vincennes France	Phone +33 Fax +33	Laurent.beaulaton@onema.fr
Uwe Bramick	Institute of Inland Fisheries, Potsdam Im Königswald 2 14469 Potsdam Zufahr über 14476 Potsdam/OT Germany	Phone +49 33201 4060 Fax +49	uwe.braemick@ifb-potsdam.de
Allan Buch	BSRAC Denmark		Allan.buch@middelfart.dk
Cédric Briand	Institution d'Aménagement de la Viliaine Boulevard de Bretagne BP 11 56130 La Roche France	Phone +33 Fax +33	cedric.briand@lavilaine.com
Paolo Colombo	Italian Fish Farmers Association-API Via del Perlar 37/a 37135 Verona Italy	Phone +39 Fax +39	sagcolombo@libero.it
Willen Dekker	Swedish University of Agricultural Sciences Institute of Freshwater Research Dept. of Aquatic Resources Stångholmsvägen 2 17893 Drottningholm Sweden	Phone +46 10-478 4248 Mobile: +46 76-12 68 136	Willem.Dekker@slu.se

NAME	ADDRESS	PHONE/FAX	E-MAIL
Magnus Eckeskog On 15 May	Oceana Stockholm Sweden	Phone +45 33 15 11 60 Fax Cell: +46 70 26 26 056	meckeskog@oceana.org
Richard Fordham	Scandinavian Silver Eel PO Box 902 251 09 Helsingborg Sweden	Phone +46 42 142433/42 142494 Fax +46 42 142575	Richard.fordham@industryparkofsweden.se
Evangelia Georgitsi	European Commission Directorate for Maritime Affairs and Fisheries 200 rue de la Loi B-1049 Brussels Belgium	Phone +32 Fax +32	Evangelia.GEORGITSI@ec.europa.eu
Matthew Gollock By WebEx	ZSL Regent's Park London NW1 4RY UK	Phone +44 207 449 6249 Fax +44	Matthew.gollock@zsl.org
Reinhold Hanel	Johann-Heinrich von Thünen- Institute Federal Research Institute for Rural Areas, Forestry and Fisheries Institute for Fisheries Ecology Palmaille 9 22767 Hamburg Germany	Phone +49 40 38905290	reinhold.hanel@ti.bund.de
Arjan Heinen	Combinatie van Beroepsvissers Postbus 72 2280 Rijswijk AB Netherlands	Phone +31 70 3369622/78 6225661 Fax +31 70- 3999426	a.heinen@pvis.nl
Morten Lauritzen	Jupiter Eel Kostervej 2 4780 Stege Denmark	Phone +45 Fax +45	jupiter.eel@mail.dk
Jean-Jacques Maguire	International Council for the Exploration of the Sea 1450 Godefroy Quebec Quebec GIT 2E4 Canada	Phone +1 418 688 3027	JJ.Maguire@ices.dk

NAME	ADDRESS	PHONE/FAX	E-MAIL
Magnus van der Meer	COSTA Plevierenweide 38 6708 Wageningen Netherlands	Phone +31 6 1297.4176 Fax +31	magnusvandermeer@gmail.com
Nicolas Michelet	Comité National des Pêches Maritimes et des Elevages Marins- CNPMEM 134, avenue de Malakoff 75116 Paris France	Phone +33 1 72 71 18 00 Fax +33 1 72 71 18 50	nmichelet@comite-peches.fr
Russell Poole By correspondence	Marine Institute Fisheries Ecosystem Advisory Services Furnace Newport Co. Mayo Ireland	Phone + 353 98 42300	russell.poole@marine.ie
Henrik Sparholt	International Council for the Exploration of the Sea H. C. Andersens Boulevard 44-46 1553 Copenhagen V Denmark		henriks@ices.dk
Alan Walker Chair	Centre for Environment, Fisheries and Aquaculture Science (Cefas) Lowestoft Laboratory Pakefield Road NR33 0HT Lowestoft Suffolk United Kingdom	Phone +44 (0) 1502 562244 Fax +44 (0) 1502 513865	alan.walker@cefas.co.uk
Klaus Wysujack	Johann-Heinrich von Thünen- Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries Branch Ahrensburg Wulfsdorfer Weg 204 22926 Ahrensburg Germany		klaus.wysujack@ti.bund.de