



Food and Agriculture
Organization of the
United Nations



TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

The state of the European eel, and overview of ongoing actions in the Mediterranean

Eleonora Ciccotti

Dipartimento di Biologia, Università Tor Vergata

Rome, Italy

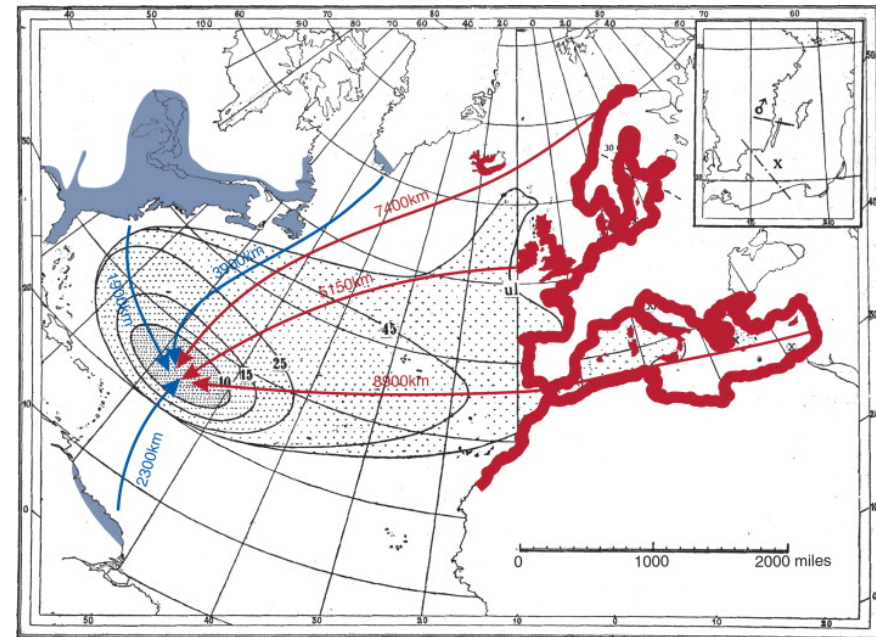
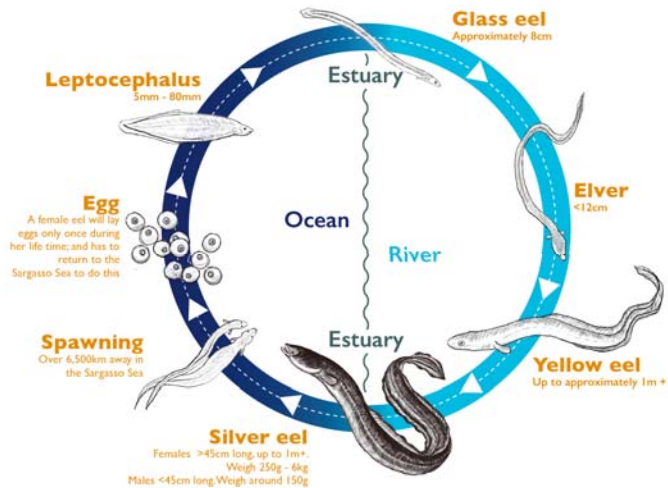


MEDAC Meeting – Montpellier, 18-19 april 2023 - Working Group 1



1. European eel life history

“The European eel life history is complex, being a long-lived semelparous and widely dispersed stock. The shared single stock is considered genetically panmictic and data indicate that the spawning area is in the southwestern part of the Sargasso Sea”

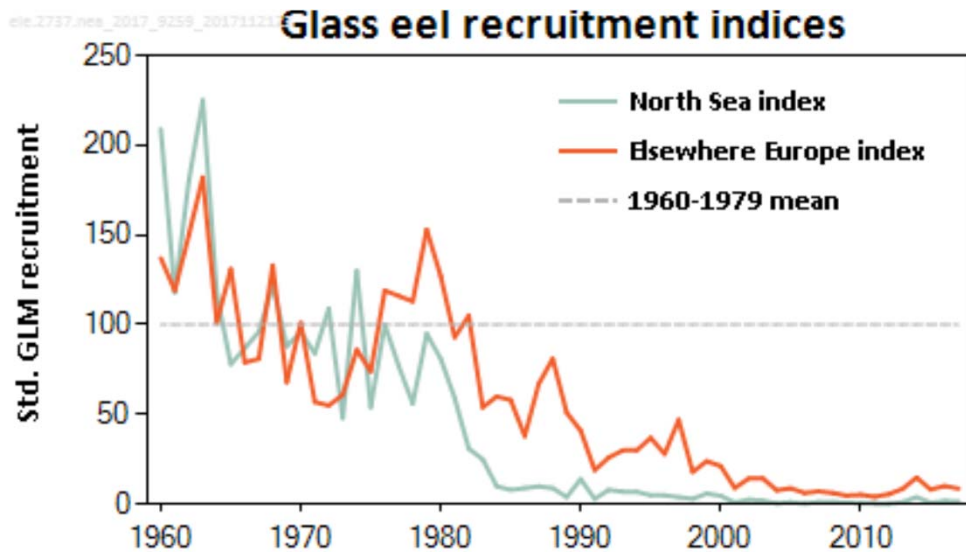


The European eel is a single species and a single stock across Europe and North Africa



2. The European eel decline

“The abundance of glass eel arriving in continental waters declined dramatically in the early 1980s to a low in 2011 (and remaining on a low level since). The reasons for this decline are uncertain but anthropogenic impacts and oceanic factors are assumed to have major impacts on the stock”



Problems:

- Climate change
- Fisheries
- Habitat loss
- Entrainment & Hydropower
- Water Quality & Pollution
- Diseases & Parasites
- Predation

Recruitment is about 5% of 40 years ago

The eel is a single stock → this is a shared problem



3. The management framework for European eel



The European eel was listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2007 (CITES, 2022a). Since 2009 when the listing came into force, any international trade in this species needs to be accompanied by an export permit supported by a Non-Detriment Finding (NDF).



The International Union for the Conservation of Nature (IUCN) listed the European eels as Critically Endangered in 2008 (IUCN, 2022). It was reassessed in both 2013 and 2018, and the status remains unchanged



In 2014, the European eel was added to Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), whereby signatories call for cooperative conservation actions to be developed among Range States (CMS, 2018).



Within EU Member State waters, the stock, fisheries and other anthropogenic impacts, are currently managed in accordance with Council Regulation (EC) No 1100/2007, “establishing measures for the recovery of the stock of European eel” (so-called ‘Eel Regulation’, EU Council, 2007)



4. Management framework for European eel in the Mediterranean Sea



Rec. GFCM/42/2018/1 on a multiannual management plan



Temporal closure



Future FRAs



Reduction of effort/catches



Traceability



Measures addressing IUU fishing



Authorised vessels/landing points



Adaptive approach



RESEARCH PROGRAMME

OBJECTIVE: contribute to controlling the fishing mortality and ensuring the long-term conservation and sustainable use: transitional measures

→ long-term management plan

TRANSITIONAL MEASURES:

1. Annual three consecutive month closure: defined by CPCs
2. 30% reduction of effort or catches wrt to 2006-2008 on a progressive basis of annual 10% reduction over 3 years
3. FRAs (possibility of CPCs est. FRAs)
4. Traceability system for landings, sales, exports



4. Overview of the GFCM Eel Research Programme

Research programme on European eel: towards coordination of European eel stock management and recovery in the Mediterranean

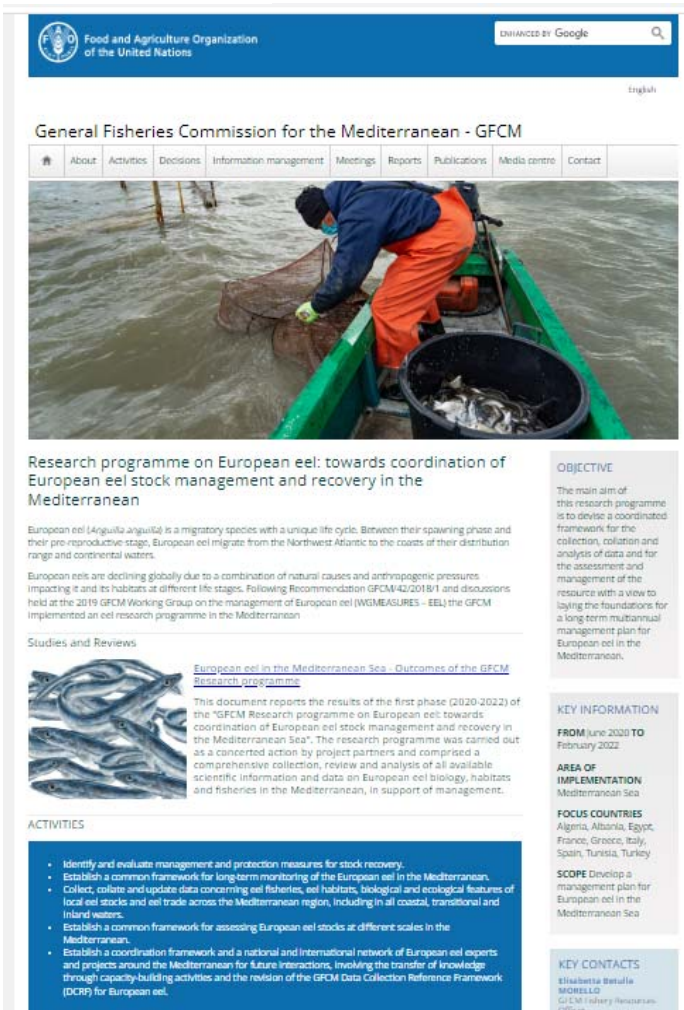
- 18 MONTHS: September 2020 – February 2022
- NINE scientific partners + administrative focal points
Spain, France, Italy, Albania, Greece, Turkiye, Egypt, Tunisia, Algeria



- Scientific Coordinators: Eleonora CICCOTTI & Argyrios SAPOUNIDIS
- Advisory Board: Reinhold HANEL, Thünen Institute, Germany
Giulio DE LEO, Hopkins Marine Station, Stanford University, USA
- GFCM Staff: Betulla MORELLO and Aurora NASTASI

5. Deliverables of the GFCM Eel Research Programme

Final Report



Food and Agriculture Organization of the United Nations

General Fisheries Commission for the Mediterranean - GFCM

Research programme on European eel: towards coordination of European eel stock management and recovery in the Mediterranean

European eel (*Anguilla anguilla*) is a migratory species with a unique life cycle. Between their spawning phase and their pre-reproductive stage, European eel migrate from the Northwest Atlantic to the coasts of their distribution range and continental waters.

European eels are declining globally due to a combination of natural causes and anthropogenic pressures impacting it and its habitats at different life stages. Following Recommendation GFCM/42(2018)1 and discussions held at the 2019 GFCM Working Group on the management of European eel (WGM/EASURES - EE), the GFCM implemented an eel research programme in the Mediterranean.

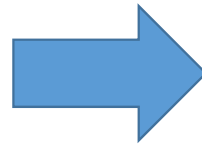
Studies and Reviews

[European eel in the Mediterranean Sea - Outcomes of the GFCM Research programme](#)

This document reports the results of the first phase (2020-2022) of the "GFCM Research programme on European eel: towards coordination of European eel stock management and recovery in the Mediterranean Sea". The research programme was carried out as a concerted action by project partners and comprised a comprehensive collection, review and analysis of all available scientific information and data on European eel biology, habitats and fisheries in the Mediterranean, in support of management.

ACTIVITIES

- Identify and evaluate management and protection measures for stock recovery.
- Establish a common framework for long-term monitoring of the European eel in the Mediterranean.
- Collect, collate and update data concerning eel fisheries, eel habitats, biological and ecological features of local eel stocks and eel trade across the Mediterranean region, including in all coastal, transitional and inland waters.
- Establish a common framework for assessing European eel stocks at different scales in the Mediterranean.
- Establish a coordination framework and a national and international network of European eel experts and projects around the Mediterranean for future interactions, involving the transfer of knowledge through capacity-building activities and the revision of the GFCM Data Collection Reference Framework (DCRF) for European eel.

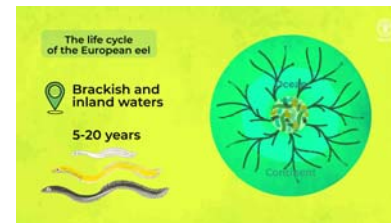
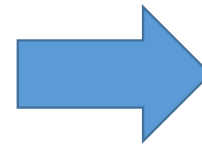



Food and Agriculture Organization of the United Nations | General Fisheries Commission for the Mediterranean

Studies & Reviews NO. 103

EUROPEAN EEL IN THE MEDITERRANEAN SEA
Outcomes of the GFCM Research programme

ADVANCED DRAFT

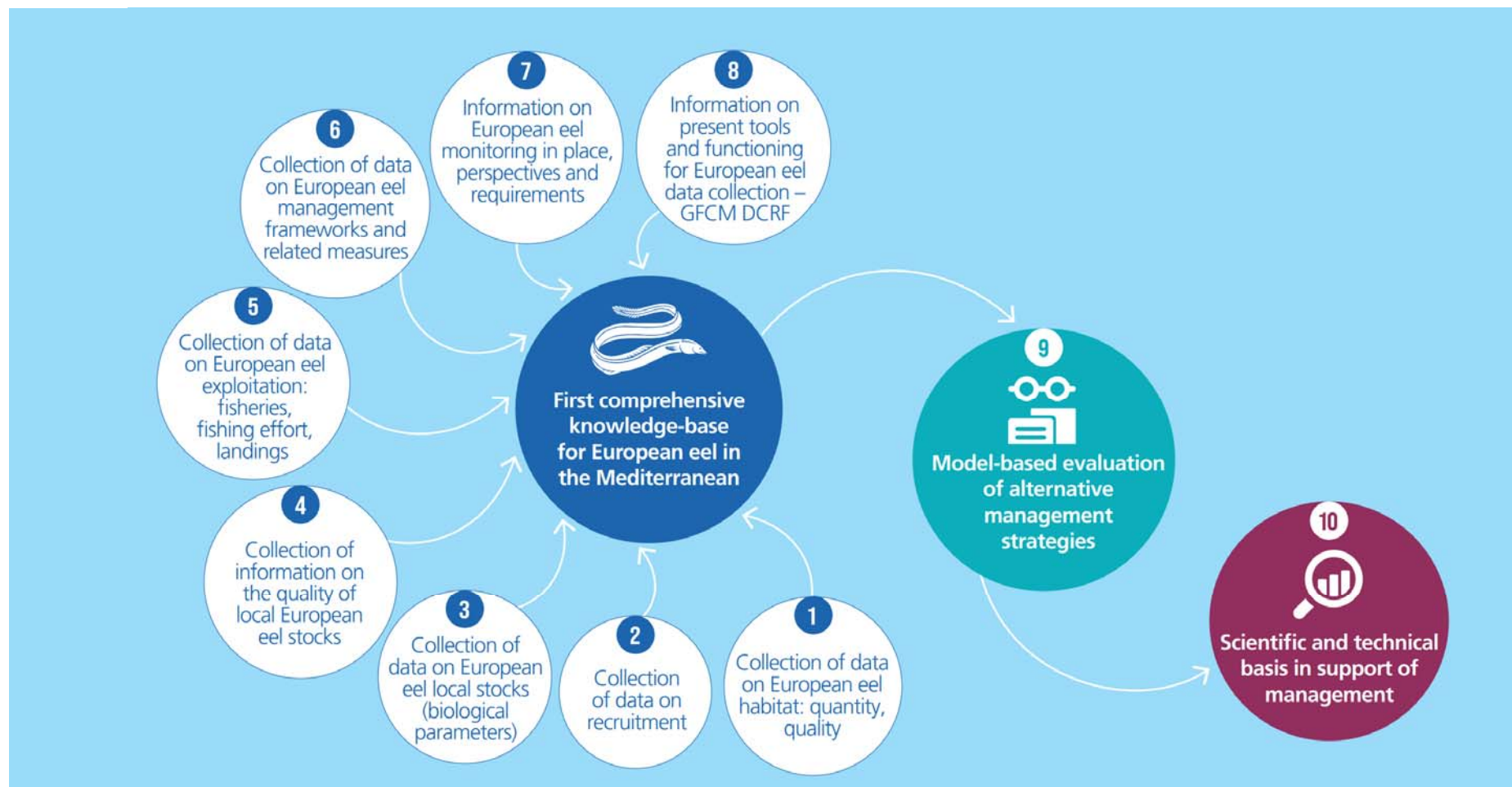


Videos for information and dissemination

<https://www.fao.org/gfcm/researchprogramme-europeaneel>



6. The GFCM Eel Research Programme



Results providing the scientific basis for Advice on European eel



7. Specific results to support management choices

a) Eel habitat

- Prevailing habitat in extension → Lagoons
- Lagoon fisheries, and related management contribute, to habitat quality

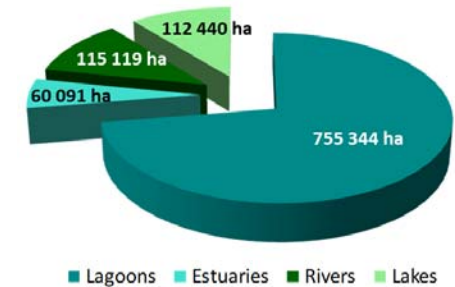
• Main impacts:

❖ in lakes and lagoons →

- anthropogenic mortality associated with fishing pressure
- pollution by heavy metals and pesticides.

❖ In rivers and estuaries →

- anthropization of river basins
 - presence of invasive alien species
 - land uses
 - habitat loss
 - poor water quality leading to frequent hypereutrophication
- pollution by pesticides and heavy metals



Maintain lagoon fisheries, focusing on management for habitat enhancement in the long term

Reduce eel fishing mortality

✓ Habitat enhancement programmes → especially related to improving water quality and connectivity. In this sense, the eel becomes an umbrella species under whose protection many other aquatic species would be improved

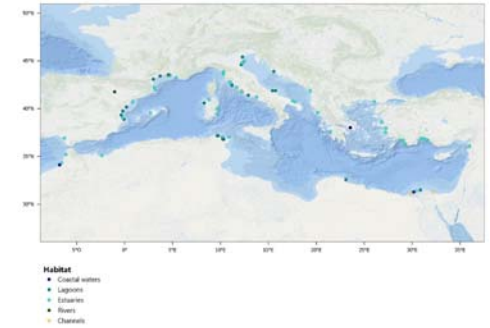
✓ In coordination with other habitat-related frameworks → EU Water Framework Directive, EU Habitat Directive, other non EU frameworks



7. Specific results to support management choices

b) Recruitment

- Documented in **80 sites** across the Med, **in transitional habitats** mostly in North-Western part
- Past abundance until the '80s, **decreasing trend** consistent with the ICES trend Elsewhere Europe
- Presently at **lowest levels**
- Many scattered fisheries, some riverine fisheries in Italy & Spain, some closed
- Most Countries already have in place a glass eel fisheries ban
- Illegal fisheries and illegal trafficking still present, and even reinforced



Total protection of recruitment

Total ban of glass eel exploitation

Reinforcement of controls

Habitat quality in recruitment sites ?

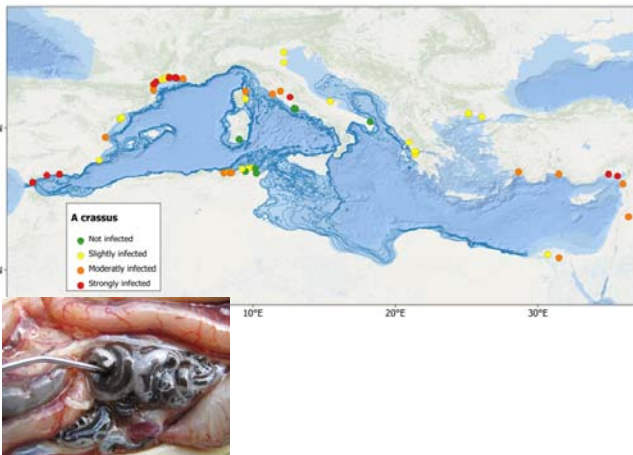
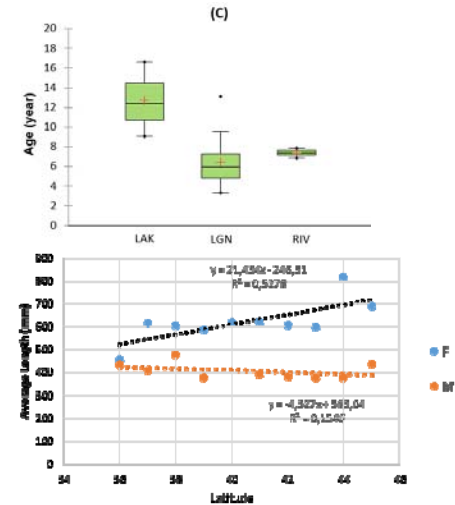
Specific habitat-related measures (assisted migration) only in case of documented specific impacts



7. Specific results to support management choices

c) Local stocks

- **Biological features** → Sizes, sex-ratios, growth rates, age structure varying across the Mediterranean geographically, by habitat, locally
→ key information for assessment



Further work on silvering and escapement

Implement regular collection of data on biological variables

→ to be foreseen in DCRF Task VII Eel

- **Quality** → not exhaustive information
→ contamination levels are low or medium (80 % of sites)
→ *Anguillicola crassus* is present in eel from all Countries
→ only in a few sites eel are free from *A. crassus* infection

- Given the importance of eel quality for successful migration and spawning,
→ avoid eel transfers across sites
→ encourage Countries to carry out regular monitoring of contaminants and pathogens, especially for silver eels

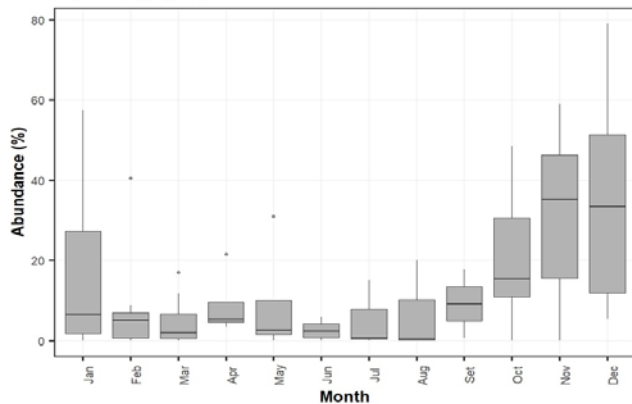


7. Specific results to support management choices

d) Seasonal patterns of migration

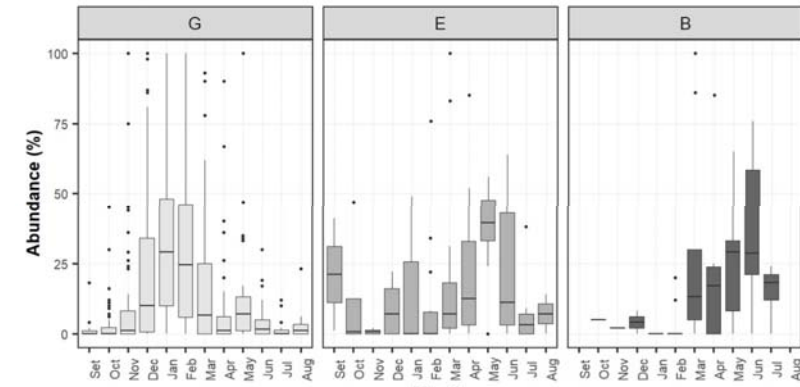
Recruitment

- Glass eel ascent coincides the winter months,
- season may extend to June, concerning pigmented elvers



Escapement

- best documented in lagoons
- migration period extends from October to March



Regional measures for commercial eel fisheries

Habitat	Country	Months												
		1	2	3	4	5	6	7	8	9	10	#	12	
LAK	DZ													
	IT													
LGN	TN													
	DZ													
ES	FR													
	IT													
CMW	DZ													
	FR													
RIV-RIE	IT													
	ES													

→ Three-consecutive months time closures have been established by most Countries based on Recommendation GFCM/42/2018/1 and Council Regulation (EU) 2019/124, and other time closures are implemented at other levels

→ Consistency of time closures with effective migration periods needs to be checked
 Better tuning of time closures with seasonality ?



7. Specific results to support management choices

e) Management

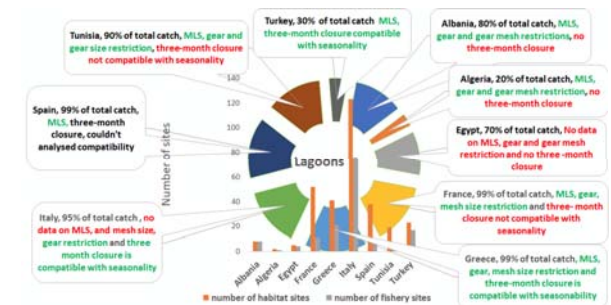
- Under different frameworks → EU, National, none
- At different levels → Country, EMU, local
- Many measures in place, mostly *fishery-related* (mesh, gear, min landing sizes)
- No harmonization, not always really tuned to the local situation
- Some measures not really useful for eel (from regulation from other fisheries)
- Some Countries implement *stage-related measures*:
 - ✓ **Restocking** → only occasional, restocking sites not always suitable
no evidence of effective contribution to escapement
 - ✓ **Releases** → performed by some Countries, in some cases consistent (Greece, France)
effective contribution to escapement
- No habitat-related measure specific for eel, but many protected sites (most lagoons, many rivers, lakes)



Agree on coordinated, simple, feasible management schemes

Harmonize, when possible, fishery-related measures

Restocking by glass eels is not an option, silver eel releases are a suitable option





7. Specific results to support management choices

f) Model-based evaluation of management strategies

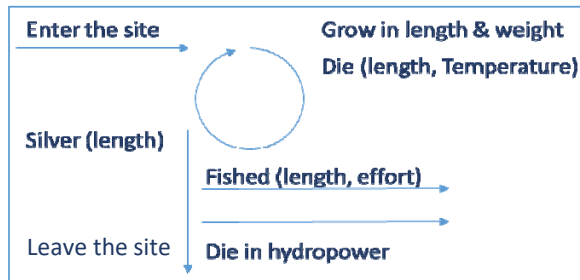
Input data from WP3 and WP1



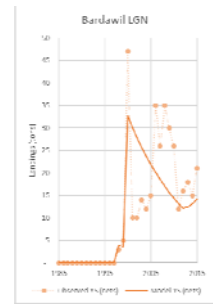
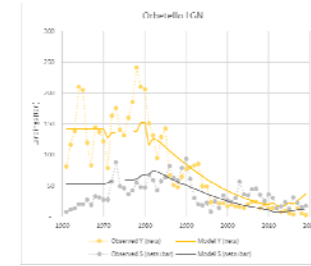
Data rich sites → data poor → no data



ESAM Model



Results for sites



Expansion and comparative appraisal

- Potential management scenarios identified based on the current management applied in different habitats and across Partner Countries in the Mediterranean
- Time horizon: 2030
- Baseline: current set of measures (2020)
- Results expressed as increase/decrease of landings and escapement with respect to the baseline

2030 SCENARIOS	LANDINGS	SILVER EEL ESCAPEMENT
A NO TIME CLOSURES (without 3 months requested by GFCM/AZ/2018/1 & EU Reg. 2019/124)	+4,1%	-5,7%
C ABOLITION OF CURRENT MINIMUM LANDING SIZE (where present)	+0,7%	-1,5%
D FULL FISHERY CLOSURE	-100,0%	+109,7%
E REDUCTION BY HALF OF FISHING EFFORTS AT BARRIERS	-15,5%	+19,2%
F REDUCTION BY HALF OF FISHING EFFORTS OF ALL NETS	-10,2%	+11,8%
G REDUCTION BY HALF OF FISHING EFFORTS OF OTHER GEARS (hooks)	+0,0%	+0,0%
H REDUCTION BY HALF OF ALL FISHING EFFORT	-25,9%	+31,4%
I RIVER CONNECTIVITY RESTORATION (both upstream and downstream)	+0,0%	+0,4%
J RESTOCKING IN ALL SITES (kg/ha)	+0,3%	+3,2%
K FULL FISHERY CLOSURE IN PROTECTED SITES (RAMSAR, Regional parks, etc.)	-65,5%	+64,3%



8. Scientific Basis for Advice on European eel

1. Advice of the 23rd Scientific Advisory Committee for fisheries (SAC)

Acknowledging...

- The alarming status of European eel in the Mediterranean and across its entire distribution range, which remained critical and had reached its **lowest critical recruitment levels ever recorded**
- The importance of these **traditional fisheries for fisher livelihoods**, and the **potential socioeconomic impacts** of implementing the proposed measures



- ➔ **immediately strengthen the existing transitional measures in 2023** based on the WGMEASURES-EEL toolbox of measures
- ➔ **continue working towards informing future long-term management measures for 2024**
- ➔ **align the current closures with the effective migration periods of silver eel** at the country level and consider a **total ban of glass eel fisheries and of recreational fisheries** for all life stages



8. Scientific Basis for Advice on European eel

2. Advice of the 23rd Scientific Advisory Committee for fisheries (SAC)

The SAC agreed on a **second phase of the research programme** extending through 2023 that would inform discussions on long-term management measures, with the aim of:

- i. conducting a **socioeconomic analysis** of the proposed closures;
- ii. implementing **standardized fishery independent monitoring** of all eel life stages coupled with long-term monitoring efforts for fishery-dependent data, **involving fishers**;
- iii. conducting **stakeholder awareness activities**;
- iv. working on **modalities for compensation schemes for fishers**;
- v. conducting **pilot studies in key sites**



8. Scientific Basis for Advice on European eel

3. Advice on stock status from Joint EIFAAC/ ICES/GFCM WGEEL 2022

The status of European eel remains **critical across its entire distribution range** with the **lowest recruitment** ever recorded

4. Advice of the GFCM Working group on management of European eel (WGMEASURES-EEL)

- I. Agree to constitute a **permanent GFCM expert group on European eel in the Mediterranean** to consolidate the network of experts (scientific and administration), ensure Mediterranean-wide coordination of the work and provide mutual assistance in addressing stock-wide issues (ToRs provided)
- II. Agree to **increase available knowledge** through:
 - + Long-term standardized fishery-independent monitoring of all eel life stages
 - + Long-term fishery-dependent surveys of all eel life stages
 - + Long-term monitoring of environmental aspects

involving fishers when/if a fishery were to be discontinued or closed



9. GFCM decision making process for European eel

45th annual session of the GFCM (2022)

Recommendation GFCM/45/2022/1 on a multiannual management plan for European eel in the Mediterranean Sea, amending Recommendation GFCM/42/2018/1

Closure options

Option 1: Annual fishing closure of **6 consecutive months** where landing all stages of European eel (glass, yellow, silver) shall be prohibited. The closure period shall be defined in line with the temporal migration patterns of European eel in the CPC concerned

Option 2: Annual fishing closure of **3 consecutive months from 1st January to 31st March + three additional months between 1 April and 30 November** where landing all stages of European eel (glass, yellow, silver) shall be prohibited

Fishing prohibitions

Recreational fishing of European eel at all stages (glass eel, yellow eel and silver eel) **is prohibited** in all habitats

➔ evaluate the possibility of implementing **additional measures addressing glass eel**, also based on the **outcomes of the socioeconomic analysis** to be performed under the **second phase of the research programme in 2023** towards the implementation of new long-term measures in 2024



10. Following steps -EU

SECTORAL POLICIES / FISHERIES

European Commission proposes six-month closure of eel fisheries in 2023

Brussels, 28/10/2022 (Agence Europe)

On Friday 28 October, the European Commission adopted proposals on Total Allowable Catches (TACs) for 2023 for certain fish stocks in EU waters of the Atlantic Ocean, Kattegat and Skagerrak, including for deep-sea stocks for 2023 and 2024.

In particular, the Commission is proposing a six-month closure of eel fisheries in EU waters.

The proposal only concerns 17 TACs. It will need to be updated after the results of the negotiations

COUNCIL REGULATION (EU) 2023/194

of 30 January 2023

fixing for 2023 the fishing opportunities for certain fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters, as well as fixing for 2023 and 2024 such fishing opportunities for certain deep-sea fish stocks

Article 13

Measures on European eel fisheries

1. This Article applies to Union waters, including brackish waters, such as estuaries, coastal lagoons and transitional waters, and for Union fishing vessels in GFCM geographical subareas 1 to 27. This Article does not apply to GFCM geographical subarea 29.
2. It shall be prohibited to engage in commercial fishing activities for European eel (*Anguilla anguilla*), either as a targeted species or as by-catch, at all life stages for a period of at least six months. To that effect, each Member State concerned shall determine one or more closure periods subject to the following:
 - (a) where appropriate, the closure period or periods may differ within one Member State from one fishing area to another in order to take account of the geographical and temporal migration pattern of eel at its different life stages;



11. Following steps – GFCM

SSF Forum EEL2 – Orbetello (Italy)

- ➔ Follow-up from the SSF Forum during Escale à Sète , taking into account advice emerging from the 45th annual session, with the aim of enhancing fisher-scientist interactions towards:
- + Exchanging knowledge and experience
 - + Discussing future activities involving fishers, e.g.:
 - standardized fishery independent monitoring of all eel life stages coupled with long-term monitoring efforts for fishery-dependent data, involving fishers
 - key sites for future pilot studies
 - socioeconomic study



Food and Agriculture
Organization of the
United Nations



TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Thank you for your attention

