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RESCOM Project

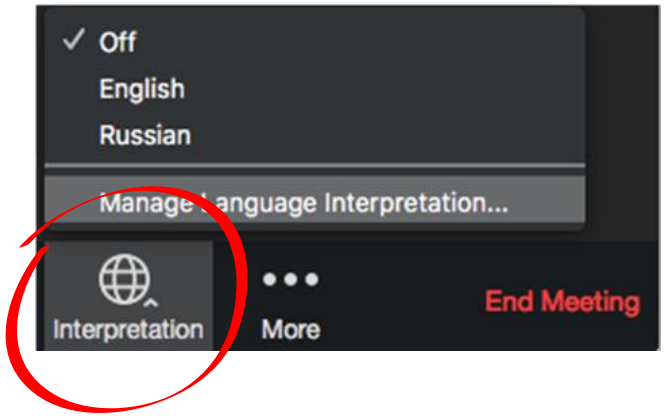
Strengthening the resilience of ecosystems in the Mediterranean

Sustainable fishing: challenges and lessons from the field

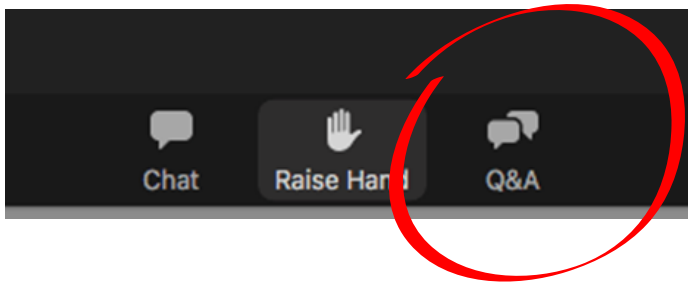
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Interpretation

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Speakers

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MAVA FONDATION POUR LA NATURE

AFD AGENCE FRANÇAISE DE DÉVELOPPEMENT

Organising team



Fabrice Bernard
Director of International Partnerships and Patronage



Emma Doat
Project Officer



Clarissa Bottos
Interpreter



Angélique Triguel
Project Officer



Vera Panno
Interpreter

Speakers



Antonio di Franco

Marine ecologist at Anton Dohrn Zoological Station



Antonio Calo

Marine ecologist University of Palermo



Antoni Grau

Director of the Marine Resources Service of the Balearic Autonomous Government (Spain)



Zafer Kizilkaya

Founding member of the Mediterranean Conservation Society

AKDENİZ KORUMA DERNEĞİ
Mediterranean Conservation Society

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Photocredit: Torre Guaceto MPA

Sustainable fishing in Mediterranean MPAs

Antonio Di Franco · Antonio Calò
RESCOM webinar | 8 October 2026

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Antonio Di Franco

Senior Researcher / Stazione Zoologica Anton Dohrn (Palermo, Italy)



Antonio studies marine protected areas (MPAs) and small-scale fisheries (SSFs), combining ecological assessment with research on fishers' perceptions and governance. His work also explores how fishers' engagement can support sustainable fishing and effective MPAs.

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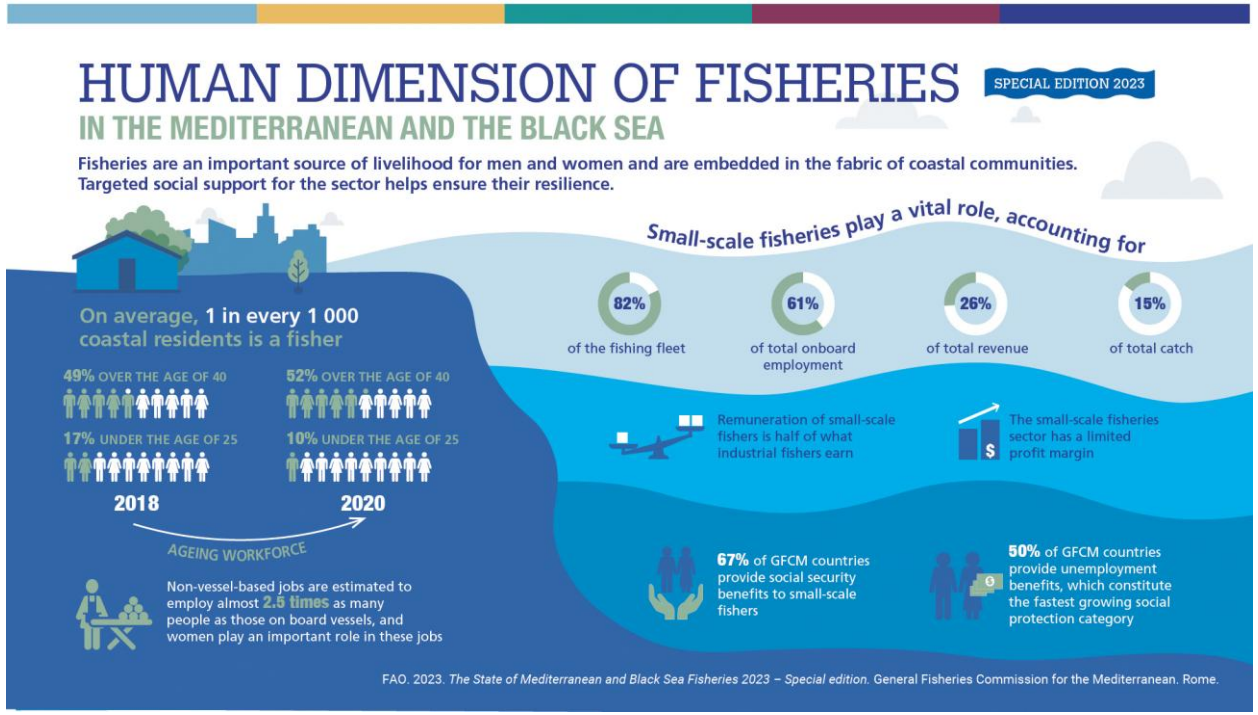
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THE CONTEXT OF SSFs IN THE MEDITERRANEAN

- ~72,000 fishing vessels in the Mediterranean
- 81% of vessels are small-scale across the Mediterranean and Black Sea
- SSFs has long sustained coastal livelihoods. In 2018, the RPOA-SSF set a regional roadmap for sustainability
- Toward social-ecological sustainability: maintains stocks and habitats, supports viable livelihoods, and foster participatory management with fishers.



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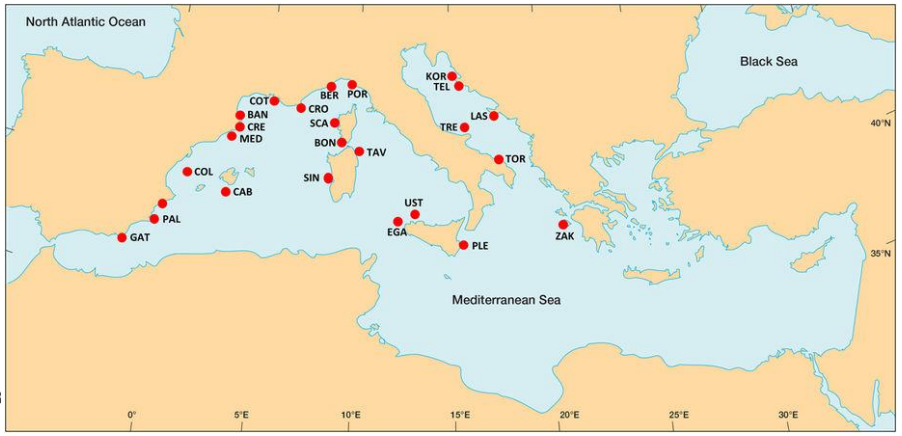


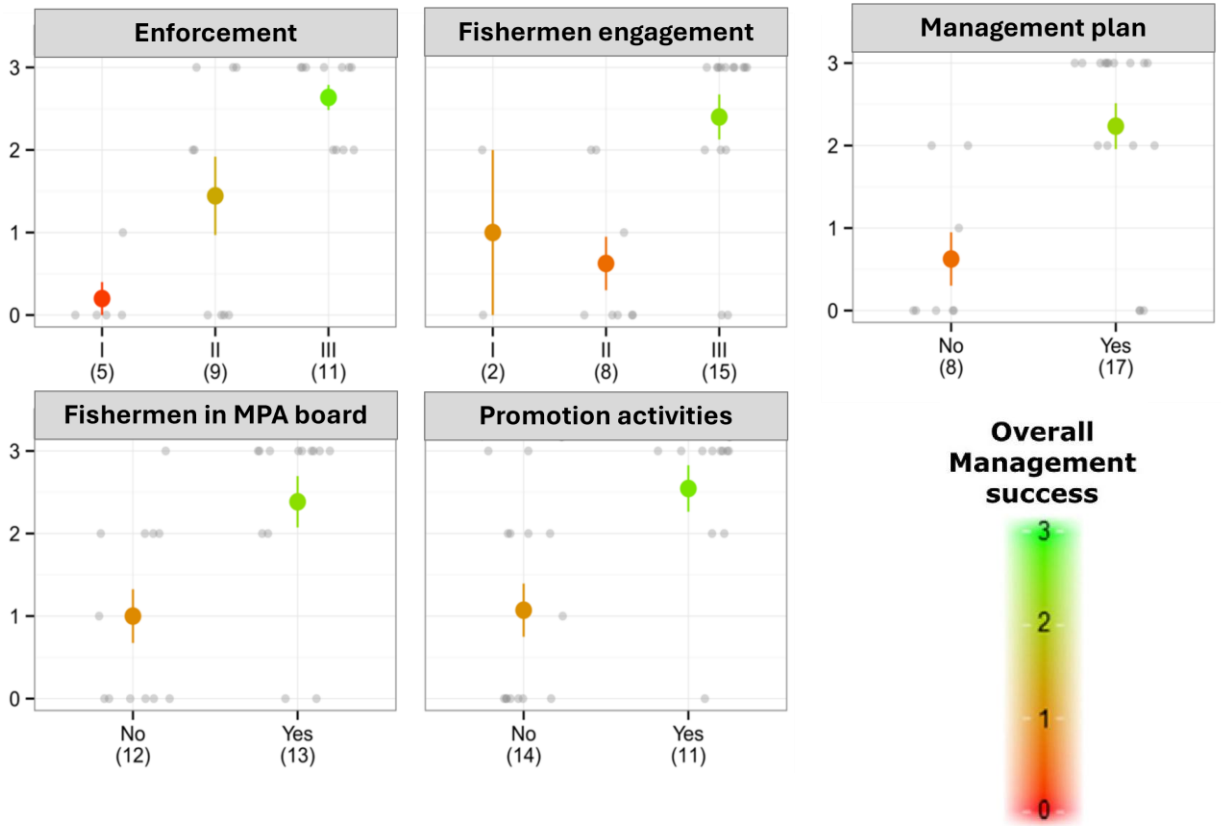
CHALLENGES RELATED TO SSFs IN THE MEDITERRANEAN

- Changing ecosystems - Warming and shifting species change the baseline for management.
- Increasing competing use of the maritime space
- Limited information - Small-scale catch and effort are rarely monitored consistently.
- Uneven power in decisions - Rules are harder to sustain when fishers lack a meaningful role.

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- Uneven power in decisions - Rules are harder to sustain when fishers lack a meaningful role.
- Engagement is part of SSF management effectiveness – the case of Mediterranean MPAs





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IMPROVING SSFs GOVERNANCE THROUGH COLLABORATION



THEME	INTERVENTION	THEME	INTERVENTION
INVOLVEMENT IN DECISION MAKING	1. Create collaborative platforms to engage fishers in decision	IMPROVE SSF ENVIRONMENTAL SUSTAINABILITY	7. Reduce fishing effort 8. Modify/substitute fishing gears 9. Set-up SSF Code of conduct
ENFORCEMENT STRENGTHENING	2. Increase surveillance by MPA staff and improved infrastructure 3. Increase surveillance through fishers' direct involvement 4. Increase surveillance through the cooperation with relevant authorities	IMPROVEMENT OF SSF PROFITABILITY	10. Add value to local fisheries products 11. Promote new commercial species 12. Support Pescatourism
KNOWLEDGE & OWNERSHIP	5. Engage fishers in monitoring activities 6. Raise the awareness of fishers, MPA managers and local communities		

	THEME	TOOL	COST	TIME NEEDED	LOCAL STAKEHOLDERS INVOLVEMENT	PERCEIVED EFFECTIVENESS	MPAS THAT IMPLEMENTED THE TOOL
a	INVOLVEMENT IN DECISION MAKING	Create collaborative platforms to engage fishers in decision making	LOW COST	MEDIUM TIME	MEDIUM STAKEHOLDERS INVOLVEMENT	HIGH IMPACT	11 RNBB, Cabo, Cap Roux, PMCB, Egadi, Portofino, Es Freus, Strunjan, Telašćica, Torre Guaceto and Zakynthos
b	ENFORCEMENT STRENGTHENING	Increase surveillance by MPA staff and improved infrastructure	MEDIUM COST	LONG TIME	MEDIUM STAKEHOLDERS INVOLVEMENT	HIGH IMPACT	5 PMCB, Es Freus, Strunjan, Telašćica and Zakynthos
		Increase surveillance through fishers' direct involvement	MEDIUM COST	LONG TIME	HIGH STAKEHOLDERS INVOLVEMENT	HIGH IMPACT	6 Cabo, Egadi, Portofino, Strunjan, Telašćica, Zakynthos
		Increase surveillance through the cooperation with relevant authorities	MEDIUM COST	LONG TIME	MEDIUM STAKEHOLDERS INVOLVEMENT	HIGH IMPACT	4 Cap Roux, PMCB, Telašćica, Torre Guaceto
c	KNOWLEDGE & OWNERSHIP	Engage fishers in monitoring activities	MEDIUM COST	MEDIUM TIME	HIGH STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	5 RNBB, Egadi, Portofiono, Strunjan, Torre Guaceto
		Raise the awareness of fishers, MPA managers and the local community	MEDIUM COST	MEDIUM TIME	MEDIUM STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	5 Egadi, Zakynthos, Cabo, Strunjan, Cap Roux
d	IMPROVE SSF ENVIRONMENTAL SUSTAINABILITY	Reduce fishing effort	MEDIUM COST	LONG TIME	HIGH STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	3 Portofino, Torre Guaceto, Zakynthos
		Modify/substitute fishing gear	MEDIUM COST	LONG TIME	HIGH STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	3 RNBB, Strunjan, Telašćica
		Set-up SSF Code of conduct	MEDIUM COST	LONG TIME	HIGH STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	1 Egadi
e	IMPROVE SSF PROFITABILITY	Add value to local fisheries products	LOW COST	MEDIUM TIME	HIGH STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	1 PMCB
		Promote new commercial species	LOW COST	SHORT TIME	LOW STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	1 Zakynthos
		Support Pescatourism	MEDIUM COST	LONG TIME	HIGH STAKEHOLDERS INVOLVEMENT	MEDIUM IMPACT	1 Telašćica

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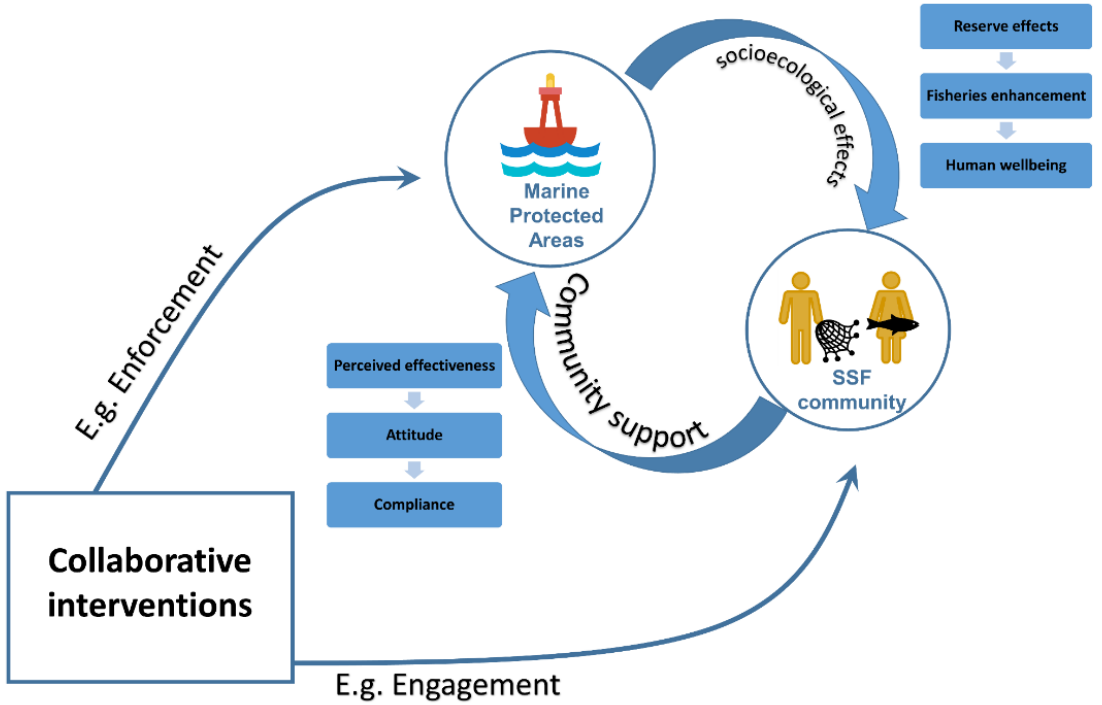
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Antonio Calò

Assistant Professor/ University of Palermo (Italy)

UNIVERSITÀ DEGLI STUDI DI PALERMO

Antonio is a marine ecologist studying marine protected areas and small-scale fisheries in the Mediterranean. His research examines the ecological and socioeconomic effects of protection, including changes in catches and fishers' livelihoods. His work explores how collaboration with fishers and MPA managers can support sustainable fishing and effective MPAs.

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IMPORTANCE OF ASSESSING SSFs OPERATIONS

An easy, quick and accurate protocol relying on fishers engagement



Fishers and observers trained to collect data

Photo-sampling



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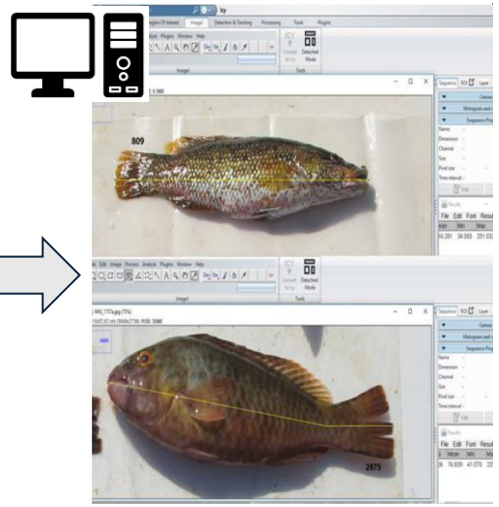
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Extraction of lengths through image analysis

Length-weight relationships and Fish 1st sale price

Catch unique code	Photo ID	MPA	In-Out	Catch Number	Species	Individual	Length
Tel-IN1	photo1m	Telascica	IN	1	S.scrofa	1	34.17
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Tel-IN1	photo1m	Telascica	IN	1	S.scrofa	3	36.073
Tel-IN1	photo1m	Telascica	IN	1	S.scrofa	4	29.315
Tel-IN1	photo1m	Telascica	IN	1	S.scrofa	5	26.757
Tel-IN1	photo1m	Telascica	IN	1	S.scrofa	6	22.73
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Tel-IN1	photo1m	Telascica	IN	1	S.scrofa	8	21.85
Tel-IN1	photo2m	Telascica	IN	1	D.dentex	1	42.196
Tel-IN1	photo2m	Telascica	IN	1	D.dentex	2	46.214
Tel-IN1	photo3m	Telascica	IN	1	M.surmuletus	1	20.164
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Biomass and Economic Value of the catch

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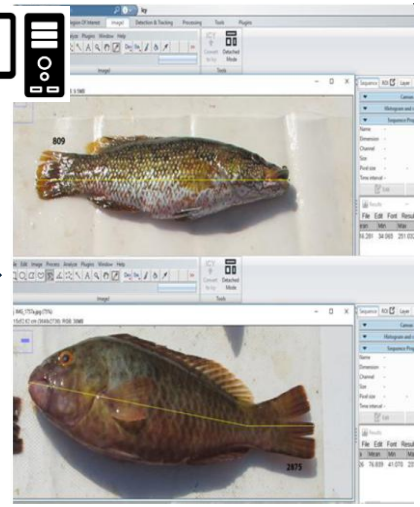
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Unique ID:	Sampling Date:
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Type of net: □trammel □gillnet □combined (trammel-gillnet)	Net length (m):
Duration of fishing operation (time of net in the water in hours):	Fishing Depth (min-max):
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IMPORTANCE OF ASSESSING SSFs OPERATIONS

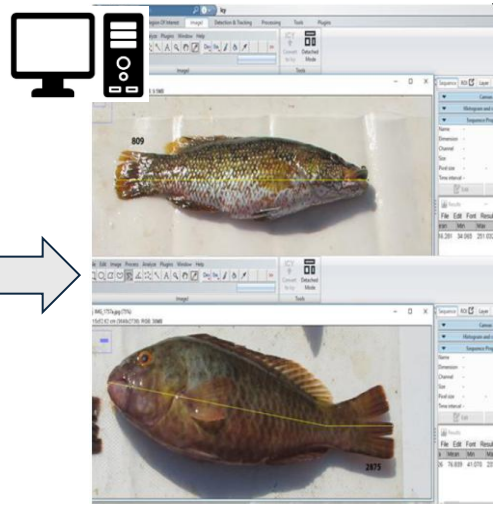
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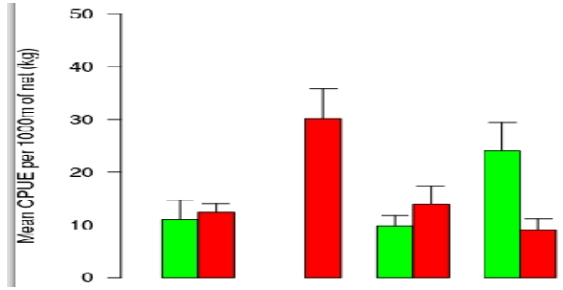
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Catch and Revenues per unit of effort



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Biomass and Economic Value of the catch

compared for catches conducted within the PPAs and Outside

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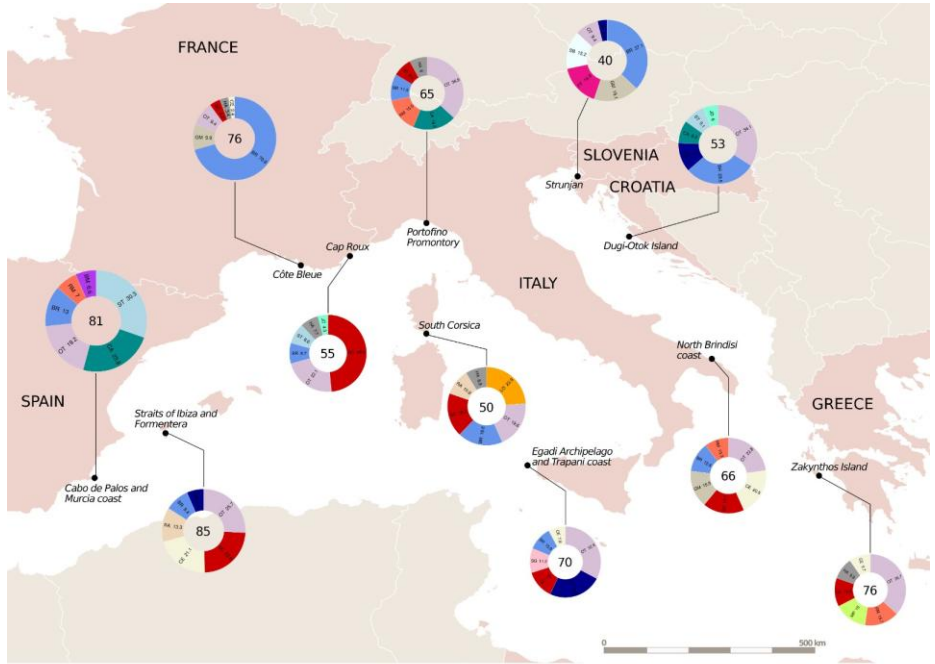
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IMPORTANCE OF ASSESSING SSFs OPERATIONS

A way to understand stocks and livelihoods







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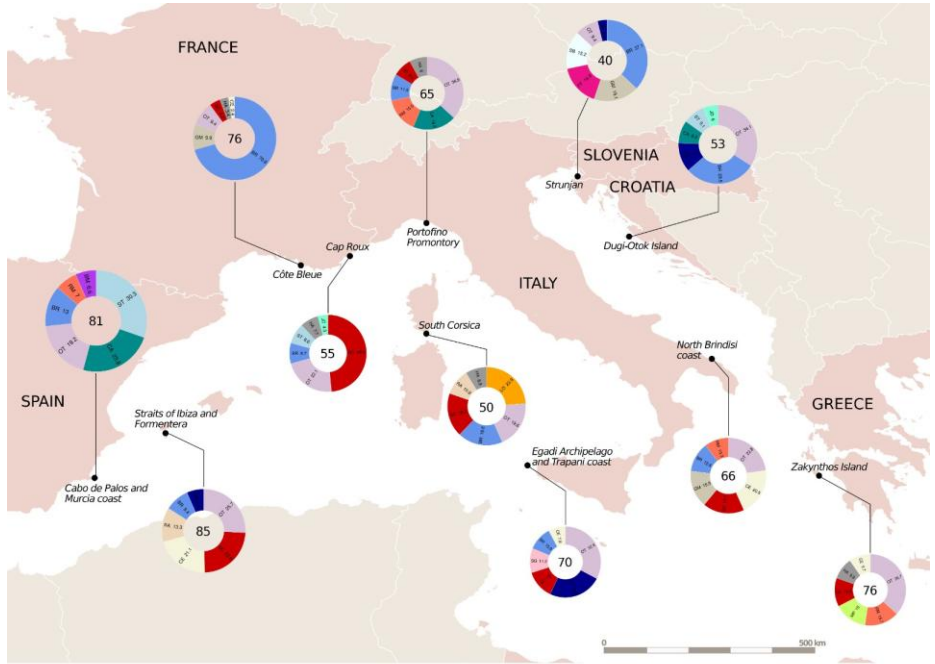
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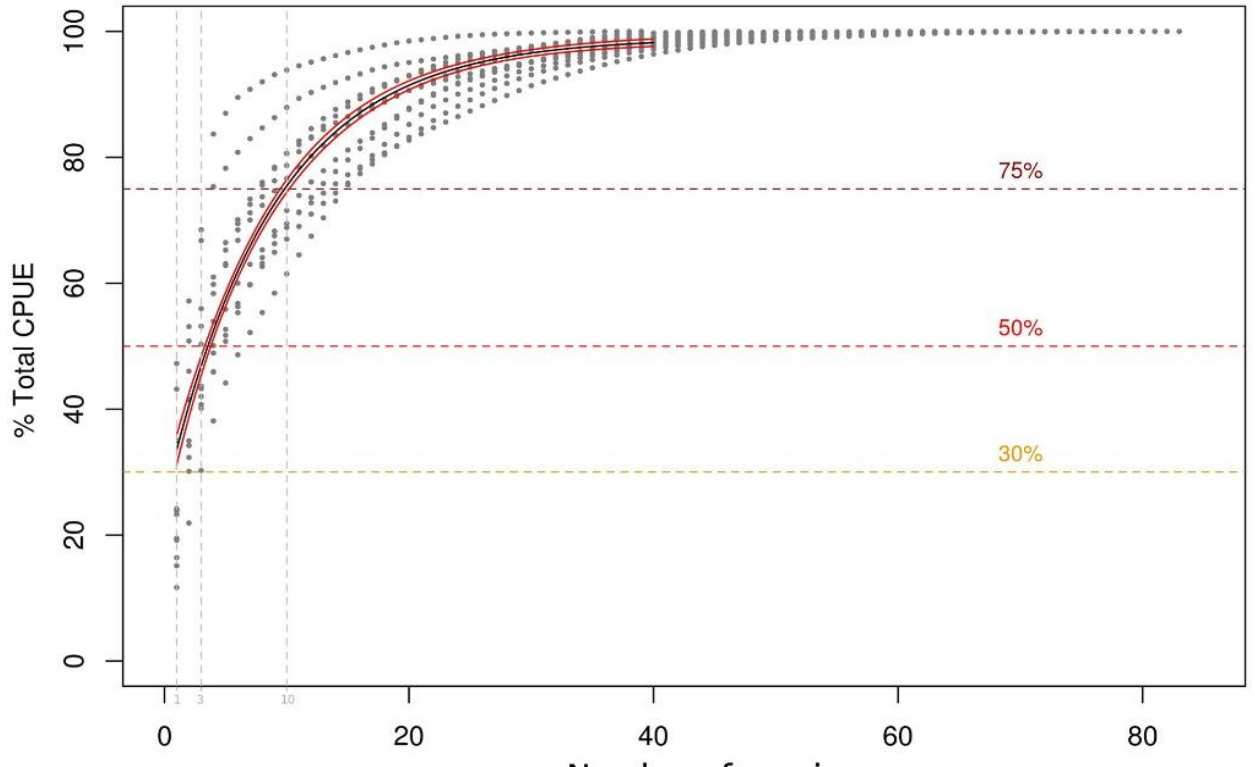
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Catch per unit of effort



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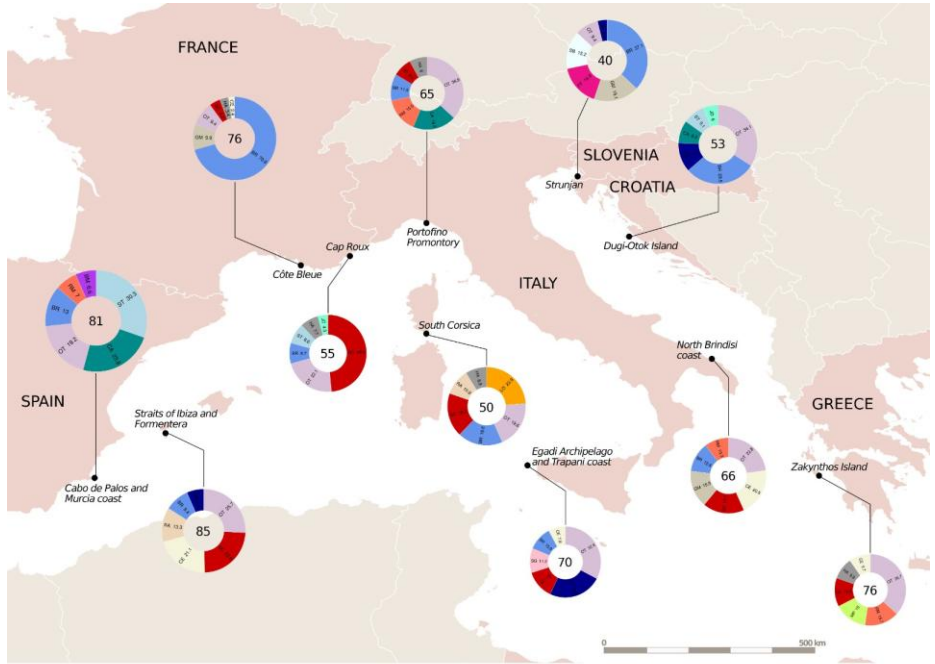
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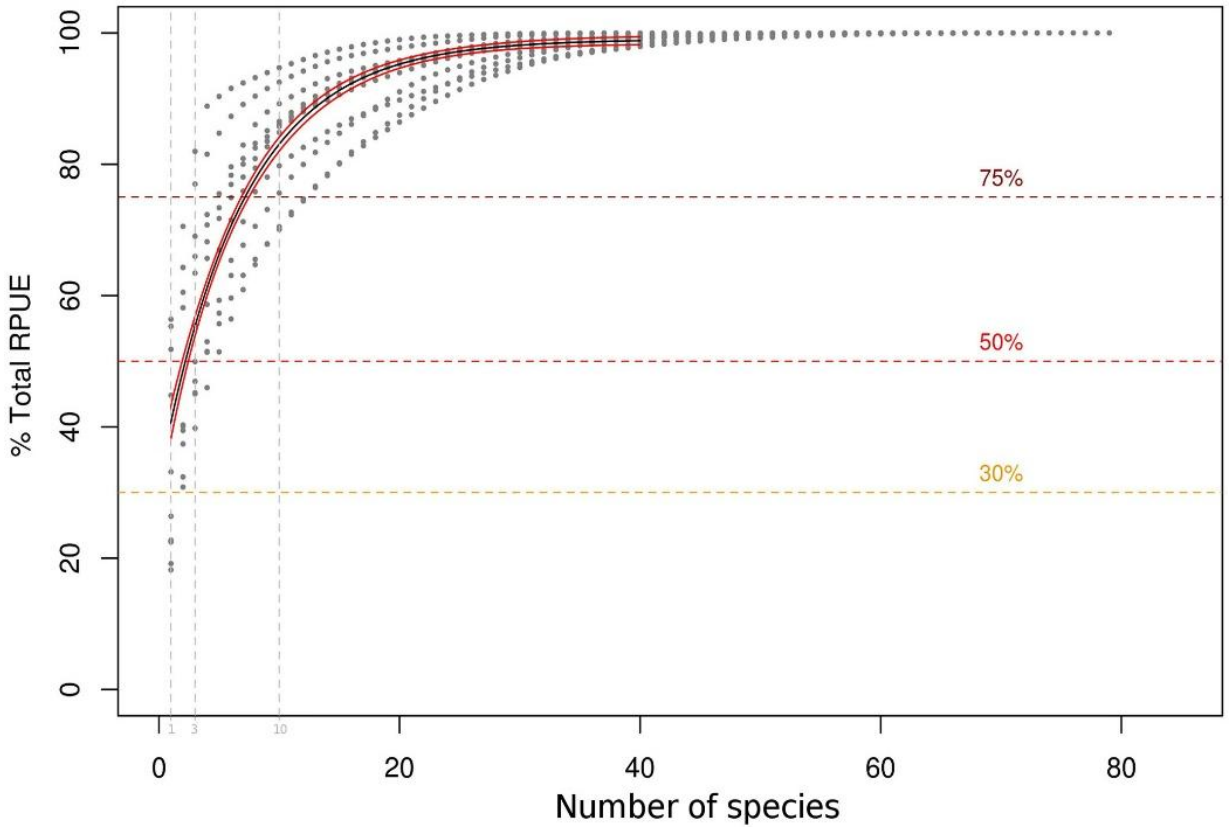
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Revenue per unit of effort



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A way to understand stocks and livelihoods

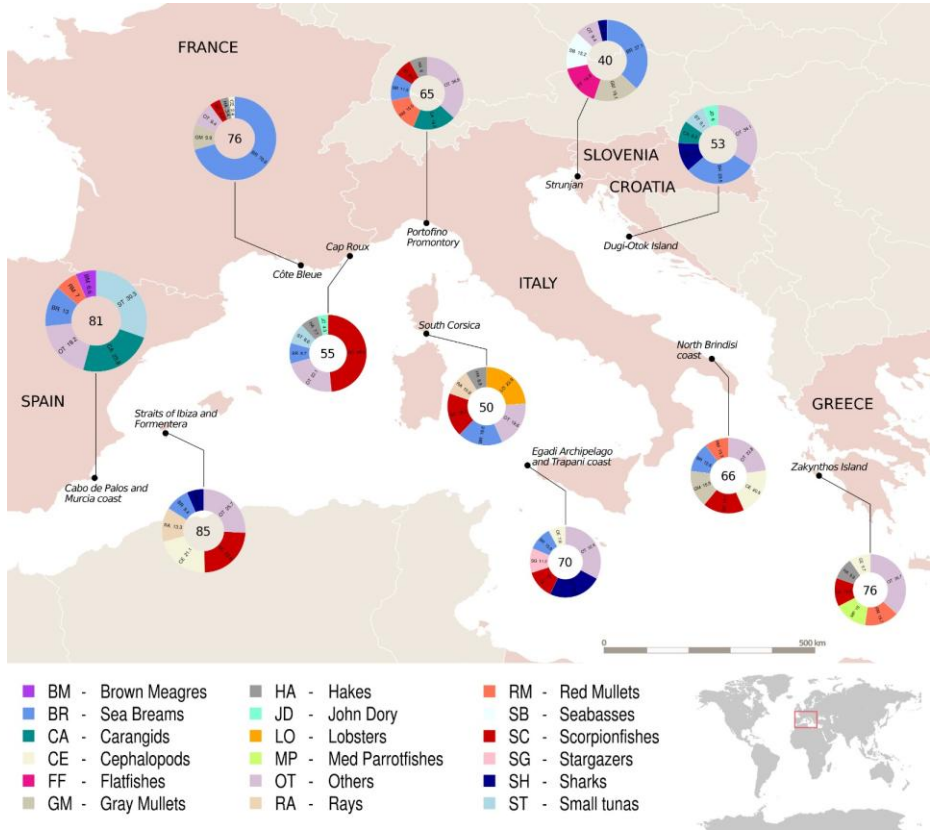


Table 2. Species with Minimum Conservation Reference Size (MCRS, EU 2008) among those recorded in our study. Absolute and relative number of undersized individuals observed in the study, total number of individuals measured and overall mean ± se per each species. Species are ranked from the highest percentage of undersized individuals to the lowest.

Species	MCRS (cm)	Number of undersized individuals	% of undersized individuals	Number of individuals measured	Mean size ± SE (cm)
Epinephelus caninus	45	1	100	1	43.01 ± NA
Pagellus bogaraveo	33	3	100	3	18.08 ± 2.71
Epinephelus costae	45	8	80	10	29.54 ± 2.16
Epinephelus marginatus	45	27	67.5	40	43.58 ± 2.69
Pagellus acarne	17	215	51.19	420	17.24 ± 0.13
Palinurus elephas	9	186	46.38	401	9.39 ± 0.11
Diplodus vulgaris	18	351	35.56	987	19.82 ± 0.14
Diplodus annularis	12	169	29.7	569	13.29 ± 0.1
Diplodus sargus	23	140	28.51	491	25.27 ± 0.2
Lithognathus mormyrus	20	18	26.47	68	23.97 ± 0.66
Pagrus pagrus	18	58	19.4	299	23.76 ± 0.4
Diplodus puntazzo	18	14	13.46	104	24.06 ± 0.56
Pagellus erythrinus	15	108	12.2	885	21.64 ± 0.2
Scomber colias	18	6	6.59	91	34.5 ± 0.85
Euthynnus alletteratus	30	12	4.07	295	41.72 ± 0.39
Sarda sarda	25	2	1.92	104	48.4 ± 0.79
Sparus aurata	20	79	1.85	4265	26.48 ± 0.06
Trachurus trachurus	15	2	1.54	130	25.11 ± 0.44
Scomber scombrus	18	1	0.66	152	28.75 ± 0.33
Mullus surmuletus	11	15	0.3	4966	19.26 ± 0.05
Solea solea	20	1	0.18	562	29.29 ± 0.17
Dicentrarchus labrax	25	0	0	178	37.76 ± 0.4
Merluccius merluccius	20	0	0	573	33.54 ± 0.27
Mugilidae	20	0	0	496	40.15 ± 0.28
Mullus barbatus	11	0	0	169	18.43 ± 0.21
Sardina pilchardus	11	0	0	1	17.99 ± NA
Scomber japonicus	18	0	0	24	30.38 ± 0.96
Trachurus mediterraneus	15	0	0	260	26.48 ± 0.27





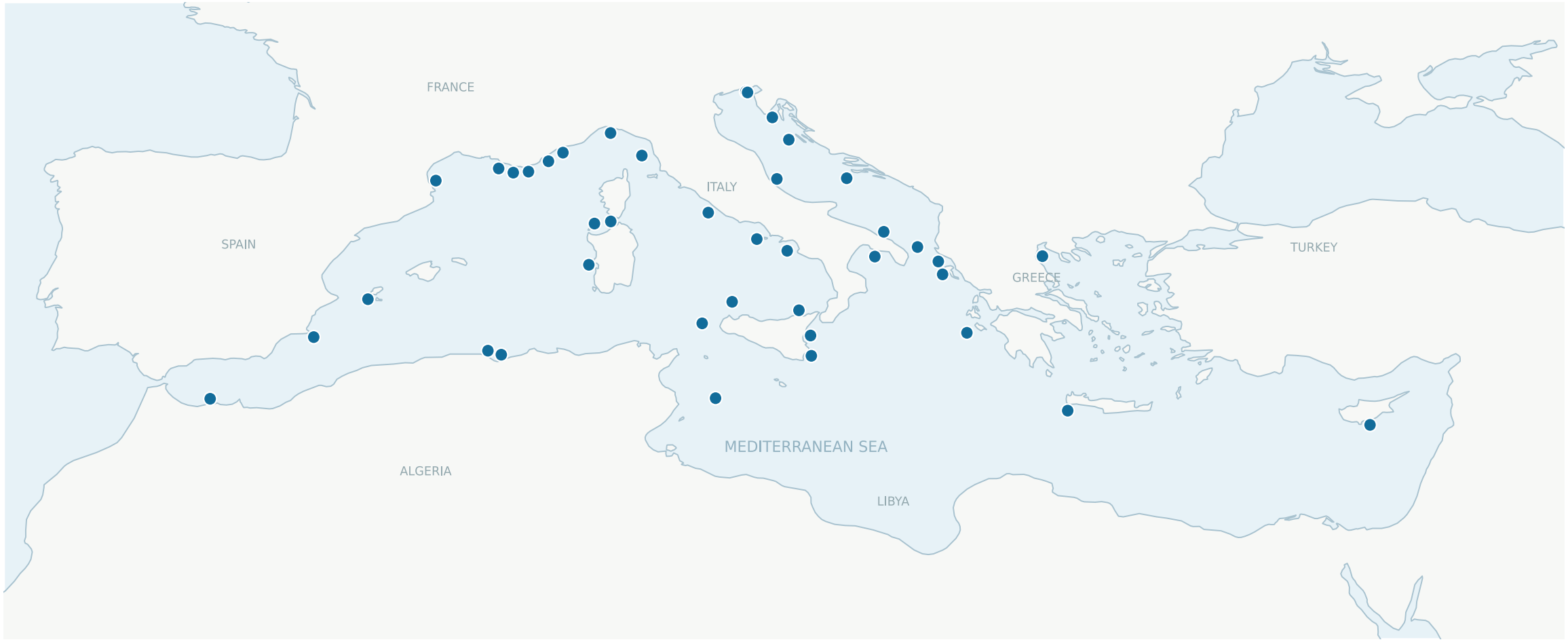
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A LARGE NETWORK OF FISHERS AND MPAs ENGAGED



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More than 40 MPAs have been trained in the last 10 years and many have started SSF monitoring

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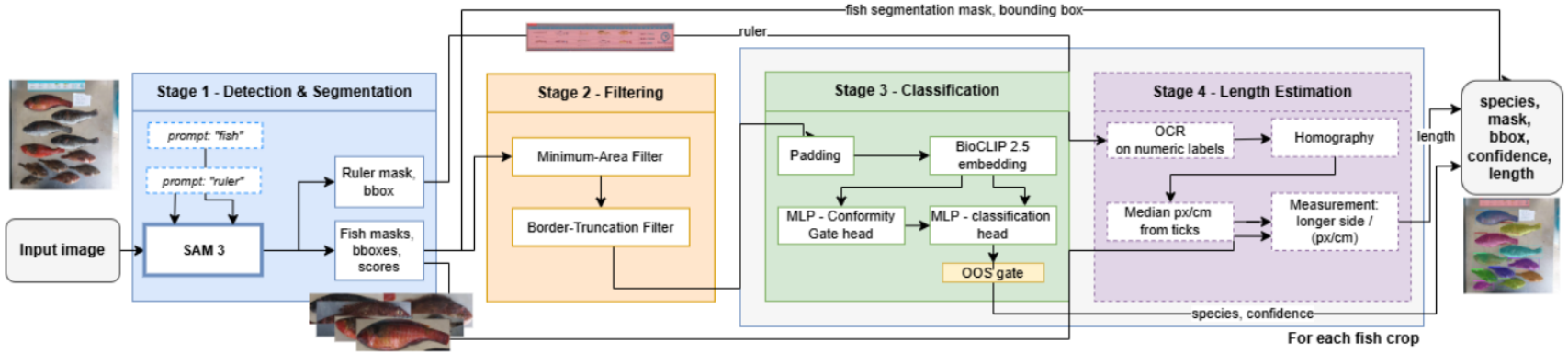
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RECENT ADVANCES IN AUTOMATED AND STANDARDIZED DATA EXTRACTION

A Foundation-Model Pipeline For Low-Shot Fish Catch Species Identification

Alessandro Inguglia[1], Antonio Calò[2,4], Antonio Di Franco[3,4], Federico Quattrocchi[2,4], Carlo Cattano[3,4], Patricia Ventura[5], Gabriele Turco[2,4] Marco Milazzo[2,4]





EyeOnFishCatch (EOFC): modular pipeline based on AI that detects individual fishes in images, identifies the species and measures the length (work in progress)

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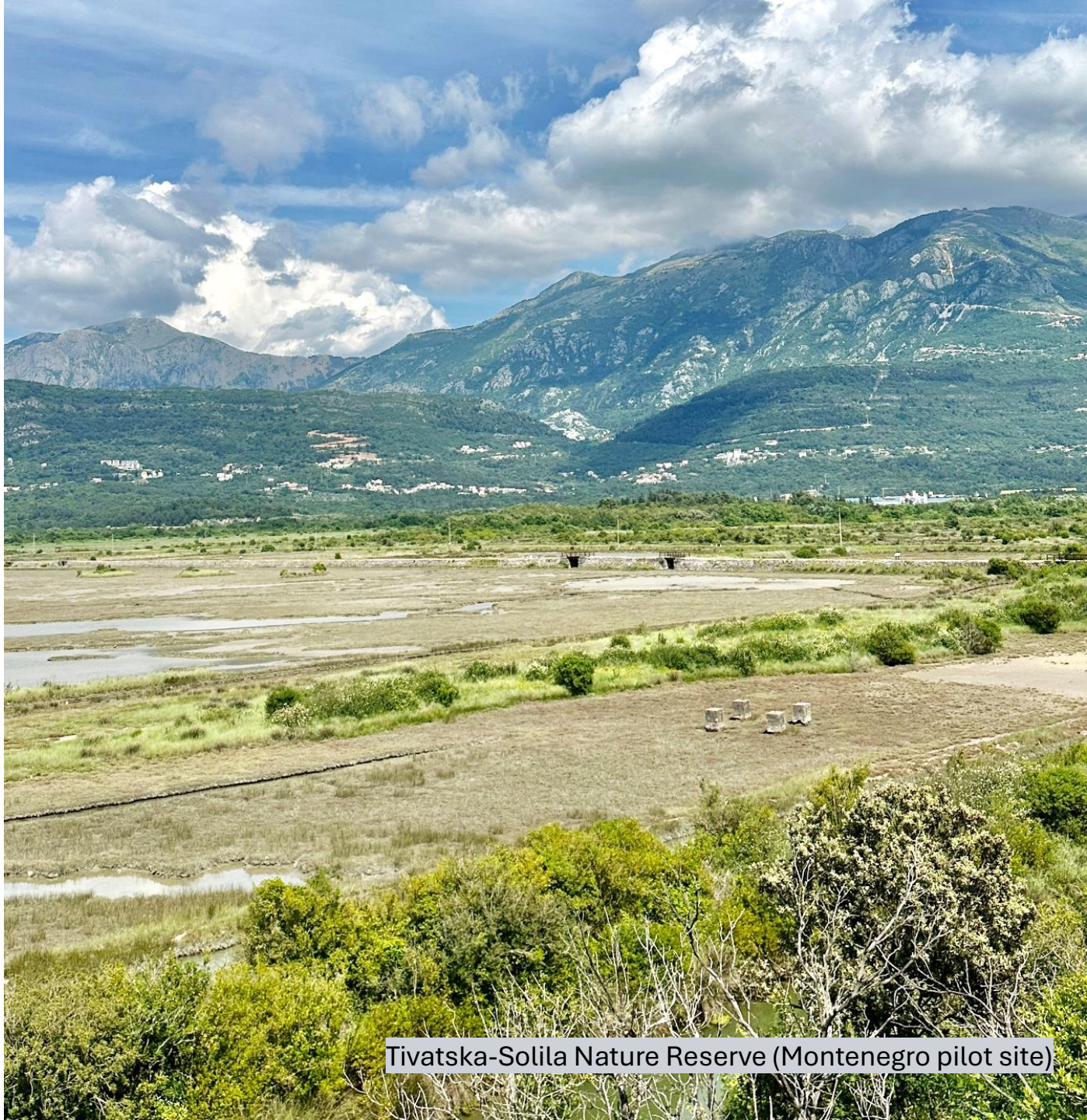
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Tivatska-Solila Nature Reserve (Montenegro pilot site)

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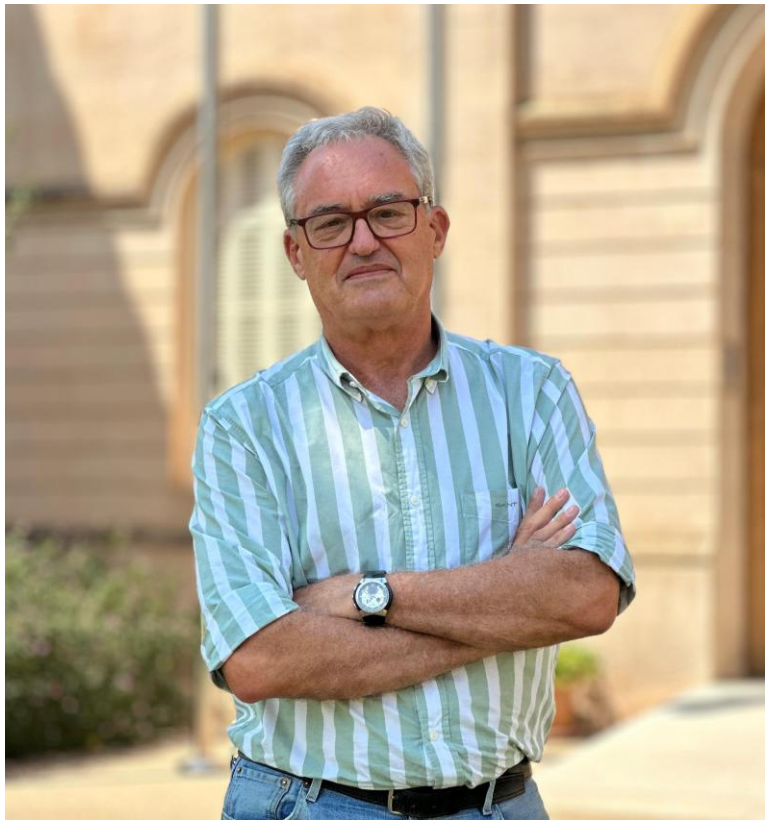
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Experiences Managing Regional Fisheries: Lessons learned in the Balearic Islands

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Antoni M. Grau

General director of Fisheries / Government of the Balearic Islands

Antoni M. Grau is biologist and works in the Balearic G. D. of Fisheries since 1982. Specially interested on the linking between marine ecosystems conservation and fishing activity, he has integrated several research teams concerning: i) artisanal and recreational fisheries management; ii) benthic communities and invasive species; iii) marine reserves. A.M. Grau has published over 200 papers on these subjects, several book chapters and five popularization books

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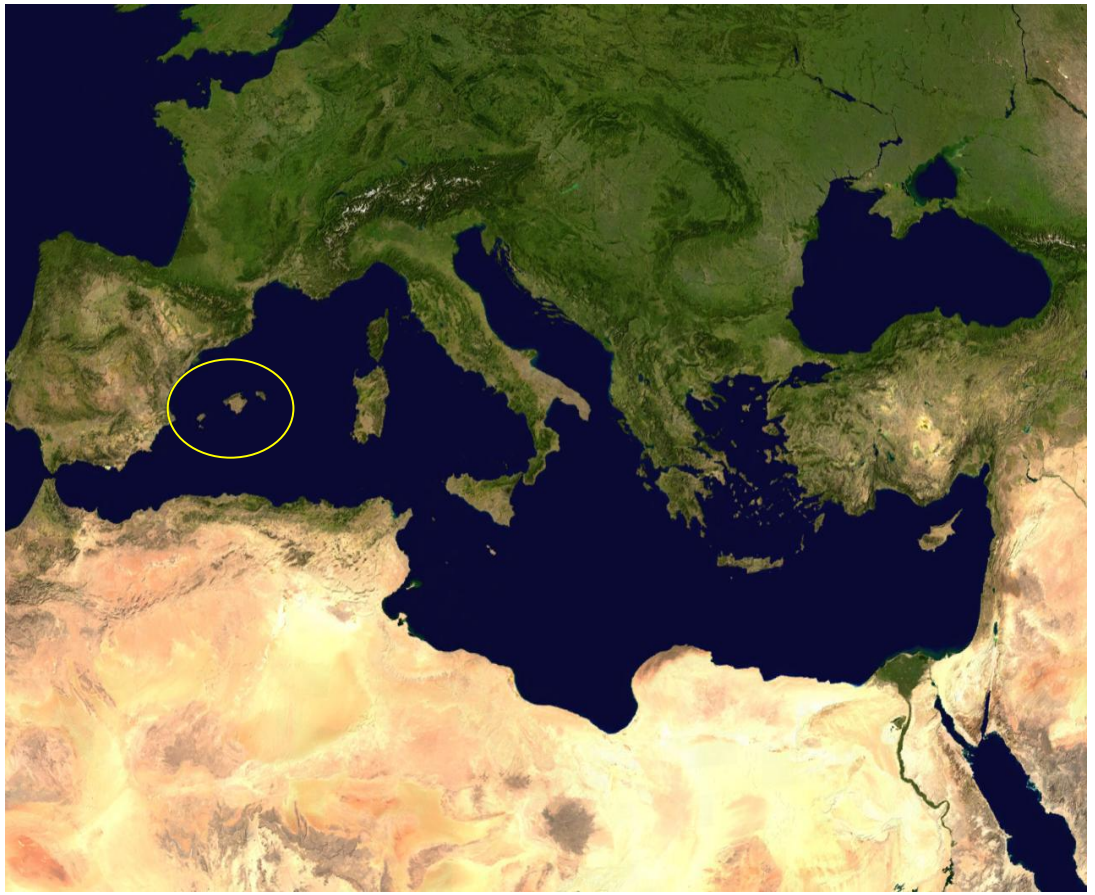
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The Balearic Islands (GSA05), a singular fishing area in the Western Mediterranean

Professional fishing in the Balearic Archipelago has distinctive characteristics:

- Demersal fisheries are independent of those on the mainland
- Fishery resource conservation status better than in neighbouring areas
- 310 professional fishing vessels (280 artisanal)
 2,320 tonnes of professional catch declared (2025)
- Local vessels fish only near the islands, and few foreign vessels fish in the area
- Small vessels (5–25 m)
- Day trips, close to the home port
- Fleet dispersed across small harbours and shelters along 1,428 km of coastline.



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The Balearic Islands (GSA05), a singular fishing area in the Western Mediterranean

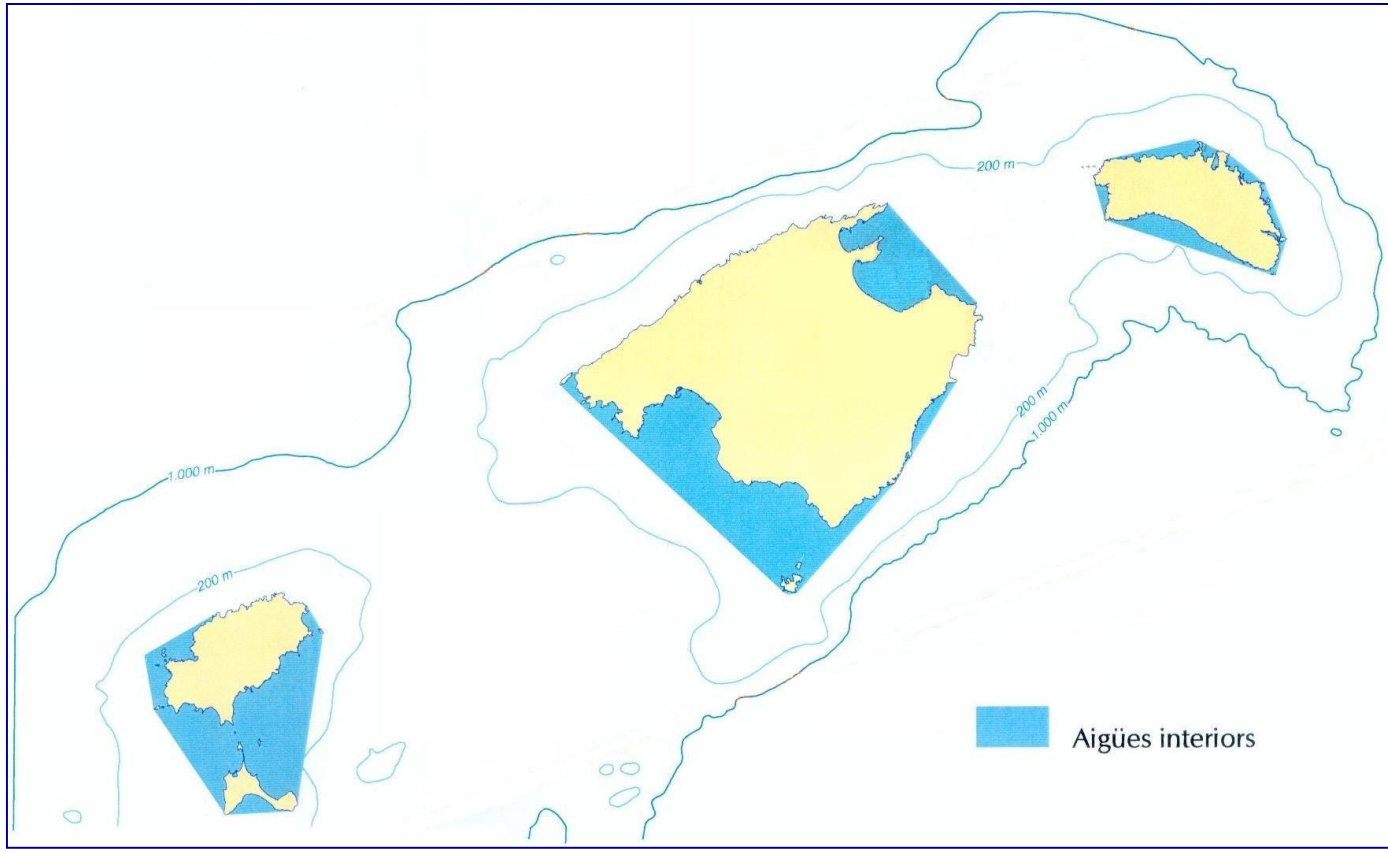
- Trawling accounts for the largest share of the catch; small-scale gear predominates in number of vessels.
- Multi-species fishery, with a wide diversity of commercial species (>120)
- Artisanal: Diverse gear types, with annual rotation based on the biology of target species.
- Spiny lobster in spring-summer, dolphinfish in autumn, cuttle fish or transparent goby in winter



SHORE AND OFFSHORE WATERS

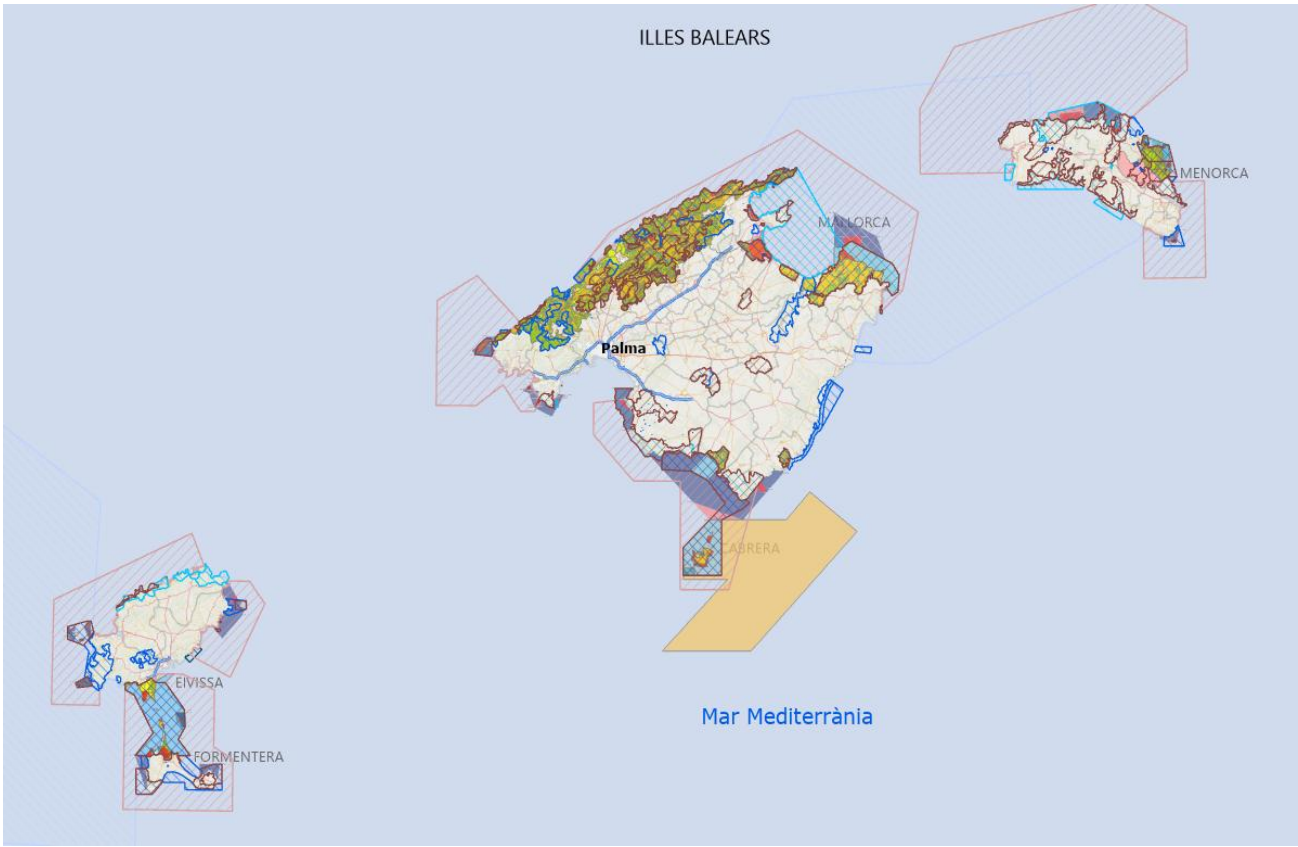
Fisheries management is shared between the national and regional administrations, always subject to the overarching regulatory framework of the European Union

In fact, the regional administration primarily regulates small-scale fishing, while the national administration regulates the other fishing methods.
For the main artisanal fisheries (spiny lobster, dolphinfish), there are specific national regulations for the Balearic Islands



MARINE PROTECTED AREAS

Actually, Balearic Islands have more than 12.000 km^2 of MPA. Of these, 900 km^2 correspond to the Cabrera National Park and 670 km^2 to Marine Fishing Reserves. The rest mostly correspond to the European NATURA 2000 network. However, in this presentation, I will not discuss about fisheries management within MPAs, but rather outside of them



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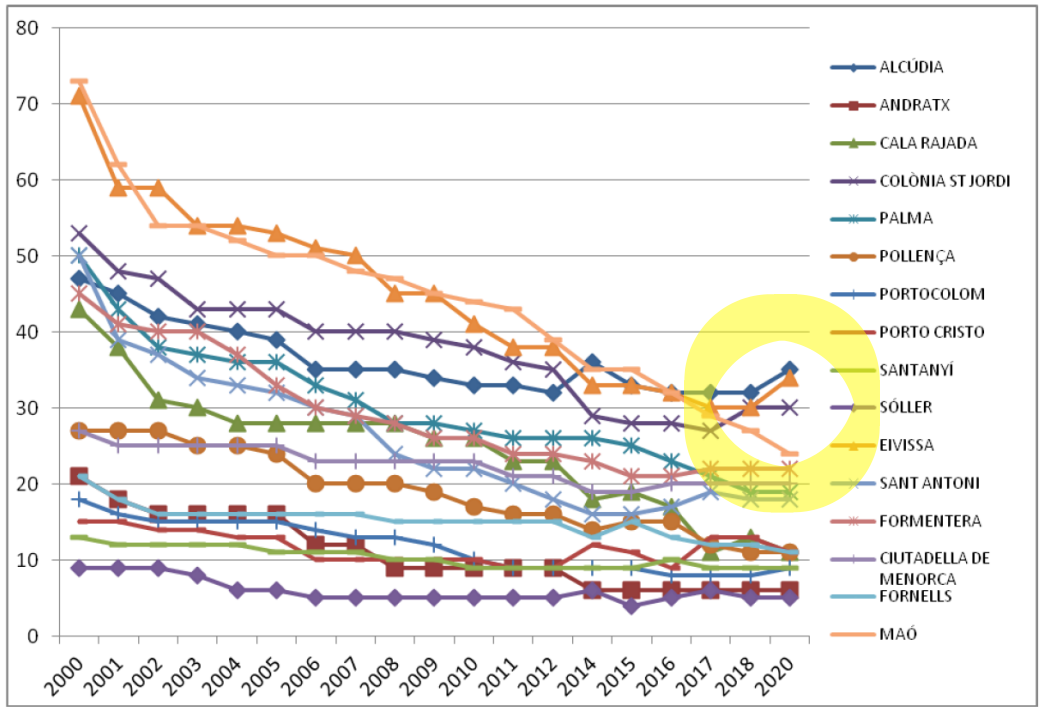
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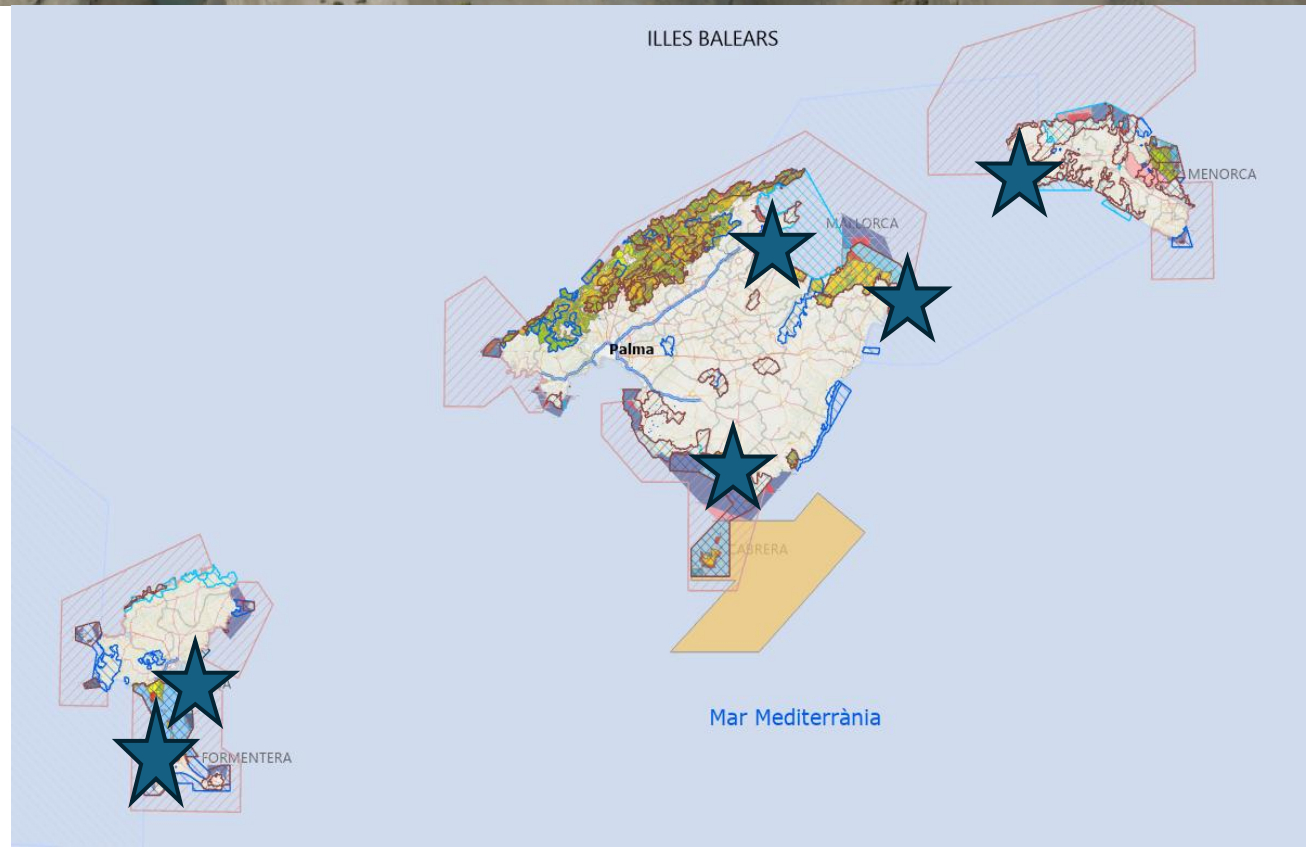
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MARINE PROTECTED AREAS

However, it is worth noting that were there are large well enforced PMAs, the artisanal fleet has stopped shrinking and is even growing.





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COMANAGEMENT

The defining characteristic of artisanal fisheries management in the Balearic Islands is co-management. In addition to the Marine Reserves—each with its own co-management commission—there are four small-scale fisheries (spiny lobster, seine net, the waters of Ibiza and Formentera, and the bays of northern Mallorca) that operate under a co-management model. Co-management entails the participation of the fishermen –alongside the administration, scientists and NGOs- in the decision-making process for fishery management





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THE MANAGEMENT PLAN FOR TRADITIONAL SEINE NET FISHERY





This Plan originated from an EU derogation from the provisions of Regulation (EC) No 1967/2006 regarding minimum distance from the coast and minimum depth

Target species: transparent goby (*Aphia minuta* and *Pseudaphya ferreri*) and picarel (*Spicara smaris*)

Restricted access: Only vessels with recorded historical catches spanning more than 5 years prior to 2012 (44 vessels in 2026)

Technical limitations on vessels and gear

Daily catch quotas per vessel

Five-month season: December to April

Minimum monthly catch threshold per vessel per day

All the vessels have a VMS positioner



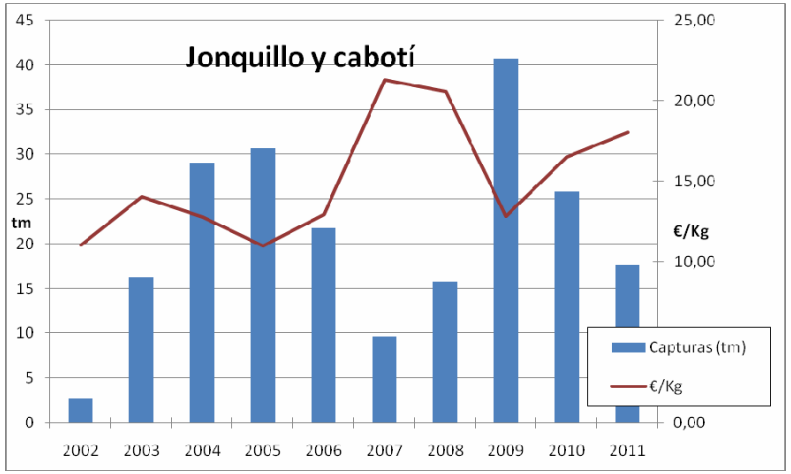
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THE MANAGEMENT PLAN FOR TRADITIONAL SEINE NET FISHERY



During the fishing season, the co-management committee meets monthly to analyze the previous month's catch. If the average daily catch falls below a minimum threshold, measures to reduce fishing effort are implemented—typically eliminating one fishing day per week. If the following month also yields poor results, the fishing season is brought to a close
Mandatory scientific monitoring, including on-board observation



It is important to highlight that the co-management committee is composed primarily of the fishermen themselves, in addition to scientists, the administration, and an NGO (WWF Spain).

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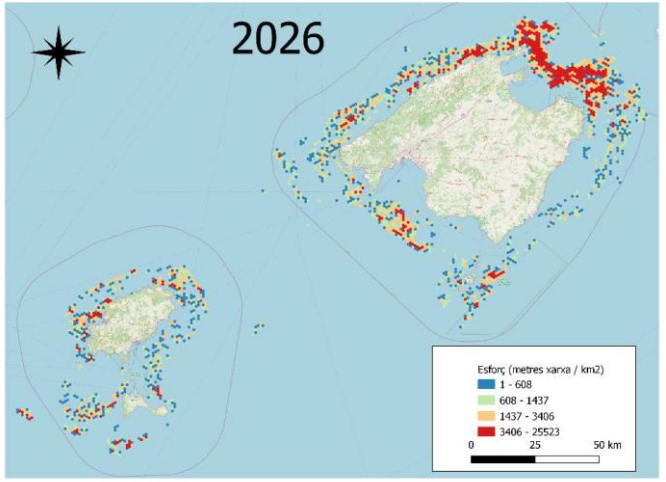
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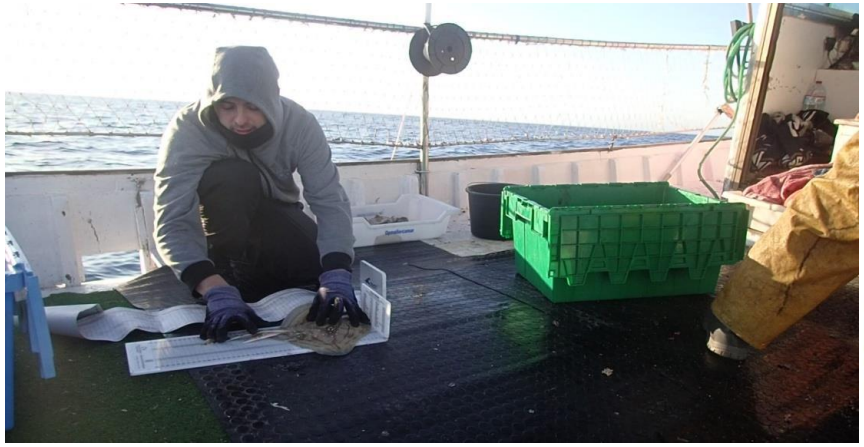
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THE MANAGEMENT PLAN FOR SPINY LOBSTER FISHERY



Spiny lobster (*Palinurus elephas*) fishery has a specific regulation
Five-month season: April to August
Trammel nets with 16 cm mesh size or more.
Total ban on any type of net at depths greater than 60 m in the closed season
nets set for a maximum of 24 hours
All the vessels have a VMS positioner
Mandatory scientific monitoring, including on-board observation
Registry of authorized vessels
End-of-season meeting





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THE MANAGEMENT PLAN FOR SPINY LOBSTER FISHERY

Minimum European size 90 mm (cephalothorax)
Retaining egg-bearing females is prohibited
Mandatory individual marking of the lobsters using plastic cable ties
Each island has marking of a different colour
Fishing is inseparable form marketing: It is essential that the end consumer can be certain they are buying or eating a sustainable local product









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LESSONS LEARNED

CHALLENGES

- How to convince fishermen that scientists, managers and NGOs can help them?
- How to make sustainable fishing profitable?
- How assure consumers that the fish they eat is local, legal and sustainable?

TIPS & LEARNINGS

- **It is essential that fishermen feel part of the decision-making mechanism**
- Fisheries management cannot be based solely on biological calculations regarding reasonable catch levels; it must also take in account the entire underlying social, commercial and cultural framework
- Local artisanal fishing management makes no sense without consumers



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RESULTS

- Co-management plans build relationships of trust among fishers, scientists, and managers: rules are followed, and results improve
- VMS units make it possible to determine the geographical distribution of fishing effort and provide assurance that all vessels complying with regulations.
- Individual markings of fish and lobsters assure the end consumers of the product's local origin and legality. That is why marked fish command a higher price than the rest.
- Lobster catches have increased slightly since the plan began (2022), fishing effort has been reduced by 40%, and the price per kilogram has risen by 30%: everyone –lobsters, the seabed, and fishermen – has benefited



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Gökova Bay

Fish come back when fishers lead: community-based protection for sustainable small-scale fisheries

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Zafer Kızılkaya

President, Mediterranean Conservation Society

(Akdeniz Koruma Derneği)

Underwater photographer and marine conservationist. Has worked with Gökova's small-scale fishers since the no-fishing zones were designed in 2009–2010, founded the Mediterranean Conservation Society in 2012 and set up Türkiye's first marine ranger system in 2013. Goldman Environmental Prize, 2013.

AKDENİZ KORUMA DERNEĞİ
Mediterranean Conservation Society

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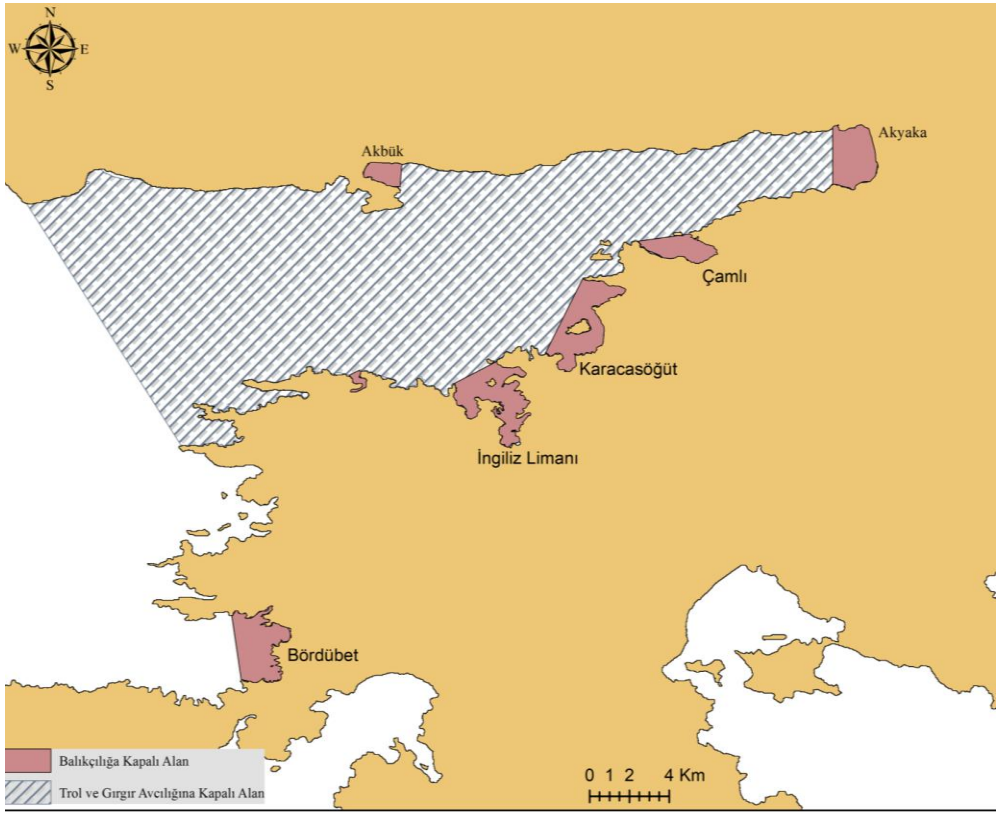
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BALANCING FISHING AND PROTECTION IN GÖKOVA BAY

Context and challenges

- **Where?** Gökova Bay, southern Aegean (Muğla), a ~100 km long bay and Special Environmental Protection Area.
- **What?** Home to ~73% of Türkiye's fish species, Posidonia seagrass meadows, monk seals, sandbar sharks and dusky grouper.
- **Why?** Decades of overfishing, illegal trawling and spearfishing emptied the reefs; small-scale fishers' catches and incomes collapsed.
- **Response:** 6 no-fishing zones (~24 km^2) and 300 km^2 No Industrial Fishing Zones designated with the fishers on 10 July 2010 (Official Gazette No. 27637).



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PRESENTATION OF THE STRATEGY IMPLEMENTED

Protect, enforce, and make it pay

- **Co-designed no-fishing zones** with fishers, cooperatives and the Ministry.
- **Marine rangers** recruited from local small-scale fishers patrol daily, record with SMART and report to the Coast Guard and Ministry.
- **Clean-up** of lost and discarded fishing gear from reefs and seagrass.
- **Invasive species to market:** buying lionfish and rabbitfish from small-scale fishers and selling them to restaurants.



Without enforcement, bottom trawlers come back to the bay.

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INVASIVE SPECIES VALORISATION

20 tons of invasive species sold in the last four years

- **Why:** warming seas help Red Sea species such as lionfish, rabbitfish, squirrelfish and pufferfish spread across our reefs.
- **Valorisation:** we buy invasive catch from small-scale fishers, who record every catch by species in daily logbooks.
- **Promotion:** chef events and new menus; restaurants ordering lionfish rose from 4 to 27 (2020–2023).
- **Mitigation:** fishing pressure on invasives eases their impact on native species.
- **Challenge:** supply is still the big problem while demand keeps growing.







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AVAILABLE RESOURCES

Who? How? What?

- **Who:** Mediterranean Conservation Foundation team, marine rangers from local fishing families, fishing cooperatives, Coast Guard and Ministry of Agriculture and Forestry, scientists.
- **How:** ranger boats, GPS-based SMART patrol monitoring, underwater fish surveys inside and outside the zones.
- **What:** long-term funding from donors such as the MedFund, Whitley Fund for Nature and Becht Foundation.



Small-scale fishers in Gökova Bay.

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RESULTS

10×

fish biomass inside some no-fishing zones vs outside

400%

increase in local fishers' income

↓

illegal fishing incidents in the zones

- **Biggest success:** bottom trawling stopped in the bay.
- **Spillover:** bigger fish and more of them are caught around the zones.
- Grouper, monk seals and sandbar sharks are back; local restaurants are full of local species.
- **Setback:** opening some zones to amateur fishing in 2019 stalled biomass growth.



Local species on a Gökova restaurant counter.

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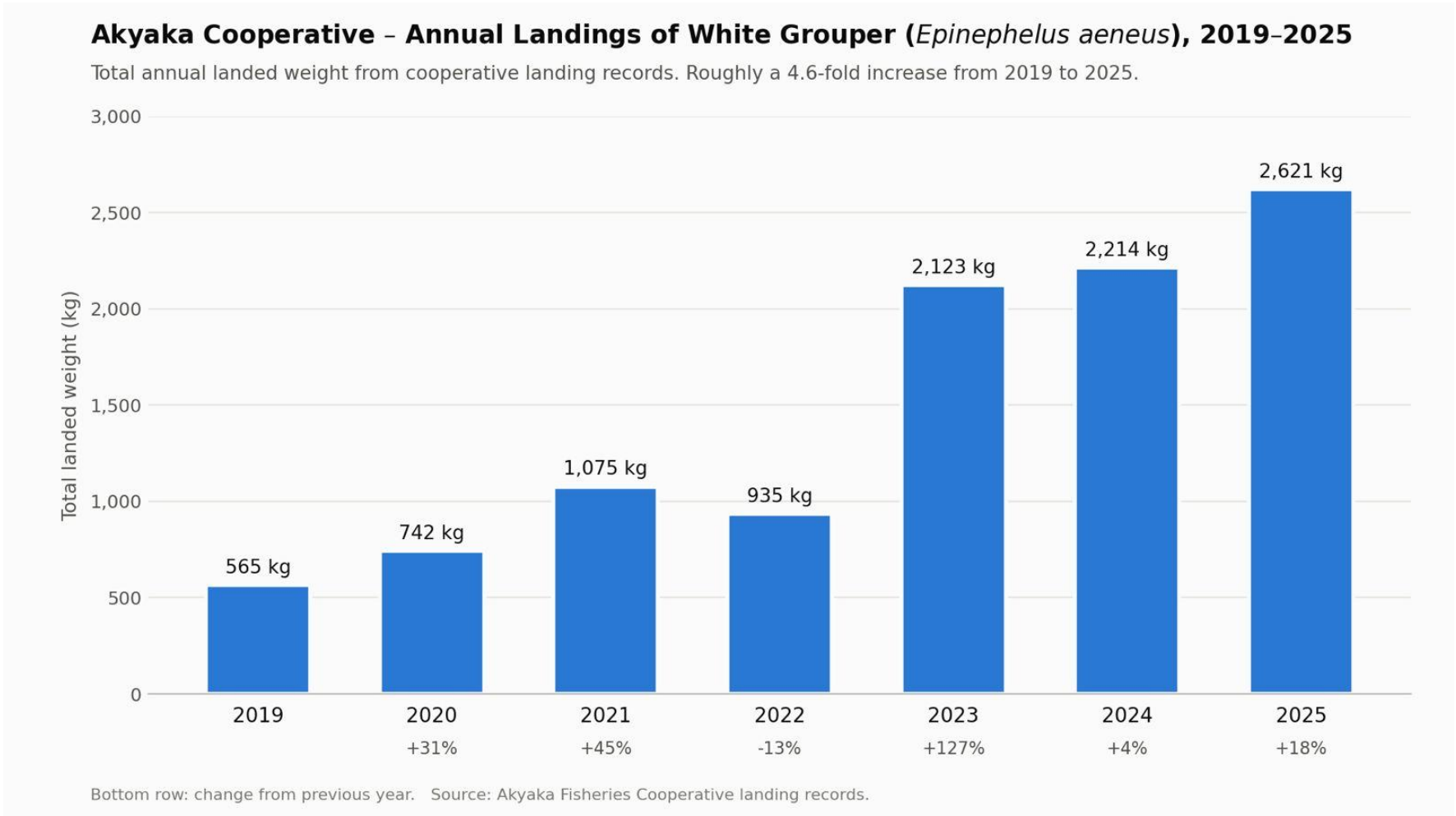
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Back Bone of Gökova Fishery:
White Grouper,
Ephinephelus aenus

Serious increase in landing values of white grouper in between 2019 and 2025.



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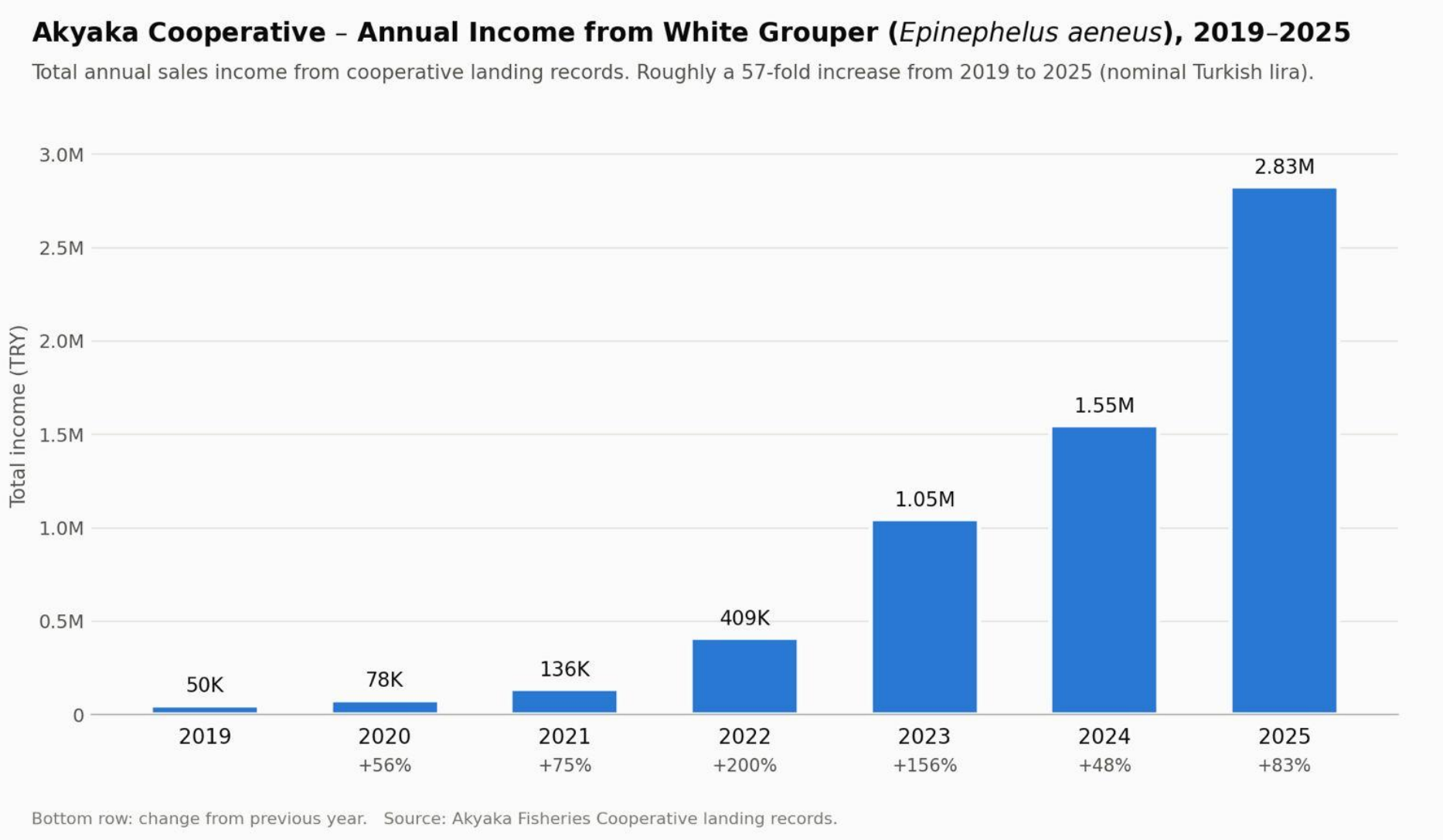
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Income increase coming with *E. aenus*



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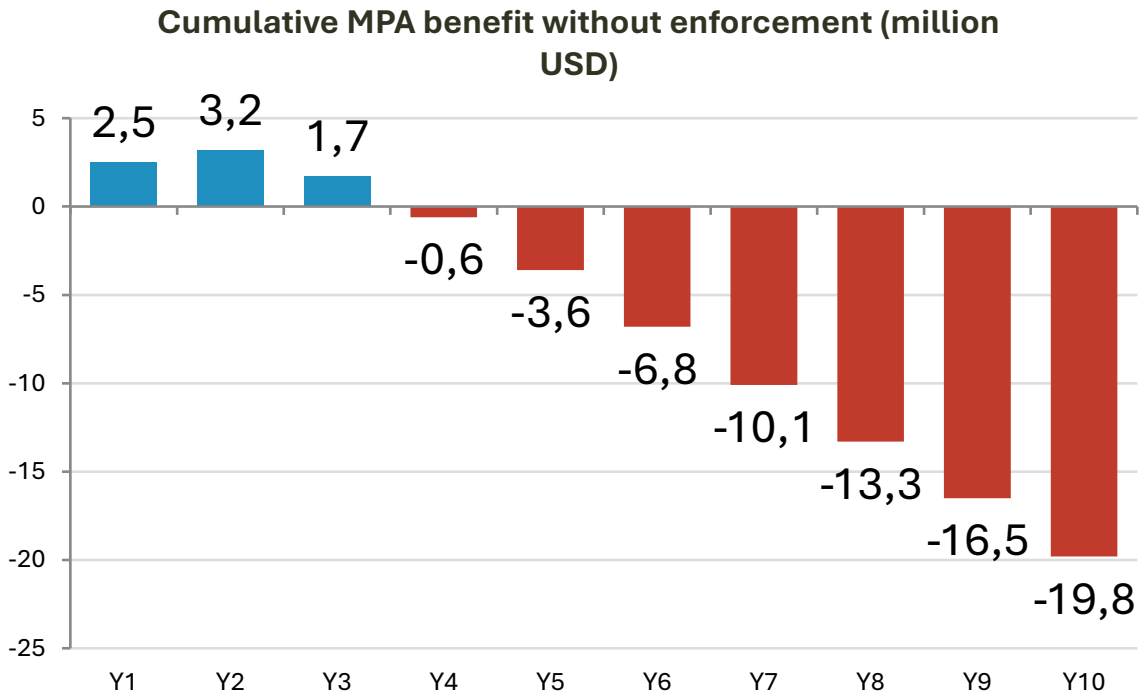
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IF ENFORCEMENT STOPS

A potential loss of USD 20 million in 10 years

- Illegal commercial vessels, including bottom trawlers, would come back to the bay.
- **Years 1–3:** illegal fishing briefly raises harvests and short-term value.
- **After year 3:** fish stocks decline, catches and long-term benefits drop.
- **Result:** about USD 20 million lost over ten years compared with continued enforcement; decades of recovery unravel.



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LESSONS LEARNED

ENFORCEMENT – CHALLENGES

- Zones on paper are not enough
- Without patrols, bottom trawlers return
- Coast Guard cannot be everywhere

ENFORCEMENT – TIPS

- Hire rangers from local fishing families
- Record with SMART, report to authorities
- Keep enforcement funded long term

LIVELIHOODS – CHALLENGES

- Fishers fear losing fishing grounds
- Invasive species had no market
- Pressure to reopen zones

LIVELIHOODS – TIPS

- Co-design zones and share spillover data
- Buy invasives from small-scale fishers
- Reward good operators with certification

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Ephinephelus aenus in Akyaka Fishery Cooperative

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Q&A Session



Ain Wadi Kaam (Libyan pilot site)

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See you next week !

Thursday, October 1st
2.30 pm (UTC+2)

Episod 1 : Introduction to the concept of sustainable economy and territorial approach

Thursday, October 8th
2.30 pm (UTC+2)

Episod 2 : Sustainable fishing

Thursday, October 15th
2.30 pm (UTC+2)

Episod 3 : Sustainable Agriculture

Thursday, October 22th
2.30 pm (UTC+2)

Episod 4 : Sustainable Tourism

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