STUDY FOR THE PROTECTION OF MARINE RESOURCES AND FISHERIES AND AQUACULTURE ACTIVITIES OF THE MOLISE REGION (WP 3.2)

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Report	**STUDY FOR THE PROTECTION OF MARINE RESOURCES AND FISHERIES AND AQUACULTURE ACTIVITIES OF THE MOLISE REGION**
Description	Proposal for the institution of a FRA along the north coast of Molise Region
Version	V.0 Draft
Author	Agriconsulting-RG

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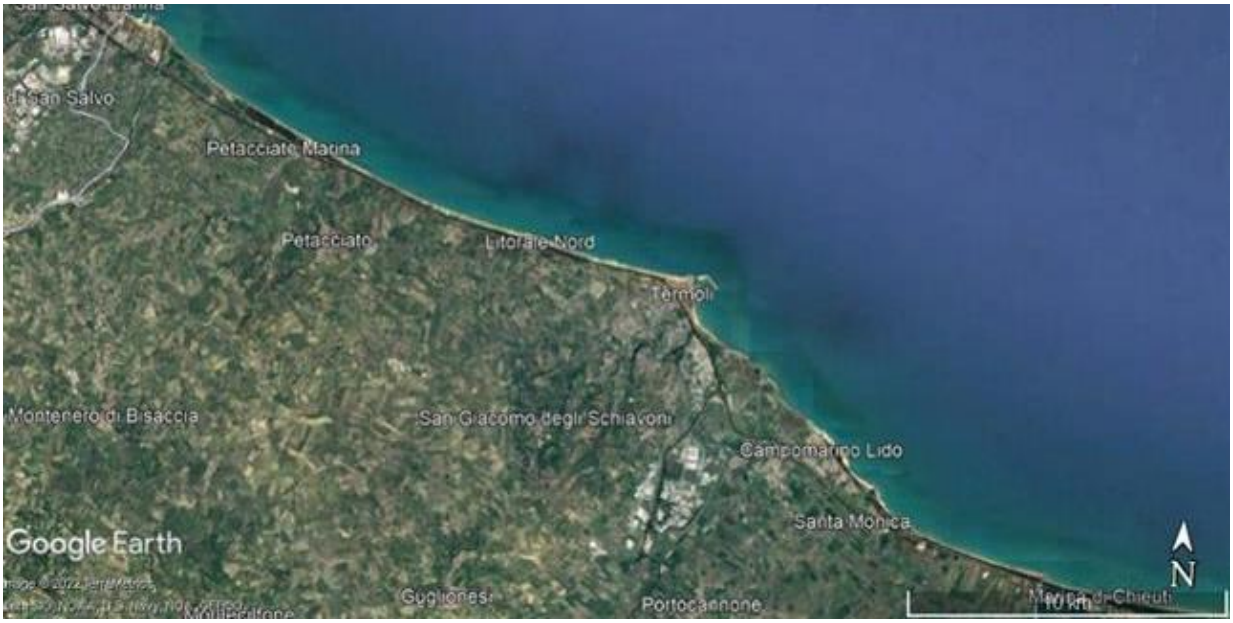


Molise Coastline

Note on the current version of the document:

The initial draft of this document was submitted to the Molise Region on November 7th, 2022, and subsequently revised based on input received from stakeholders during a meeting held on December 12th, 2022. The revisions reflected the points of consensus reached during the meeting.

The partial acceptance of the proposal resulting from the study by the stakeholders allowed for the development of guidelines to establish a protected area for demersal species that could also have a touristic value. This represents a modest but important step towards the responsible management of Molise's marine resources.

INTRODUCTION

The ARGOS project, acronym for "ShaARed GOvernance of Sustainable fisheries and Aquaculture activities as leverage to protect marine resource in the Adriatic Sea", was approved by Decree no. 97 of the Director of the Italy-Croatia Management Authority Organizational Unit of 29 April 2020 and started in August 2020.

The project, funded by the Interreg Italy – Croatia Programme, pursues both regional, national and supranational strategic objectives. The project involves 16 Partners:

LP - Regione Autonoma Friuli Venezia Giulia (IT) which has been entrusted with the role of Lead Partner of the project;
PP1 - Veneto Region (IT);
PP2 - Emilia Romagna Region (IT);
PP3 - Marche Region (IT);
PP4 - Molise Region (IT);
PP5 - Puglia Region (IT);
PP6 - Istrian County (HR);
PP7 - Coastal Montana County (HR);
PP8 - Zadar County (HR);
PP9 - Development Agency of Šibenik County – Knin;
PP10 - Development Agency of Split County – RERA;
PP11 - Dubrovnik-Neretva County (HR);
PP12 - National Research Council CNR -IRBIM(IT);
PP13 - Institute for Oceanography and Fisheries IOF (HR);
PP14 - Ministry of Agricultural, Food, Forestry and Tourism Policies (IT);
PP15 - Ministry of Agriculture of Croatia (HR).

ARGOS aims to establish a shared governance of sustainable fishing and aquaculture activities as a lever to protect marine resources in the Adriatic Sea. The project has three specific objectives:

1) Establish and encourage a coordinated common framework and strengthen institutional dialogue for sustainable and shared management of Adriatic marine resources, bringing together Adriatic institutions dealing with fishing and aquaculture and ARGOS partners through the Adriatic Consultative Committee (CAA).

2) Protect Adriatic fishery resources according to shared decision-making processes with the best available know-how.

3) Improvement of fishing techniques oriented towards environmental sustainability.

Actions to be implemented include the creation of a common and shared regulatory framework for the management of fishing and aquaculture, networking of key stakeholders by comparing and integrating existing data base and establishing cross-border cooperation as a framework for training and education activities for fishing and aquaculture operators.

The ARGOS project is structured into five work packages (WPs), of which the first (WP1) concerns project management, WP2 concerns communication activities, while the other WPs concern the more operational actions of the project:

WP3 - The governance framework: the Adriatic scientific panel and assessments on the exploitation of fish stocks;

WP4 - Collection and analysis of biological and socio-economic data;

WP5 - Pilot actions (Transboundary network for sharing and implementing sustainable fishing and aquaculture practices).

In this context, the Molise Region, through a public tender procedure, entrusted Agriconsulting S.p.A with the activities related to WP3, which include:

- Participation in the work of the consultative body called Adriatic Advisory Committee (AAC) (ACTIVITY 3.1: Establishment and functioning of the governance framework) in order to participate in any technical proposals (common measures, protocols) and governance (plans, recommendations), approving coordinated interventions and shared measures for the protection of marine species and habitats.
- The preparation of a study concerning the planning of the coastal area in the Adriatic Project area of the Molise Region (ACTIVITY 3.2: Maritime Spatial Planning assessments).
- The technical-scientific manager of the activities carried out by Agriconsulting is Dr. Riccardo Germano who, in this role, has participated and is participating in the meetings envisaged within activity 3.1 (see logbook; chapter 5 of this report).

As for Activity 3.2, this involves the realization of a study aimed, in particular, at deepening the theme of existing synergies and potential integrations, as well as competition in the use of maritime space in the Molise Region. The study aims to propose a management plan that can gradually ensure future sustainability for fishing and aquaculture activities in the maritime compartment in front of the Molise Region. The results of the study conducted are presented in the following chapters.

CHAPTER 1: OBJECTIVES AND AIMS OF THE STUDY

The main objective of the study is to provide technical and scientific elements, based on the analysis of socioeconomic and environmental data, also using sectoral studies and research, regarding the current use of the maritime space of the Molise Region and its development potential from a perspective of greater environmental, economic and social sustainability. These three aspects together represent the three pillars of sustainability in its definition of "condition whereby the present generation meets its needs without compromising the ability of future generations to meet their own needs."

From an economic perspective, to obtain profit, the commercial value of the extracted or produced resource must exceed the costs of the activity. Actions to increase economic sustainability in the fishing sector can therefore be directed at reducing the costs of the activity (e.g. through the adoption of equipment and machinery that can guarantee energy savings) and/or increasing the commercial value of the catch.

Observation of the fishery products market shows that many species achieve higher prices when they are larger. The quality of the catch is also influenced by its characteristic of being a "easily perishable product" with short conservation times (shelf-life) compared to those of other animal-derived foods. Studies on shelf-life have shown that the fishing equipment used affects the quality and commercial lifespan of the catch, reaching its peak in fishing with the hook and traps (which therefore retains its quality and lasts longer) mainly because the catch is in a better state and has not suffered pressure damage (as in the case of drag nets) and/or abrasion and constriction (as in the case of post nets).

Starting from these economic considerations, it is possible to study solutions that can improve the quality of the catch with obvious repercussions on the other components of sustainability (environmental and social). For example, the definition of safeguard and growth zones for fishery resources and the subsequent experimentation in such zones of fishing activities that involve the use of less impactful and more selective systems regarding the size of the catch can have positive repercussions on the economic sustainability of fishing activities practiced in the Molise Region. Indeed, for some of the high-value commercial species present in the area (European hake "Merluccius merluccius", red mullet "Mullus barbatus", mantis shrimp "Squilla mantis"), achieving larger sizes is relatively quick and advantageous, increasing both the weight of the specimen and the market price.

CHAPTER 2: SOURCES AND METHODS

The results presented in this study are based on the analysis of:

- Statistical data from official sources;
- Studies and research in the literature;
- Interviews with experts;
- Collection of stakeholders' testimonies;
- Comparison with other project partners.

Below, for the different aspects investigated in the project (socioeconomic, environmental, etc.), some of the main sources used for the conduct of this study are reported.

Data	Reference sources
Socioeconomic	1 - **Movimprese** (data updated to 12-31- 2021) 2 - ISPRA **Annuario ambientale 2019 SWOT (tabs.13 and 15)**
Environment	1 - ISPRA Environmental yearbook 2019 - **Rete natura 2000, Ramsar, AA.MM.PP.** 2 - Molise Region - **www.regione.molise.it-Rete Natura 2000** 3 – National Rural Network **www.reterurale.it/atlante/molise/** (caire_molise_5 (reterurale.it) 4 - Geoportal of the data collected by ISMAR in the Adriatic Sea: **Geologia di superficie:** http://gismargrey.bo.ismar.cnr.it:8080/mokaApp/apps/ismarBoApp/index.html 5 – ISPRA - CARG map: **Pozzi, campioni geologici e linee sismiche:** http://www.isprambiente.gov.it/Media/carg/index_marine.html 6 - EMODnet portal: https://emodnet.ec.europa.eu/geoviewer/#!/
Climate changes	1- ISMAR (cnr.it) 22 Aprile 2022 **La resilienza degli ecosistemi dell'adriatico e l'impatto dell'attività umana sulle aree costiere** 2 - De Falco G.: **Mappa delle spiagge del Molise e definizione del limite di retrospiaggia sulla base dei dati del SIGC (Sistema Informativo Geografico Costiero)** 3 - Angela Barbano: **Rapporto ISPRA sul Dissesto Idrogeologico in Italia** - Ed. 2021 Roma, 7 Marzo 2022 www.isprambiente.gov.it/files2022/notizie/ab_erosione-costiera-rapdis2021-07-03-2022.pdf 4 - Carmen M. Rosskopf: **Il monitoraggio della costa molisana in relazione alle sue tendenze evolutive e alla sua dinamica attuale**.,

Data	Reference sources
	in: Convegno interno del progetto LITTORISK – Termoli 20 ottobre 2006, Università degli Studi del Molise – Dipartimento S.T.A.T. 5 - G. De Lisio1 , F. Ortolani1 , S. Pagliuca : **Erosione costiera nell'area di foce del fiume Biferno (Molise) ed impatto ambientale dell'evento alluvionale del gennaio 2003-** fortolan@ unina.it, S.Pagliuca@ispaim.na.cnr.it 6 - C.F. Izzi, S. Del Vecchio, A. Acosta : **Distribuzione delle specie rare e vulnerabili sulle coste dunali tirreniche del Lazio** Biology Department, Università degli Studi di Roma Tre
Fishery management	1 - Bastardie F., Angelini S., Bolognini L., Fuga F., Manfredi C., Martinelli M., Nielsen J. R., Santojanni A., Scarcella G., and Grati F., (2017). **Spatial planning for fisheries in the Northern Adriatic: working toward viable and sustainable fishing**. Ecosphere 8(2): e01696. 10.1002/ecs2.1696. 2 - Recommendation GFCM/43/2019/5 on a **multiannual management plan for sustainable demersal fisheries in the Adriatic Sea** (geographical subareas 17 and 18c 3 - Recommendation GFCM/44/2021/1 on the **establishment of a fishing effort regime for key demersal stocks in the Adriatic Sea** (geographical subareas 17 and 18 4 -Resolution GFCM/44/2021/3 on a **roadmap for the establishment of a fisheries restricted area in the southern Adriatic Sea** (geographical subarea 18) 5 - Martina Bocci, Emiliano Ramieri, Marina Marković : **Pan Adriatic Scope/ Adriatic Ionian Cooperation towards MSP,** 6 - CAMP Project Italy, Final report - **Programma di Gestione delle Aree Costiere (Coastal Area Management Programme – CAMP)** 7 - **Conceptual Framework for Marine Spatial Planning in the Mediterranean**, 2018, UN Environment/MAP – United Nations Environment Programme – Mediterranean Action Plan Secretariat to the Barcelona Convention 8 –**DISPLACE Programme** 9 - **OECM** (Other Effective Area-based Conservation Measures (OECMs) | IUCN) 10- *ISPRA Technical guide**: "Assegnazione di Zone Marine per l'Acquacoltura"*** 11 - Puglia Region: LEGGE REGIONALE 3 NOVEMBRE 2017, N. **43 "Pianificazione e sviluppo della pesca e dell'acquacoltura regionale"** *12* **–** Council Regulation (EC) No 1967/2006 of 21 December 2006 concerning **management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea** 13 – Directive 2014/89/EU on establishing a **framework for maritime spatial planning**

From Media were considered:

1 – Arriva l'atlante su pesca a strascico nel mediterraneo
https://www.ansa.it/canale_terraegusto/notizie/dal_mare/2022/11/02/arriva-atlas-atlante-su-pesca-a-strascico-nel-mediterraneo_6fc4642c-18a9-4091-834f-0c7b2f62e887.html

Consulted Experts

- Dr. Massimo Pillarella, Director of Department II, Molise Region
- Sig. Giuseppe Nardone e San Basso Fishery Producers' Organization
- Dr. Nadia Barile, Head of the Marine Ecosystems and Fisheries Research Centre
- Experimental Zooprophylactic Institute Abruzzo Molise " G. Caporale"
- Dr. Thomas Galvan esperto in pesca ed ecosistemi - Regione Veneto
- Dr. Luca Bolognini - CNR-ISMAR
- Dr. Federica Foglini – CNR-ISMAR
- Dr. Valentina Grande – CNR-ISMAR
- Dr. Nadia Tassetti – CNR-ISMAR
- Dr. Carmen Ferrà – CNR-ISMAR
- Dr. Giuseppe Scordella expert in fishing and ecosystems - Puglia Region
- Dr. Roberto Ugolini CIHEAM fishing expert –Bari
- Dr. Domenico Guidotti- Federcoopesca Molise
- Dr.Franco Ricci – President of the Quality Agro-Food District, Fishing and Aquaculture and Coastal Action Group "Costa dei Trabocchi" Abruzzo

CHAPTER 3 - ANALYSIS OF THE REFERENCE CONTEXT

This chapter provides a general overview of the reference context for the Molise Region and presents the results of projects related to the fishing sector conducted at both national and European levels that are relevant to the goals of the ARGOS project, which aims to promote sustainable use of the maritime space in the Adriatic Sea.

Geographical overview of the Molise Region

With an area of 4,438 km², Molise is the second smallest region in Italy. The main transport infrastructure of Molise is concentrated on roads and railways. The only motorway that passes through the region is the A14, which skirts around Termoli. The Molise coastline, which is about 36 km long and faces the Adriatic Sea, is mostly low and sandy except for the promontory of Termoli, where the port offers connections to the Tremiti Islands and Croatia. The Molise coastline is bounded to the north (at the border with the Abruzzo Region) by the mouth of the Trigno River and to the south (at the border with the Puglia Region) by the mouth of the Saccione stream. The region has vast areas of unspoiled greenery. The well-preserved natural environment and absence of pollution are strong tourist attractions, although Molise has always been the Italian region with the lowest number of visitors and the lowest percentage of tourism. However, maritime tourism is still significant, concentrated mainly in Termoli and Campomarino.

Environmental framework of the Molise region

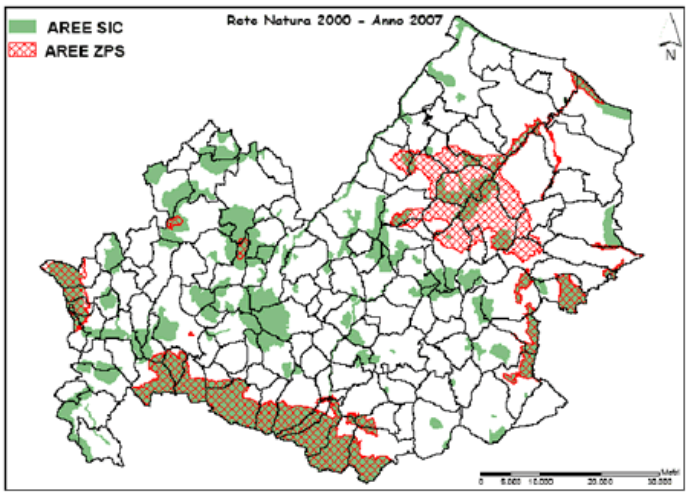
Molise participates with part of its territories in important environmental reserves such as the Abruzzo, Lazio, and Molise National Park. As for the coast, in the past, the formation of coastal dunes caused the formation of coastal marshes, which have now been eliminated through reclamation works.

The sandy-gravelly coastline represents a narrow, unstable boundary zone between the land and the sea and is composed of sediments that are constantly shifted along the coast by currents induced by the oblique breaking of the waves.

It is a widespread belief that coastal erosion is essentially caused by human activities, but in reality, many are purely natural phenomena. However, many coasts are severely threatened by anthropogenic erosion phenomena and where national strategic infrastructures such as railways and highways are also located.

In Molise, large erosion containment works have generated delightful coves where beach tourism has found points of development. Both the beaches north and south of Termoli have been the subject of protection interventions against erosion, also recognizing in the southern zone naturalistic values that have led to the proposal for the designation of protection areas, particularly for coastal pine forests and associated dune flora.

At the time of the bibliographic review, there were no specific protected areas for the Molise coast. According to ISPRA (Environmental Yearbook 2019), there are no protected areas (Natura 2000 Network, Ramsar, Protected Marine Areas) in the region. However, the Regional Site indicates that some areas have been proposed but probably not yet approved.



Source: www.regione.molise.it - Natura 2000 Network

Production framework of the Molise region

Given the low population (just over 300,000 inhabitants), the economy of Molise is poorly developed compared to other regions, and the primary sector is where the highest economic income comes from. In general, production satisfies the internal demand of Molise and only a small part is intended for export. Today, Molise has a series of small and medium-sized companies operating in various sectors, with the food industry being prominent, including the processing of fish products with 92 employees (Source: Movimprese 2021).

Fishing and aquaculture in the Molise region

The table below shows the incidence of different Italian regions in the main indicators for fishing and aquaculture (fishing effort, workforce units, etc.).

REGION	Indicators fleet and fishing effort (% of total country) *	Processing of products Fisheries and aquaculture (% of total country) *	Work Units (UULL) active in the production and processing chain of fishery and aquaculture products (% of total country)
ABRUZZO	5,17	2,85	2,82
BASILICATA	0,00	0,05	0,11
CALABRIA	4,94	3,84	2,65
CAMPANIA	7,10	5,54	3,97
EMILIA ROMAGNA	4,43	10,48	17,34
FRIULI-VENEZIA GIULIA	1,51	1,52	2,83
LAZIO	4,56	3,20	4,40
LIGURIA	2,94	2,71	2,98
LOMBARDIA	0,00	2,37	1,94
MARCHE	8,35	6,06	5,26
MOLISE	1,28	0,86	0,56
PIEMONTE	0,00	0,47	0,62
PUGLIA	13,06	11,12	6,29
SARDEGNA	8,36	9,55	5,80
SICILIA	27,95	21,56	14,10
TOSCANA	3,72	3,77	3,54
P.A. BOLZANO	0,00	0,24	0,07
P.A. TRENTO	0,00	0,53	0,45
UMBRIA	0,00	0,21	0,24
VENETO	6,63	13,10	24,01
Totale ITALIA	100%	100%	100%

**(Fishing effort indicators: set of fishing gear for time/space in a given area.)*

The Molise region represents a rather small reality compared to the incidence of large fishing regions such as Sicily and Puglia, as can be seen from the data. However, the Molise fleet is composed for a significant part (compared to the volumes of catches) of trawlers. Updated data indicates 52 trawlers out of a total of 182 registered vessels.

At present, after the pandemic, about seventy units have benefited from the "relief" tenders, but the recent increases in fuel prices lead to a less optimistic view of the post-Covid period. In fact, a trawler boat of 22-25 meters has fuel costs that account for about 80% of general expenses, and with the increase in fuel prices, these fishing units have seen an increase in expenses of about 30,000 euros/year (estimates and indications collected during interviews with stakeholders).

This cost increase does not seem to be currently offset by an increase in the sale of the catch, so many companies are supporting their activity with their own reserve funds. Witnesses agree that a good part of the Molise fleet consists of rather old boats, which

therefore find it difficult to access financing for technological innovations. Moreover, at present, there are no clear incentives from the government for demolition.

Some fishing units have organized themselves and tend to push their activities towards still rich seabeds (deeper and further from the coast), adopting freezing strategies for the most profitable species (shrimp "Parapenaeus longirostris" and Norway lobster "Nephrops norvegicus"). Trawling activities along the coast in shallow water (beyond 3 miles) are therefore mainly practiced during periods when it is risky to venture offshore and by boats that are unable to operate offshore due to their size, age, and equipment.

However, the damage remains and is represented by small-sized catches, the capture of some typically coastal species, and fishing in a bathymetric range where the penetration of light allows the development of often environmentally important plant forms.

Speaking of other types of fishing (such as pelagic fishing), this one, due to its characteristics, has lower energy consumption, employs more people on the same vessel, and does not seriously damage the seabed.

Even artisanal fishing offers positive aspects: investments, consumption materials, and fuel are reduced, the catch is generally of larger size and better preserved, and prices are more interesting.

The "fishing stop" for trawlers lasts one month (between August and September) and does not allow all fish populations to recover and reproduce, but essentially favors a redistribution of species that take advantage of occupying more peaceful sea spaces thanks to the fishing stop.

Currently, trawlers carry out 170 fishing days a year, but the recommendation of the GFCM proposes a 40% reduction, bringing activity days to 90. The attempt is to rebuild fish stocks, but the measure is complex for social and economic impacts. Reducing days means reducing fuel consumption and working days for salaried personnel, an effect that is only apparently positive for the fishing unit's costs but overall dependent on the effectiveness of the reduced fishing actions, which must achieve sufficient catches.

Although Molise's fishing boats represent only 0.8% of Italian vessels (source Movimprese, data 12/31/2021), Molise, with 52 boats, is still in a good position for new initiatives to regulate the sector.

At present, there are no updated data on fishing units to definitively quantify the advantages and disadvantages of the initiatives that will be proposed, such as the impacts on the fishing units involved in the change. It is therefore important to integrate the data with an updated census.

National context: the CAMP Italy Project

The main objective of the program is to develop and implement strategies and procedures for sustainable development of coastal areas, and for this purpose, to identify and apply ad hoc methodologies and tools for the management of these areas in particularly significant sample areas. The legal reference tool is the Protocol on Integrated Coastal Zone Management of the Mediterranean (ICZM Protocol) of the Barcelona Convention - adopted in Madrid on January 21, 2008. The activities of CAMP Italy have focused on three thematic areas:

• Planning of coastal terrestrial and marine areas;

• Protection, conservation, and restoration of coastal and marine habitats;

• Sustainability of socio-economic pressures in the coastal zone.

International context

The Adriatic has reason to be treated as a unique entity and as such to be protected at the international level. Among the various initiatives, recent recommendations of the GFCM-FAO, in particular GFCM/44/2021/1 and GFCM/44/2021/3, stand out. The presented recommendations aim for a general sharing among member and non-member states (such as Albania and Montenegro) for the increase in protected areas and restrictions on fishing for demersal resources.

As evident from the documentation regarding the Southern Adriatic, it remains a "special surveillance" area due to the situation of overexploitation and by 2023, limitations on areas demonstrating greater impact will probably be proposed.

Studies for the conservation and resilience of fish stocks have been carried out, proposing total restriction measures for some areas.

In particular, the study "Spatial planning for fisheries in the Northern Adriatic: working toward viable and sustainable fishing" presents interesting considerations. This study has been consulted in the framework of limiting some fishing activities. It focuses on the consideration that excessive fishing of demersal resources in the northern Adriatic Sea (geographic sub-area [GSA] 17) and pressure on marine habitats. The study also considers the different fishing activities that operate simultaneously in the zone and the need to minimize conflicts between them.

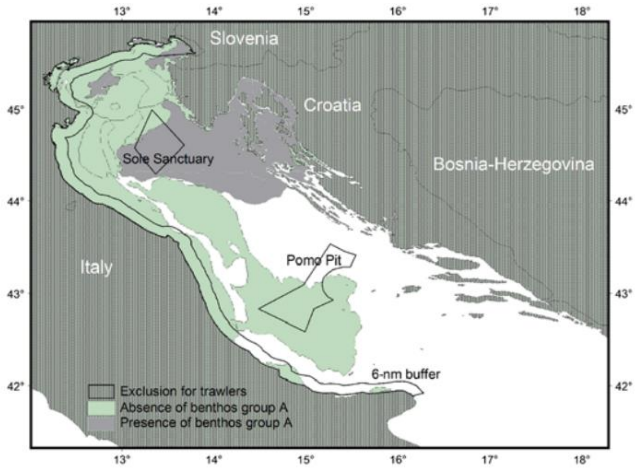
A plan is thus proposed for the reduction of fishing pressure on the 4 demersal species of high commercial interest. The study seems to demonstrate that the exclusion of trawlers from

some zones has reduced the effective fishing effort, causing some economic losses but providing benefits to fixed nets. Not all trawlers will be affected in the same way because some units already prefer deep-water fishing (searching for shrimp and prawns).

In particular, the study proposes a buffer zone of 6 nautical miles from the coast. Along this buffer zone, the four species have benefited from the protection of the area and have become accessible in coastal waters, thus increasing landings for fishermen with limited range.

The study concludes with: "Simulated spatial management has been useful but not sufficient to ensure sustainable fishing in the area, and therefore further management measures should be adopted."

In fact, it should be considered that in the buffer zone hypothetically applicable to Molise, there are no specific seabeds for the reproduction of, for example, hake. However, as anticipated, this proposal intends only to take a first step towards obtaining larger sizes.



Source: Bastardie et All.

As highlighted in the representation, the proximity to the Pomo (Yabuka) trench actually favors the migration of some species towards the Molise coasts. Considering the most significant influence to the north of Termoli, it was therefore decided to "balance" by proposing a buffer zone for the southern part (from Termoli to the regional border with Puglia).

Possible conservation measures: OECM status

The OECM status is defined as follows: "Other effective area-based conservation measures" mean "a geographically defined area other than a protected area, governed and managed in ways that achieve positive and lasting long-term outcomes for the in-situ conservation (including the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties), of biodiversity, with associated ecosystem functions and services, and, where applicable, cultural, spiritual, socio-economic, and other locally relevant values."

Possible conservation measures: Limited Fishing Area (FRA) status according to GFCM directives

Limitation interventions on fishing activities are already in the proposal phase by international organizations such as the GFCM-FAO through resolutions aimed at reducing overfishing of the resource. It is possible to request areas where fishing is limited (FRA) by submitting a standard form that lists all the reasons and socioeconomic impacts.

CHAPTER 4 - MAIN RESULTS

Proposal to Stakeholders

The recent rise in fuel costs and consequently transportation and materials make it even more urgent to implement targeted interventions to increase the sustainability of fishing activity. In particular, some types of fishing are very impactful on the marine environment, and paradoxically, the damage they cause is proportional to the amount of fuel consumed. These technologies also involve a smaller proportion of workers compared to other types of fishing. Therefore, the conversion from trawling to other forms of fishing (e.g., trolling) should be promoted.

Limitation measures on such fishing activities are already being proposed by international organizations such as the GFCM-FAO through resolutions aimed at reducing overexploitation of the resource.

The study proposes a series of interventions and forms of limitation in the (1) regional water space with the aim of progressively favoring types of fishing with less environmental impact that also offer greater employment opportunities. At the same time, as compensation for the proposed limitations (2), an information system for trawl fishing units could be proposed that indicates the areas where there is a greater probability of obtaining good profits from fishing.

The choice of areas for partial limitation (1) of fishing activities should be the subject of consultation with sector operators to define areas for "nursery" and limited zones for small-scale fishing and trolling of pelagic fish.

For the areas where limitations are to be applied, forms of environmental protection could be evaluated, or alternatively, a shared code of conduct could be developed among sector operators.

Areas designated for protection could be designated as areas subject to conservation measures through the OECM recognition procedure, or even FRA (GFCM procedure) where fishing limitations are internationally recognized.

Such approval is subject to a series of required characteristics for recognition, which will also be investigated based on the environmental data proposed by the Molise Region in the context of the Natura 2000 Network, as well as other justifying aspects for approval.

The possibility of having a "growth basin" does not mean that larger fish will only be caught by those operating within the area; fish move based on migrations, food search, and other factors, and, as with protected areas, once a certain density is reached, migration to the outside is observed.

In light of the above, it can be hypothesized that the increases in size will allow a greater number of specimens to reach maturity and therefore reproduce.

In a relatively short time (a couple of years), an increase in catches by small-scale fishing should be observed, as a larger number of fish have reached the size to become entangled in nets. This can be considered an indicator of the initiative.

Limitations on trawl fishing in certain areas could be compensated by assistance provided through a georeferenced software model that, using AIS data identifying the seabeds where a larger biomass is hypothesized, advises fishing units to exploit the richer areas.
Attention should be paid to eliminating as much as possible the possibility of conflict between interventions and other activities in the maritime space (e.g., prohibited cells on the routes of other vessels or containing wrecks), and the model presented to project partners.
Studies on the environment, socio-economic aspects, and stakeholder opinions are fundamental to this initiative, as they allow the proposal of environmental support solutions.
Of course, this study remains propositional and intends to update itself during and after its drafting and presentation based on collective consensus.
Based on these considerations, a first intervention proposal is presented below.

CHAPTER 5: MEETING WITH STAKEHOLDERS

On December 12th, 2022, a meeting was held with representatives of the fishing industry in Termoli, where the key aspects of the initiative, environmental issues, and intervention proposals were presented. The team requested approval of the recommended area from the technical team. During the discussion, the area was deemed too extensive, and an area along the north coast of Termoli, starting from the coast up to three nautical miles away, was proposed as an alternative. The representatives of the fishing industry claimed that the proposed area was of interest because of its hard bottoms that were once considered rich in fish and were also home to lobster specimens. The Molise seabed is generally lacking in hard bottoms that support good biodiversity and therefore deserve special attention and, if possible, protection.

CHAPTER 6: INTERVENTION PROPOSAL

Identification of Limited Fishing Areas

Following the meeting with the fishing union leaders, an area was identified on the map that has hard bottoms and good biodiversity. This area is suitable for protection and tourism, and is already within the three nautical miles limit. It was collectively agreed to propose this area for protection and preservation.

The area has already been proposed as a nature reserve and ZPS (Special Protection Area) for some of its coastal characteristics. The establishment of this marine area is already within the ban on trawling.

In these conservation areas, where the area presents alternating sandy or muddy bottoms with hard bottoms and rocks, some activities will only be permitted following an objective assessment of the resource to be protected.

The area must be dimensioned with boundaries from the shore to three nautical miles and an extension that includes the entire hard bottom ecosystem.

If funding is available for the area in question, anti-trawl beaching devices or other structures such as fish aggregating devices (FADs) can be positioned on the side, including wrecks that have been properly pre-treated to eliminate sources of environmental contamination.

For tourism purposes, such as snorkeling or diving, it is recommended to install mooring buoys attached to dead bodies, thus avoiding the use of anchors.

Predicting the effects of the protected area on fish species

Excluding small trawlers and fast boats from within 3 nautical miles would protect not only sole, but also all those species for which the coastal strip represents a primary growth area, especially cuttlefish. In fact, in spring, adult cuttlefish migrate from offshore waters to coastal waters to reproduce. Juveniles stay near the coast until the end of summer (Reid et al., 2005), then migrate in autumn to deeper waters, where they will remain until the following spring. With this management measure, part of the cycle could be preserved while ensuring better recruitment.

Currently, there is no minimum landing size for this species. In addition, to increase the reproductive success of cuttlefish, a good amount of hard substrate would allow the hatching of deposited eggs. Ad hoc artificial structures for cuttlefish egg deposition have been experimented with for some time and the results have been published in the work of Grati et al. (2018). Such structures could be provided alongside the natural area.

Opportunities for exploitation of areas in the surrounding areas

If requested, the study of new spaces for mollusk farming activities alongside the area is possible. The following are the characteristics that mussel long-line systems have on the environment:

Anchors and other fixed structures provide a substrate for the settlement of sessile forms, increasing the biodiversity of the seabed (muddy or sandy).

The effect of mussel farms, which are traversed by waves, reduces the same wave motion and consequently tends to reduce beach erosion.

The filtering action of mussels contributes to water clarification.

The structures have an aggregating effect for many species of fish that are attracted for both food and shelter.

The more the area in concession is interdicted to fishing, the more it acts as a growth zone for important coastal species.

Information System for Fishing Units

The "fishing break" was originally defined as a period of prohibition to allow for the reproduction of certain fish species, but it is actually a break for social purposes, where fishermen reunite with their families and an important moment for planning maintenance interventions on boats.

However, after only a month of rest (clearly, fish have not grown or reproduced), the first fishing days are generally profitable. Essentially, this is due to a redistribution of fish in areas where, due to disturbance or extraction, they had become depopulated.

This experience provides inspiration for a pilot project that could be an output of the Argos Project and aims to optimize the results of individual fishing actions (trawling or hauling).

At present, fishing units operating above 15 meters have two monitoring systems: VMS and AIS. Data relating to the movement of naval units, in this case trawl fishing vessels, are monitored by the VMS system, including fishing actions. However, as this system aims at detecting fraud, a public license is not released.

On the other hand, the AIS system has the required features with fishing functionality, but even though the option for the vessel commander to report the start and end of fishing operations is available, this mode is often forgotten, generating unreliable data.

Instead, data should be collected from all units and then interpreted by software that, based on an evaluation of the number of hauls/time (dates), extracts areas where fishing has been practiced less recently and/or frequently, changing the color of a grid covering the permitted fishing zones. This tool would allow boats to steer towards areas where they have not fished for a longer time and, statistically, where they can make more catches.

The state of the art in this case is represented by the DISPLACE program, which has already been applied in Northern Europe and provides a screen of marine areas with one-kilometer squares. The model provides information for the spatial management of fishing effort and evaluates how fishing revenues and environmental benefits are influenced. However, it is not yet available.

In a simplified form of this system, the vessel would be informed (cell by cell of a square kilometer) of which cells have received fewer fishing actions inside them, therefore potentially more profitable. With, for example, a variation of the cell color, the ratio of fishing interventions in the area compared to time will be indicated. The areas will thus gradually acquire a color that quantitatively indicates the exploitation status.

It is likely that in the future, the same data related to the Displace/AIS system will indicate the benefits generated by the initiatives proposed through this report (e.g., an increase in fishable biomass).

If scientific and control organizations manage to extract a maximum capacity for the grid cells to avoid overexploitation, some cells will even be uncolored for a time as resting areas where fishing is not recommended.

CHAPTER 7: RECOMMENDATIONS

Below are a series of recommended actions summarized:

Development and protection tools

- Inclusion of the coastal area in the Natura 2000 network
- Candidacy of the marine area to OECMs: one of the possible tools for the protection of marine areas officially recognized by the international community.
- Request for the establishment of an FRA to the GFCM.

Incentives to compensate for the reduction of the area

The Public Administration can try to promote the initiative with incentives:

- In favor of fishing activities in deeper waters, therefore further away from the prohibited areas, for example by providing funds for the purchase of fish conservation systems or by facilitating the purchase of equipment types intended for these types of fishing.
- In favor of conversion to less impactful forms of fishing on the seabed (e.g. fishing for small pelagic species).
- By financing the information system for trawling fishing on the Displace model and making it simple and available to operating units.

CHAPTER 8: ACTIVITY 3.1 LOGBOOK

The various meetings of the AAC (Adriatic Advisory Committee) aim to coordinate and approve the initiatives of the different partners of the ARGOS Project.

To date, 11 AAC meetings have been held mainly focused on preparing the deliverables prescribed by the project, their approval by the committee, and planning joint activities among the partners.

The goal is to complete the draft of the following documents:

- The Final Position Paper with related recommendations, and
- The Maritime Spatial Planning Programme, so that they can be delivered definitively by the end of the project.

Main considerations

The Molise Region, although participating actively and on time, represents a modest part of the Adriatic sea and does not currently have protected areas within its territorial waters.

Apart from a few aquaculture plants (mussel farms) and the shipping routes from the port of Termoli, there are no situations reported in the regional maritime space that could generate conflicts over the use of marine areas.

However, the regional vision is in line with project partners, and the exchange of information and ideas for achieving future sustainability of fishing and aquaculture activities remains a strategic interest.

Proposals to restrict fishing activities by international organizations can have a significant impact on the sector and therefore must be evaluated with great care, also at the regional level, while still committing to protecting marine ecosystems and their sharing.

The possible creation of a protected area with the potential to develop tourist activities at sea falls within the objectives of "ecosystem services and goods" of the Blue Economy, differentiating another source of employment in tourism assistance.

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ANNEXES

ISPRA Technical guide

ISPRA

mipaaf Ministero delle politiche agricole alimentari e forestali

ASSEGNAZIONE DI ZONE MARINE PER L'ACQUACOLTURA (AZA)
- GUIDA TECNICA -

"Assicurare lo sviluppo sostenibile dell'acquacoltura attraverso la pianificazione dello spazio e l'aumento del potenziale dei siti" è tra gli obiettivi prioritari del Piano Strategico Acquacoltura 2014-2020 e del Programma Operativo del FEAMP 2014-2020 per favorire un'acquacoltura innovativa e competitiva, sostenibile sotto il profilo ambientale ed efficiente in termini di risorse.
Questa Guida Tecnica è uno strumento per facilitare la comprensione dei processi per l'assegnazione di zone marine per l'acquacoltura (AZA) e guidare nella selezione di nuovi siti, rispettando la tutela dell'ambiente, la conservazione della biodiversità e integrando le attività d'acquacoltura nella pianificazione dello spazio marittimo, secondo un approccio ecosistemico.

L'assegnazione di spazi marini da parte delle Autorità competenti deve basarsi sulle migliori conoscenze ambientali, tecniche, biologiche e avvalersi di strumenti e modelli che consentano di prevedere e misurare i potenziali impatti delle attività d'acquacoltura.

La Guida Tecnica fornisce le conoscenze avanzate, gli strumenti e il percorso metodologico per individuare I) le **zone marine per l'acquacoltura (AZA),** sulla base delle caratteristiche ambientali e oceanografiche delle aree marino costiere, la logistica e i servizi, utilizzando strumenti GIS e modelli numerici; II) i **siti vocati**, sulla base delle indagini di caratterizzazione ambientale, di stima della capacità portante, di valutazione dell' impatto ambientale, e delle concessioni demaniali marittime; III) i **programmi di monitoraggio ambientale** da svolgere nelle aree marine date in concessione, specifici in funzione delle attività di produzione e delle caratteristiche del sito, per monitorare i potenziali impatti e ridurre i potenziali rischi ambientali e sanitari, secondo un approccio adattativo.

La pubblicazione, redatta da ISPRA per la Direzione generale della pesca marittima e dell'acquacoltura del MiPAAF, è il risultato di un lungo percorso conoscitivo e partecipativo, condiviso a livello Mediterraneo con la FAO-CGPM, con cui è stata redatta la Guida AZA per il Mediterraneo e il Mar Nero, e a livello italiano con le Direzioni competenti regionali e dei ministeri, le associazioni di produttori, gli operatori d'acquacoltura, la comunità scientifica, le agenzie ambientali e gli istituti zooprofilattici sperimentali, che sono stati consultati.
Per questo i contenuti di questa Guida sono un supporto tecnico per le Amministrazioni regionali e il Comitato tecnico del Ministero delle Infrastrutture e Trasporti, che stanno redigendo i Piani di gestione dello spazio marittimo, (D.Lgs. 201/2016) e per tutte le parti interessate, a vario titolo, nella pianificazione dello sviluppo dell'acquacoltura nelle aree marine e nella crescita dell'acquacoltura nella Economia blu italiana.

IDENTIFICAZIONE DELLE ZONE MARINE (AZA)

01 Analisi iniziale di settore
02 Analisi vincoli e usi e aree libere
03 Consultazione con i portatori di interesse
04 Analisi criteri di idoneità
05 Caratterizzazione ambientale
06 Zonazione
07 Istituzione e pubblicazione delle AZA

IDENTIFICAZIONE DEI SITI DI ALLEVAMENTO

Studio preliminare del sito 08
Caratterizzazione ambientale e indagini in situ 09
Analisi della capacità portante dell'area marina 10
Valutazione impatto Ambientale del progetto 11
Classificazione sanitaria delle acque (molluschi bivalvi) 12
Richiesta di concessione demaniale 13
Altre autorizzazioni 14

MONITORAGGIO E GESTIONE

15 Programma di Monitoraggio ambientale
16 Fonti di impatto e componenti abiotici e biotici da monitorare
17 Zone di Effetto Ammissibile
18 Tipologie e protocolli di monitoraggio ambientale
19 Report ambientale

Other Effective Area-based Conservation Measures

'Other effective area-based conservation measures' (OECMs) are areas that are achieving the long term and effective in-situ conservation of biodiversity outside of protected areas.

A geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socio–economic, and other locally relevant values (CBD, 2018).

Governments, relevant organizations, Indigenous peoples and local communities are invited to apply the voluntary guidance on OECMs to identify, recognise and support OECMs, and report data on OECMs to the **World Database on OECMs**. Identification of OECMs offers a significant opportunity to increase recognition and support for de facto effective long-term conservation that is taking place outside currently designated protected areas under a range of governance and management regimes, implemented by a diverse set of actors, including by Indigenous peoples and local communities, the private sector and government agencies.

Our objectives

By enabling and enhancing the appropriate identification, recognition, support and reporting of OECMs across landscapes and seascapes, we aim to:

- Promote equitable governance, effective management and positive conservation outcomes.
- Increase coverage of ecologically representative areas of particular importance for biodiversity and ecosystem functions and services.
- Support the recovery of threatened species.
- Enhance connectivity between protected and conserved areas and across landscapes and seascapes.
- Foster engagement with a diverse range of rights-holders and stakeholders who contribute to area-based conservation outside of protected areas.
- Support sustainable livelihoods and provide a framework to help transform sectoral practices.
- Address climate change by contributing to net-zero climate targets and building resilience to the physical impacts of climate change through nature-based solutions.

NewForm_FRAsSub mission_adopted_by_

Resolution GFCM/44/2021/3

on a roadmap for the establishment of a fisheries restricted area in the southern Adriatic Sea (geographical subarea 18)

The General Fisheries Commission for the Mediterranean (GFCM), (omissis

FURTHER NOTING in particular the critical state of European hake (Merluccius merluccius) due to a low biomass in the recent years; RECALLING the importance of protecting vulnerable marine ecosystems (VMEs) and essential fish habitats (EFHs) as well as juvenile phases and areas of spawner aggregations in order to support the objective of reaching maximum sustainable yield by 2026 for the key Adriatic demersal stocks managed under Recommendation GFCM/43/2019/5;(omissis)

ADOPTS, in conformity with Articles 5 and 8 of the GFCM Agreement, the following resolution: 1. The GFCM Secretariat, with the support of relevant CPCs, should launch, in 2022, a pilot project to underpin the biology and ecology of bamboo coral in the Adriatic Sea, including a quantification of the interactions between Isidella and bottom contact fisheries and the determination of their footprint, within the framework of the Working Group on Vulnerable Marine Ecosystems, including a session on essential fish habitats. 2. The GFCM Secretariat, with the support of relevant CPCs, should support, in 2023, the implementation of the roadmap towards the establishment of an FRA in the southern Adriatic (geographical subarea 18) as outlined in paragraph 3. 3. The CPCs should implement technical actions to advance towards complying with the requirements of Recommendation GFCM/43/2019/5 with a view to establishing additional FRAs in the southern Adriatic, including: a) investigating the monitoring activities needed to identify a possible FRA (fleet behaviours, impacts on sea bottom, observers on board) in the southern part of geographical subarea 18; b) implementing an ad hoc socio-economic survey covering the fleets operating in the area; c) designing an ad hoc scientific survey for a better definition of VMEs to identify a possible FRA; and d) ensuring that the key components of a future proposal include VMEs, EFHs, spatial fishing fleet dynamics and socio-economic impacts, as provided by the national administrations. 4. In 2023, on the basis of the data collected under paragraph 3, CPCs should jointly evaluate the possibility of establishing an FRA with the aim of protecting relevant VMEs and EFHs identified, following a bottom-up approach and engaging with relevant stakeholders. 5. In 2023, the GFCM Secretariat should organize, ahead of the SRC-

AS meeting, a workshop with scientists and stakeholders to discuss the preparation of an FRA proposal, with a view to achieving the objectives of paragraph 4. 6. In 2023, the SAC should evaluate the possible FRA proposal in the southern Adriatic Sea and the GFCM should examine such proposal at its annual session in 2023.