Case Study 5

MARINE FISHERIES AND AQUACULTURE under Maritime Spatial Planning

Approach toward integration

Cross Border
Maritime Spatial Planning
in the Black Sea
– Romania and Bulgaria
MARSPLAN–BS Project

EUROPEAN UNION
European Maritime and Fisheries Fund

EASME/EMFF/2014/1.2.1.5/2/SI2.707672 MSP LOT 1/BLACK SEA/MARSPLAN-B

CASE STUDY 5 - Special case of Marine fishery and aquaculture under Maritime Spatial Planning

Approaches towards integration

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CASE STUDY 5

MARINE FISHERIES AND AQUACULTURE

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Summary

Marine fish populations represent natural resources shared among Black Sea countries. The marine fishery was the most affected sector by the dramatic changes produced last decades in the Black Sea ecosystem. The fisheries themselves contributed to the worsening of ecological status and fish stocks diminishing, through:

- free access to the resources and management system individually applied by each Black Sea country;
- over-fishing and illegal fishing;
- utilization of the destructive fishing tools and techniques.

There are some main problems and interrelation in the Black Sea fisheries, such as:

- decline of Black Sea natural resources;
- lack of a regional fisheries management system and incompatible national practices;
- poor co-operation between riparian countries for knowledge and rational management of Black Sea ecosystem and living resources in compliance with the principles of Code of Conduct for a responsible fishing;
- fisheries regulatory framework promoted by each coastal country harmonized at regional level for all fish species, only in the case of shared or migratory species;
- fishing effort continually increasing in spite of evident decline of fish stocks;
- fishing strategies development according to the environment protection, through the implementation of ecosystem approaching concept, not well implemented.

Unfortunately, at regional level persist:

- fragmented and irregular fish stocks assessment and monitoring activities, at national level;
- lack of annual assessment of Black Sea fish stocks;
- fish stocks assessment missing for all species, excepting the most spread (shared) and migratory species;
- incompatible and incomparable data and methodologies for assessment purpose.

The transboundary character of the living resources from the Black Sea imposes the necessity for:

- coordinated efforts for fish exploitation and protection, at regional level;
- fisheries sustainable development.

For an effective management of fisheries, for decisions taken and suitable actions, it is necessary to provide scientific fundamental information reclaimed to be promptly and in due time.
Identified potential barriers are a lack of spatial explicit information on fisheries related parameters such as:

- occurrence of productive areas;
- habitats relevant for recruitment and spawning of target fish;
- priority areas for fish stocks concentration and for fishing.

The link between all human activities, including fisheries, and vulnerable areas, that sustain high biodiversity and biological production, are also important to commercial fish stocks (Olsen et al., 2007). Marine Fisheries are almost exclusive activities of the whole marine space. Taking into account the migratory species which live in the sea and migrate to freshwater for reproduction or feeding, our study case takes into account also the main cases concerning the link with wetlands, lagoons and important effluents. This is a specifical case which should be included in the Black Sea Methodology for Maritime Spatial Planning.

1. Introduction

Fish stocks are the main natural resource of seas and oceans and they are able to eradicate the poverty all over the world in coastal areas. Around the whole Planet, fisheries are valuable, marketable and suitable. In the same time fisheries aim to protect environment and preserve resources for future times and generations. More than all, fisheries need scientific support and ecosystem approach.

The Black Sea is one of the largest almost enclosed seas in the world: its area is about 420 thousands km^2, the maximum water depth 2,212 m, the total water volume of about 534,000 km^3. This basin is placed in the south-eastern part of the Europe between 40º54'40" and 46º34'30" northern latitudes, 27º27'00'' and 41º46'30" eastern longitudes.

The Black Sea is connected to the Mediterranean Sea to the west and to the Sea of Azov to the north. The connection with the Mediterranean Sea is limited to the Istanbul-Canakkale (Bosporus-Dardanelles) straits.

The Black Sea is surrounded by high folded mountain chains represented by the Balkanides Pontides belts to the south-west and south, by the Great and Little Caucasus to the east and by the Crimea Mountains to the north. There are low-standing plateaux and the Danube delta lowland only in the west and north-west. On the opposite eastern side there is the Kolkhida lowland of smaller extent. Consequently the relief energy is much higher on the eastern and southern costs than on the north western shore (Fig. 1.1).

Fig.1.1 Place of implementation of the Black Sea turbot case study

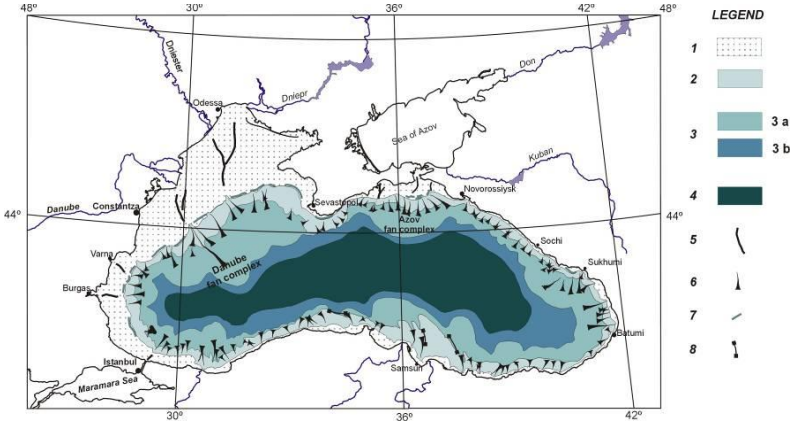


Fig.1.2 Geomorphologic zoning of the Black Sea (aft.Ross) et al., 1974; Panin, 1997)

Legend: 1, continental shelf; 2, continental slope; 3, basin apron: 3 a - deep sea fan complexes; 3 b - lower apron; 4, deep sea (abyssal) plain; 5, paleo-channels on the continental shelf filled up with Holocene and recent fine grained sediments; 6, main submarine valleys - canyons; 7, paleo-cliffs near the shelf break; 8, fracture zones expressed in the bottom morphology.

The Black Sea basin can be divided into four physiographic provinces: the shelf representing about 29.9% of the total area of the sea, the basin slope - about 27.3% of the total area, the basin apron, with 30.6%, and the abyssal plain - 12.2%. One of the most prominent physiographic features is the very large shallow (less than 200 m deep) continental shelf within the north western Black Sea

(about 25 % of the total area of the sea). The Crimean, Caucasian and southern coastal zones are bordered by very narrow shelves and often intersected by the submarine canyons (Fig.1.2).

Table 1.1. Main fishing grounds at the Romanian littoral

The Romanian fishing area is comprised between Sulina and Vama-Veche; coastline extends for over 240km, which can be divided into two main geographical and geomorphologic sectors (Radu G., 2001):

- 1/ the northern sector (about 158km in length) lies between the secondary delta of the Chilia branch and Constantza, constituted of alluvial sediments;
- 2/ the southern sector (about 85km in length) lies between Constantza and Vama-Veche characterised by promontories with active, high cliffs, separated by large zones with accumulative beaches often protecting littoral lakes.

The distance from the sea shore to the shelf limits (200m depth) varies from 100 to 200km in the northern sector and to 50 km in the southern one. The submarine slope of the shelf is very gentle in the north, while in the southern sector the slope increases very quickly (Fig. 1.3, 1.4).

The shallow waters up to 20m depth of the northern part are included in the Biosphere Reserve of Danube Delta (declared through the Low no. 82/1993).

The marine zone of the "Danube Delta" - Biosphere Reserve constitutes a traditional zone for spawning and feeding for transboundary species as well as a passage route for anadromous species (sturgeons, Danube shad) (Fig.1.4).

In the Southern part of the littoral is situated also the Vama Veche - 2 Mai reserve with the surface of 5,000 hectares (Fig. 1.4).

The marine Reserve “2 Mai - Vama Veche” is an area with a high diversity of the biotopes and biocoenosis, being settled on the migration routes of the pelagic and benthic fish and marine mammals.

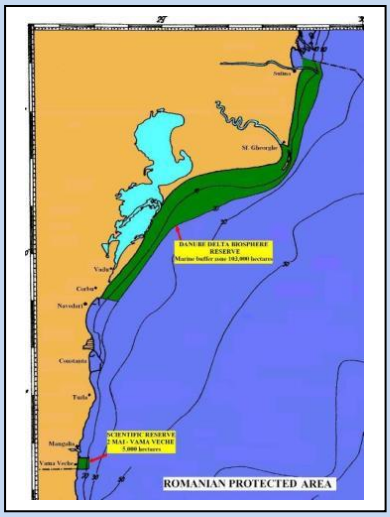


Fig.1.4. Romanian protected area/NIMRD

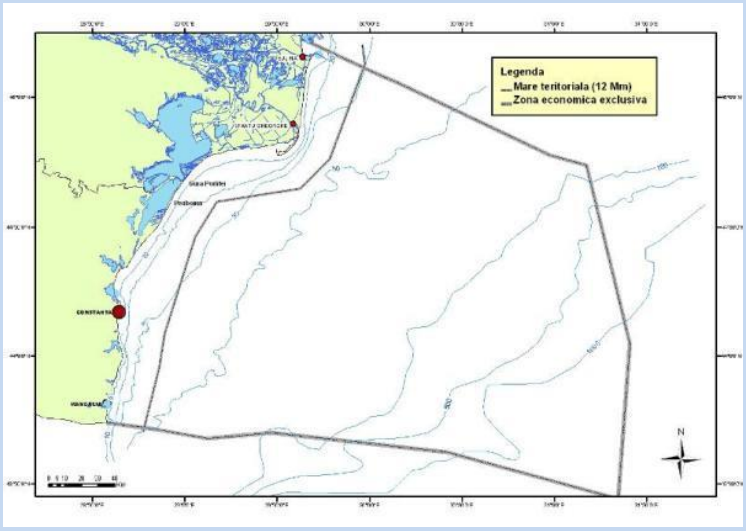


Fig.1.3. Territorial waters and Economic Exclusive Zone /NIMRD

1.1.Main fisheries activities in the Black Sea

The Black Sea is an important fishing region and the majority of its fish stocks are shared among transboundary countries. This basin is surrounded by seven countries: Bulgaria, Georgia, Moldavia, Romania, Russian Federation, Turkey and Ukraine. Fisheries and aquaculture in these countries provide vital sources of food, employment, recreation and trade which support the Black Sea coastal communities, and both fisheries and aquaculture are critical to the social and economic health of the region. In spite of this, the Black Sea is widely recognized as one of the regional seas most impacted by human activities. A number of its fish stocks are in a depleted or critical state and concerted action at regional level is therefore needed to help them to recover.

Black Sea needs a special policy to preserve and improve the situation of fisheries resources and ensure that the fisheries sector is suited to the Black Sea basin, bearing in mind the peculiarities of this region. Creation of a common mechanism for the seven countries bordering the Black Sea

should be examined from a long-term perspective in order, among other things, to guarantee protection of the environment and facilitate the economic and social development of littoral areas under an integrated marine spatial planning. In the European Union Aquaculture and Fisheries is subject of the Common Fisheries Policy. Despite of the fact that they both are marine major sea uses with spatial impacts – aquaculture and marine fishery have been debated cases for spatial planning regime at EU level.

A very short presentation of the main target species in the Black Sea area is necessary, to understand all their features, including migration and pressures, as their whole; these are as follows:

Table 1.1.1. **The main target species in the Black Sea are as follows**:
• **Pelagic fish species**: European sprat (*Sprattus sprattus*), Mediterranean horse mackerel (*Trachurus mediterraneus ponticus*), flathead grey mullet (*Mugil cephalus*), Atlantic bonito (*Sarda sarda*), bluefish (*Pomatomus saltatrix*)
• **Demersal fish species**: red mullet (*Mullus barbatus*), piked dogfish (*Squalus acanthias*), thornback ray (*Raja clavata*), turbot (*Psetta maxima*), gobies nei (*Gobiidae*). The Bulgarian fishing fleet exploits also the stock of Rapana snail (*Rapana venosa*).

Source: IOBAS

Bulgaria and Romania have allocated quotas for two species, turbot and sprat. The total allowable catch (quota regime) was introduced for the Black Sea in 2008 after the accession of Bulgaria and Romania to the European Union (EU). In 2014, the turbot quota was 43.2 tonnes and the sprat quota was 8,032.5 tonnes. In 2014, the turbot catch was 39.5 tonnes and the sprat catch was 2,279.0 tonnes.

Spatial management regimes to protect fisheries interest against other sector interests and respectively to protect other interests like nature protection from unsustainable fisheries impacts are extremely important. The necessary actions to be applied come from different examples taken both from the waters under national jurisdiction and from areas within the competence of the EU fisheries policy. Also, the spatial regulations correlated with the legal requirements and the way how these regulations can be transposed into practice have to be transferred from EU to the Black Sea basin.

The Black Sea Member States Romania and Bulgaria, as project partners, integrated fisheries into a common MSP regime. This study contributes towards this integration, having always under the same paradigm: fisheries, the specific spatial regulations and Law of the Sea.

Have to be underlined: Table 3 (*Source: IOBAS*)

1. National legislative aspects and planning competences including fisheries remain under the MS responsibility, despite the extensive EU competences.
2. The quality of Maritime Spatial Plans will rise with the inclusion of fisheries, for a better consideration and balancing of demands.
3. Maritime Spatial Planning is still pioneer work for the Black Sea and integrating fisheries is crucial.
4. Including fisheries and regionalizing regulations areas for them can be beneficial for nature conservation, for medium and long term economic viability and efficiency of fisheries.

1.2.National strategy, policy, planning, priorities

The impact of Fisheries on the marine ecosystem is an issue that requires dedicated spatial planning processes and must be regulated on a national or regional basis. In the European Union the regulation of commercial fisheries lies in the European coordination. The Directorate-General for Maritime Affairs and Fisheries (DG MARE) is responsible for the fisheries management policy, one of very few exclusive competences of the European Union. The general fisheries policy on the contrary is a shared competence between the European Union and its member states. At present there are some substantial powers for the EU's Member States (MS) to support fisheries into marine spatial planning and take regulatory measures under this frame.

This Case Study is a large mirror of the Romanian-Bulgarian marine aquaculture and fisheries:

- including aquaculture, as fisheries issues as part of spatial planning;
- showing how could an actual planning approach look like including aquaculture and fisheries at the Black Sea level;
- how could be taken into account eventual obstacles and restrictions for such activities.

There are various possibilities to integrate fisheries into spatial planning. For these reasons the field of fisheries and aquaculture are presented in all their details and this will a benefit for future (1) analyses, (2) spatial planes, (3) stakeholders and (4) general and private interests.

The management of fishing resources is an integrated process including the collection of information, data analysis, spatial planning, stakeholder consultation, decision-making, allocation of resources and formulation and implementation of possible future scenarios, as well as of regulations concerning fishing, environmental protection and waters management. The aim of such process is to assure the rehabilitation of marine fishing resources, as well as waters security.

In the recent years a number of scientific papers and research projects pointed out the need to achieve a sustainable development in the Black Sea, both regionally and nationally, such as the Strategic Plan for the Rehabilitation and Protection of the Black Sea (1996), the National Strategic Plan for Black Sea, the National Strategic Plan for Fisheries and the Fisheries Operational Program (FOP), 2007-2013 [Gh.Radu: 44-53].

The general objectives of these documents are to promote a healthy environment for the Black Sea, keeping the marine ecosystem biologically diverse and supporting livelihoods of coastal communities throughout sustainable fishing, aquaculture and tourism in all Black Sea countries.

***In Romania** the National Strategic Plan for 2007-2013 was elaborated according to the Common Fisheries Policy and the policy of Romanian governance, regarding the development of the fishery sector. The European Fisheries Fund (EFF) contributes, in several ways, to the Common Fisheries Policy implemented in Romania and also to a specific strategy, developed as starting point from the strategy proposed by the National Strategic Plan.

The National Strategic Plan was elaborated in compliance with Council Regulation (EC) no. 1198/2006 / 27 July 2006 on EFF and represents the strategic planning document which aims the setting of the priorities, objectives and the assessment of public financial resources, needed to implement the Common Fisheries Policy in Romania (CFP).

In the framework of the National Strategic Plan (NSP) a number of meetings with stakeholders, the European Commission representatives and different partners have been carried out in order to achieve the Operational Program with the contributions of the working groups established for this purpose.

The FOP 2007-2013 was elaborated by NAFA and represented the base document for obtaining the necessary sums from EFF allocated to Romania for the period 2007-2013. This framework

contained a coherent set of priorities which established the methodology for accessing the European irrecoverable funds for fisheries and aquaculture during the indicated period. This document is issued under the Council Regulation no. 1198/2006 on the European Fisheries Fund [Article no. 17 (3)] following the consultation process with the socio-economic agents, central and local public authorities, trade unions representatives, NGOs and professional organizations, being consistent with the National Strategic Plan for Fishing.

The FOP 2007–2013 Program was focused on five priority axes:

– *Priority Axis 1*: Measures for the adaptation of the Community fishing fleet
– *Priority Axis 2*: Aquaculture, inland fishing, processing and marketing of products obtained from fishery and aquaculture
– *Priority Axis 3*: Measures of common interest
– *Priority Axis4*: Sustainable development of fisheries areas
– *Priority Axis 5*: Technical Assistance

The most important sources of information necessary to understand the project requirements and to elaborate the interim evaluation of FOP were the followings:

- National Strategic Plan for Fisheries, 2007-2013
- Operational Program for Fisheries, 2007-2013 (FOP)
- Guidelines for Applicants regarding the launched measures in the FOP frame
- *See: http://www.madr.ro/pages/fep/implementare/2012/raport-fep-26.10.2012.pdf*
- *See:* http://www.ampeste.ro.

***In Bulgaria**, Sustainable development of the Black Sea and the fisheries and aquaculture is subject to a number of projects and programming and planning documents in Bulgaria such as the Strategic Plan for the Rehabilitation and Protection of the Black Sea (1996 and updated in 2002), Maritime Strategy of the Republic of Bulgaria with the implementation measures 2016-2021, National Strategic Plan and Operational Programme for the Bulgarian fisheries sector development 2007-2013 (OPBFS), Multiannual national strategic plan for aquacultures in Bulgaria 2014-2020, Maritime and Fisheries Programme (MFP) 2014-2020.

The operational programme for the Bulgarian fisheries sector development (2007–2013) was mainly aimed at transforming the fishery sector into a competitive, modern and dynamic one based on sustainable fisheries and aquaculture, as well as improving quality of life in fisheries communities. Programme budget was 101,2 million €. The Programme had four Priority axes.

Priority Axis of the Operational Program for Fisheries Strategy includes a number of measures which are correlated and defined into strategic guidelines for the community. For each axis is assigned a contribution from the Community and Romania, as well as a set of specific objectives.

Every axis is implemented by means of **Measures**, providing the co-financing frame of the projects, clearly stating the specific details of each type of individual investment.

Table 1.1.3. ***Priority Axis 1 Objectives***
– Adaptation of the fleet to the available and accessible resources of the Black Sea and to the fishing effort adjustment in accordance with the Common Fisheries Policy for the target species in the Black Sea. – Increasing of the Romanian fleet competitiveness by modernizing and adapting vessels to the current needs of safe navigation, fishing gear selectivity, working conditions and fish catches storage improvement. – Support fishermen, who are affected by the current evolution of fishing activities (i.e. fishing closure by fishing ships disposal or their designation changing), by involving them in retraining programs aimed at the reconversion towards other activities. – Support small-scale fisheries operating in coastal areas. – Increase the efficiency of the Romanian fishing fleet.
Priority Axis 1 Measures

ROMANIA	BULGARIA
– M.1.1: Permanent cessation of fishing vessels; – M.1.2: Temporary cessation of fishing activities; – M.1.3: Investments on the fishing vessels board and selectivity; – M.1.4: Coastal fishing at small-scale; – M.1.5: Socio - economic compensation for the community fleet's management.	- M 1.1. Public aid for permanent cessation of fishing activities; - M 1.2. Public aid for temporary cessation of fishing activities; - M 1.3. Investments on board fishing vessels and selectivity; - M 1.4. Small-scale coastal fishing; - M 1.5. Socio-economic compensation for fleet management.
Priority Axis 2 Objectives	
– Modernization of the aquaculture for its adaptation to market requirements; – Maintaining of a sustainable level for fisheries activities in inland waters; – Improving the quality of processed and marketed products of the fisheries sector.	
Priority Axis 2 Measures	
ROMANIA	**BULGARIA**
- M.2.1. Aquaculture; - M.2.2. Inland fishing; - M.2.3. Fish processing and marketing; - M.2.4. Financial engineering.	- M 2.1 Productive investments in aquaculture; - M 2.2 Aqua-environmental measures; - M 2.3 Public health; - M 2.4 Animal health; - M 2.5 Inland fishing; - M 2.6 Investments in processing and marketing of fishery and aquaculture.
Priority Axis 3 Objectives	
– Strengthening infrastructure to ensure a profitable and competitive fishing industry on long term, increasing the safety measures for fisheries sector workers; – Support the organization and professional skills in the field of fisheries and aquaculture sector; Support for joint actions to develop a sustainable fisheries and aquaculture sector. Financial support from the EFF under Priority Axis 3 covers the "common interest" measures with a broader scope than taken measures by private enterprises and they help to achieve the objectives of the Common Fisheries Policy.	
Priority Axis 3 Measures	
ROMANIA	**BULGARIA**
– M.3.1. Collective Actions; – M.3.2. Protection and development of wild fauna and flora; – M.3.3. Fishing ports, landing sites and shelters points; – M.3.4. Development of new markets and promotional campaigns; – M.3.5. Pilot actions.	– M 3.1. Collective actions – M 3.2. Measures intended to protect and develop aquatic fauna and flora – M 3.3. Investments in reconstruction and modernization of fishing ports, landing sites and shelters – M 3.4. Development of new markets and promotional campaigns – M 3.5. Pilot projects – M 3.6. Reassignment of fishing vessels to activities outside fishing
Priority Axis 4 Objectives Sustainable development of fisheries	
If the priority axes 1, 2 and 3 propose measures to support vertical development of the fisheries sector, priority 4 proposes a territorial approach for this set of measures completing. - Support for the **implementation of the local strategies for development** by Local Groups of Action for Fisheries (LGAF); - Support for **cooperation projects** between Local Groups of Action for Fisheries	
Priority Axis 4 Measures	
ROMANIA	**BULGARIA**
M.4.1. Development of fisheries areas	4.1 Development of fisheries areas: Sub 4.1. A. Support for implementing local development strategies

	and the operational costs of the groups Sub 4.1. B. Support for the implementation of joint activities
Priority Axis 5 Objectives :	
- The elaboration of the all preliminary documents for the preparation and implementation of the Operational Program for EFF; - The increasing of the administrative capacity, including issues regarding the Common Fisheries Policy for the implementation of the European Fisheries Fund.	
Priority Axis 5 Measures	
ROMANIA	**BULGARIA**
Technical assistance	Technical assistance

Source: EAFA

➢ *The New Strategical Plan*

The Multiannual national strategic plan for aquaculture 2014-2020 have been prepared in compliance with the provisions of Article 43 of Regulation of the Common Fisheries Policy and the Regulation of the European Parliament and of the Council concerning the European Maritime and Fisheries Fund. The plan covers all activities related to the production of fish and other aquatic organisms including the marine aquaculture and measures to diversify the activities of producers and the opportunities for marketing of the production in conformity with the proposed reform of the Common Fisheries Policy (CFP).

As EU members by 2008 in the both countries has developed 2 Operational programmes for the fisheries and aquaculture sector co-financed by the European Maritime and Fisheries Fund (EMFF):

***In Romania**, **The Multiannual National Strategic Plan for Fisheries and aquaculture 2014-2020** has been also elaborated. It is referring to:

(1) The present national context linked with the main national objectives, including:
- the strategy approach according to the EU objectives;
- the main quantified objectives for national grow.

(2) The answer to the strategy directions, containing:
- the administrative proceedings simplification;
- the ensuring of sustainable development and growth of aquaculture through coordinated territorial planning;
- competitiveness consolidation.
- Promoting a level playing field for operators by exploiting their competitive advantages

(3) Governance and partnership; (4) Best Practices; (5) Recommendations.

***In Bulgaria, The Maritime and Fisheries Programme 2014-2020 for Bulgaria (MFP)** addresses the general reform of the Common Fisheries Policy (CFP) and fully supports the priorities defined in the European Maritime and Fisheries Fund (EMFF) Regulation. The main objectives of the OP aim at enhancing the competitiveness of the aquaculture sector and processing sector, the viability of the sea fisheries sector and the sustainable development of traditionally fisheries - dependent areas. The programme also addresses the need for the protection and rehabilitation of the marine environment and its living resources, the control of fisheries activities, the collection of fisheries data and the improvement of knowledge on the state of the marine environment. The total budget of the Programme is 113 million €.

Table 1.1.4. In BULGARIA, the OP will focus on the following priorities
– 22.47% of the total OP allocation aims at ensuring the viability and sustainable development of the Bulgarian fisheries sector as well as the protection of its fishing/marine resources. This includes investments in the

modernisation of fishing infrastructure, protection and restoration of marine biodiversity, promotion of innovation, collection of marine litter, development of complementary activities /new forms of income for fishermen. It could also cover permanent cessation of fishing activities and on board-investments to increase gear selectivity; – 31.89% of the total OP allocation is aimed at fostering environmentally sustainable, resource efficient, innovative, and competitive and knowledge based aquaculture. Under this priority axis, the EMFF will support productive investments in aquaculture as well as investments aiming at enhancing the sector's competitiveness and viability; – 10.93% of the total OP resources are allocated to promoting the implementation of the CFP by collection and management of data and by supporting monitoring, control and enforcement; – 15.72% of the total OP resources are allocated to maintaining the economic and social sustainability of the Bulgarian fisheries and aquaculture areas, job creation and diversification within and/or outside fisheries and aquaculture sectors, and the sustainable exploitation of related products through the implementation of comprehensive local development strategies; – 11.19% of the OP allocation will be spent on measures dedicated to fostering marketing and processing; – 2.93% of the OP allocation will be spent on measures under the EU's integrated maritime policy aiming at improving knowledge on the marine environment and the development of part of the Common Information Sharing Environment (CISE); – 4.84% of the OP resources are allocated to technical assistance in order to ensure efficient administration of the EU funding, including support to publicity and information measures as well as evaluations.

1.3.National laws, including scope and year of adoption

To ensure the appropriate legal framework for the implementation of the Operational Program for Fisheries 2007-2013 and to accelerate the absorption level of the on-going funds, a series of regulations influencing the fisheries sector have been elaborated. These documents have been prepared for the purposes of all communitarian provisions application in conjunction with the national ones and respectively for enlarge the national legislation aiming the insurance of the legal, administrative and institutional framework, necessary for a better implementation of the Operational Program for Fisheries.

1.3.1. The specialized communitarian legislation

Fisheries policy for Romania and Bulgaria sits within the context of EU and international fisheries agreements. The international framework is provided by the UNCLOS (1982), FAO Conference Resolution 15/93 and the Agreement of 1995 (Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks). The country also fulfils the commitments of the FAO Code of Conduct for Responsible Fisheries 4/95 as well as the Convention for the International Trade with Endangered Species (CITES).

Legislation in the Republic of Bulgaria relating to the preservation of nature in particular includes the national laws and regulations, and the international conventions. According to the Constitution of the Republic of Bulgaria as part of international law, conventions which have been ratified by the National Assembly are binding on Bulgaria and have priority to domestic law in case of conflict with them. Bulgaria is a participant in the following signed and ratified global and European conventions. (Cap.4.3)

Table 1.3.1.1. The specialized communitarian legislation applicable AM FOP	*Convention on Biological Diversity*
- Regulation (EC) no. 1198/2006 as regards the support of the European Fisheries Fund; - Regulation (EC) no. 498/2007of the Commission for the establishment of detailed rules for implementing Council Regulation (EC) nr.1198/2006 regarding the Fisheries European Fund; - Regulation (EC) no. 2371/2002 of the Conseil	– Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, CITES) – Convention on the Conservation of Migratory Species of Wild Animals (Bonn); – Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar); – Convention on the Conservation of European Wildlife and Fauna and Natural Habitats (Bern);

on the conservation and sustainable exploitation of fisheries resources under the Common Policy for Fisheries; - Regulation (EC, EURATOM) No. 1605/2002 of the Council applicable to the general budget of the European Communities; - Regulation (EC, EURATOM) No. 2342/2002 of 23 December 2002 laying down detailed rules for implementing the Regulation (EC, EURATOM) nr.1605/2002 of the Council regarding the Financial Regulation, applicable to the general budget of the European Communities, with their amended and supplemented follows; - Regulation (EC) no. 104/2000 on the common organization of the market regarding the fishery and aquaculture products; - Proposal for a Regulation of the European Parliament and of the Council on the common organization of the markets for products obtained from fishery and aquaculture - COM (2011) 416 final.	– Convention for the Protection of the World Cultural and Natural Heritage. – Conventions aimed at a specific geographical region and containing general instructions for using it: – Convention on the Protection and Use of Transboundary Watercourses and International Lakes – Convention on Cooperation for the Conservation and Sustainable Use of the Danube – Convention for the Protection of the Black Sea – Conventions aimed at protecting specific species: – Convention on the Conservation of European Wildlife and Fauna and Natural Habitats (Bern Convention); – Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) ; – Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) – introduces a variety of tools for the conservation of sturgeons, including the introduction of export quotas for caviar of sturgeon species, the introduction of authorization for legal traders of caviar sturgeon, the introduction of a registration system for caviar processing enterprises, universal labelling system, etc.

1.3.2. Applicable national legislation MA FOP

***Table 1.3.2.1. Applicable national legislation MA FOP* (in Romania)**	***Applicable national legislation MA FOP* (in Bulgaria)**
- Law no. 82/1991 - Law on Accounting, re-published; - Law no. 500/2002 - Public Finance Law; - GEO no. 74/2009 on the on the management of EU granted funds from the European Agricultural Guarantee Fund, the European Agricultural Fund for Rural Development and the European Fund for Fisheries and the funds allocated from the state budget regarding the management of grants allocated by the European Community and the funds from the state budget dedicated to the program of data collection and management, necessary to conduct the common fisheries policy and to program control, inspection, surveillance in fisheries and for the amending the art.10 of the Law no. 218/2005 on stimulating the absorption of SAPARD Funds, the European Agricultural Fund for Rural Development, European Fund for Fisheries, European Agricultural Guarantee Fund by taking credit risk from guarantee funds, amended and supplemented later; - O.G. no. 15/2009 on some measures for acceleration of the absorption of the allocated amounts by European Agricultural Fund for Rural Development and European Fisheries Fund; - H.G. no. 1014/2008 for the approving of the Methodological Norms/Rules regarding the application of GEO no. 27/2008 regarding the management of granted funds allocated from the European Community by the European Fund for Fisheries and from the co-financing and pre-financing funds allocated from the state/national budget; - H.G. no. 1347/2009 on reinforcing of the management capacity for the fishing operational program; - Order M.F.P. no. 1792/2002 approving the Methodological Norms regarding the commitment, validation, authorization and the payment of expenditure of public institutions and the organization, accounting and reporting of budgetary and local spending;	– Ordinance on the rules and procedure of keeping the fishing logbook and issue and submission of landing declaration (SG, № 106 from 7.12.2001); – Ordinance on the rules and procedure for first sale of fish and other aquatic organisms; – Ordinance on the rules and procedure of use and maintenance of the system for monitoring and control of the fishing vessels, introducing the requirements of EC Regulation № 2244/2003; – Ordinance on the content and procedure of keeping the registers which introduces the provisions of EC Regulation №26 from2004; – Ordinance on the rules and procedure for recognition of organizations which produce fish and other aquatic organisms and inter-branch organizations; – Ordinance №7/27.01.2006. In force from 17.02.2006.Conditions and order of use, support and preservation of the surveillance and control system of the fishing vessels and on board equipment; – FAA,2001 – Changes and additions

- Order M.A.D.R. no. 348/2010 laying down the powers of the General Fishing Direction - Managing Authority for FOP; - H.G. no. 442/2009 regarding the establishing the general framework for the implementation of measures co-financed by the European Fund for Fisheries by the Operational Program for Fisheries 2007-2013, after, amended and supplemented; - Order M.A.P.D.R. no. 392/2009 regarding the approving of the list of eligible costs for projects funded under the Operational Program for Fisheries 2007-2013, amended and supplemented; - Order M.F.P. no. 522/2003 for the approving of the general Methodological Norms regarding the exercise of the general preventive financial control with subsequent amendments; - H.G. no. 725/2010 on the reorganization&operation of MARD & its subordinated structures, after amended&supplemented; - Order M.A.D.R. no. 1067/2010 regarding the approval of the organizational structure and state nominated functions of the Ministry of Agriculture and Rural Development; - Order M.A.D.R. no. 584/2010 regarding the approval of Regulation for organizing and functioning of the Ministry of Agriculture and Rural Development, amended by the Order MARD, nr.1068/2010; - Order M.A.D.R. no. 243/2010 on the employment, validation, authorization and payment of expenditures.	concerning: licenses, prohibitions, regulations and control of fishing vessels and stationary fishing gears from 01.01.2007 according to obligations of Bulgaria to follow CFP of EU without transition period taken into account. – FAA, 2001 and 2012 amendments Art.35(4) The gears using electric current, shotguns, harpoons could be used for scientific purposes with special permission issued by the Minister; – Art.35(5) Minister of Agriculture and Food, on the base of Executive Director of NAFA defines the zones free of Beam-trawling ; – Art.35(6) In such zones is forbidden the fishery of vessels without special surveillance equipment on board; – Art. 36(1) Additional nets are forbidden for use in case they have mesh size less than stipulated in Art.15 (1) FAA.

1.3.3. Romania adopts measures for sustainable use of aquatic resources

Romania adopts the following measures to contribute to efficient fishing activities for a competitive and viable sector by the economic point of view:

- Law on the Constitution of the Biosphere Reserve "Danube Delta" No. 82/20.11.1993;
- Law on Environmental Protection No. 137/1995;
- Order No. 179/1 June 2001 regarding the Registering and transmission of the data related with the marine fishing activity;
- Order No. 262/16 July 2001 regarding the Preparation of the Directory of Vessels and Fishing boats;
- Order no. 422/30 October 2001 for approval of the Regulation on the conditions for development of the commercial fishing activities in the Black Sea waters;
- Common Order of the Ministry of Environment regarding conservation of the sturgeon populations from natural waters 262/2006;
- Order no. 344/2008 for approval of the operational and functional manner of fishing vessel and boats file;
- Order no. 342/2008 on minimal size of the aquatic living resources;
- Order no. 449/2008 on technical characteristics and practice conditions for fishing gears used in the commercial fishing;
- OUG on Fishing Fund, Fishery and Aquaculture No. 23 /2008;
- Law 317/2009 approving Government Emergency Ordinance OUG 23/2008 on fishing and aquaculture;
- Annual orders for prohibition for the delimitation of fishing zones, gear, species and prohibited fishing periods.

The general legal framework for the fisheries sector in Romania is in line with the European legislation.

1.3.4. Normative acts affecting the FOP implementation, prepared, reviewed/completed during 2011 (Romania)

- Law no. 95 of 6 June 2011 regarding the approval of the Government Emergency Ordinance no. 114/2010, completing the Government Emergency Ordinance no. 74/2009 on the management of EU granted funds from the European Agricultural Guarantee Fund, the European Agricultural Fund for Rural Development and the European Fund for Fisheries and the funds allocated from the state budget regarding the management of grants allocated by the European Community and the funds from the state budget dedicated to the program of data collection and management, which are necessary to conduct the common fisheries policy and to the program control, inspection and surveillance in fisheries and for the amending the art. 10 of the Law no. 218/2005 on stimulating the absorption of SAPARD Funds, the European Agricultural Fund for Rural Development, the European Fund for Fisheries, the European Agricultural Guarantee Fund by taking credit risk from guarantee funds, published in the *Official Monitoring/Gazette no. 404 of 09.06.2011;*
- Government Decision no. 778/3.08.2011 amending art. 18 of Government Decision no. 442/2009 for establishing the general framework for the implementation of measures financed by the European Fund for Fisheries by the Operational Program for Fisheries 2007-2013, published in the *Official Monitoring/Gazette no. 566 of 08.09.2011;*
- Government Decision no. 1294/27.12.2011 amending and supplementing the Government Decision no. 442/2009 regarding the establishment of the general framework for the implementation of measures financed by the European Fund for Fisheries by the Operational Program for Fisheries 2007-2013, published in *Official Monitoring/Gazette no. 939 of 30.12.2011*;
- Government Decision no. 1356/23.12.2010 amending and supplementing Government Decision no. 442/2009 on establishing the legal framework for the implementation of measures financed by the European Fund for Fisheries by the Operational Program for Fisheries 2007-2013, published in *Official Monitoring/Gazette no. 7 of 04.01.2011;*
- The Minister of Agriculture and Rural Development Order no. 392/2009 approving the list of eligible expenses for projects financed by the Operational Program for Fisheries 2007-2013, published in *Official Monitoring/Gazette no. 587 of 19.08.2011;*
- Minister of Agriculture and Rural Development Order no. 117/24.05.2011 for the repeal of Section II, lit. C, position no. 2 of the Annex to the Minister of Agriculture, Forests and Rural Development no. 392/2009 approving the list of eligible costs for projects funded under the Operational Program for Fisheries 2007-2013, published in *Official Monitoring/Gazette no. 380 of 31.05.2011;*
- Minister of Agriculture and Rural Development Order No. 47/24.02.2011 on approval of the procedures manuals for Fisheries Operational Program, as next amended and supplemented, un-published in the Official Gazette;
- Minister of Agriculture and Rural Development Order no. 11/14.01.2011 to modify the Methodological Norms for the application of Government Emergency Ordinance no. 74/2009 on the management of EU granted funds from the European Agricultural Guarantee Fund, the European Agricultural Fund for Rural Development and the European Fund for Fisheries and the funds allocated from the state budget regarding the management of grants allocated by the European Community and the funds from the state budget dedicated to the program of data collection and management, which are necessary to conduct the common fisheries policy and to the program control, inspection and surveillance in fisheries and for the amending the art. 10 of the Law no. 218/2005 on stimulating the absorption of SAPARD Funds, the European Agricultural Fund for Rural Development, the European Fund for Fisheries, the European Agricultural Guarantee Fund by taking credit risk from guarantee funds, approved by the Ministry of Agriculture and Rural Development no. 16/2010, published in *Official Monitoring/Gazette no. 193 of 21.03.2011.*

- Minister of Agriculture and Rural Development Order no. 24/28.01.2011 amending the Annex to the Minister of Agriculture, Forests and Rural Development no. 392/2009 regarding the approval of the list of eligible costs for projects funded under the Operational Program for Fisheries 2007-2013, published in *Official Monitoring/Gazette no. 97 of 02.07.2011*.

1.3.5. Normative acts supporting the FOP implementation. National Legislation in Bulgaria

- Biological Diversity Act (BDA) – BDA transposes the basic principles and requirements of the Birds Directive and the Habitats Directive. The Law regulates the establishment of the National Ecological Network as part of the European ecological network Natura 2000.
- Fisheries and Aquaculture Act (FAA) – registration of persons keeping and breeding fish and other aquatic organisms, control of fisheries and aquaculture; introduction of bans on fishing during spawning, in certain subjects or areas thereof; introducing temporary bans on catch in change in the status of stocks of certain fish species; introduction of specific prohibitions on the use of equipment and gear for catching fish; aquaculture development as a measure limiting pressure on natural resources.
- Water Act (WA) – regulates key issues concerning the rules for the use and protection of water resources.
- Environmental Protection Act (EPA) – fundamental law, the provisions of which are developed in numerous special laws such as the BDA and the FAA.
- Veterinary Law, Food Law, Law on the Bulgarian Agency for Food Safety - Control of production, transport, processing and marketing of fish and fish products.
- Ordinance on the conditions and procedures for assessing the compatibility of plans, programs, projects and investment proposals with the object and purpose of the conservation of protected areas (adopted by Decree № 120 of 31.08.2007 of the Council of Ministers, promulgated in State Gazette No. 73 of 11/09/2007).
- Ordinance № 37 of 10.11.2008 on the use of dams – state property, in regard to fish husbandry and the conduct of business, recreational fisheries and aquaculture production sites – state property, under Article 3, paragraph 1 of the Fisheries and Aquaculture Act (promulgated, State Gazette No. 100 of 2008, amended and supplemented. State Gazette No. 18 of 01.03.2011).
- Order № РД -09-43/20.01.2012 of the Minister of Agriculture and Food on ban on sturgeon species catch in Bulgarian waters of the Danube and the Black Sea for a period of 4 years as of 01.01.2012 on.

1.3.6. Aquaculture legal base

The list of most important legislation documents concerning aquaculture industry in Bulgarian Black Sea waters are listed below:

- FAA,2001,Chapter IV(Aquacultures,St.Gazzete,94/2005, in force from 01/01/2006);
- National law for waters11.08.2006;
- Bulgarian national programme for collection, management and use of fisheries data (2008);
- Environmental protection act 25.09.2002 /last amendment 24.04.2012/;
- On the rules for ecological assessments of plans and programmes (http://www3.moew.government.bg/files/file/Legislation/Naredbi/NAREDBA_za_usloviqta_i_reda_za_izvyrsvane_na_ekologicna_ocenka_na_planove_i_programi_Zagl_izm_DV_br_.pdf)
- Water Act: (http://www3.moew.government.bg/files/file/PNOOP/Acts_in_English/Water_Act.pdf 28.01.2000 /last amendment 01.01.2011/
- Ordinance N1 for water monitoring/repealing; Order N5 for water monitoring/ (http://www3. moew.government.bg/files/file/Legislation/Naredbi/vodi/N1_monitvodi.pdf11.04.2011

- Ordinance N 2 for protection of water from pollution from agricultural sources /repealing Order N 2 for protection of water from pollution from agricultural sources since 16/10/2000 /http:// www3.moew.government.bg/files/file/Legislation/Naredbi/vodi/N2_nitrati.pdf13/09/2007
- Ordinance № 8, Quality of Marine Coastal Waters
- Ministry of Environment and Waters, Ministry of Health, Min of Regional Development (http:// www3.moew.government.bg/files/file/Legislation/Naredbi/vodi/N8_kraibrvodi.pdf02/02/2001
- Ministerial ordinance N 321 for establishment of priority and priority dangerous substances in water area 05/06/2007
- Ordinance N 13 for the characterisation of surface water 08/05/2007
- Plan for the water management in the Black Sea Basin, Directive 2000/60/EC 13.05.2013
- Ordinance N 4 on the order for execution of first sale of fish and other aquatic organisms.
- Ordinance N 7 on the conditions and order for use, maintenance and keeping of the vessel monitoring system.
- Ordinance N 41 for the conditions and order for recognition of fish and other aquatic organisms
- Producer organisations.
- Ordinance N 43 for the order for keeping fishing log-books.
- Ordinance N 54 for keeping registers for licenses for commercial fishing, tickets for non-commercial fishing, aquaculture producers, fishing fleet, centres for first sale of fish and other aquatic organisms, registered buyers, producers' organisations and manufacturers organisations.

2. Current situation of Romania and Bulgaria marine fisheries and fishing areas

The Romanian fishing fleet is operating in the area of competence of the Regional Fisheries Management Organisations - GFCM, Area 37 - Mediterranean and Black Sea, Sub-area 37.4., Division 37.4.2, GSA 29.

Small-scale fisheries using traditional techniques for subsistence or for selling the fresh product at local fish markets represent 90% of the Romanian fishing fleets. This sector is characterised by low technological investments and limited infrastructures (i.e. landing facilities, catch storage, etc.).

The evolution of the Black Sea ecosystem from the 1950s until the present is quite characteristic of inland seas subject of land-based pollutions and other human influences.

In a period of only three decades (after the 1970's), the environment of the Black Sea has deteriorated dramatically in terms of its biodiversity, habitats, fishery resources, aesthetic and recreational value and water quality.

Increasing loads of nutrients from rivers caused on overproduction of micro-phytoplankton, which in turn blocked the light reaching the sea plants and algae, essential components of the sensitive ecosystem of the North-Western shelf. The entire ecosystem began to collapse.

This problem coupled with pollution and irrational exploitation of fish stocks, triggered a sharp decline in the fishery resources.

To make matters worse in the mid of the 1980's, a jellyfish - like species (*Mnemiopsis leidyi*), which was accidentally introduced from the ecosystem seaboard of America in the ballast water of a ship, invaded the Black Sea. Its diet included fish larvae and the tiny animals small fish feed upon.

Fishery was the most affected sector by the dramatic changes of the Black Sea ecosystem. On the other hand, fishing activities contribute themselves to the worsening of the ecological situation and for the depletion of the fish stocks through: open access resources management regime applied

individually by each coastal country; overfishing and illegal fishing; and the use of destructive harvest technique.

The composition of the Black Sea ichthyofauna has changed in response to the alterations of the living conditions in the sea. Some of the changes had an impact on coastal and shelf waters; others, on the pelagic zone, affecting common and rare species, juveniles and adults, commercial and non-commercial species.

It is fair to say that, in terms of the number of species, the Black Sea fauna has not suffered a decline in biodiversity in the last 2-3 years (comparing with last three decades); on the contrary, it has even gained two species. One of them is *Centracanthus cirrus*, which penetrated the sea from the Mediterranean, thus proving that the process of the mediterranisation of the Black Sea fauna is continuing. The second, is the Far-Eastern harder *Liza haematochella*, which was brought from the Sea of Japan for acclimatisation to the Black Sea and escaped free in natural waters.

Changes in the ichthyofauna composition of the Black Sea have primarily involved alterations in the number of individuals in specific populations. For many species, fish populations have declined so sharply that they have lost their importance for commercial fishing, and remain within the Black Sea ichthyofauna only as zoological representatives of the species.

Distribution areas for the fish species present in commercial catches were defined on the basis of available information for Romanian littoral, i.e. data from scientific surveys (in the last 15 years more than 45 scientific surveys have been undertaken for determination of the abundance and distribution of eggs, larvae, juveniles and fishing agglomerations), information on catches and landings, as well as other types including indirect and bibliographic information and expert estimates.

Bulgaria

Bulgaria's fish and seafood industry follows the EU Common Fisheries Policy (CFP). The CFP is a set of rules for managing European fishing fleets and for conserving fish stocks. Designed to manage a common resource, it gives all European fishing fleets equal access to EU waters and fishing grounds and allows fishermen to compete fairly.

The overall management, observation and control of the fishery, aquacultures and trade with fish and other aquatic organisms is carried out by the Executive Agency of Fisheries and Aquaculture (EAFA) at the Minister of Agriculture and Foods.

The Executive Agency of Fisheries and Aquaculture (EAFA) is a legal entity at budget maintenance with headquarters in Burgas and 27 regional fisheries inspectorate responsible for monitoring and control of activities on the ground.

The activity and the structure of EAFA shall be determined by a structural regulation, approved by the Council of Ministers.

The main activities of the Executive Agency for Fisheries and Aquacultures are:

- Applying the Common fishery policy (CFP);
- Control of fisheries, aquacultures and first sale of fishery products;
- Granting fishing licenses and authorizations;
- Registration of aquaculture farms;
- Registration of first sale auctions and registered buyers;
- Validation and verification of catch certificates at import/export of fishery products;
- Allocation of quotas for fish and other aquatic species;
- Conservation of fish stocks and control for respecting the rules for fisheries;
- Granting rights for utilization of fish resources – state property;

– Representation of Bulgaria in international organizations.

The Agency maintains a National Information Statistical System for Fisheries and Aquaculture (NIFSS). Statistical data are processed, summarized, analysed and stored as:

– register of permits issued for commercial fishing;
– register of issued angling;
– register of aquaculture farms;
– register of fishing vessels (with the Executive Agency "Maritime Administration");
– register of centers for the first sale of fishery products;
– register of buyers registered in accordance with the FAA;
– register recognized by MAF producer organizations and professional organizations in the sector;
– register the rights to catch fish with regard to permits issued for research purposes; administrative and criminal activities imposed in accordance with the provisions of the FAA; production of fish and other aquatic organisms; catching fish and other aquatic organisms;

The implementation of the Common fishery policy is supported by the research capacity built, consisting of the following scientific institutes and organisations:

– Institute of Biodiversity and Ecosystem Research at the BAS (IBER);
– Institute of Oceanology – Varna at the IO BAS;
– Institute of Fishery Resources, Varna (IFR); Institute of Fishery and Aquaculture, Plovdiv (IFA);
– Trakia University, Stara Zagora;
– Sofia University, Faculty of Biology, Sofia. The identified scientific units have their own bases for research and studies.

The Ministry of Environment and Waters of Bulgaria draws up specific legal acts regarding environment protection, waters management and marine biodiversity. The control functions are exercised by the Regional Inspectorates of Environment and Water.

Bulgarian Food Safety Agency (BFSA) is an integrated body for controls of safety and quality of food and feed in Republic of Bulgaria. Being established in 2011, BFSA provide the legal framework and development of the specific regulations and standards for the activities in the veterinary and food safety field and control functions in the areas of safety and quality of food, veterinary medicine and animal welfare.

National Veterinary Service (NVS) to MAF state administration has the power to control all activities, businesses and facilities in fisheries and aquaculture related health requirements and standards. HBC organized system of state veterinary supervision and control in processing plants of fish products registered sites for aquaculture (fish farms), organized a national system for Disease Control fish, treatment and prevention and issuing veterinary certificates for fishery products aquaculture for sale in all markets, transportation, processing, import and export. The central and regional veterinary laboratories NVS monitor and control all aspects of veterinary and sanitary condition and safety of the production of fish / aquaculture.

National Diagnostic and Research Veterinary Institute is part of the structure of the NVS. The Institute has special responsibilities and obligations in the field of veterinary and sanitary control in the fisheries and aquaculture sector and has a laboratory specializing in the monitoring of diseases in fish.

Executive Agency "Maritime Administration" at the Ministry of Transport is a state body that registered fishing vessels in the fishing fleet register.

2.1. Sub-sectors: artisanal, semi-industrial and industrial fisheries

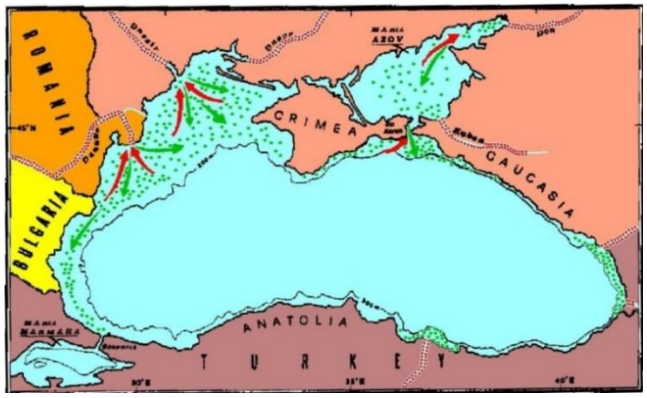
2.1.1. Black Sea Fish Species

Distribution areas for the key aquatic organisms (commercial fish species and invertebrates) were defined on the basis of available information for Romanian littoral, as well as other types including indirect and bibliographic information and expert estimates.

Present report makes in summary a description of peculiarities in distribution of the key commercial adult fish specimens in the Romanian Black Sea area during spawning, fattening and wintering, as well as distribution of the juveniles during different seasons.

- **Danube sturgeon -** *Acipenser gueldenstaedti colchicus*, 1940

Marine demersal species, migratory, anadromous, enters in fresh water for spawning. In the sea exists and especially wintering in the area of mytiloid and faselynoid facies, at 60-70m depth. By zoning point of view, depending on season, starry sturgeon occurs at 2-100m depths. A part of juveniles are stationing in front of Danube mouths 1-2 years, after that are going in the sea.



areas of distribution and network of fishing station;

migration to the sea water
migration to freshwaters for reproduction;

- **Starry sturgeon -** *Acipenser stellatus* Pallas 1771

Demersal species in the daytime, on sandy, oozy bottoms, especially near the shore from 10m to 40m in the spring and summer period and from 40-100m in the autumn. Juveniles make agglomerations in the sea in front of Danube mouths. Fig. 2.1.1.1 Migration routes, spawning, feeding and wintering areas for sturgeons

Beluga - *Huso huso* (Linnaeus, 1758)

Anadromous marine species, semi-pelagic, in the coastal waters from 70 until 180m depth. In the sea the adults mainly inhabits the pelagic zone, in the oozy facies, at depths of 50-100m, water salinity of 18-24‰. For beginning the juveniles remain in front of Danube mouths, later are spreading on whole continental shelf.

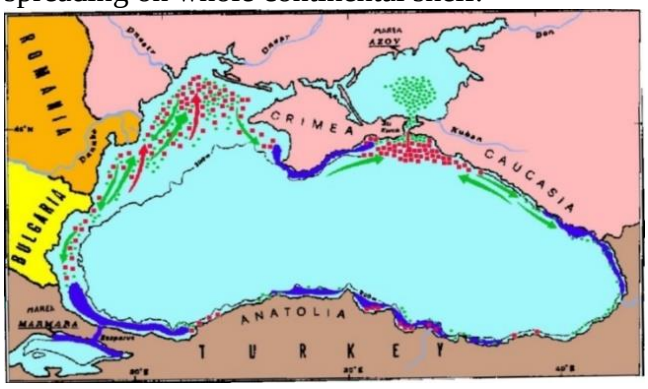


Fig. 2.1.1.2. Migration routes, spawning, feeding and wintering areas for red mullet

- **Red mullet**

Mullus barbatus ponticus Essipov, 1927

Gregarious, demersal species, found on muddy bottoms or gravels and sandy bottoms of the continental shelf between 5m and 100m depth. In the spring, at temperature of 7-8 ^{o} C, appears near of the shore; when the water is warming at 15-16 ^{o} C, going back to higher depths. Reproduction occurring in the period June - September, on muddy or sandy bottoms, from 10m to 55m. Fig. 2.1.1.2.

➢ **Bluefish -** *Pomatomus saltatrix* (Linneaus, 1766). Fig. 2.1.1.3

Adults and especially juveniles occur near shore at temperature of 20-26 ^{o} C. From October - November leaves to deep water, probably in southern part of the Black Sea. In the Romanian Black Sea waters, juveniles has been signalled especially in northern part, both near to shore and also offshore.

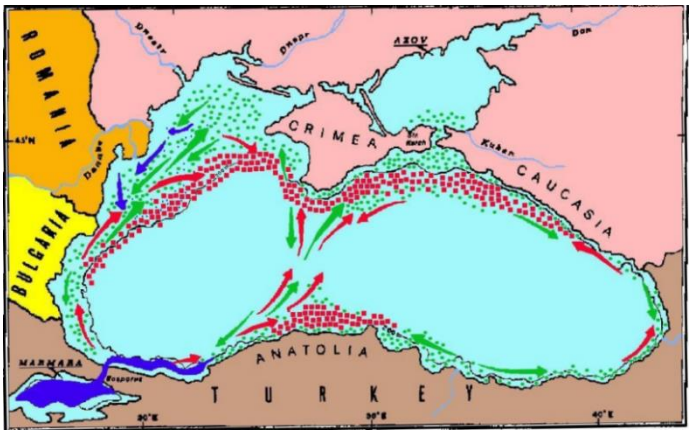


Fig. 2.1.1.4. Migration routes, spawning, feeding and wintering areas for bluefish

Sea trout - *Salmo trutta labrax* Pallas,1811

Marine species, widespread along whole littoral in the coastal waters up to 80m depth, from spring until autumn.

➢ **Bonito -** *Sarda sarda* (Bloch, 1793). Fig. 2.1.4

Species often encountered in the Romanian catches in the period of the years '50-60, absent a long periode of time, reappear at Romanian coast in the last years between Vama - Veche and Cape Midia from May to November.

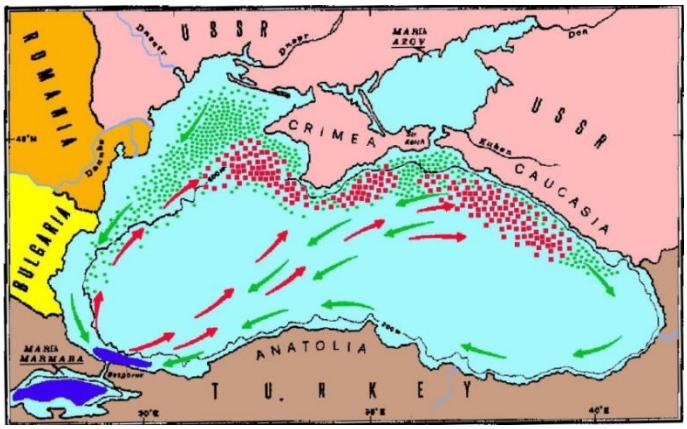


Fig. 2.1.1.4. Migration routes, spawning, feeding and wintering areas for bonito.

➢ **Atlantic mackerel -** *Scomber scombrus* Linnaeus, 1758. Fig.no.2.1.1.5

In the Romanian waters appears in April - May at water temperature of 8^{o} C, but also in the May - June interval. In the last years was signalled very rarely at Romanian littoral, only few specimens in the area Mamaia - Cape Midia. Eggs and larvae are not signalled in the Romanian Black Sea area.

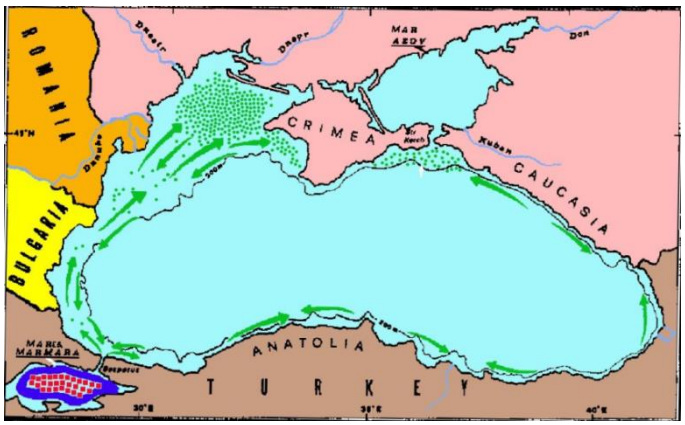


Fig. 2.1.1.5. Migration routes, spawning, feeding and wintering areas for atlantic mackerel

Turbot- *Psetta maxima maeotica* (Pallas, 1814).

Marine demersal species, specific of the sandy, rocky or mixed bottoms. In winter, adults are encountered at depths of 60-70m; in spring (March - April) are nearing of shore until 18 - 30m for reproduction. After spawning, adults are spreading and retiring again towards deeper water. Turbot migrations are relative shorts and perpendicular on shore.

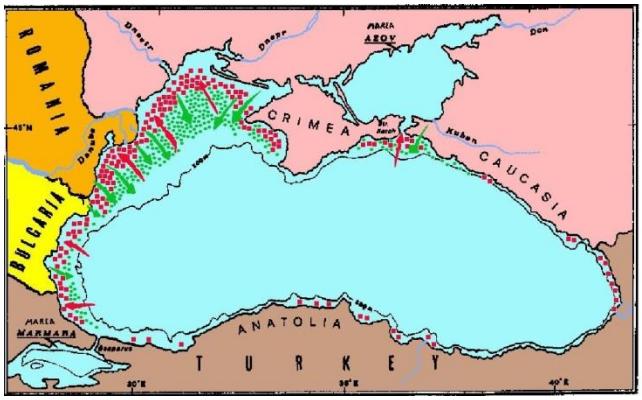


Fig. 2.1.1.6 Migration routes, spawning, feeding and wintering areas for turbot routes

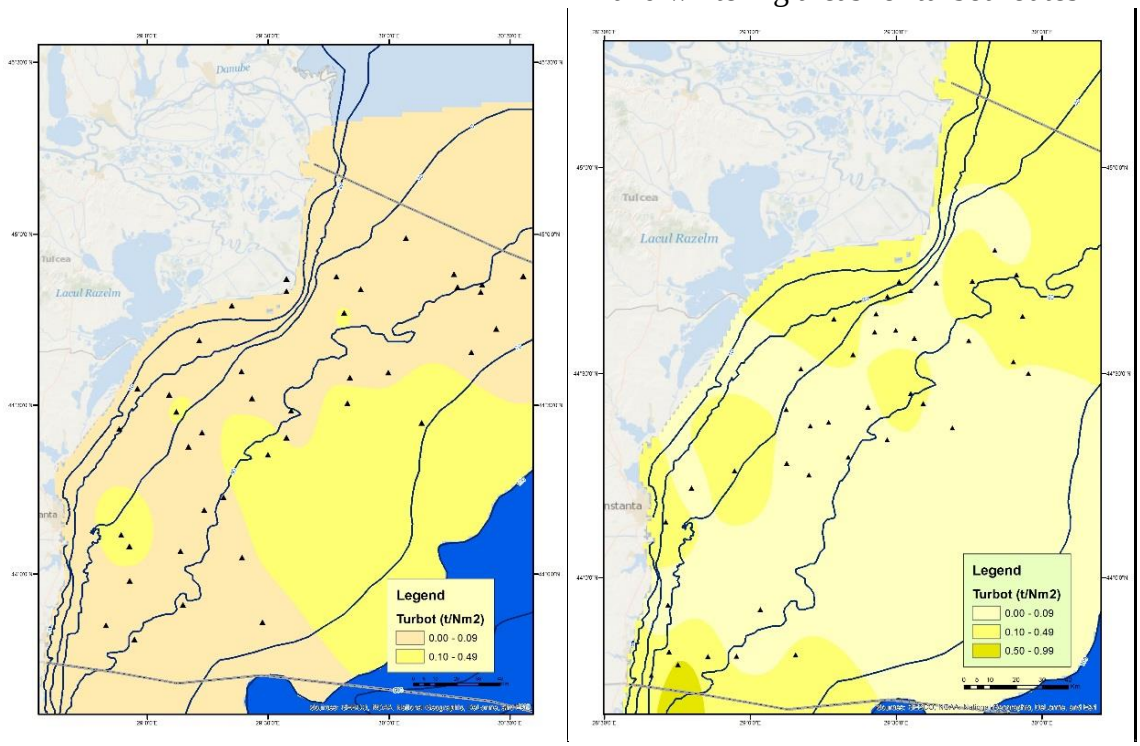


Fig. 2.1.1.7. Turbot biomass distribution in spring (a) and autumn (b), 2013 (NIMRD data)

- **Spiny dogfish** - *Squalus acanthias* Linnaeus, 1758

Migratory species lives in cold water. Concerning spatial and temporal distribution at Romanian littoral of this species, researches have demonstrated that dogfish has two seasons to approaching of the shore: first in April - June and second in October - November at a depth ranged between 20-50m. In the winter and spring time, dogfish inhabiting the marine areas with depths over 65m until 120m, while in June - August is encountered at depths until 60m being disperse in water mass.

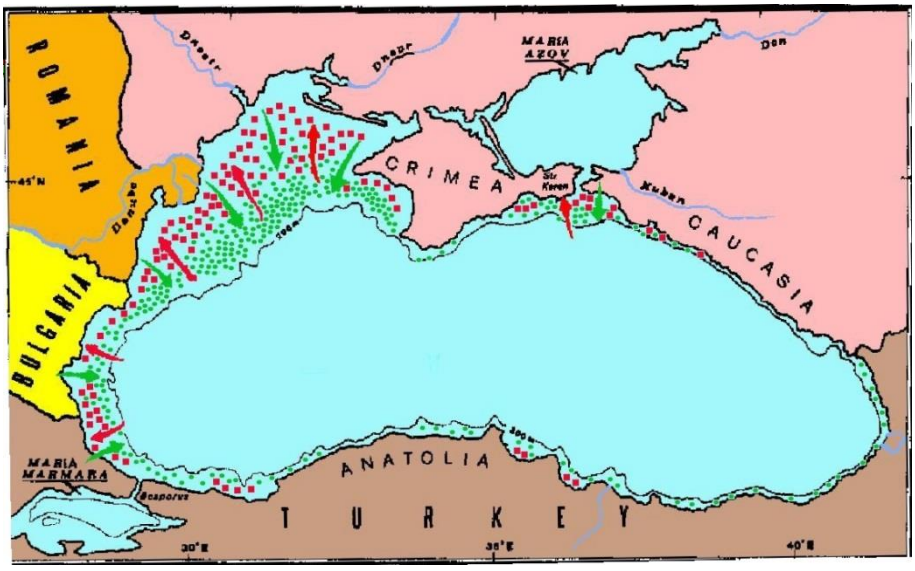


Fig. 2.1.1.8. Migration routes, spawning, feeding and wintering areas for spiny dogfish

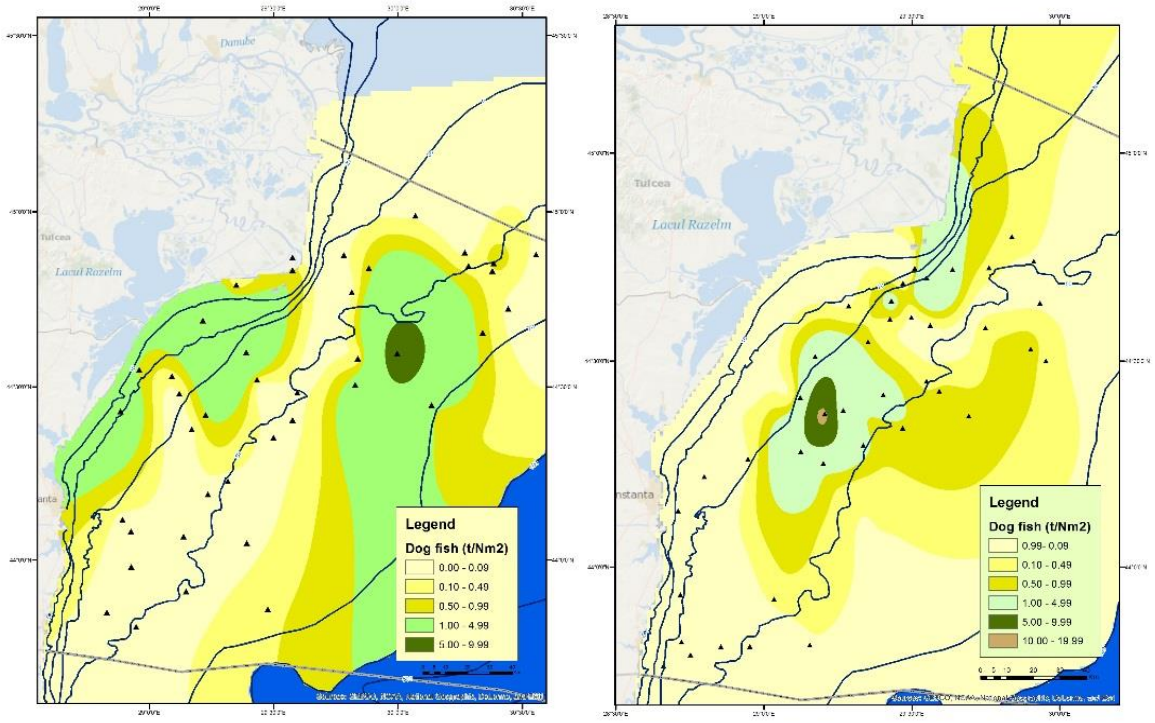


Fig. 2.1.1.9. Spiny dogfish biomass distribution, in spring (a) and autumn(b), 2013 (NIMRD data)

- **Sprat -** *Sprattus sprattus* L., 1758. Fig.no.2.1.10.

Marine pelagic species. Forms important agglomerations and performs unregulated migrations between nutrition areas and spawning places determined by temperature conditions. In the spring exists a tendency of movement of the shoals toward coast and northwards and toward offing in the autumn, but are not exist specific migrations of spawning or feeding.

The sprat wintering offing at depths of 80-100m; in April - May is nearing of littoral area in exploitable quantities, while in the summer avoids high water temperature performing migrations from coast to offing.

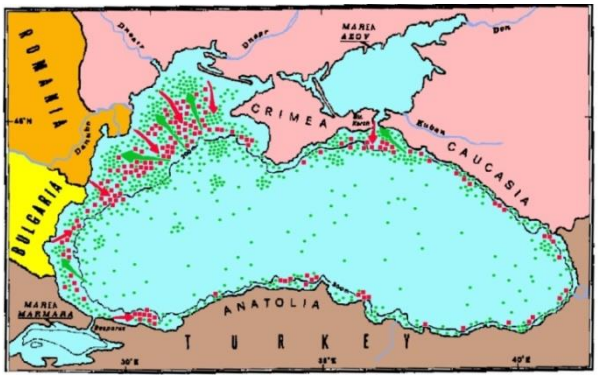


Fig. 2.1.1.10. Migration routes, spawning, feeding and wintering areas for sprat

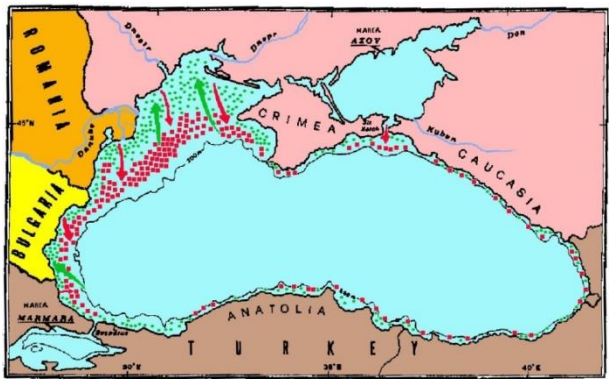


Fig. 2.1.1.11. Migration routes, spawning, feeding and wintering areas for whiting

➢ **Whiting -** *Merlangius merlangus* (Linnaeus, 1758). Fig. 2.1.11.

Marine bentho-pelagic species, in cold water, mostly is encountered in coastal waters until 200m depth, on continental shelf from 10 to 130m, on mud and gravel bottoms, but also on sand and rock. In spring and autumn found near shore while in summer when the temperature increases it gives way offing and is nearing of coast only with cold-water streams. Juveniles found closer to shore, from 5m to 30m depth.

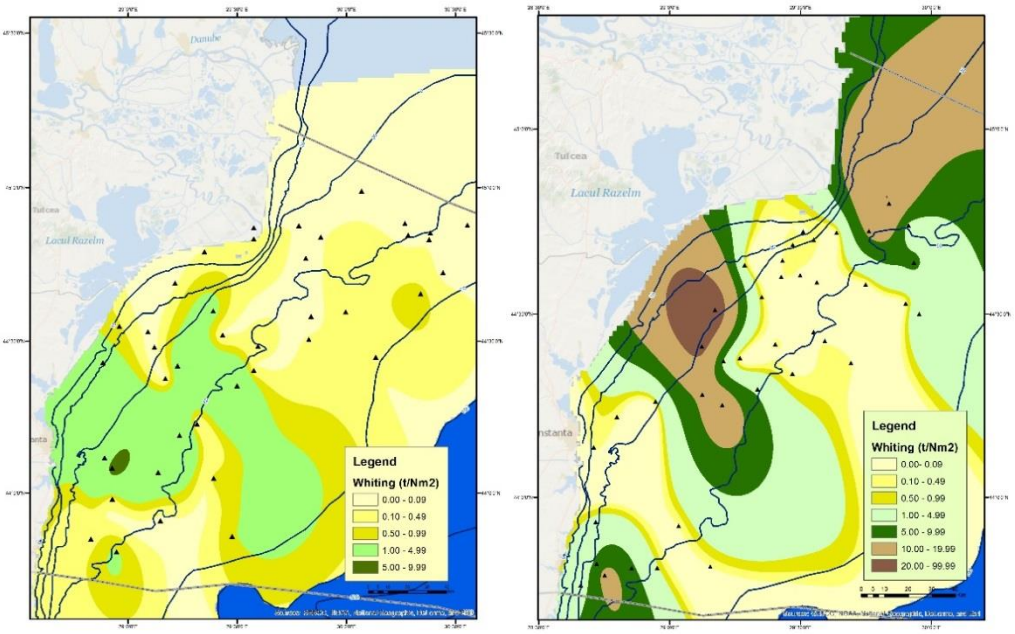


Fig. 2.1.1.12. Whiting biomass distribution, in spring (a) and autumn (b), 2013/NIMRD

➢ **Horse mackerel** -*Trachurus mediterranean ponticus* Aleve, 1956. Fig. 2.1.1.13.

Appearance of the horse mackerel at Romanian littoral is closely related to water heating up to 14 °C in the last decade of May. The nearness of the shoals to our littoral is favoured by the salinity of 12-16‰ and southern winds. Horse mackerel remains in front of Romanian littoral till October. In

this period, function of environmental variations, horse mackerel shoals perform movements on whole littoral between coast and open sea.

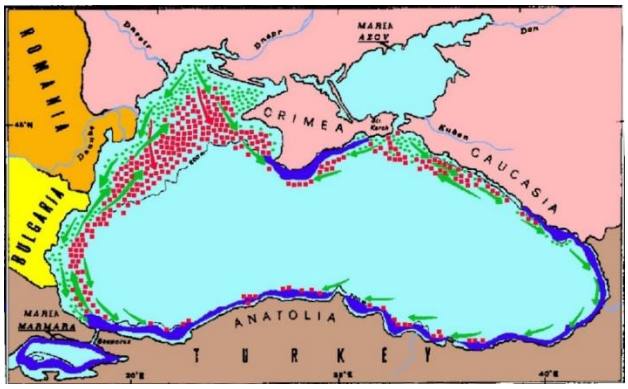


Fig.no. 2.1.13.Migration routes, spawning, feeding and wintering areas for horse mackerel

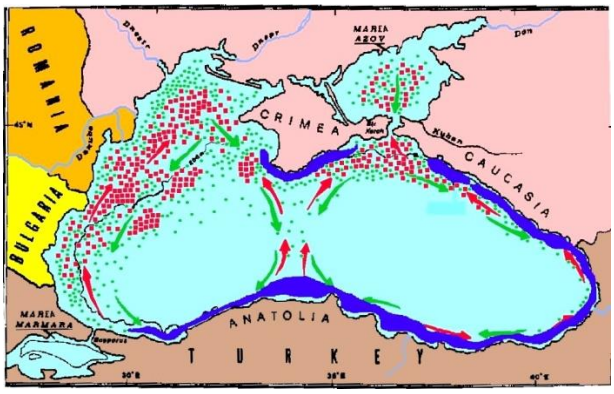


Fig. 2.1.1.14. Migration routes, spawning, feeding and wintering areas for anchovy

- **Anchovy -** *Engraulis encrasicolus* L., 1758. Fig.no.2.1.1.14.

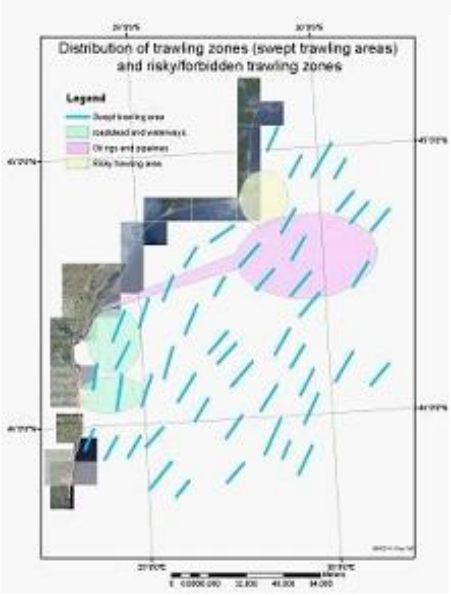
Marine, pelagic, gregarious, coastal species, forms large schools.

Migrations are unregulated, from open sea to coast and vice versa, function of thermic conditions and food. In March - April (when water reaches the temperature of 13-14 °C) migrates toward northern part on western and east coast where feeds intensive. Migration for wintering begins in October and follows the same route. Larvae and juveniles, mostly are found in the spawning area where also are feeding.

2.1.2. Vessels

Romanian fleet operates up to 30–35 nautical miles out in the Black Sea (Figs. 2.1.2.1, 2.1.2.2).

1



2

Trawl fishing has a seasonal pattern linked to the presence of the fish in the areas.

In the last decades the new conditions of fishing practice, with the ceasing of state subsidy to the principles of alignment and competitive economy, have led to radical changes in the conditions for national marine fisheries.

Fig. 2.1.2.1. Distribution area for passive fishing gears

NIMRD: Fig. 2.1.2.2. Trawling area in the Romanian coast

In the same time, the competition created by the opening of imports on fishery products, especially imports of frozen fish, the lack of experience of exploitation under the new conditions, the high age of the vessels and especially the rising cost of fuel and maintenance have led to a drastic involution of active fishing in the Romanian Black Sea.

Year after year the fishing activity decreased gradually in Romanian till 2015. 20 vessels with LOA between 24-40 m were registered in the 90s. In last years only one or two vessel were active and only for a very short period of time, as the Fishing Fleet Register shown. In 2015, the total number of boats registered was 151; only 127 have been active, most of them having LOA of 6 - 12 m (79,53%). These boats mainly used gillnets and long lines. This small fleet is typically artisanal and target different species using a pool of fishing gears. Fishermen switch gear on a seasonal basis several times throughout the year.

This fleet is in poor conditions and needs improvements of safety on-board, working conditions and facilities for landing.

Traditionally, fishing activities in the Romanian Black Sea area are carried out in two ways:

Coastal trawlers, equipped with pelagic trawls and turbot gillnets, operating at depths greater than 20 m. In 2013 they have started working with beam trawl, with this fishing gear being equipped boats/vessels over 12 m length. During a fishing season, a vessel may alternate the use of fishing gear such as pelagic trawls, beam trawls or gillnets for turbot (NIMRD, 2009-2013).
Fishing practiced along of the coastline in about 28 landing sites between Sulina and Vama Veche, in the coastal area with shallow waters (3,0 – 11,0 m) with set gear (pound nets, gillnets, long lines, and beach seine) and up to 40 – 60 m depth, with gillnets and long lines mainly for turbot and dogfish (NIMRD, 2009-2013).

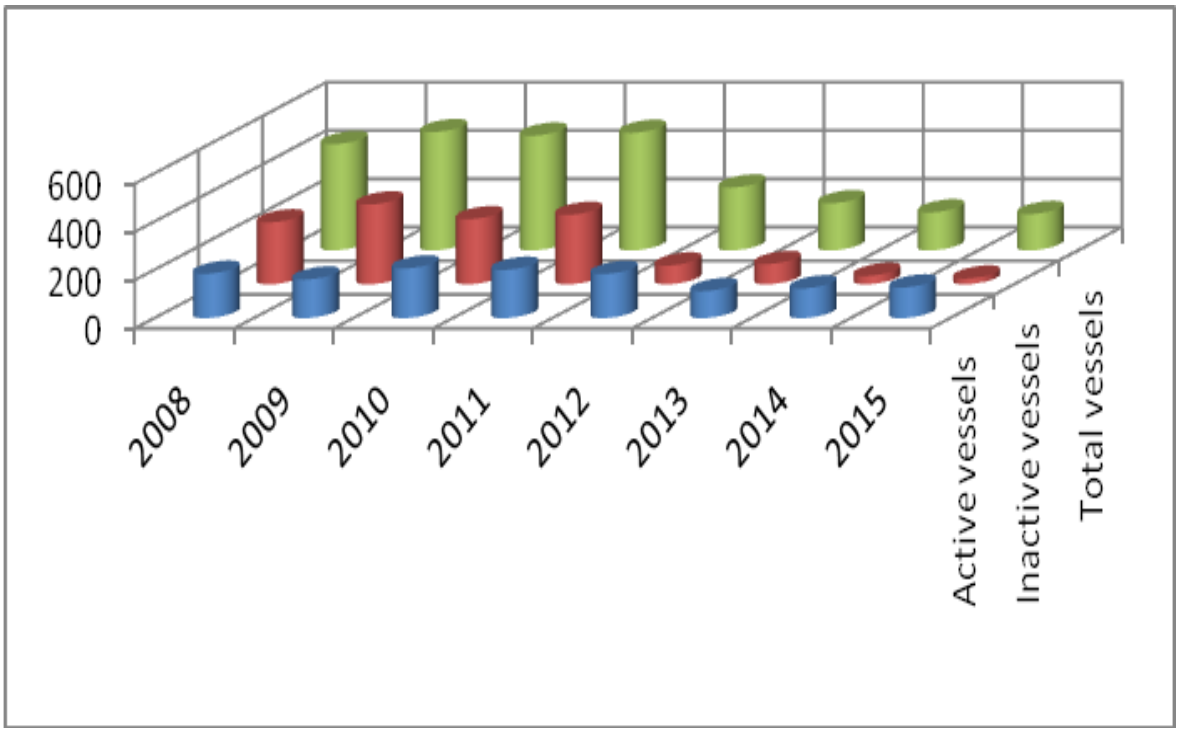


Fig. 2.1.2.3 Number of active and inactive fishing vessels

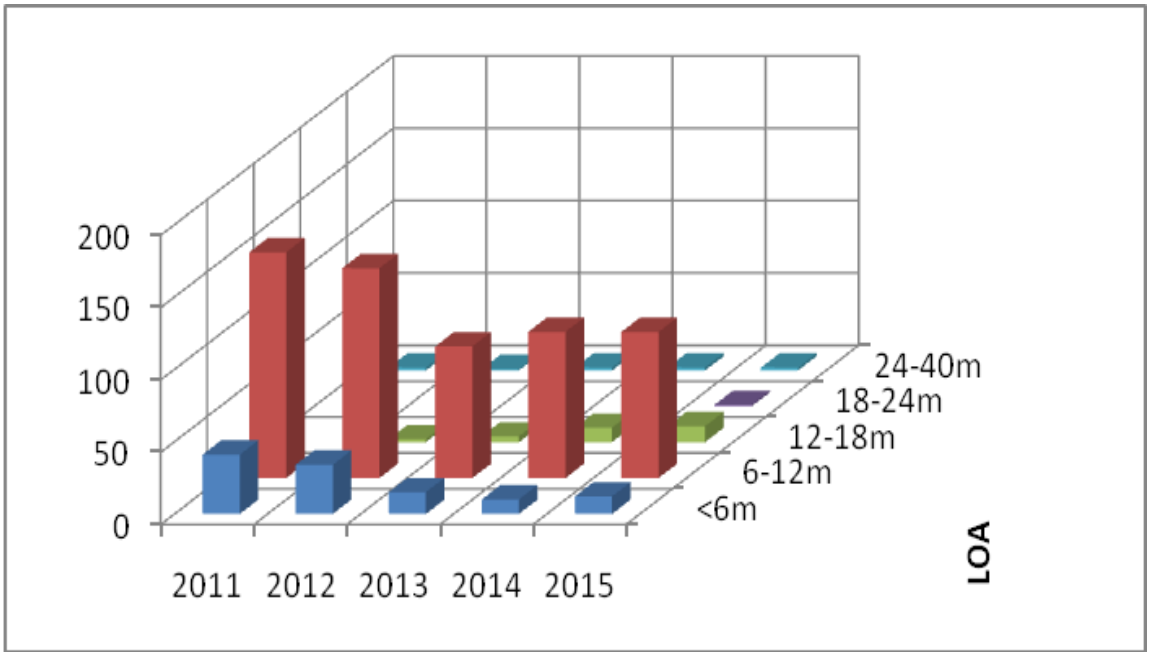


Fig. 2.1.2 4. Number of active fishing vessels by length class

Table 2.1.2.1. Technical characteristics of the Romanian fishing fleet

Fleet segment	No. Boats/ vessels	Total length (m)	GT total	KW total	Total age	Average Age	No. fishermen
0 - 6 m (PG)	12	60.93	8.78	201.84	192	16.0	33
0 - 6 m (inactive)	4	21.25	3.16	10	80	20.0	4
6 - 12 m (PG)	78	594.17	120.39	1256.46	1574	20.2	169
6 - 12 m (PMP)	23	192.42	65.25	678.42	432	18.8	58
6 - 12 m (inactive)	20	145.5	25.38	196.29	306	15.3	17
12 - 18 m (PMP)	11	160.95	340.37	2305	90	8.2	42
18 - 24 m (PMP)	1	20.2	70	272.06	16	16.0	5
24 - 40 m (PMP)	2	52	240	1111.6	31	15.5	13
TOTAL	**151**	**1247.42**	**873.33**	**6031.67**	**2721**		**341**

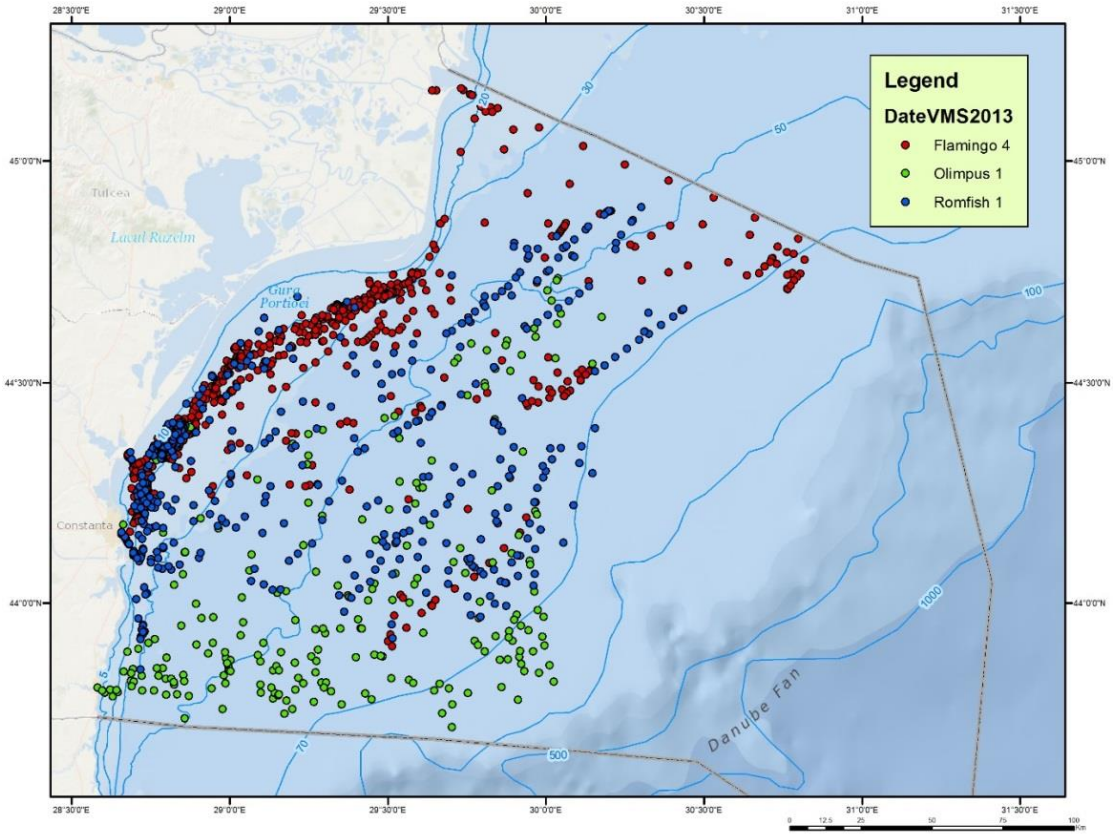


Fig. 2.1.2.5. VMS – Vessels Monitoring Systems data 2013/NIMRD, referring to location; additional can be added course and vessels speed)

In 2015, the Bulgarian fishing fleet consisted of 1,979 registered vessels, of which 1,204 were active, and the remaining 775 vessels were inactive. The active fleet had a combined gross tonnage (GT) of 5,000, engine power of 39,600 kW and an average age of 23 years.

The major part of the vessels composes the small-scale segment (89.7% in 2015) with an engine power of 20.8 kW and a large-scale fleet segment (10.3% in 2015) with an engine power of 16.9 kW.

Table 2.1.2.2 and Figure 2.1.2.6 present the data on the fishing activity of fishing vessels in 2011, 2012, 2013 and 2014, showing that the number of active vessels was increased by 31 % and the number of inactive vessels was reduced by 80 % in the LOA 18–24 segment, whereas all vessels in the LOA 24–40 segment tended to be active.

Tabel 2.1.2.2. Fishing activity of vessels of the Bulgarian fishing fleet (only 2011-2014)

	Loa	<6m				6-12m				12-18m				18-24m				24-40m	
		2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011
AV	N	343	375	399	384	586	728	725	645	52	56	55	52	16	19	13	17	12
	D/S	4409	4512	5059	4561	8170	9391	9795	9161	2725	3163	3489	3953	950	1170	1290	1527	2045
IV	N	431	429	304	307	883	746	534	583	12	14	14	9	10	6	10	2	2

AV- Active vessels; IV- Inactive vessels; N- Number; D/S- Days at sea

Fig. 2.1.2.6. Number of the active and inactive fishing vessels

Most vessels in the Bulgarian fishing fleet are obsolete and are characterised by poor economic viability due to low energy efficiency, inadequate equipment, etc.

For segments 18-24 m and 24-40 m the port infrastructure is in poor condition. Lack of designated areas for sorting of catches reduces the attractiveness of the sector and the quality and price of catches. Vessels from both segments are concentrated in ports of Balchik, Varna, Sozopol and Nessebar. These ports are of great importance for Bulgarian fisheries in terms of their location (2 in the Northern and 2 in Southern part of Bulgarian coast), the number of landings, the total amount of landed catches, and they are designated for turbot landings. Smaller fishing ports lack facilities for waste treatment and do not provide adequate first sale, safety and working conditions

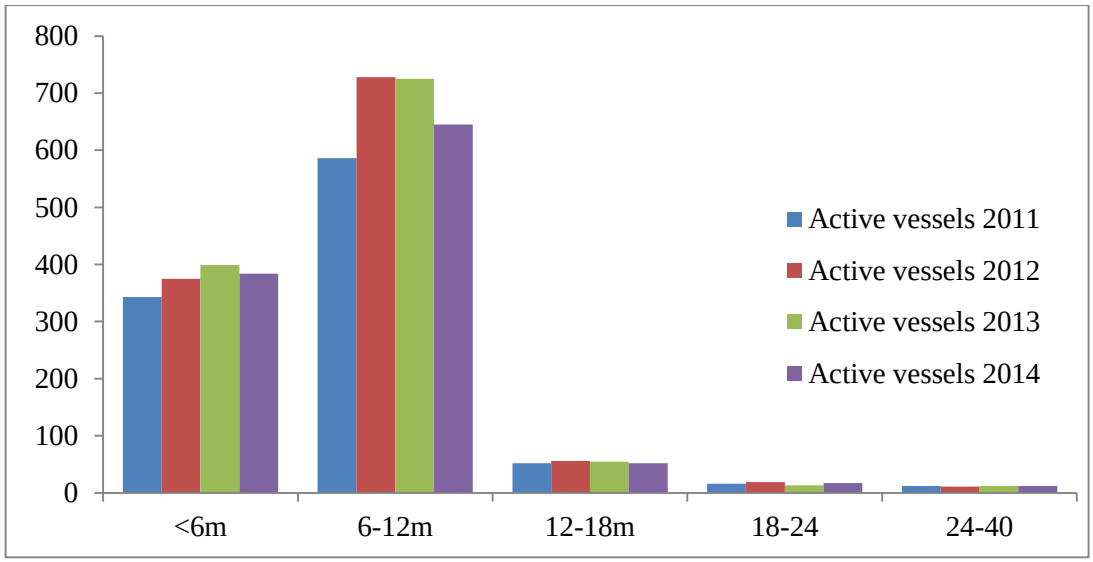


Fig. 2.1.2.7. Number of active vessels and days at sea

Figure 2.1.2.8: Location of the main fishing ports in Bulgaria
Specified percentage of the total gross tonnage

Source: *Register of Community fishing fleet*

There are different types of fishing gears for the active and passive fishery practiced in the inshore and offshore fisheries. The passive fishing gears include the equipment for catching in general the fish migrating for spawning and feeding in shallow waters, namely:

- pelagic long lines and bottom long lines;
- gillnets for the Danube shad, turbot, mugilidae and gobies;
- sea pound nets.

2.1.3. Gear

Another category of fishing equipment used in the Romanian coastal zone includes the active fishing gear: beach seine; beam trawl; pelagic trawl.

In 2015, the number of fishing gears and respectively of vessels, were: trap nets (29), turbot gillnet (2,360), shad gillnets (319), gobies gillnets (153), dogfish gillnets (137), beam trawl 35, pelagic trawl 3, etc.

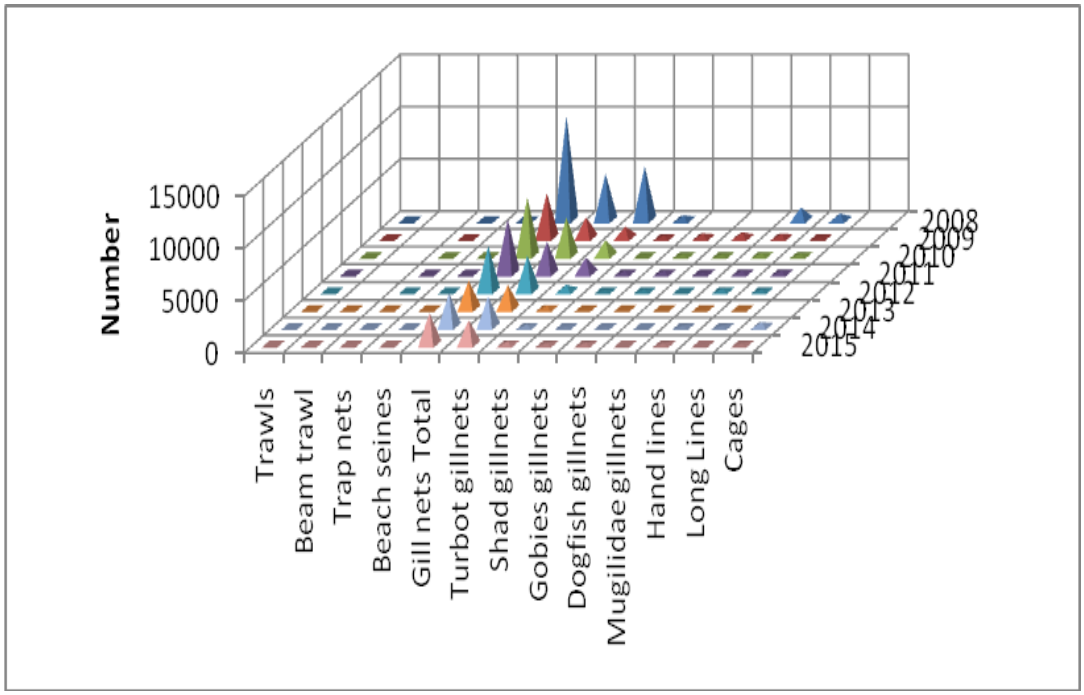


Fig. 2.1.3.1. Number of the fishing gears, respectively of vessels (too)

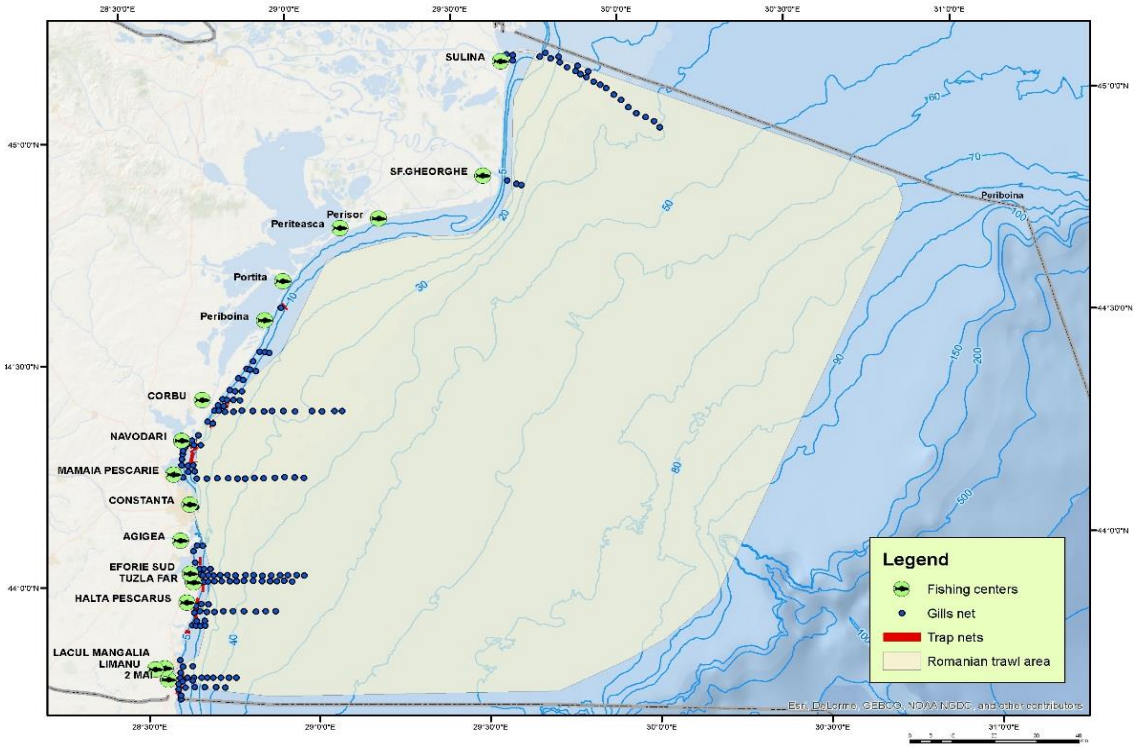


Fig. 2.1.3.2. Romanian fisheries/NIMRD

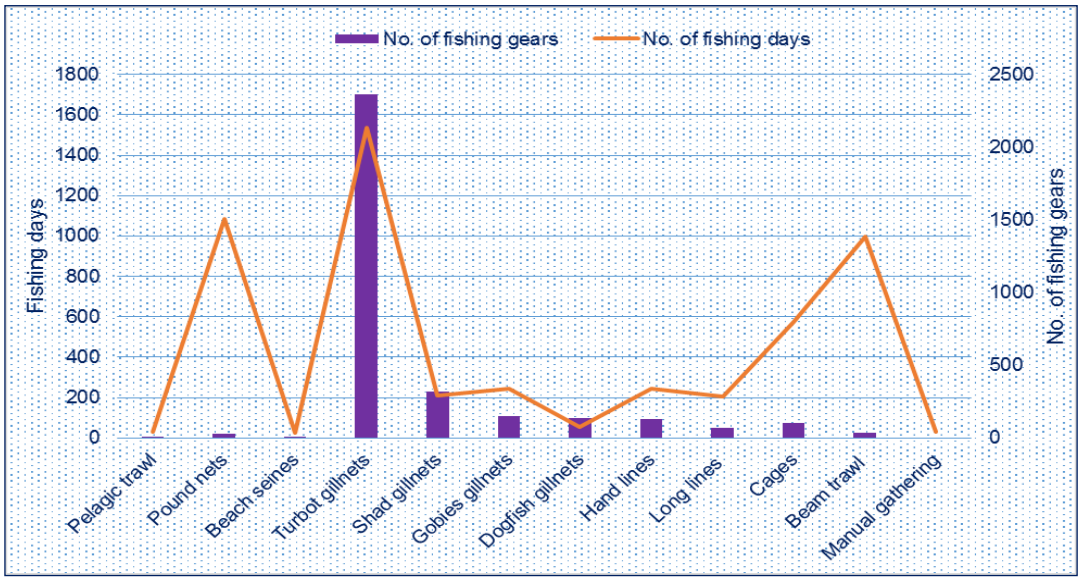


Fig. 2.1.3.4. Fishing effort of the different fishing techniques used in Romanian littoral during 2015

In all Black Sea countries turbot is one of the most valuable fishery resources. Apart of the specialized fisheries targeting turbot, it is also caught as a by-catch by other fisheries using trawls, long-lines and purse seines (e.g. the sprat fishery). The mesh size of gillnets has been synchronised between Bulgaria and Romania in order to protect the stock and improve reproductive capacity. The twine thickness of gillnets is an important factor and has an effect on the marine mammals' populations [E.Anton. 5].

Bulgaria. Specialised turbot fishery is conducted by bottom gill nets with minimum mesh size 200 mm (Stretched mesh). The use of bottom trawls is prohibited since 1984. The gillnets are deployed in the coastal area during spring and autumn. Turbot fishery has been regulated using TAC since

2004. Seasonal fishing closure of 60 days during spawning season (April – June) is in force in Bulgaria. The Minimum Landing Size (MLS) for turbot is 45 cm Total Length (TL).

Almost all fishing activities are carried out within the 12 miles zone off the Bulgarian coast. A part of the sprat catch is taken with stationary fishing gears: uncovered pound nets. The fishing grounds of the Bulgarian sector are of small depths (up to 100-120 m): from Cape Kartalburun (on the North) to Rezovo (in the South). Active fishing is carried out with small trawlers (12-30 m LOA, Fig. 2B) (Tables 1 and 2). The warm period (April-October) is the main fishing season along the Bulgarian coast. The stationary pound nets are situated along the entire coastline from Cape Siviburun (in the northern part) to Rezovo (in southern part). Trawling activities with mid-water trawls are performed dominantly in the southern area (Bourgas, Sozopol, Nessebar, Cape Emine, Cape Maslen). Sprat fishing takes place on the continental shelf on 40-100 m of depth. The harvesting of the Black Sea sprat is conducted during the day time when its aggregations become denser and are successfully fished with trawls (TDA, 2007).

In Bulgaria the MLS (minimum allowable size) for sprat is 7 cm TL.

Bulgarian legislation prohibits the bottom trawling, with the exception of scientific purposes. The main fishing gears are trawls, gillnet (for turbot fishing) and pound nets (for pelagic species). From 2013 the beam trawling is allowed only inside some established zones.

Most of the Bulgarian fishing vessels (around 97%) uses set gear. Trawlers represent around 3% of the total fleet, 38% of the total gross tonnage and 17% of the total engine power, with all parameters significantly increasing since 2007. Vessels use either demersal gear (48%) or a combination of pelagic and demersal (52%), with vessels from the latter category showing a higher capacity (73% of the total gross tonnage and 59% of the total engine power).

The vast majority of vessels use set gillnets - 83.6%. Nevertheless, high capacity vessels use mostly midwater pelagic trawls (ca. 38% of the total gross tonnage). Vertical lines (present on 10.5% of the vessels) represent 7.2% of the total gross tonnage and 9.2% of the total engine power. Pots are also used in Bulgaria by 2.1% of the vessels, whereas less than 1% of the vessels use driftnets, hand lines, set longlines or beach seines.

More than half of the fishing vessels (55.8%) uses one fishing gear. This category is dominated by vessels equipped with set gillnets (44.7%). The non-specialised vessels (41.1%) declare several types of gear. They represent around 65% of the gross tonnage of the Bulgarian fishing fleet. The most common main gear is by set gillnets - vertical lines (21.4% of the vessels), followed by set gillnets - driftnets (ca 8%). High capacity vessels normally use midwater pelagic trawls - vertical lines (20.6% of the total gross tonnage).

The main fishing gears on board of the fishing vessels are trawls (pelagic – for pelagic species and a by-catch of demersal species), gillnet (for turbot fishing) and pound nets (for pelagic species). Most of the landed picked dogfish are caught by longline fisheries.

By spatial point of view appeared significant contradictions between NATURA 2000 marine zones (proposed and agreed or approved) and zones designated for fisheries, mainly beam trawling for Rapana (with coordinates above described).

Pound nets are part of the aquatory of the Bulgarian Black Sea, defined under the terms of Bulgarian Fisheries and Aquaculture Act, where a stationary net gear for passive marine fishing is set up in a depth of 8-12 m. Via the underwater facilities (nets), the fish is guided to a certain part (house, trap), that is harvested by the fishermen with usually small and open air boats (Report, Operational program fisheries sector development republic of Bulgaria 2007 – 2013). Target species are migratory species such as anchovy, horse mackerel, dogfish and other species.

Trap nets were situated along the Bulgarian coast, being in the Southern region-Bourgas to Ahtopol with highest concentration. Very low percent of the total catches belongs to the stationary pound nets. Most actively exploited demersal fish species in Bulgarian territorial waters is the turbot (with gillnets), excluding 45 to 60 day period of complete ban every year.

The most intensive fisheries of the Black Sea sprat are conducted in April till October with bottom and mid-water trawls by vessels having 15-30m LOA and >30m LOA (very small number). Offhore the 12-nautical milesa special permission is needed for fishing. Harvesting of Black Sea sprat is conducted during the day, when the sprat aggregations become denser and are successfully fished by trawling fishing gears. Whiting (*Merlangius merlangus euxinus*) represents by-catch of the sprat fishery (by active fishing gears) and is not fished independently. Its agglomerations are close to the bottom, usually under 60-70m depths. Highly migrating species like bluefish (*Pomatomus saltatrix*) and bonito (*Sarda sarda*) are caught by passive fishing gears in the BG southern part (Sozopol, Nessebar, mostly) accidentally during August-October. *Rapana venosa* fishery, although forbidden with dredge and bottom trawls (most recently in 2012) allowed in special zones by beam trawls, is one of the main fishery activities with high economic value. Rapa whelk is fished on sandy bottoms. Fisheries of picked dogfish and rays (thornback ray and stingray) are conducted with baited hooks and dogfish nets all year when the hydro-meteorological conditions are suitable, most often where sprat (its main food) are concentrated. Sturgeon fishery is banned with all gears in the Bulgarian Black Sea waters.

As regards conserving marine biological organisms, it is necessary to take action to support the transition towards MSY and a gradual introduction of the ban on discards through an integrated approach, including the funding of activities concerning investments in more selective fishing equipment and techniques, complemented by investments in on-board and port facilities, necessary to use unwanted catches, and investments for market sales and processing.

It is very important to aim fishery innovations at reducing the impact of fishing on the marine environment, more specifically through stimulating eco-innovations and developing and introducing more selective fishing equipment and facilities.

2.1.3. Management measures (General)

The National Strategic Plan for Fishing and Aquaculture in Romania (NSPFAR) was drafted according to Article 15 of Council Regulation (CE) no. 1198/2006 of July 27, 2006 on the European Fishing Fund following a consultation process with the socio-economic stakeholders, national local government authorities, trade unions, NGOs and professional organizations. The National Strategic Plan (NSP) for the period between 2007 and 2013 covers all the aspects of the Common Fisheries Policy (CFP) in Romania. The National Strategic Plan shows the priorities, objectives and public financial resources required for the implementation of the CFP in Romania.

The basic law for the fisheries sector in Romania is Law no. 192/ 2001 (modified by OUA no.23/2008) on live aquatic resources, fishing and aquaculture, regulating the conservation, management and exploitation of live aquatic activities, as well as the processing and trading of fishing and aquaculture products. This law has been amended and completed during the pre-accession period, in order to be in line with the acquis communitarian for fisheries.

In order to achieve the objectives in the basic legislation and transpose the “acquis” in the Romania legislation, secondary legislation has been drafted using ministerial orders, the most important of which referring to:

- the organization and operation of the Fishing Vessels Register,
- organization and operation of the Aquaculture Company Register;
- setting up of the Satellite Monitoring Center for Fishing Vessels;

- licensing and authorization procedures;
- prohibition periods.

2.1.4. Management measures (Details)

The overall responsibility for fisheries policy in Romania falls under auspices of the National Agency for Fisheries and Aquaculture (NAFA), public institution integrally financed from the state budget subordinated to the Ministry of Agriculture and Rural Development [27-30, 32-38, 39-42].

This Agency shall draw up the strategy and legal framework for fisheries in Romania, and it shall carry out the implementation of technical measures and the control of regulations in fisheries and aquaculture.

In order to reach its objectives, NAFA has the following main tasks:

- to draw up strategies for fishing, aquaculture and marketing developing, according to the Government's economic policies;
- to act as a Management Authority for the structural policies in the field of fishing and aquaculture;
- to regulate the specific legal framework;
- to control and inspect;
- to draft laws;
- to draft development programs;
- to develop the drafts of the programming documents for access to the support granted by the European Fishing Fund (EFF);
- to collect data on the fishing, aquaculture and fish processing activities;
- to provide the database and statistical reports for internal and international institutions;
- to keep the Fishing Vessel Register;
- to keep the Aquaculture Production Unit Register;
- to keep the Processing Unit Register;
- to provide satellite monitoring for fishing vessels (VMS) longer than 15m.

In the frame of ANPA the Control and Inspection Directorate has the following main duties:

- to draft the framework program on the training, development and finishing of the control and inspection activities;
- to coordinate the inspection and control activities in the regional branches;
- to draft the Annual Institutional Cooperation Plan with other institutions in charge of control;
- to issues fishing licenses for fishing vessels;
- to issue aquaculture licenses;
- to issue fishing authorizations;
- to issue manufacturing licenses for processing units.

Fishing and aquaculture entitlements are managed similar for inland and marine fisheries activities by NAFA.

All fishing vessels have to be recorded in the Fishing Vessel Register (FVR) as the first condition for obtaining a fishing licenses issued by the NAFA through FVR unit. An authorized person intending to perform fishing activities must be granted with a fishing permit issued by the National Agency

The National Sanitary-Veterinary and Food Safety Authority (NSVFSA) provide the legal framework and development of the specific regulations for the activities in the veterinary and food safety field. This authority supervises and controls the implementation and observance of the sanitary-veterinary and food safety norms.

Ministry of Environment and Waters Management draws up specific legal acts regarding environment protection, waters management as well as authorization procedures for all activities, including fisheries enterprises.

Administration of Biosphere Reserve Danube Delta (DDBRA) with the following obligations:

- to assess the ecological status of the natural patrimony;
- to organize the scientific research;
- to assure the necessary measures for conservation and protection of genofound and biodiversity;
- to identify, delimitation and propose to Ministry of Waters and Environmental Protection the declaration of the functioning zones of the Reserve;
- to assess the status of natural resources and the level of their development, in compliance with their regeneration potential, and with the support capacity of the ecosystems;
- to issue the environmental agreement and permit regarding the organization and development of the productive-economical activities, tourism and recreation by the natural and legal persons, in compliance with the requests of the biodiversity conservation and of specific ecological structures;
- to support and protect the traditional economic activities of the local population;
- to promote activities for research and international scientific cooperation;
- to organize the actions for information and ecological education.

Management system is based on: (i) vessel licensing; (ii)fishing authorization; (iii) Fishing Vessel Register (FVR); (iv)Aquaculture Units Register (AUR); (v)Quota System.

Table 2.1.5.1. EC quota and recommended sprat Total Allowable Catch (EU waters/2008-2014)

Year	2008	2009	2010	2011	2012	2013	201
Species	***Sprat***	***Sprat***	***Sprat***	***Sprat***	***Sprat***	***Sprat***	***Sprat***
Quota, t	15 000[2]	12 750[2]	12 750[2]	11 475[2] 8032.51	11 475[2] 8032.51	11 475[2] 8032.51	11 475[2] 8032.51
Total catch, t	4 300.0363(BG) 234 (RO)	4 541.35(BG) 92(RO)	4 039. 966(BG) 39(RO)	3 957.895(BG) 131.3 (RO	3 156.832(BG) 87.458(RO)	3784.191(BG) 98.84(RO)	2279.3 84.9 (
Biomass. t	32 718.33	41 761.398[3]	75 080.20[4]	-	-	-	55 3
	60 000[5]	60 000[5]	59 600[5]	48 201.7[4]	68 886	56 428	39 2
Recommended TAC	Average 13 746.57	11 469.9[3]	12 500[4]				

[1]. *Quota according to Regulation (EU) № 1579/2007. Regulation (EU) № 1139/2008.Regulation (EU) № 1287/2009.Regulation (EU) № 1004/2010.Regulation (EU) № 1256/2010. Regulation (EU) № 5/2012*
[2]. *EC's quota*
[3]. *Source of data: Institute of Oceanology – BAS. Bulgaria*
[4]. *Source of data: Institute of Oceanology – BAS. Bulgaria and NIMRD,Romania*
[5]. *National Institute for Marine Research and Development, Romania*

***Management regulations applicable for sprat and turbot in 2015** (most important species)*

There are quotas for turbot and sprat in the Black Sea . Quota for sprat in 2014 was 8,032.5 tonnes and the amount caught was 2,279.0 tonnes. Quota for turbot in 2014 was 43.20 tonnes and the amount caught was 39.45 tonnes.

A quota (Table 2.1.3) is allocated in EU waters of the Black Sea (Bulgaria and Romania). No fishery management agreement exists among other Black Sea countries. In the EU Black Sea waters a global (both Romania and Bulgaria) TAC 12,750 tons has been allocated in 2009 and 2010. In 2011 and in 2012-2014 allocated quota in Bulgarian waters was at the rate of 8,032.5 t sprats (Council Regulation 5/2012) and 3,442.49 t for Romanian waters. The decreasing trend in indices since 2008 was observed despite of quotas regime in force in community waters. Because of insufficient national funding by NDCP hydro acoustic survey (2012 and 2014) for the assessment of sprat stocks in front of Bulgarian Black Sea coast not carried out. Sprat (*Sprattus sprattus*) is subject to national quotas for EU member states.

In 2015 and 2016 in terms of sprat (type sprat) no reduction of the quota compared to the levels of 2014 - to 8,032.5 tons Bulgaria and Romania 3,442.5 tons.

Under DCR 199/2000 Bulgaria, for 2014 reported 36 vessels operating with OTM with nominal effort of 7,002 kW and GT of 1,823 t.

The management measures concerning the turbot stock in Black Sea already in force are given by countries. In Black Sea EU waters, turbot fishery has been managed through the annual establishment of fishing opportunities (EU quotas) since 2008, by the adoption of Council Regulations. During the last five years, the EU turbot quota has been fixed at 86.4 t and allocated to Bulgaria and Romania (50 % each). The same Council Regulations set up every year the prohibition of fishing activities during spawning period for turbot. The ban has been in force from 15 April to 15 June in European Community waters of the Black Sea.

Bulgaria retains its quota for turbot in 2016 on the same level as in 2015. To preserve the levels of allowable catch of 2015 came after meetings with Romania, the European Commission and the EU Presidency, which compromise was reached as a result of the quota for turbot determined for Bulgaria for 2016 to remain the same and the catch a shark will not be a subject to the Total allowable catch.

2.1.5. Markets – National Markets – Export

Romania

In 1989, in Romania, the fish production covered 96% of domestic consumption. Fish production in the country has had a steady decline until stabilization. As a result, Romania has moved from a position in which it provides itself the necessary internal market of the own fish production to a situation where domestic production covered only 14.4% (in Romania) in 2005 of the internal consumption. This difference was covered by imports.

This shortfall of domestic production compared with the fish consumption can be interpreted as a potential for development of fisheries sector in Romania.

Fisheries sector contribution to the added gross value (GVA) is very low, with weights ranging from 0.0058% in 2005 to 0.0049% in 2008. Concerning the fisheries sector percentage in the gross domestic product (GDP) has ranged between 0.0047% in 2005 and 0.0086% in 2008 (according to data provided by NSI - National Statistical Institute).

The trade in fish and fish products on the domestic market is due to farms, processing plants, importers, wholesalers and retailers. The promotion of fishery products is done by the processing units through the media and exhibitions with agricultural products. There are no centers first sales and distribution channels are not developed. Fishery products are distributed mainly by manufacturers and importers rather than by professional intermediaries and finally they arrive to consumers through supermarkets and specialized stores**.**

The imported products have a large sharing on the market of fishery products in Romania. Only in recent years a few Romanian marketing companies have begun to offer competitive products, also from the domestic production (including semi-finished products). However, most raw materials are imported. Mackerel and herring are species that have the dominance in the both imports and processing activities. Most representatives of all imports are the frozen fish import in various forms of presentation.

Till 1990, fish consumption was around/approx. 8 kg / inhabitant / year, and then dropped to 2kg / capita / year from 1990 to 2000; after 2000 it began to grow, reaching in 2005 to 4.29kg / inhabitant / year, and in 2007 to 5.63kg / capita / year. In the recent years, fish consumption decreased, reaching in 2011 to 3.14kg / capita / year. Imported species appearance on the Romanian market has led to a diversification of offer supply and a shift in consumer preference towards new fish species and forms of presentation (live, threaded, headless, gutted, sliced kinds) and a request for fish and fish products in increase by 2007. Since 2009, based on the economic crisis, the imports and hence the fish consumption shown a marked regression.

2.1.6.1. Table THE SWOT ANALYSIS on fish market in **ROMANIA** highlights the following:	
KEY STRENGTHS AND OPPORTUNITIES	**WEAKNESSES AND RISKS**
Request for processed products; marketing potential for new fish species and products	Production is not consistent with the market expectations; lack of wholesale fish markets; lack of centres for the first sales and conditioning equipment; poor organization of producers; simple diversity of fish products; insufficient promotion of the fish products
CONCLUSIONS	
1. The Romanian market for fish and fish products is growing but still there are few links between market and primary producers in Romania. 2. The consumption increasing of fish products is a necessity. This should be achieved by reducing the dependence on imports and by increasing the coverage of the internal market based on local domestic fish production. 3. It is necessary to adapt the marketing of fisheries products to market expectations: new species, semi-prepared products, products based on quality, in a view to ensure traceability. It also needs of a better market monitoring in the aim to anticipate and adapt its development and production capacity accordingly.	

Regarding the **foreign trade** of the fish and fish products it can say that the trade balance is poor. If in 2005 there were imported 80,160.60 tons (valued at 72,110.40 thousand Euro) and were exported 815.70 tons (valued at 4,089.70 thousand Euro), in 2011 were imported 56,920 tons and 8,170 tons were exported.

Exports of fish and fish products decreased continuously since 1989 and Romania suffers every year because of the **negative trade balance**. Consistent with data from MARD, the imports increased by 22.19%, from 65,604 tons in 2004 to 80,160.60 tons in 2005, while exports increased only by 4.60% from 779.80 tons in 2004 to 815.70 tons in 2005, so in the recent years fluctuated between 1,710 tons in 2008 and 8,170 tons in 2011.

Bulgaria

According to the Bulgarian National Statistical Institute data, the total imports of fish and fishery products in Bulgaria in 2013 is 30,645 tons, which represents an increase of 5.7% compared to 2012. This number accounts for increase of imports of fish and fishery products and processed fishery products.

According to Bulgarian National Statistical Institute data, the total export of fish and fishery products from Bulgaria in 2013 is 9,776 tons, an increase of 3% over 2012. This is due mainly to the increase of catch and production as well as realized re-export of imported fish – mainly mackerel (http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Fish%20and%20Seafood%20Market%20Brief%20-%20Bulgaria_Sofia_Bulgaria_4-20-2015.pdf).

In 2013 export of Bulgarian fish and fishery products to the EU remained at the level of 2012 with 7,511 tons, 77% of total exports. The main destinations were Romania (4,400 tons), Sweden (1,300 tons), and Greece (1,000 tons) (http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Fish%20and%20Seafood%20Market%20Brief%20-%20Bulgaria_Sofia_Bulgaria_4-20-2015.pdf).

Stocks may be renewable, but they are finite. Some of the EU's fishing stocks, however, are being overfished. As a result, EU countries have taken action to ensure the European fishing industry is sustainable and does not threaten the fish population size and productivity over the long term.

Sea snail processing company, situated near Varna, produces over 1000t/year frozen meat for export to Korean/Japan market.

Fish consumption in Bulgaria is rather moderate on a per capita basis and is below the EU average level. Per capita household fish consumption in 2013 was 5.4 kilos. This number does not include

consumption in restaurants. Cumulative consumption per capita, including the consumption in restaurants, is estimated at 8.9 kg. Although the consumption level has remained stable for the last three years, the industry forecasts that it will increase slightly, despite increasing wholesale and retail prices of fish and fishery products, due to rising consumer incomes.

Bulgarian prices are determined mainly by movements in the international market as well by the imposed ban on commercial fishing in Bulgarian internal water basins. In 2013, higher prices are most notable for Atlantic bonito (up by 51.5%) and herring (up 43.3%), and least for zander (2.2%). It's expected that the prices of the main species will remain stable in 2015. For the traditional species in Bulgaria, prices will depend mainly on the catch size and domestic aquaculture production, while for imported species it will be determined by the import prices.

Table 2.1.6.2. **Exports of fishery products**	The main characteristic of exports of fishery products in Bulgaria is their limited range. Imports exceed exports and the fish processing industry depends on imported raw materials. However, in recent years there has been a gradual increase in exports of fishery and aquaculture products.
Imports of fishery products	Relatively large amount of imported products supplying the market with fish and seafood products that do not meet the domestic market, and provides enough raw material for fish processing factories.

The infrastructure of the fish market in Bulgaria is still underdeveloped. There is a clear need for organizing and building markets selling fish wholesale and distribution network of fish.

In Bulgaria there is no well developed system of fish trade. To meet the requirements of EU Bulgaria intends to establish of centres for the first sales of the auction to ensure transparency, better control of data and quality as well as better conditions and prices for fishermen.

Fish from inland and marine waters is sold by wholesalers (or by registered buyers in accordance with the provisions of the Ordinance on the conditions and procedure for first sale of fish and other aquatic organisms), many of which trade and other food products. They get fresh fish from wholesalers on the coast, frozen sprat from processors and frozen imported fish from importers and supply domestic markets for retail and stores. Quantities of fresh fish are small (perhaps less than 20% of the total catch) and supplies are not regular. Small amounts of Bulgarian fresh fish products and live fish are sold in major supermarket chains.

The fish consumption in Bulgaria is traditionally low compared to some neighboring countries. Nearly reached 6 kg per capita per year in the mid-80s it fell sharply in the 1990s to 3 kg per capita. To the observed decline in consumption have contributed various factors: the economic crisis in the early 1990s during the transition to a market economy; lack of tradition in the preparation and regular consumption of fish; the seasonal nature of fishing activities due to the specific climatic conditions; lack of well-organized market infrastructure and poor promotion of fish products; higher fish prices compared with those of poultry; Higher prices of imported fish and fish products against the average income of the population.

In recent years it can observe a tendency to slowly increase the consumption of fish and it has already reached the level of 6 kg per capita. To the increasing consumption of fish and fish products contributes the development of the tourist industry and tourist products.

There is a tendency to slowly raise fish prices (retail and wholesale) in the domestic market. For producers, this factor is positive, as it increases the efficiency of fish, but consumers are negative, which reduces demand and consumption.

The needs are connected with the development and/or implementation of new products, processes, services, technologies, including for marketing and trade, improvement of the quality of packing and labeling, control and traceability, improved first sale points in fishing ports and landing sites. In order to obtain products that are competitive in the EU countries, production must follow the quality standards required by the European market with regard to food safety and traceability.

2.1.6. Main similarities with other Black Sea riparian countries

Is hard to find a similarity with other Black Sea country, maybe with the fisheries from Georgia. The Romanian marine fisheries can be considered that is almost in collapse if we take into account decreasing of catches from 16,000 tons in the 80's period and 200 tons in 2010, the decreasing the number and the GRT of vessels, the actual state of fleet that is in poor conditions and needs improvements of safety on-board, working conditions and facilities for landing.

For Bulgaria, the main similarities of the fishery development with other Black Sea riparian countries are largely connected and determine by the typical of the Black Sea weaknesses.

Table 2.1.7.1. Similarities between Black Sea riparian
- Climate change may have negative impact on biodiversity and habitats due to the semi-closed nature of the Black Sea,; - Flow huge amounts of fresh water from coastal rivers with all the ensuing consequences; - Biogenic and waste pollution impact; - Small variety of commercial species and seasonality of fishing activities; - Illegal fishing; - Destruction of bottom coenoses; - Continuous decrease in fish resources; - Intense human activities on the Black Sea basin dominated by industrialization, urbanization, underlining mixed affected areas.

This specificity is not typical for either of sea basins in which the member states of the EU fishing.

The similarities with Romania are also in the common regulatory context due to the memberships of the two countries in EU.

2.1.7. Main differences with other Black Sea riparian countries

Romania is situated in northwest part of the Black Sea. The Romanian shelf receives significant fresh water input from major rivers (the Danube-mainly, the Dnieper and the Don) and its catchment area extends over one third of continental Europe (over 17 countries and contains more than 160 million people).

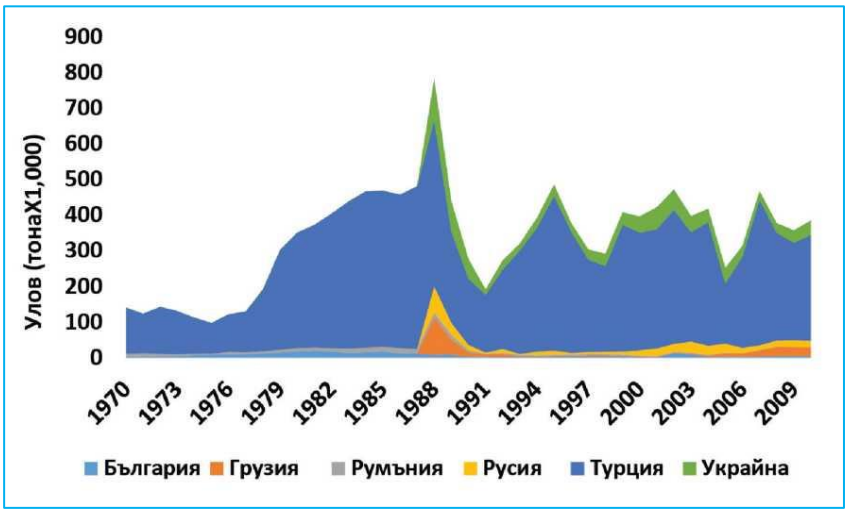
This huge river supply is an essential factor for the ecology of the Black Sea, as it pours into the basin a huge amount of freshwater and with it nutrients and pollutants from one third of continental Europe.

Table 2.1.7.2. **Differences between Black Sea riparian countries due to the state of marine living resources**
- Loss of valuable habitats for fish spawning and feeding, which have been transformed in lagoons/limans and then in freshwater reservoirs; - Alteration of ecological state in rivers, lagoons/limans and shelf areas; - Eutrophication due to different sources from agriculture, municipal waste, industries, etc.;

- Mass mortalities of demersal species;
- Disturbance of fish behaviour, mainly by keeping of fish shoals away from shallow waters.
- Loss of spawning habitats for anadromous species by rivers damming;
- Affected shelf habitats, important for spawning and feeding of living resources, through siltation by building of port dams or civil coastal defence works;
- Changing of fish behaviour near the coastal areas due to modification of water currents because of big ports building;
- Wide north-western shelf particularly most important for fish spawning and feeding area for the Black Sea, Romania having one of largest shelf;
- Very small share of the fishing fleet and catches of Romania in the Black Sea basin, comparing to Turkey, Russian Federation and Ukraine;
- Annual quotas and TACs of Member States, for Romania and Bulgaria for two main commercial species is disadvantaged compared to their Black Sea neighbours;
- Responsibility of Bulgaria and Romania, due to their EU membership, in applying measures to the preserve fish stocks in their waters, measures which cannot bring the maximum effect without being also applied in the rest of the Black Sea States;
- Fisheries management less developed at basin level, applied only individually by each coastal country in spite of the case of shared and/or migratory species; no regionally agreed system to adjust the catches to the status of the present stocks; fisheries regulatory framework promoted by each country is not regionally harmonized (prohibition periods, minimum admissible fish length, etc.);
- Fisheries statistics, fish stock assessment and monitoring activities are fragmented and irregular at national level; some data and methodologies used at national level are not compatible for regional purposes;
- No one process for assessment of fish stocks exists, even for shared and migratory species at the regional level. Data and methodologies used at national level for collection, processing and assessment scope are not compatible and comparable for regional purposes;
- Absence of a common regional view on criteria and methodologies regarding evaluation of marine habitats with regional importance for (1) conservation of living resources and for (2) establishment of protected areas or of fishing free zone, in transboundary context;
- The lack of an adequate management in the Black Sea fisheries; in spite of evident decline of stocks, the fishing effort continued to increase in some countries, even is very obvious the cases of high value and long life fish species as sturgeons, turbot, spiny dogfish, etc;
- There are large differences in the economic and technical structure of the fleets exploiting the Black Sea fishery resources among all countries, making the regional cooperation a more demanding exercise;
- Very poor development of Romanian marine aquaculture, almost inexistent, being only one farm for molluscs, in present, without licences of functioning.

The main differences with other Black Sea riparian countries are presented in the next Fig.

Fig. 2.1.8.1. No. Total catch in the Black Sea between 1980 and 2010 by countries



Source:

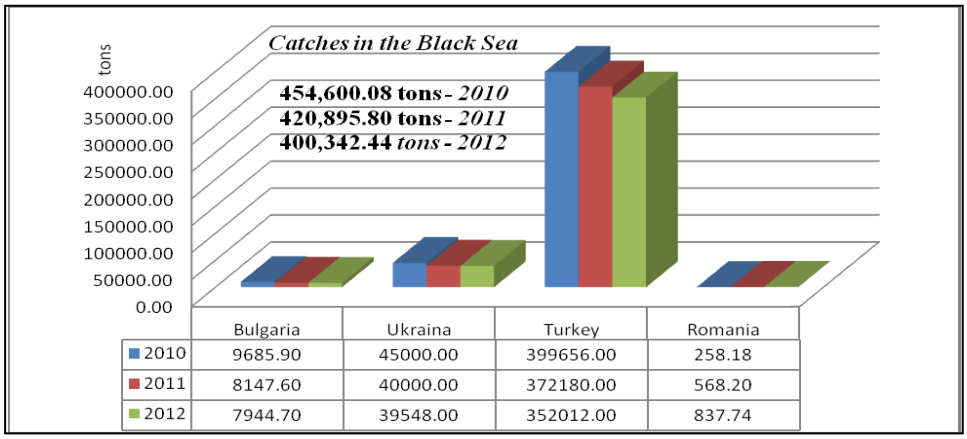
South Stream. Annex 16.1 to the EIA report. Research on fishing. MRAG Ltd. on behalf of South Stream Transport BV, 2013

BULGARIA GRUZIA ROMANIA RUSSIA TURKEY UKRAINE

- ***Total catch of the Black Sea***

The total catch of the four states participating in the project, namely Turkey, Bulgaria, Ukraine and Romania, ranged, in the past three years, between 455,000 tons and 400,000 tons. The total catch recorded a downwards trend, in 2011 being by 7.41% smaller than in 2010, and in 2012 by 4.88% than in 2011 and by 11.93% than in 2010 (Maximov *et al.*, 2013) (Fig. 83).

Turkey is by far the main fishing country in the Black Sea, reaching a catch exceeding 85% (87.91 - 88.43%) of the total catch, followed at great distance by Ukraine, with almost 10% (9.50 – 9.80 %), Bulgaria with 2% (1.94 - 2.13 %) and under 1% Romania (0.06 - 0.21 %) (Maximov *et al.*, 2013).



	Bulgaria	Ukraina	Turkey	Romania
2010	9685.90	45000.00	399656.00	258.18
2011	8147.60	40000.00	372180.00	568.20
2012	7944.70	39548.00	352012.00	837.74

Fig. 2.1.8.2.

Total catch of Bulgaria, Turkey, Ukraine and Romania, during 2010 - 2012

Out of the total catch recorded during 2010-2012, the small pelagic species are the background of Black Sea fisheries, with a percentage of 78%, followed at great distance by demersal species 2%, other species 17% and the Rapa whelk 3% (Fig. 84) (Maximov *et al.*, 2013).

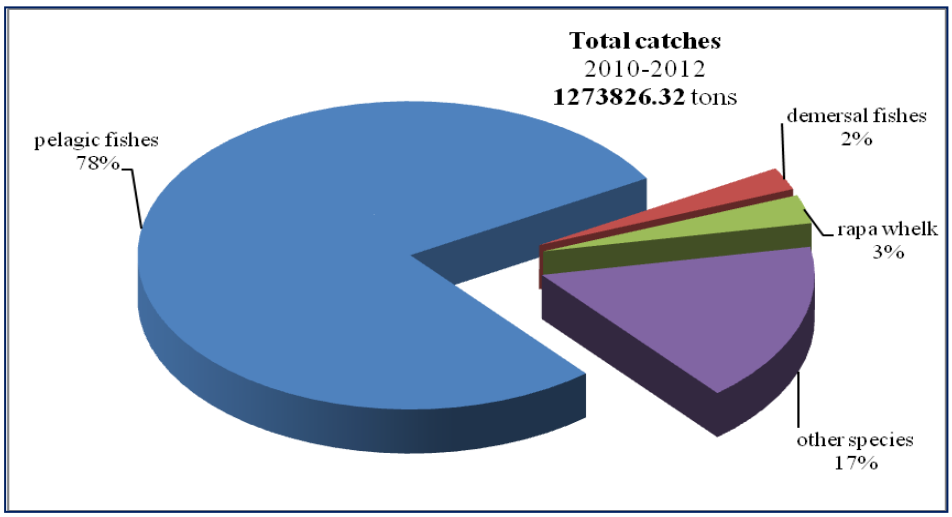


Fig. 2.1.8.3.

Share on species of the total catch in the Black Sea, during 2010-2012

Table 2.1.8.1.

Significant aspects concerning economic and technical activities of Black Sea Fisheries

Large differences in the economic and technical structure of the fleets
In 2014, the Bulgarian fleet has one of the smallest annual catches for only 1% of the total catch of fish in the Black Sea; only Romania (from Black Sea countries) have a smaller share (0.05%). The largest share of the catch is of Turkey (by 77%), followed by Ukraine (11%), Georgia (6%) and Russia (5%). The entire fishing fleet of Bulgaria operates in Bulgarian waters, contiguous zone of 24 nautical miles; fishing fleets operating in distant seas was disbanded in the early 1990s and thus no fishing interests outside the Bulgarian waters.
The different EU statutory of the countries and compliance with EU requirements regarding sustainable fishery and aquaculture
No common legislative agreement on fisheries between the Black Sea countries have been developed, equality questioned, neither Communitarian fishing legislation respecting decisions and implementation at the Black Sea level.

Only two of the seven countries from this basin are members of the European Union with all the attendant advantages and disadvantages. Under the diverse status of the various Black Sea countries, for example only Bulgaria and Romania, following the EU requirements for sustainable fishing have restrictive quotas to catch turbot and sprat. The other five countries (including Moldavia) are not subject to the same legislation, rules and restrictions for more important fish species stocks. The control of fishing activities which should comply with CFP rules.

2.2. Need of including fisheries into spatial planning processing

2.2.1. Fisheries spatially relevance

Sea fishing, conducted along the Romanian coastline, is limited to the marine areas up to 60-70 meter isobaths, as a consequence of the characteristics of the vessels and their limited autonomy (fig. 2 and 14 - Annex). So, the Romanian fleet operates up to 30–35 marine miles out in the Black Sea.

In 1986, Romania declared an Exclusive Economic Area (EEA) of about 25,000 km² in the Black Sea. However, Romania's fishing area in the Black Sea, as stipulated by the UN Convention on sea rights, is yet to be delineated especially after the trial decision of International Court in 2009 with Ukraine contentious for the marine platform, the EEZ increasing at 29,000km^2.

Romanian fleet operates up to 30–35 nautical miles out in the Black Sea (Fig. 2.1.15, 2.1.16).

Trawl fishing has a seasonal pattern linked to the presence of the fish in the areas.

An important fishing area is the Danube Delta Biosphere Reserve, where fishing activities are forbidden to trawlers. In addition, the near-shore area of the Black Sea coast up to 20m isobaths is out of limits for fishing vessels that use towed gears. Fishing activities are limited to the utilization of pound nets and gillnets.

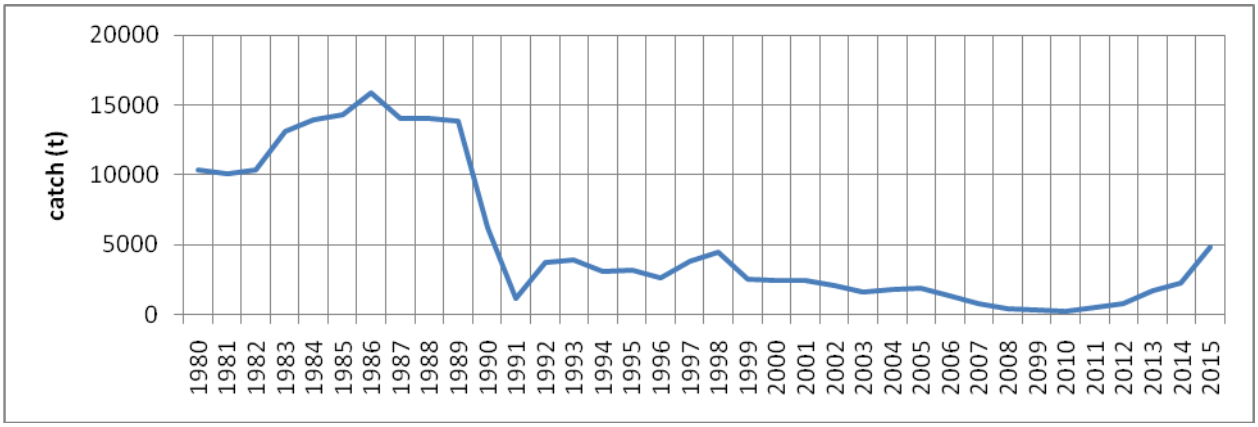


Fig. 2.2.1.1. Total landings (t) in the Romanian marine area.

In the last 20 years, the Romanian fleet was acting only in the Romanian marine waters.

During 1980-2015, the level of total catch declined from about 16000 tons (1986) to 258 tons (2010). In the following years the catch began to grow to 568 tons (2011) and 4,800 tons (2015) due to the presence of *Rapana* in catches, also reflected on landings.

In 2015 the main species in the catches were: Rapa whelk (4,460 tons / 92.02 %, of total landings); anchovy (112 tons); sprat (110 tons); turbot (31 tons); horse mackerel (14 tons); shad (22 tons) and gobies (around 24 tons).

The Bulgarian marine fishery is taking place in the Black Sea (GFCM Fishing Sub-area 37.4 (Division 37.4.2), and Geographical Sub-area (GSA) 29). Fishing with active fishing gears is carried out by small fishing vessels (LOA<12m) inside the 3-nautical miles zone.

The opportunities of marine fishing in the Bulgaria are limited by the specific characteristics of the Black Sea. The fishing grounds of the Bulgarian sector are characterised by shallow waters (up to 100-120m.)

From Cape Kartalburun (close to the Romanian border) to the river Rezovo (close to the Turkish border). The exploitation of the fish recourses is limited in the shelf area (depths under 100-150 m concentrate high amounts of H_2S that limits the life).

In 1987, Bulgaria declared a 200 nm EEZ-Fishing Zone by Decree No. 77 (January 1987). In July 1987 by Act Governing Ocean Space of Bulgaria, the limits of the Continental Shelf were to be established by Agreement between states with adjacent or opposite coasts on the Black Sea according to international law. On 4 December 1997, the Agreement between the Republic Turkey and the Republic of Bulgaria on determination of the boundary in the mouth area of the Mutludere/Rezovska River and delimitation of the maritime areas between the two states in the Black Sea was concluded.

The catch in the Black Sea represent almost 90% of total commercial catch in Bulgaria. Catch of sea snail *Rapana* account for 47.7% of total catch in the Black Sea. The remaining 53.5% include various fish species, including the largest share takes sprat (40.9% of the total catch).

Marine aquaculture consists only of mussels and represents less than 1.0% of total production. The country has no marine finfish farms, despite the experience of the past. Marine aquaculture has good potentials for future development and requires special support measures.

Catch of fish and other aquatic organisms in the Black Sea in 2014 amounted to 8,546.7 tons - 10.1% less compared to 2013, which is explained by lower catch of sprats. Of these, 3,713.7 tons are marine fish, 20.5 tons - through fish (shad) and 4,812.5 tons - shells, mussels and shrimp. The catch of marine fish species as a whole fell by 20% mainly due to reduction of the quantities of the most important for commercial fishing species *Sprattus sprattus sulinus* (sprat) by 39.8% to 2,279.3 tons (61 % of the total catch of marine fish species in 2014).[1]

Detailed information about the catches of the main species of fish and other aquatic organisms in the Bulgarian Black Sea are given in the tables below.

Table 2.2.1.1 Catches of the main target species in the Bulgarian Black Sea in 2014 (kg).

Main target species	**FAO code**	**< 6 m**	**6-12m**	**12-18m**	**18-24m**	**24-40m**	**Total 2014**
European sprat	SPR	15 441.1	35 626.2	182 923.0	282 611.1	1 762 687	2 279 288.4
Mediterranean horse mackerel	HMM	13 580.8	26 066.6	33 916.3	15 030.0	24 545.0	113 138.7
Atlantic bonito	BON	1 031.0	4 480.3	0.0	0.0	0.0	5 511.3
Bluefish	BLU	12 051.6	16 779.1	107 316.2	69 447.3	99 144.0	304 738.2
Flathead grey mullet	MUF	10 036.7	5 689.7	0.0	180.0	410.0	16 316.4
Red mullet	MUT	858.0	35 131.7	202 140.3	51 909.8	23 734.0	313 773.8
Picked dogfish	DGS	1 685.0	3 482.3	28 179.2	663.2	0.0	34 009.7
Turbot	TUR	747.3	13 435.5	16 278.6	6 300.7	2 687.7	39 449.7
Rapana snail	RPN	357 090.0	1 632 830.8	1 860 714.0	793 782.0	87 994.0	4 732 410.8

[1] Systematized data on the Fishery sector, EXACTA RESEARCH GROUP, December 2015 (with the financial support of the OP "*Development of Fisheries sector" Bulgaria*, 2007 – 2013)

Gobies nei	GPA	25 595.7	36 890.4	892.0	75.0	245.0	63 698.1
Thornback ray	RJC	165.0	13 712.5	37 518.0	16 916.3	2 010.0	70 321.8
Silversides nei	SIL	4 471.3	53 036.5	96.0	0.0	0.0	57 603.8
Anchovy	ANE	4 617.0	29 912.1	55 543.0	13 710.0	265 864.0	369 646.1

(*IOBAS Data*)

Table 2.2.1.2. Catches of the main target species in the Bulgarian Black Sea 2011–2014 (kg)

Main target species	**FAO code**	**Catch in 2011**	**Catch in 2012**	**Catch in 2013**	**Catch in 2014**
European sprat	SPR	3 957 895.0	2 836 201.9	3 784 192.1	2 279 108.4
Mediterranean horse mackerel	HMM	394 836.0	380 662.2	271 376.9	113 073.7
Atlantic bonito	BON	8 257.0	96 099.6	6 131.0	5 511.3
Bluefish	BLU	29 387.0	550 782.7	49 024.3	304 738.2
Flathead grey mullet	MUF	14 687.0	24 702.2	9 029.7	16 316.4
Red mullet	MUT	176 199.0	131 488.3	256 775.0	328 815.8
Picked dogfish	DGS	81 014.0	28 692.7	30 947.7	34 009.7
Turbot	TUR	38 060.0	36 361.6	39 577.0	39 449.7
Rapana snail	RPN	3118 868.0	3 793 386.0	4 819 061.5	4 732 410.8
Gobies nei	GPA	85 184.0	89 481.0	74 001.0	63 698.1
Thornback ray	RJC	93 434.0	68 587.7	56 114.7	70 321.8
Silversides nei	SIL	16 515.0	28 108.5	9 795.4	57 603.3
Anchovy	ANE	17 999.0	7 388.0	9 932.2	369 646.1

(*IOBAS Data*)

The table 2.2.1.3 shows the landings of fish and other aquatic organisms, according to the Executive Agency for Fisheries and Aquaculture (NAFA) in the last six years:

Table no. 2.2.1.3. Catches of the main target species in the Bulgarian Black Sea 2010–2015 (t).

Main Types	2010	2011	2012	2013	2014	2015
SPRAT *(Sprattus sprattus sulinus)*	4 029,9	3 957,9	2 836,2	3 750,4	279,3	3297
SCAD *(Trachurus mediterraneus ponticus)*	165,2	394,8	380,6	258,7	113,11	87,17
ANCHOVY *(Engraulis encrasicholus ponticus)*	57,4	18,1	8.8	9,8	369,67	12,47
Belted bonito *(Pslsmis sarda)*	16,3	8,3	96,1	5,9	5,51	7,73
Bluefish *(Pomatomus saltatrix)*	63,5	29,4	550,8	48,4	304,74	138,1
Grey mullet *(Mugil cephalus)*	18.7	14,7	24,7	9,03	16,32	10,19
Red mullet *(Mullus barbatus ponticus)*	72,4	176,2	131,5	256,6	313,77	632,4
Black Sea shark *(Squalus acanthias)*	77,2	81.1	28,7	30,9	34,01	133,04
Turbot *(Psetta maxima)*	46,243	38,06	36,36	39,58	39,45	43,01
Rapana *(Rapana spp.)*	830,79	3118,9	3793,4	4819,1	4732,4	4100,6
Gobies *(Gobiidae)*	44,2	85,2	89,5	74	63,7	47,6
Sea Fox *(Raja clavata)*	72,2	93,4	68,4	56,1	70,3	43,2
Atherina *(Atherina spp.)*	26,9	16,5	28,2	V	57,6	9,2

Source EAFA

2.2.2. *Fisheries conflicts or competition with other claims of space*

- ***Shipping***

Commercial shipping routes are not easily compatible with industrial fishing. Oil tankers, besides being very large and difficult to manoeuvre close to the shore, can flush the oil from the tanks, thus increasing oil pollution that may be unfavourable, deteriorating marine environment, blunting meat fish, fouling fishing gear.

Major oil spills may, in terms of fishing, local real disaster, but overall, the risk of shipping was often exaggerated.

- ***Marine mining and natural inorganic resources***

Marine mining includes drilling for oil and gas and dredging for sand and gravel. When such mining is widespread and especially if some industrial processing is made in sea the consequences for fisheries may become important (downloading powders rock in the sea can increase turbidity or increasing concentrations of elements that are normally rare in seawater, but become toxic in high concentrations).

Currently, the extraction of oil and gas energy and chemical processing is an important activity, but once the investigation stage seismic surveying, drilling exploratory ended and production platforms were placed, fishing is possible only affected if these platforms are placed too close to the fishing or in the fishing zone, which may lead to the closure of part of it. However, such platforms parks can be a refuge for fish and an opportunity for angling (Douglas et al., 1979; Reggio, 1987).

Accidents on the platforms leading to the discharge of substantial amounts of oil into the sea and have special effects on fisheries stationary, but also on other activities such as tourism. Extraction of sand and gravel adversely affect benthic organisms through habitat destruction by destroying breeding areas of the demersal species and interferes with trawling and other fishing methods. However, the duration of effects, of this form of mining may be relatively short.

- ***Tourism and Recreation***

In many coastal areas, in summer, the local population is multiplied several times. This requires significant investment in infrastructure and services, even if these facilities will be used only part of the year. Local authorities need to organize services, especially those dealing with waste increased from summer to avoid marine pollution.

- ***The impact of agriculture on marine basin***

Inappropriate agricultural practices raise serious problems for coastal fisheries, both by pesticides, fertilizers and through losses.

Pesticides, which are applied in excessive amounts, can be washed and placed directly into the sea, or indirectly via rivers that flow into the sea and have potential adverse effects on coastal marine life and on the species of interest. There is also a substantial pesticide transport through the atmosphere, they can reach the sea, but on a wider area, affecting ecosystems remotely.

Effects of chemical fertilizers washed by rains or discharged directly into the sea via rivers, are potentially very important, often with adverse effects in the vicinity of the source and possible positive points ahead after dispersion has taken place.

- ***Coastal constructions***

Given that coastal human populations are growing, construction increased accordingly as housing, hotels, ports, etc. and associated facilities (stations sewage treatment, landfills, shops, banks, post offices, etc.) and industrial plants. Human settlements bring with them not only contamination

problem, but threatens the habitats of many species of marine life such as frogs, mammals, birds and other bodies which have their habitats in coastal areas (at sea or on land near the sea).

Coastal construction has significant impact on local marine ecosystems and fisheries often forced to change their tools, methods and target species.

Hydraulic works produced:

- Loss of valuable habitats for spawning and feeding habitats of fish due to transforming of lagoons/limans in freshwater reservoirs;
- Affecting the shelf habitats important for spawning and feeding of living resources through siltation from building of port dams or civil coastal defence works;
- Changing of fish behaviour in coastal areas due to modification of water currents by building of big ports.

○ *Costal industry*

Coastal industry, not only can affect the local marine environment where the discharges, but it occupies with terrestrial neighbouring on reckoning of other biologically important critical habitats for marine and coastal species.

The sum of all coastal industrial discharges, fully unabsorbed has a great potential to adversely affect coastal marine fisheries. So, coastal industry (including industrial-scale fish farms) has the potential to harm the interests of inshore fisheries and fisheries require reconciliation in the context of ICZM to avoid conflict of interest.

○ *Aquaculture*

Coastal marine aquaculture may represent a solution for those species with a high price and high demand which cannot be met by fishing activities.

But, feeding intensively cultivated species by adding food in the wild, can, under certain circumstances, result in loading abnormal organic matter of the local coastal sea, leading to eutrophication, causing the explosive growth of plankton blooming, sometimes harmful.

Marine aquaculture development cannot be seen favourably by all fisheries due to the competition for the markets, but it is desirable to ensure, where possible, fishermen unemployed or surplus of labour to find a role in this sector.

○ *Marine fishing*

Black Sea ichtyofauna in general and the populations of commercial interest particularly in recent decades have witnessed severe mutations, often unpredictable. Because of this situation, it is put mainly on account of the sharp degradation of the environment in coastal areas and especially in the area of the north western self, representing the main breeding ground and nursery growing commercial species.

Dependent of biological specifics of each fish species, these mutations are apparent both in structure and potential of ichtyofauna and also in ethological aspects of the population.

Factors that are purely ecological are complete for some species (anchovy, mackerel, turbot, sturgeon, shark, etc.) with an unregulated fishing and a catch improperly big. Overexploitation of fish species has led and will lead to a decrease in their biomass, and by using inappropriate fishing gear and techniques, it is jeopardized the state reserves of juvenile fish or destruction of the benthic communities that are food for many species.

Most drastic effects **of trawling on the seabed bottom**, not due to mechanical effect on ecological communities, but especially of water disorder that entails large masses of fine sedimentary material, so-called fraction "pelitic".

It is easy to calculate that the opening of 25-50 m of a trawl that is towed at a speed of 3-4 knots per hour of activity will disturb the mud over an area of several tens hectares.

These particles contain not only minerals and organic substances that add to eutrophication of the area, also toxic substances deposited on the bottom.

The movement mode of the particles is disturbed from the bottom is the south west fishing area and to the north, in the eastern fishing.

Geological studies have shown that particles entrained by trawling in the eastern, are carried by currents at a distance of 150-200 km and stored on more than 5,000 km^2 at depths of 10-50 m. The thickness of sediments varies in some areas from 2-5 cm to 40-50 cm (Zaitsev and Mamaev, 1997).

Species diversity in areas covered with mud fell by almost 71%, the abundance with about 60% and biomass to almost 95%.

Commercial bottom trawl in the Black Sea were banned in the 70s, but all the states of the Black Sea have restarted bottom trawling (officially called hauls near the bottom), to increase catches of sprats which is near the bottom layers of the self. As a result, catches of sprat in the 80s were 15-20 times higher than in the 60s (Serobaba Novikov, 1989).

2.2.3. Fishermen and marine species claim for same resources

In the Black Sea, as well as in other marine areas there is competition between fishermen and dolphins for the same fishery resources. From this competition, dolphins always lose; they are affected by fishing gears.

From Romanian data has resulted that the gill nets are the most dangerous fishing gears for dolphins which are moving in the area where are installed these.

Being made of thin, less visible and elastic threads, which facilitate the catching and tangling of the specimens crossing these nets, the gill nets have a big capacity for retention of dolphins which, in the searching of the food, are crossing these nets.

2.3. Identified instruments employed for regulating fisheries (closed areas, species restrictions, engine size restrictions, gear restrictions, etc., if data exists)

Romania completed negotiations with the EU in the area of fisheries in 2001, and accepted the entire "acquis communautaire" without requesting derogations or transition periods. Fisheries have traditionally been managed through direct restrictions, including seasonal and area closures, minimum mesh size, and access limitations. In recent years, licensing and individual quota system were introduced as effort-control measures, in order to bring fishing effort more in line with the available resources.

Romania and Bulgaria became members of the EU in 2007, which extended the EU Common Fishery Policy (CFP) into the Black Sea. In Romania and Bulgaria, the transfer to the CFP has not encounter major problems: these countries have basically accepted and met all the requirements for joining the CFP and are now eligible for support from the European Fisheries Fund (EFF).

In 2008, for the first time, EU Total Allowable Catches (TAC) for sprat and turbot in Bulgarian and Romanian waters were set. In 2008 and 2009, the catch limit for turbot was set at 50 tonnes for Bulgaria and 50 tonnes for Romania, and in 2010 at 48 tonnes for each of them (after an initial Commission proposal of 38 tonnes). The TAC for sprat was 15,000 tonnes in 2008, and 12,750

tonnes in 2009 and 2010 (to be fished only by vessels flying the flag of Bulgaria and Romania). The technical measures accompanying the quantitative restrictions for the turbot fishery consist of a fishing ban from 15 April to 15 June, a minimum landing size of 45 cm, and the use of a 400 mm minimum legal mesh size for bottom-set nets.

- ***Areas and periods of fishery restrictions***
  - ***in Romania***

Accordingly to the Prohibition Order on 2016, of the Agriculture Ministry of Romania, the following areas are declared areas of protection of the biological resources, and in this respect, the fishing and capturing of the living organisms are strictly forbidden:

- Prut river, the sector between Stânca-Costeşti dam and the confluence with Elan river, *all year*;
- Dunărea Veche (Old Danube), the sector between the confluence with Sulina channel, and from Mm 8+900 to the confluence with Răducu channel, *all year*;
- Gâsca Lake of Somova-Parcheş Complex *all year*;
- Erenciuc and Zmeica Lakes, *all year*;
- Old course of Danube's Sfântu Gheorghe branch at Uzlina, between km 84 and km 65, *all year*;
- Danube's Chilia branch, at km 72-77 Pardina, *for 60 days*, between 15 march - 13 may inclusively and for *60 days* between 01 October - 29 November, inclusively;
- Danube river, at Mm 53-54 (Isaccea), Mm 64,5 - 65,5, Mm 67-68,5 (Groapa Catargului and Pluton) *for 60 days*, between 15 march - 13 may inclusively and for *60 days* between 01 October - 29 November inclusively;
- Danube's Borcea branch, at km 37 - 41 (Stelnica - Feteşti), *for 60 days*, between 15 march - 13 may inclusively and for 60 days between 01 October - 29 November inclusively;
- all the protected areas within the perimeter of Danube Delta Biosphere Reserve, *all year*;
- the area of **Marine Reserve** Vama Veche - 2 Mai, within the coordinates, *all year*:
  - NV: 43° 47' lat. N and 28° 35' 18" long. E;
  - NE: 43° 47' lat. N and 28° 40' long. E;
  - SV: 43° 44' 20" lat. N and 28° 35' 18" long. E;
  - SE: 43° 44' 20" lat. N and 28° 40' long. E

  - ***in Bulgaria***

The catch of fish species and other aquatic animals by any kinds of bottom trawling and dredging gears and devices is banned for the whole Black Sea territorial waters except in cases of conducting of scientific investigation, for which a special permission from the authorities /Fisheries and aquaculture act/ is needed. With Ordinance № 37/10Nov. 2008 and m.3., al.1 from FAA the mesh sizes of the gears for different fish species have been established. The fishermen using turbot nets are obliged to fit them with devices for radio-resound protection of dolphins. The catches of fish and other aquatic animals in Bulgarian Black Sea waters by any kind of pelagic trawling gears in the coastal zone is prohibited, as follows (EAFA, Fisheries and Aquaculture act):

a) from cape Sivriborun to the river Kamchiya outflow - in 3 mile zone
b) from the river Kamchiya outflow to the cape Emine - in 1 mile zone;
c) to the line of cape Emine - Nessebar lighthouse;
d) to the line of Nessebar lighthouse - village Chernomorets, south cape;
e) From the c. village Chernomorets to the Rezovska river outflow - in 1 mile zone.
f) All fishery activities with all kind of gears are prohibited in the radius of 500 m area of Thermo

Electrical Power Stations warm water inflow into the Varna lake system.

The fisheries by any kind of fishing gears are prohibited completely in the places of flow of warm waters of Electrical Power-stations. The zones of artificial installations (farms) for mussels, considered to 100 m from their constructions are declared as fish farming waters and zones of natural reproduction of local fish species. In such zones the catch of fish and other aquatic animals by all fishing gears is prohibited.

➢ *Species restriction*

- For ***Squalus acanthias***

In Black Sea Romanian territorial waters, prohibition is established for 5-March to 30-April, for *47 days*, and 15 October to 30 November. The retention on board of pregnant females is prohibited throughout the year.

In Bulgaria's territorial waters there are MPAs of 16 sites (NATURA 2000) and also the Black Sea shark is prohibited within 1 mile zone around ports and estuaries; MLS (minimum landing size) is 90 cm TL;

- For ***Psetta maxima maeotica***

In Romania this specie is under EC Regulations. Mesh size of 2a=40cm and MLS of 45 cm TL.

In Bulgaria, effort restrictions include constant fleet capacity based on the EU Reg 31/12/2002 and gear restrictions - prohibition of usage of bottom trawls and dredges. Gillnets mesh size are the same like in Romania [Black Sea EU waters: 40 mm stretched; MLS 45 cm TL]. Closed season 15 Apr-15 Jun (possibility of shifting and extension);

- For ***Engraulis encrasicolus ponticus***

In the Black Sea countries, anchovy fisheries are generally regulated; for Bulgaria and Romania closed seasons are *May-April* to *October-November*. Mesh size regulations and MLS are similar UE (9 cm TL in general);

- For **Horse mackerel *Trachurus mediterraneus ponticus***

In the professional fishery of the Black Sea Member States, it is banned to use:

a) trawling under the 20 m depths;
b) gear type of dredge and bottom trawl; fishing gears with minimum mesh size smaller then: a = 7 mm, 2a = 14 mm respectively (the trawl in the Black Sea); MLS is 12 cm TL;
c) (minimum dimensions of the fish in centimetres and other living aquatic resources able to be fished are regulated by Order no. 342/2008 on minimal size of the aquatic living resources in Romania);
d) (Minimum dimensions of the fish in centimetres and other living aquatic resources able to be fished are regulated by Order no. № 37/10Nov. 2008 and m.3., al.1 from FAA, in Bulgaria);

- For **Acipenseridae**

In Danube River and Black Sea, is prohibited from April 2007 to April 2016, for 10 years.

For reproduction, fishing id forbidden in present, too, in the areas recommended by CITES, for a period of *46 days*, between 1 March - 15 April. Sturgeon fishery is banned with all gears in the Bulgarian and Romanian Black Sea waters.

- For **Gobies**

Prohibition period is *30 days* May 1 to May 30 inclusive. Gobies fishing in marine waters are prohibited, for the period of April 15 to May 15 inclusive. Commercial fishery for Gobies should be restricted to set nets with minimum mesh size of 22 mm;

- For ***Alosa immaculata***

Fishing is prohibited in Danube River between April 15 to May 15 inclusive. During the prohibition for turbot, commercial fishery for shad (*Alosa spp*.) should be fulfilled by one gillnets with minimum mesh size of 36 mm;

- Capturing **Rapana (***Rapana venosa***)** is allowed all year round.

Using "*beam trawl*" during prohibition of turbot, appears the obligation to notify the National Agency for Fisheries and Aquaculture at each exit/entry in the marina ports/boats to can check the potential turbot catches.

The catch of the *Rapa whelk* is continued during summer, using the diving method. In 2013, the National legislation was amended, to allow the beam trawling targeting *Rapa whelk*. Bulgarian legislation prohibits the bottom trawling, except that which is dedicated to scientific purposes. From 2013 beam trawling is allowed only in preliminarily established zones.

- For **Marine Mammals**

In Romanian and Bulgarian marine waters, the catch is prohibited whole year. It is an obligation for cetacean by-catches to be reported.

➢ *Gears, minimum mesh size and fishing methods*

In the professional fishing activity, it is banned to use:

a) in marine fishing, all kind of trammel nets, sturgeon gill nets, drifted gill nets whose total height is higher than 2.5 m, as well as the turbot gill net manufactured from threads with thickness smaller the 6.350 Kg/m;
b) the trawl in marine zone under the 20 m depths;
c) dredges and bottom trawl in the Black Sea;
d) gillnets for shad, from 1 August to 31 December
e) hooks and lines and little hooks and lines in natural waters;
f) fishing gears monofilament gill net.
    - *It is banned to utilize the fishing gears with minimum mesh size smaller then:*

a) a = 30 mm (bar), 2a – 60 mm (stretched) respectively, at the active fishing gears for Danube shad and mullet (4 species);
b) a = 20 mm, 2a = 40 mm respectively, at trawl codend type settled at the dams of littoral lakes;
c) a = 7 mm, 2a = 14 mm respectively, at the room catching of pound nets in the Black Sea Romanian littoral zone;
d) a = 180 mm, 2a = 360 mm respectively, beyond the territorial waters, and 200 mm, 2a = 400 mm respectively, in the territorial waters for the turbot gill nets;
e) a = 7 mm, 2a = 14 mm respectively, at the bottom otter trawl in the Black Sea;
f) a = 10 mm, 2a = 20 mm respectively, at codend of beach seines.
g) a = 10 0mm, 2a = 200 mm for dogfish gillnets.

MLS of the fish in centimetres and other living aquatic resources able to be fished are regulated by Order no. 342/2008 on minimal size of the aquatic living resources.

3. Suitability of spatial planning to regulate fisheries

3.1. Reasons for including fisheries into planning processing

Fisheries field has been recently included in the Maritime Spatial Planning framework. Itself it is new and has no tradition. But the knowledge in fisheries is extended and traditionally registered in long-term monitoring programs and could be subject of detailed planning. The dedicated authorities for fisheries, at different levels, are nominated.

The good reasons to include fisheries issues into spatial planning at the Black Sea level
– Fisheries are one of the most important human uses of the sea, with a special economic and social importance; – Fisheries are affected by marine environment, but also could affect the marine environment, altered marine habitats and the ecosystem; – Spatial planning should incorporate a spatial approach to allow non-biased and well justified decisions between competing claims; – There is a very strong relation between sea – resources - fishermen in all traditional, including fishing techniques; – The ecosystem approach in spatial planning demands the analysis of ecosystem services; has evaluated the claims and uses of natural resources, including fisheries, to can plan the sustainable development and use; more than this, to help in preventing the fish overexploiting; – The spatial analyses of all maritime uses and users in an harmonized way require the study (assessment) of fish stocks as main and vulnerable natural resources, avoiding conflicts and natural damages; – Including fisheries into spatial planning is advantageous for wiser and better sustainable use.

3.2. Evolutionary historical data

The collection of data and information is not an end in itself but is essential to inform decision-making factors and processes. It is therefore important for the management authority to ensure that the data collected are analysed correctly, disseminated to where they can best be used, and used appropriately in decision-making. Information is also needed to assure the people that resources are managed responsibly and that the objectives are being reached. Approaches to collecting data for fisheries management vary substantially, depending on, for example, the nature of the fishery, the staff and facilities available, and the social and economic importance of the fishery. Whatever methods are used, the quantity and quality of the data collected will have a direct influence on the quality of the management which can be exercised, and so the most effective use must be made of personnel and facilities available for data collection.

Romania, in fulfilment of requirements of the DCF, respects the framework Council Regulation (EC) 199/2008, and implementing Commission Regulation (EC) 665/2008 and Commission Decision 2010/93/EU which intended to help Member States (MS) in producing Technical Report that contain all the necessary information to be evaluated by the Sub-group on Research Needs (SGRN) of the Scientific, Technical and Economic Committee on Fisheries (STECF) and by the European Commission (EC).

In the Romanian Black Sea coast is a routine and traditional in implementation of sampling of catches, age estimation throughout otolith reading, qualitative-quantitative analysis of catches, age and size structure of the population and also, to carry out fishing surveys. The National Institute for Marine Research and Development “Grigore Antipa” Constantza has historical catch data on a period more than 50 years ago and catch structure on length and age classes, more than 40 years ago.

The species for which we have these data are sprat, whiting, anchovy, horse mackerel, turbot, spiny dogfish, red mullet, Danube shad, blue fish, and gobies (minimum 4 exploitable species).

Data required for the participation at the joint assessment of the fish stocks are the follows: catch and effort; structure on length and age classes of the catches; biologic data (gonad maturation stage, length/weight relationship, etc.); generally data about the species biology (reproduction season, migration, etc.); growing parameters; fishing and natural mortalities; selectivity of gears, standardization of the fishing effort.

For assessment of eggs, larvae and juvenile abundance, spanners' biomass and fishing agglomerations, the following methods were used in Romania:

- the swept area method (fishing survey) for evaluation of eggs, larvae and juvenile abundance;
- the swept area method (fishing survey) for evaluation the biomass of fishing agglomerations of sprat, whiting, turbot and dogfish;
- methods of Sette-Ahlstrom and Parker are used for to assess the biomass of spawners of anchovy and horse mackerel.

For sprat, the abundance of recruits was assessed by survey data with fingerling trawl (midwater pelagic), which was regularly carried out in April-May. The biomass of adult agglomerations has been assessed by pelagic trawl with a rigging system ensuring it work near bottom.

For whiting, stock assessment was made mainly using survey data of obtained with bottom otter trawl in March-April or in autumn when density of near-bottom schools on the continental shelf is high.

Sampling of spiny dogfish is traditionally made during spring and autumn surveys with bottom otter trawl. Also, the stock of turbot has been assessed with survey data with bottom otter trawl in spring and autumn.

Anchovy and horse mackerel spawner biomass have been assessed using the data on eggs abundance that was determined with Bongo nets. In order to obtain materials to forecast the level of stock recruitment, in late summer (August-September), in surface layer of the sea, surveys have been carried out with special small-mesh fingerling/midwater pelagic trawl.

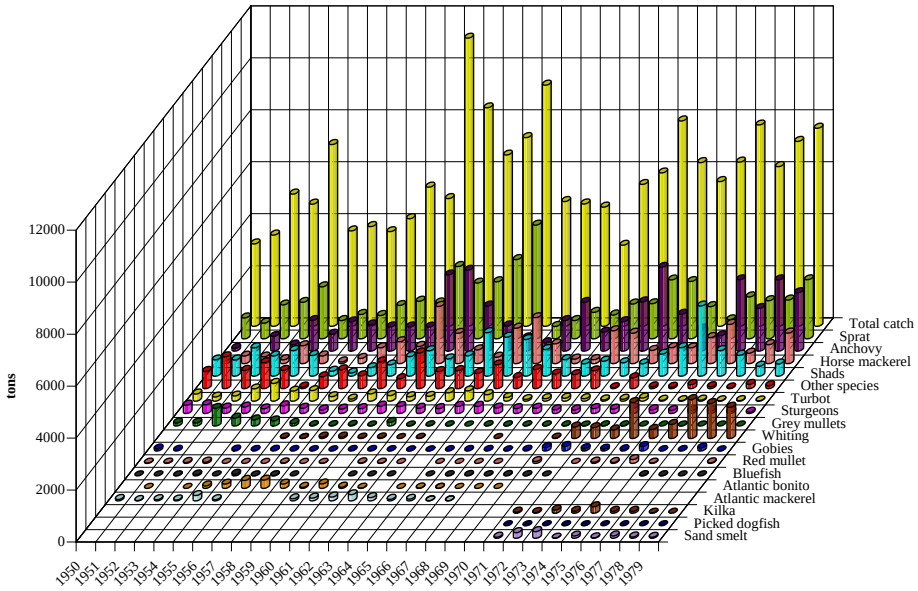


Fig. 3.2.1.

Catches of the main fish species on the Romanian coast between 1950 – 1979

Globally, in Romania the dynamics of catches in recent decades reflects a discrepancy between the fishing effort and the production capacity of stocks. This disproportion is also found in the Black Sea basin, between the fishing capacity of the six riparian countries (e.g. for the year 1985, of the 2,448 units of 1-24.9 GRT, Turkey held approximately 99% (2,415) (FAO, 1998). Depending on the status of fish populations, the fishing effort applied and the type of tools used, the catches on the Romanian littoral had a variable evolution of the qualitative and quantitative structure (Radu, 2010; RMRI/NIMRD 1980-2014).

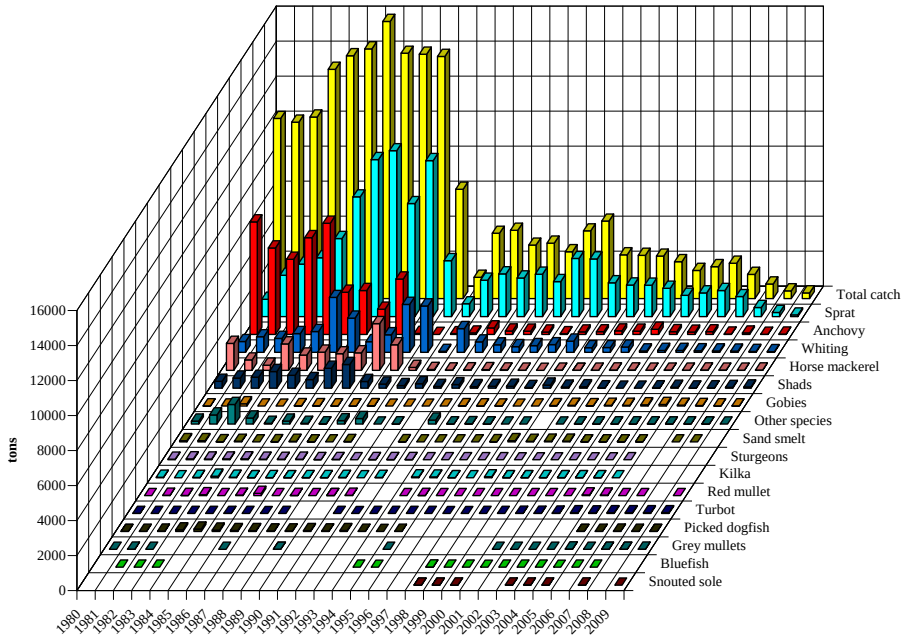


Fig. 3.2.2.

Catches of the main fish species on the Romanian coast between 1980-2009

Between 1950-1979, fishing on the Romanian coast was done with pound-nets, trap-type tools installed perpendicular to the shore, from Sulina to Mangalia. The main target of pound-net fishing was represented especially by: anchovy, shads, horse mackerel, sprat and small quantities of blue mackerel. The high value of the percentage of species like anchovy and sprat and their constancy within the landings explain the high oscillations of the annual catches on the Romanian coast: from 3,120 tonnes, in 1969, to 11,088 tonnes, in 1961 (Fig. 93). These oscillations occur even more as the fishing is done in a restricted coastal area, where the conditions of maintaining fish shoals are extremely variable (Parcalaboiu, 1977).

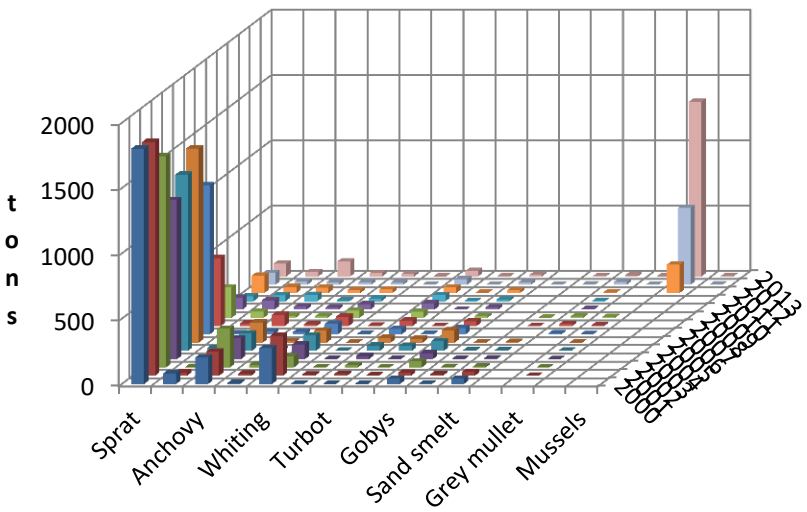


Fig. 3.2.3.

Total landings and structure on species at the Romanian littoral in the period 2000-2013

3.3. Specifical Pressures and impact on marine fisheries

3.3.1. Physical alteration of marine habitats

Until recently, human impact on marine ecosystems has been considered largely limited to the effects of fishing. The ability of marine environment and living resources to absorb the effects of other human activity was considered effectively unlimited.

During time passing, it was shown that changes of environmental conditions (as a result of human activities, other than fishing) that fall under the name of "development" much affecting the living resources. These are:

- Activities that occur (within or adjacent) to the marine environment such as coastal development, navigation, discharges, coastal tourism, mining undersea oil and gas extraction;
- Inland human activities affecting the marine basin and marine systems through rivers (transport material derived from erosion of land, nutrients, pesticides, metals and other toxic materials) or through the atmosphere (organic chlorides, heavy metals, etc.).

○ *Maritime pollution*

Toxic chemicals (heavy metals, petroleum products, detergents), could reached the coastal marine waters of the Danube and municipal and industrial discharges of coastal zone having a great influence on the health of harvestable fish. Heavy metals, especially zinc and lead are very dangerous for fish. From more than 0.03 to 0.05 mg/l, these metals cause serious disturbance, irreversible for the fish internal organs functioning. Pesticides and detergents, higher concentrations produce metabolic disorders and petroleum products cause severe injuries, particularly structural lesions of the internal organs (liver, kidney, and spleen). NIMRD has a permanent monitoring program having the obligation to signal concentrations if they could be over limits.

○ *Waste disposal and the environmental capacity of acceptance*

Chemical pollution may influence fish production in numerous ways: reducing stocks by mass mortalities; gradual decline, or changes in the composition of whole populations or ecosystems; increasing existence of disease; deteriorating quality of fish food; decreasing growth rates, etc.

The impact of waste discharges into the sea, either deliberately or accidentally, on marine resources, depends to a significant degree and intensity of discharge location. Thus, the oil spill in the ocean waters is widely expected to have less serious effects (though not necessarily negligible) than in nearshore waters.

In many marine environments, diversity and productivity are limited by the relative uniformity of bottom topography. In cases where such areas, flat-bottomed occurs throwing materials (according to some agreed criteria) to form artificial reefs may be inconsistent with the London Convention, but can be considered beneficial development of marine resources and protect marine habitats against trawling. Thus, it is necessary to discuss exactly how throwing place and its intensity to be considered harmful and whether the existing conventions must be modified in order to promote sustainable development. It is recognized that:

- The environment has a limited capacity to accommodate wastes without becoming significantly altered by them;
- Such a capacity can be quantified;
- Up to a certain level of contamination there will be no unacceptable impact on living marine resources.
- Artificial reefs are usually deployed for other purposes, as biomass production, protection from illegal trawling, nurseries, etc.
- Material used for ARs, following the latest guidelines, must be environmental friendly as concrete, for example

○ *Introduction of alien species and biodiversity aspect*

The dramatic changes in the Black Sea fauna due to the introduction of exotic species better adapted to eutrophic conditions than native species (Ivanov and Beverton, 1985; and Grifiths Caddy, 1990), are an example of the influence of accidental introduction of new species. The environmental conditions allowed formation and maintaining of very large agglomerations of gelatinous species, especially jellyfish. Jelly fish and ctenophore agglomerations make difficult the trawl fishery on all hauling level in some years and periods. Consequences:

- Outbreak of some alien species (such as *Mnemiopsis leidyi*) multiplied the ecological disturbance, especially inside the food chain of marine living resources and on fish behaviour.
- Increased the natural sensitivity of the Black Sea ecosystem.

Rapana venosa, is also an alien species. In present represents an important resource for fisheries because it replaced the proportion in catches. Unfortunately, it affected much Mussel population which is one the most used source of food for Rapana.

○ *Causes that influence the evolution of fishery (identified for the sprat fishery)*

One of the main cause responsible for decline of marine living resources were generated by eutrophication resulted from agriculture, municipal waste, industry, etc., impacts; harmful substances (also from agriculture, industry, municipal waste, etc.); hydraulic works; commercial fisheries; alien species; climatic changes;

Eutrophication, has had a similar effect on the benthic zone of the Black Sea, like the bottom trawling on the shelf (Zaitsev: 61, 62). Alteration of ecological state in rivers, lagoons/limans and shelf areas has been:

- Mass development of phytoplankton;
- Mass mortalities of demersal species;
- Disturbance of fish behaviour, mainly by keeping of fish shoals away from shallow waters.

○ *Commercial fisheries*

- Using of non-selective fishing gears allowing catching of non-target species (some of them endangered) and/or having undersize length;
- Increasing of catches and fishing effort which permits exploitation of stocks outside safe biological limits;
- Illegal fishing amplifies the effect of overfishing. Moreover, abandoned fishing gear associated with this kind of activity has an important impact on fish, mammals and birds.

So, the causes of this situation are multiple, the independent effect of each being very difficult to be assessed:

- The high value of the percentage of the species sprat and their constancy within the catches is reflected in the high oscillations of the annual catches on the Romanian coast. These oscillations occur even more as the fishing is done in a restricted area of coast where the conditions of maintaining fish shoals are extremely variable;
- The small-scale fishery uses pound nets and has suffered the strongest impact due to the change of the ecological conditions near the coastal zone. Moreover, there are observations attesting that the fish migration routes have changed during the last 6-7 years. The fish has the tendency to remain more offshore, at a certain distance from the coast within the isobaths of 5-13 m where the pound nets are located;
- Heavy fishing on small pelagic fish predominantly by the Soviet Union, and later also by Turkey, was carried out in a competitive framework without any agreement between the countries on limits for fishing. Depletion of the small pelagic stock appears to have led to

increased opportunities for population explosion of planktonic predators (jelly fish and ctenophores) which have competed for food with fish and preyed on their eggs and larvae
- The reduction of the fishing effort as a consequence of the economic changes caused by the transformation of the state capital into private capital;
- The limitation of market demands for some periods of the year, mainly amplified by the fact that more than 90% of the production was delivered as salted fish, because people prefers fresh fish;
- The free market and imported products have caused the limitation of the traditionally prepared products and the reduction of their price until the limit of the profitableness.

○ *Aquatic product safety*

Consumers started to become increasingly aware of the quality of fish products and the urgent need input to government regulations to ensure such quality;

Discharges into the environment and subsequent concentration in the food chain of contaminants such as heavy metals, dioxins, etc. may impact the quality of fish products. Such problems are increasing worldwide in particular contamination of aquatic products by pathogenic bacteria and viruses from domestic discharges of sewage and uncontrolled urban areas (Ahmed, 1991). Nutrients from the same sources also favour the explosive development of toxic dinoflagellates, contaminating fish and shellfish, whether wild or culture. In areas of oil exploration, catch and fishing gear can be tainted with oil.

3.4. Active removal of species from ecosystem

➢ Gelatinous zooplankton

According to recent observations (1998-2004), *Mnemiopsis biomass* had a decreasing trend following its population control by *Beroe* (other jellyfish) after 1998. Nonetheless, *M. leidyi* can occasionally be abundant in the north-western and western coastal waters (Fig. 11), in contrast to deeper part of the western shelf and the north-eastern basin where the share of *Aurelia aurita* was increased due to its competitive advantage under low *Mnemiopsis* populations.

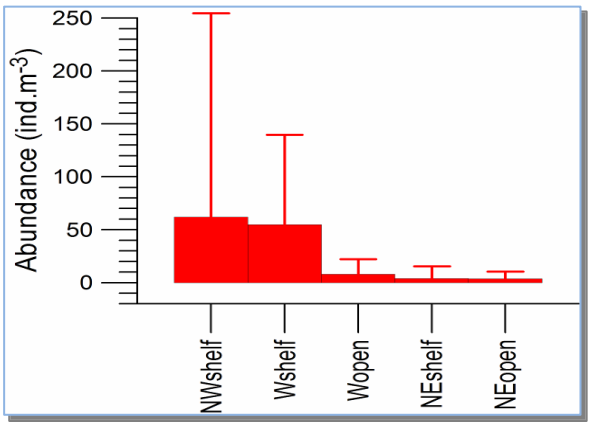


Fig. 11. Mean *Mnemiopsis leidyi* abundance (ind•m^{-3}) in the Northeastern (NE), North-Western (NW), and Western (W) Black Sea inshore and offshore waters during the summer 1998-2004 (redrawn from Kamburska *et al*. 2006) (BSC, 2008)

As one of the worst cases, edible zooplankton biomass in the Danube delta region constituted only 10% of the total zooplankton structure during 2003-2007; the rest was dominated by the combination of *Mnemiopsis*, *Aurelia* and the opportunistic species *Noctiluca scintillans*. On the premise of low edible zooplankton and high gelatinous and opportunistic species, the western-north-western inner shelf waters therefore do not show a stable zooplankton structure within the present decade, but a sign of recovery of mesozooplankton community structure is well-marked within the northeastern basin.

As for the long-term variations of phytoplankton, zooplankton biomass and community structure also appear to be strongly regulated by climatic variations. Jellyfish are concurrent at the same food

with fish, the development of jellyfish producing the decreasing of fish stocks. They are also indicator to the bad waters in which they register high densities and production. Relatively mild years with warmer winter temperatures favour more efficient *Mnemiopsis* and edible zooplankton growth, whereas severe years with colder winter temperatures limit edible zooplankton production albeit producing stronger spring phytoplankton blooms and promote more favourable *N. scintillans and A. aurita* development. The spring temperature conditions are particularly critical for the intensity and species succession of zooplankton production. Mnemiopsis attained higher biomass when August surface temperature was relatively high as in the case of 2000-2001 and 2005 or lower biomass as in the case of relatively cold August temperatures during 1996-1998 and 2003-2004 (BSC, 2008).

3.5. Present good practices for aquaculture

The practices of national aquaculture were assessed for two segments, namely technologies & technological systems used and the administrative sector. The data on the technological practices of the production sector have resulted on the one hand from questionnaires filled-in by actors in aquaculture, by technical discussions during focus groups and, on the other hand, by documentation from databases, case studies and research results.

Starting from the existing EU systems of acknowledging sustainability, the National Association of Fishery Producers ROMFISH has elaborated the draft of an aquaculture certification system in Romania, by an unitary approach of the practices in the sector, based on a "*Code of Good Practices in Aquaculture"*, which would differentiate from the environmental, social, sanitary-veterinary, food safety values the products of its followers. This code could either be applied voluntarily or it could become a minimum legal requirement for performing aquaculture activities in Romania (http://www.romfish.ro/despre-romfish/cod-de-bune-practici-in-acvacultura/s19)

3.6. Others

3.6.1. Danube Delta case

Danube Delta has been object of spatial basin on balanced spatial development and sustainable set of methods used by the public sector aiming to ensure a rational organization of planning, environmental protection and economic and social goals. Starting *'Design for investment works in water management, civil engineering, fisheries, cartography and cadaster'* activity NIRD Danube Delta Institute, Tulcea contributed to the "*Ecological and Economical Restoration of the Lower Danube Floodplain– REELD"*, creating a view to strategically coordinate the investment works for floods prevention and combat. At consequence it was elaborated the manner for repairing of the infrastructure works destroyed or damaged by the 2006 year's flooding, as well as the ecological reconstruction of certain areas enclosed by dams. A number of spatial planning draft plans for integrated flood management were developed.

Have been implemented spatial analysis, land indicators, integration of socio-economic data, EU spatial development policies, effects of land planning and management, regional assessments, etc. Guidelines for sustainable spatial planning and assessment on land and sea have been produced for Danube Delta , especially vulnerable areas such as coastal urban settlements, islands, wetlands, relevant marine and coastal ecosystems.

The assessment of exploitable fish stocks in Danube Delta, is a traditional activity of research and monitoring, adding the main environmental parameters wich vitally influence them: ecological factors, as water quality, hydrological conditions of reproduction (water temperature and floodability), the food chain components density and biomass, interspecific relations, intraspecific mortality rate and other anthropogenic factors.

Dynamics of the total catch - in the last 55 years (1960-2014), the evolution of the current fisheries DDBR space, reflected the dynamics of the total catch, experienced three characteristic periods:

- The period 1960-1970 characterised by variable catches influenced by the hydrological regime of the Danube with values between10,000 and 20,000 t/year;
- The period 1970-1984 with annual rates broadly unchanged around 15,000 t/year in which important changes occurred in the environment and fish community structure;
- The period 1984-2014 in which there was a decline in catch from 15, 000 to 4, 000-6, 000 t/year.

The three main fishery categories, according to fish species, methods and fishing areas, are:

- the fishery of fresh water fish (delta; Razim - Sinoie; the Danube river)
- the fishery of anadromous species (Pontic shad and Sturgeons)
- the fishery of marine fish
  - ➢ Fisheries status and evolution - 1960-2015 (Fig.3.6.1.1,2,3,4)

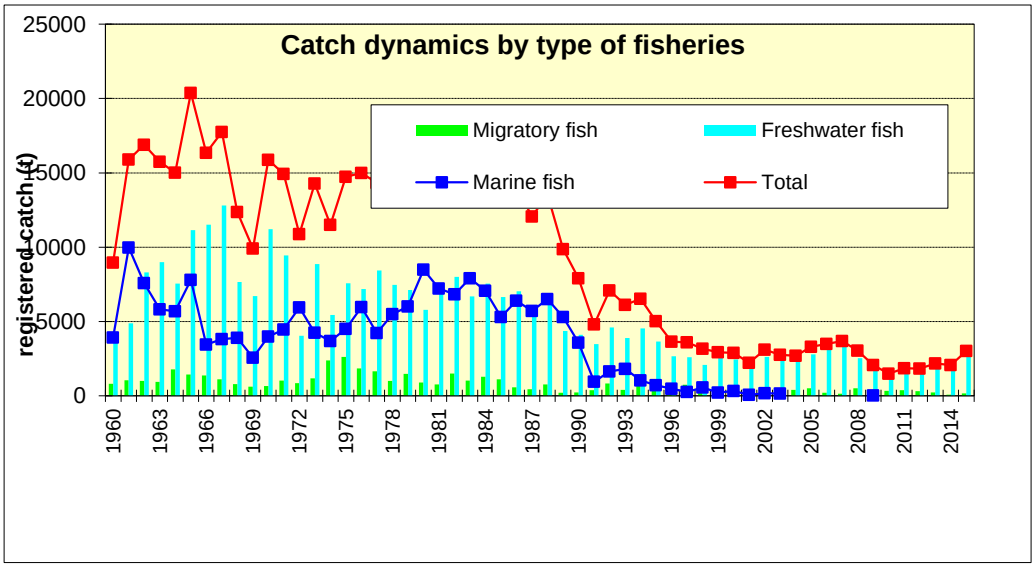
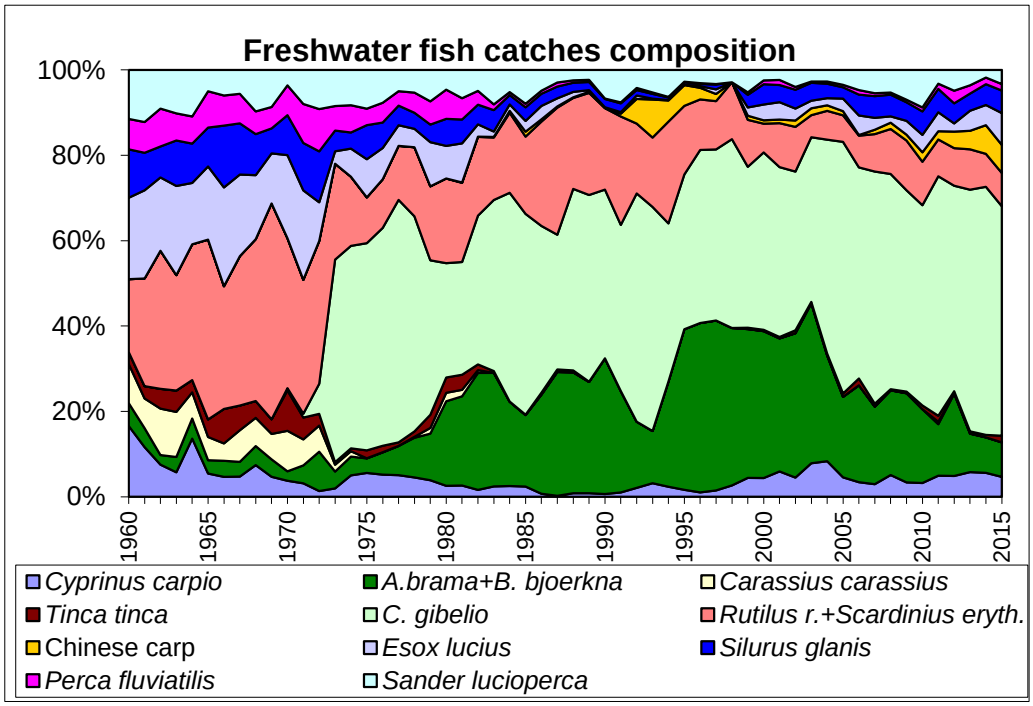


Fig.3.6.1.1.



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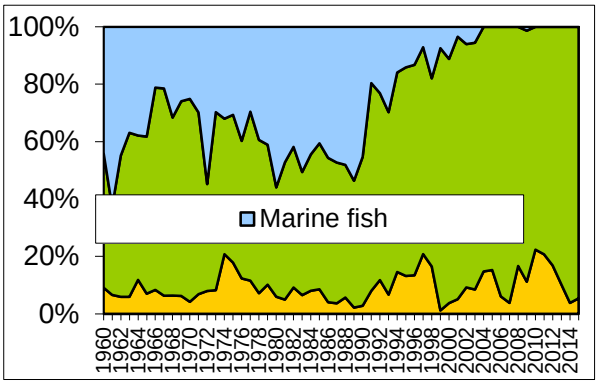

Fig.3.6.1.3.

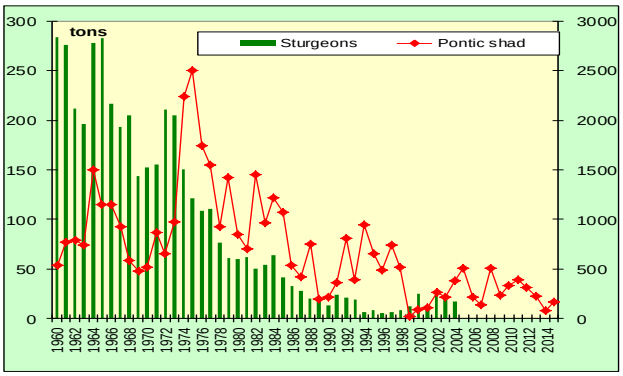

Fig.3.6.1.4.

In front of Danube Delta the *Black Sea sector*, the human activities, climate factors, led to changes in marine fish populations' structure in the last years:

- environmental condition on littoral area are precarious, fact reflected by the removal of the fish agglomeration in the open area, during the summer season,
- hydrotechnical works has impact on sturgeons and pontic shad spawning area,
- poaching practising by local people affects valuable species as turbot, sharks, sturgeons, similar to industrial fishing which is still practised,
- declining of the anchovy and horse mackerel stocks in the whole basin led to fishing of other species like sprat, with reduced value by commercial poit of view and people preferance,
- Turkish vessels continuously intensive fishing, especially for turbot fishing, affects natural stocks,
- use of some unsuitable gears and fishing techniques are still undesired,
- overfishing of anchovy and horse mackerel during winter period by foreign vessels has contributed to the lack of the quota, at regional and local level,

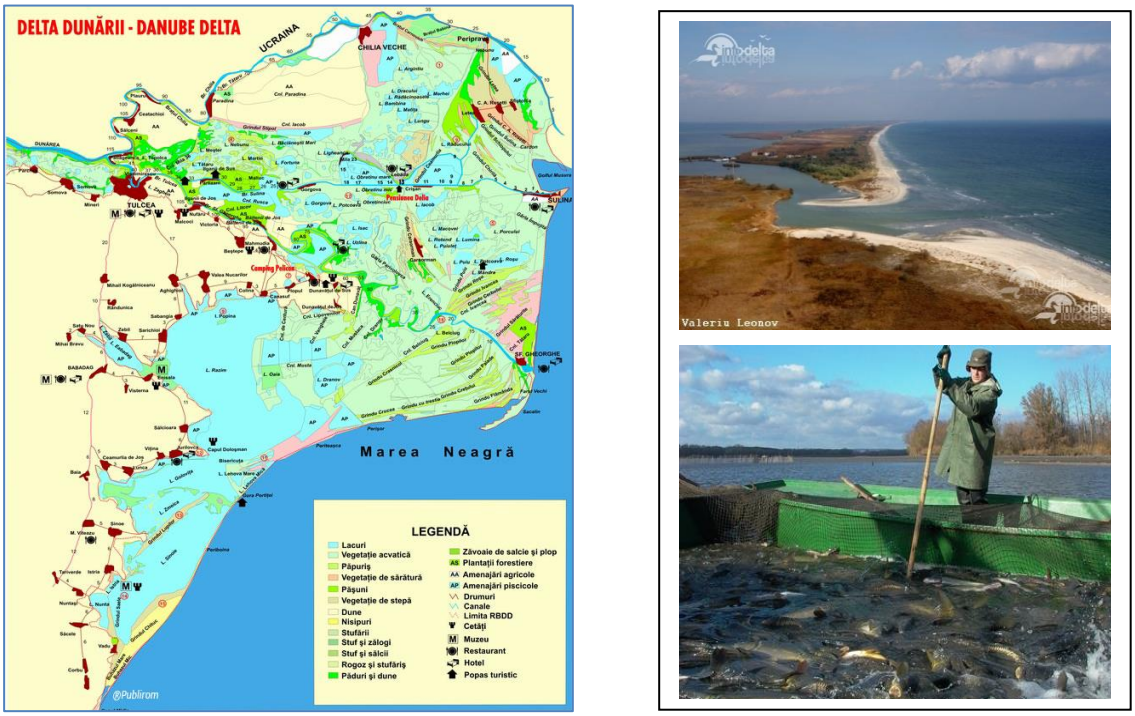

Fig. 3.6.1.5. Danube Delta features, coastal zone and main resource

- overfishing in the Bosfor area affect migratory species from Marmara Sea which used (in the past) to come for spawning and feeding in the Danube Delta area of the Black Sea,
- add to this also the domestic and industrial pollution, naval traffic, coastal erosion are all factors which stop the annual migration of the mediterranean fish species in the Black Sea.
- use of some unsuitable gears and fishing techniques are still undesired,
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- add to this also the domestic and industrial pollution, naval traffic, coastal erosion are all factors which stop the annual migration of the mediterranean fish species in the Black Sea.

Danube Delta has a reach biodiversity, around 5,000 plants and animals, being of the third place in the world, similar with the Amazonian basin. It is an important fish reservoir for Romania.

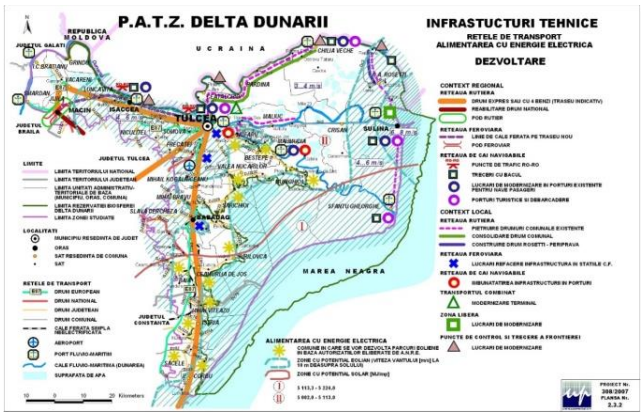


Fig. 3.6.1.6. Technical infrastructures

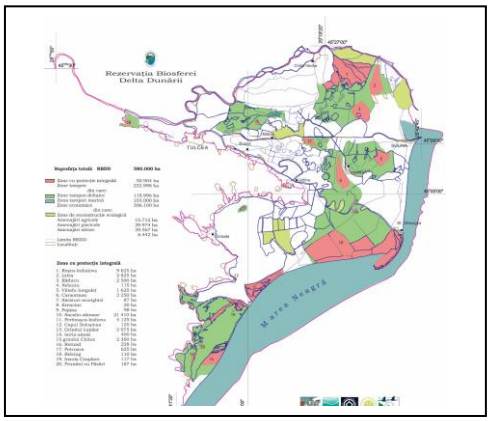


Fig. 3.6.1.7. Map of the main habitats

3.6.2. Coastal Lakes and Lagoons

There are four coastal lakes types: *river-estuaries*, *river-sea-estuaries*, *lagoons* and *ponds*.

Lakes present some genetic types: the river estuaries, related whit the Danube River, located on the right side of it, in the area between Harsova and Ostrov. Due to low rainfall and strong evaporation, the rivers that feed these estuaries have a discontinuous course, and there hydrologic regime is determined by the Danube river, especially when it overflows.

The largest estuary expansion in the country is the eastern part, consisting of lagoons and isolated estuaries by coastal current deposits, which travel from north to south.

From Cape Midia to Mangalia there are several closed estuaries like: Tasaul, Corbu, Techirghiol, Mangalia and several lagoons, Siutghiol, and Hergheliei swamp. **Tasaul lake** has a surface of 23.35 km^2 is situated in prolongation of Casimcea valley and it has an elongated, sinusoidal shape with an altitude of 5-12 m has fisheries function.

Siutghiol Lake with a surface of 19 km^2 is feed by powerful springs of fresh water and it's isolated from the sea by a sand bank on which Mamaia Resort was developed. Tabacarie Lake with an area of 0.98 km^2 located on the northern edge of Constanta in a marine bay is connected by channels to Lake Siutghiol and the Black Sea.

Lake Techirghiol is situated South side of Constanta and has an area of 11.61 km^2. It was formed in a deep valley flooded by high sea waters and sealed by a sand bank of about 200 meters wide,

South of Techirghiol in the tourist area of Mangalia North, Comorova swamp former marine gulf was drained, in its place there recreational lakes: Neptune (15.6 ha), Jupiter (18.2 ha), Tismana (1.56 ha). Hergheliei swamp (Iezerul Mangalia) occupies an area of 110 ha, almost completely clogged. The southeast lake is Lake Mangalia (2.6 km^2), located in the basin of a river with its moth closed by a sand bank. It has a winding shape and its slopes look like a canyon. By building two earth dams in Mangalia valley, Lake Mangalia, pond Limanu and pond Hagieni were born.

All these lagoons and ponds have ecologic, but also economic value, as industrial water needs, irrigation, and for therapy, fishing, hunting and tourism.

River estuaries that are formed by blocking the mouth of the river by the Danube silt are located along the right bank of the river and have depths below 1.5 m.

Fig. 3.6.2.1 Laguna Sinoe (NIMRD)

Fig. 3.6.2.2 The littoral belt Sinoe Lagoon and Black Sea

River-sea estuaries located on the eastern side of the county were formed by anastomosing the mouth of the river by marine sand banks. This category includes: Corbu or Gargalic (S = 5.39 km^2) Tasaul (S = 22.8 km^2) Agigea (S = 0.55 km^2) Techirghiol (S = 10.68 km^2) Tatlageac (S = 1.41 km^2) and Mangalia (S = 2.61 km^2).

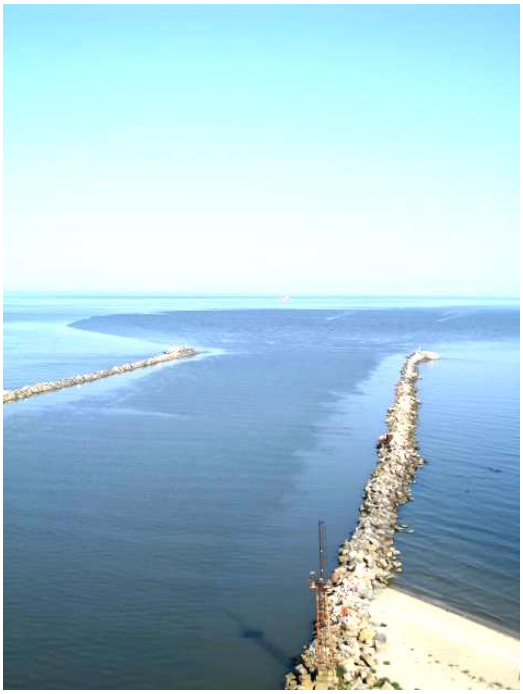


Fig.3.6.2.4. Danube Outflow of Sulina Chanel

Fig. 3.6.2.3 Baia Musura and the island formed in its front, view from the Sulina lighthouse,

Fig. 3.6.2.5. Pelicans in Musura Bay,

Estuaries (habitat 1130)

The mouth of the Danube, together with Musura and Sacalin baths and Black Sea waters in front of them up to 20 m represent habitat 1130, estuarine waters. The water in front of the mouth of the Danube is substantially influenced by inflow of fresh water. This habitat is characterized by low salinity water from entering upstream surface and deep layer sea water. Therefore this is not a typical estuary as in the Mediterranean and Baltic, but the water salinity is variable, quite close to the Baltic. These waters are home for euryhalin communities of plants and animals, including specific fish, most of them migratory species.

Coastal lagoons (habitat 1150)

The lagoons are expanses of salt water coastal shallow water, having variable salinity and volume, and being separated totally of the sea, or partially by sand or gravel banks. Salinity may vary from brackish to hypersaline, depending on the amount of precipitation, evaporation intensity, and high intake of fresh water during storms and high temporary flooding with water during winter or floods.

At the Romanian Black Sea shore, an example is Razelm - Sinoe Lake Zăton. Due to the impact of hydraulic works, the typical lagoon is still represented today especially in Sinoe Lagoon.

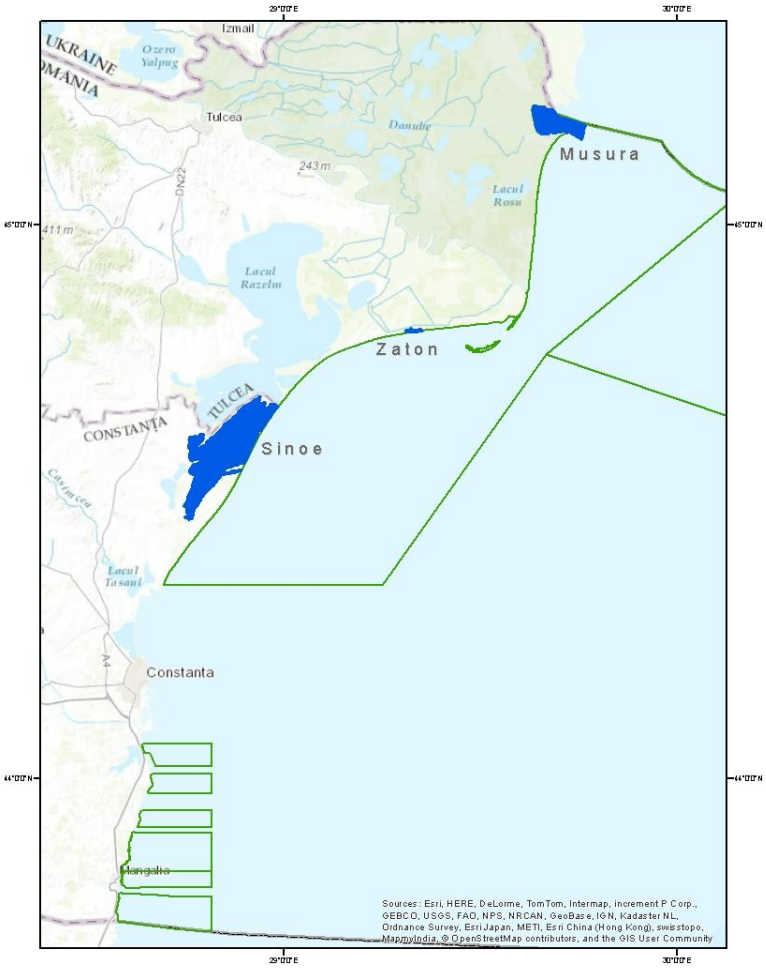


Fig. 3.6.2.6. Romanian present Lagoons/NIMRD

This salinity is a very variable line between freshwater and saltwater, being able to move hundreds of meters several times a day under the influence of the wind, simulating conditions of tidal lagoons. At South of the mouth of the arm of St. George, there is a lagoon area - Zătoane composed, according to some authors, two aquatic ecosystems: Zatonul Mare and Zatonul Mic, separated from the sea by a narrow sand belt but still retains communication Danubian system. There is little information about the ecology of the area.

Musura Bay lagoon formed thanks to the high amount of sediment here. Musura unhooking arm is at the southern arm Stambulul Vechi arm of the delta side of the arm Chilia.

Communication with the sea is difficult because of the deposits of silt brought here and the N-S coastal current entails, ordering them transversely to the mouth of the freshwater, building an island. Geomorphological, the channel and Musura bay are very recent: they were formed in the first half of the twentieth century.

During **marine period** (15-20 g/l) (till 1970), 22 marine and euryhaline fish species were registered. The most frequent remained the Mugiliformes, usually entering in lagoons during summer season, for feeding. The presence of typical marine species: *Belone belone euxini*, *Engraulis encrasicholus ponticus* and *Trachurus trachurus trachurus* was frequent. Other marine-euryhaline species with a high ecological or economical value were present:

Alosa caspia nordman, A. maeotica maeotica, A. pontica pontica, Anguilla anguilla, Atherina mochon pontica, Clupeonella cultriventris cultriventris, Gasterosteus aculeatus aculeatus, Gobius cephalarges cephalarges, G. ophiocephalus, Mugil auratus, M. cephalus, M. saliens and *Platichthys flesus luscus*

The geomorphologic features, origin, surface, relief, water level, structure, variety, can be considered a valuable support for a good fishery in lagoons. They have double connection:

– with marine waters through natural gates, inlets, inducing a permanent instability regime;
– with freshwater permanent inflow from Danube, inducing a huge continental pressure.

Because of these, lagoons have passed different stages of salinization.

Table 3.6.2.1:

Measures for direct intervention added to spatial planning	**Economic and social measures**	**Educational Measures**
- Hydro-technical interventions in order to restore water circulation in the system (dredging the channels, possible reopening of the connection with the sea); - Degraded areas' ecological restoration of; - Pollution reducing; - Number of invasive species decreasing; - Endangered species restocking and conservation, main sources for the sea space; - Characteristic habitats reconstruction;	- Application of an adaptive management; - Development of local associations; - Programs dedicated to promote eco-tourism, cultural tourism, sport tourism (yachting competitions) etc.; - Support of local small businesses; - Nominating lagoons are protected areas and identify possibilities for their definition as touristic areas of national interest; - Access to European funding programs; - Development of programs dedicated to the support of SMEs;	- Increasing the awareness and education in order to solve the existing threats; - the local communities involvement; - Transfer of "Know-how"; - Permanent and coherent partnerships between Universities and Local Administration (Schools); - Setting up county centres for the recognition of the specific skills of the inhabitants (cultural and handicraft); - Changing the education law to promote children's education and schooling in the areas, afterschool dedicated systems; - Creating local education and information centres.
Other Measures		
- Developing an integrated real-time monitoring system to be used also as basis for an early warning system in case of natural and human induced hazards; - Creating the necessary Decision Support System in RSLS (DSS		

After 1961 freshwater species occurred, pike (*Esox lucius*), pike perch (*Stizostedion lucioperca*) and some Cypriniformes.

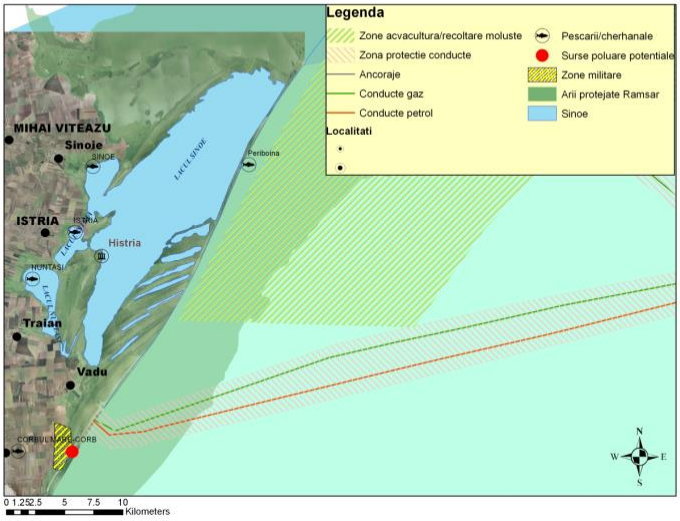
The evolution of ichtyofauna in Sinoe Lagoon connected with the changes of environmental parameters is the results of the natural and anthropogenic impact:

- during 70' hydrological works had the aim to use lagoon freshened waters to increase freshwater fish species production and subsequently for agricultural irrigation; this transformed it into an oligohaline lake;
- after 1980 the acceleration of freshening and eutrophication process induced catastrophic ecological effects: aquatic environment degradation (third part of lagoon tends to became marsh), ecosystem balance disturbing, traditional biodiversity diminishing, natural resources quality decline, traditional activities disorganization.

The most important impacts consisted in:

- ***Freshening,*** with impact on the salinity gradual and distinctive decreasing;
- ***Pollution,*** by hydrotechnical works, domestic waste products, detergents, agricultural and breeding activities, chemical agents, agricultural fertilizers, pesticides, private vegetable garden works, seasonal sailing and bathing areas, roads and railways access, coast consolidation;
- ***Others***: 1) Overexploitation, mainly of fish resources, 2) Lack or wrong use of legislation for environmental protection, 3) Habitats degradation and diminishing of places for reproduction and larval rearing.

Therefore, the radical changes in the species structure and the fish catches was a consequence of the regional climate, hydrological regime, salinity decreasing, intensity of migration of some species from the Black Sea and the last decade increased eutrophication.



40 years long term research monitoring can offer the main data recommendation for the lagoon area recovery.

It is clear that the period was the marine one based on migratory and most valuable species. The brackish period supported the better development of pike production. The freshwater species had the highest productivity in the first years which decreased totally in time. A better management and spatial planning could resolve all lagoons problems.

Fig. 3.6.2.7. Sinoe Lagoon spatial plan / NIMRD

3.6.3. Exotic species

Last assessment of the non-indigenous species in the Romanian waters carried out in the framework of the project MISIS (MSFD Guiding Improvements in the Black Sea Integrated Monitoring System (2012 – 2014), identified 80 species, benthic invertebrates being the most numerous (36%); they were followed by phytoplankton (29%), zooplankton (19%), fish (8%), macrophytes (5%), microphytobenthos (2%) and reptiles (1%) (Fig. 3.6.3.1-2; Table 3.6.3.1).

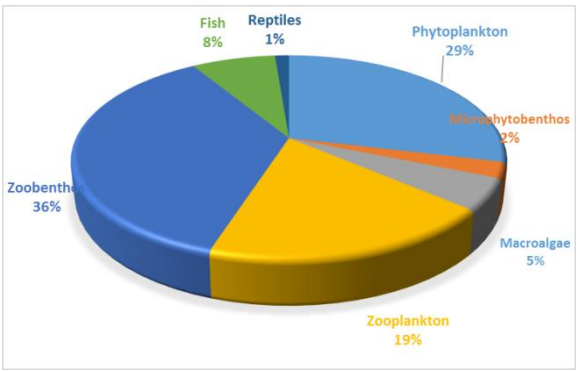


Fig. 3.6.3.1 Share of the major non-Indigenous species groups in the Romanian Black Sea waters

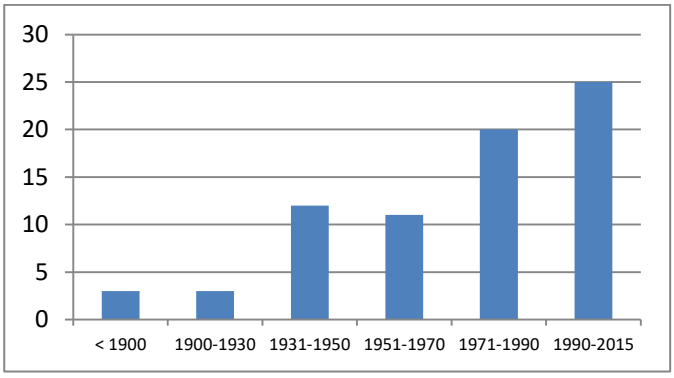


Fig. 3.6.3.2. Number of non-indigenous species signalled in Romanian Black Sea waters

Considering the number of species signalled in the Romanian Black Sea waters in different periods, an increasing trend can be observed along 20th and beginning of 21st centuries (Fig. 3.6.4.2)

Table 3. 6.3.3.1. Fish species introduced in the Romania (Black Sea)

Fish Species	First Year in national waters	Place of the first occurrence	Origin	References
Lithognatus mormyrus (Linne, 1758)	1980	Shelf waters	MS, AO, NE	Vasileva, 2007; Stanciu&Ilie, 1980; TDA, 2007; Boltachev&Karpova, 2013
Liza haematocheila Temmnick & Schlegel, 1845; *Mugil so-iuy* (Basilewski, 1855)	1975	Shelf area	SE	Aleksandrov et. al., 2007; TDA, 2007
Prionace glauca (Linnaeus, 1758) *; Carcharius glaucus* Linnaeus 1758	1940ies	In front of Danube Delta	AO, IO, PO	Cărăușu, 1952
Sardinella aurita, (Valenciennes, 1847)	1980ies	Coastal waters near Constanta	AO, PO	Maiorova, 1951; Salekhova et al., 1987; Svetovidov, 1964; Boltachev et al., 2000; Boltachev&Karpova, 2012
Sarpa salpa (Linnaeus, 1758)	1949	coastal waters	MS, AO, NE	Maiorova, Marti, 1938; Svetovidov, 1964; Bat et al., 2005; Boltachev&Yurakhno, 2002
Sphyrena zygaena (Linnaeus 1758)	1999	In front of the Danube Delta	AO, IO, PO	Zaitsev, 2011

Some bivalves arrived into the Black Sea were *Anadara inaequivalvis*, *Mya arenaria*, gastropod *Rapana venosa* and ctenophores *Mnemiopsis leydi* (Skolka&Gomoiu, 2005), new arrived *Corambe obscura*, *Beroe ovata*. Presently, the two species partially co-exist, although a substrate preference was observed: *Lentidium* inhabits clean fine sands, while *Mya arenaria* prefers very fine sands having important muddy fraction rich in organic matter.

Anyway there are acclimatised 22 Phytoplankton species, 2 from microphytobenthos, 4 macroalgae, 15 zooplankton, 28 zoobenthos, 6 fish species, 1 reptila, (*Chelonia mydas*, Linnaeus, 1758).

Tabel 3.6.3.2.

Tabel 3.6.3.2. **Place/Year of the first occurrence in national waters**							**Cited in**
	BG	**GE**	**RO**	**RU**	**TR**	**UA**	
Blennidae							
Parablennius incognitus (Bath, 1968)						Crimea coast 2002, near Sevastopol	Boltachev *et al.* 2009
Chaetodontidae							
Heniochus acuminatus (Linnaeus, 1758)						Balaklava Bay, 2003	Boltachev and Astachov 2004
Centrarchidae							
Lepomis gibbosus (Linnaeus, 1758)			Danube Delta			Danube Delta	Busnita 1929; Aleksandrov *et al.* 2007; TDA 2007
Clupeidae							
Sardinella aurita Valenciennes, 1847					1997	Balaklava Bay, 1999	Aleksandrov *et al.* 2007
Cyprinidae							
Carassius gibelio (Bloch, 1782)						1987	1987, Salehova *et al*, Boltachev *et al.* 2009
Gadidae							
Micromesistius poutassou (Risso, 1827)						Cape Aiya 1999	Boltachev *et al.* 1999

Gobiidae							
Gobius cruentatus Gmelin, 1789					2006, BS coastal zone	Sevastopol Gulf, 2002	Engin *et al.* 2007; Boltachev *et al.* 2009
Gobius xanthocephalus Heymer et Zander, 1992	2000s	Abkhzia Coast				1967, Crimea coast zone	Boltachev *et al.* 2009
Millerigobius macrocephalus (Kolombatovič,1891)						Sevastopol Bay, 2009	Boltachev *et al.* 2010
Tridentiger trigonocephalus Gill, 1859						Sevastopol Gulf, 2006	Boltachev and Karpova 2010; Oral 2010
Pomatoschistus marmoratus (Risso, 1810)	Marine, benthic 2010						Vassilev *et al.* 2010
Pomatoschistus bathi Miller, 1982	Marine, benthic 2010					Crimea coast near 2000	Boltachev and Karpova 2010; Vassilev *et al.* 2010
Moronidae							
Morone saxatilis (Walbaum, 1792)		Coastal zone 1965				Dniester liman 1965	Zaitsev and Öztürk 2001; Aleksandrov *et al.* 2007; TDA 2007
Mugilidae							
Liza haematocheila Temmnick et Schlegel, 1845	Shelf Area 2000	Shelf area 1975	Shelf area 1975	Shelf area	Shelf area	1968	Aleksandrov *et al.* 2007; TDA 2007; Dobrovolov *et al.* 2003
Sparidae							
Lithognatus mormyrus (Linne, 1758)			Shelf area 1980				Stanciu and Ilie 1980; TDA 2007
Sphyraenidae							
Sphyraena phyraena (Linnaeus, 1758)	Coastal area		Coastal waters 1905		Bosphorus region	Odessa Coast, 1905	Boltachev 2009
Sphyraena pinguis Günther, 1874						Balaklava Bay, 1999	Boltachev and Yurakhno 2002
Syngnathidae							
Syngnathus acus Linnaeus, 1758					BS coastal zone 2006	Chernaya river mouth 2006	Boltachev *et al.* 2009
Sparidae							
Sarpa sarpa (Linnaeus, 1758)					Sinop-Samsun rocky,vegetation 1998	Crimea 1999	Bat *et al.* 2005
Umbridae							
Umbra krameri Walbaum, 1792	Black Sea, 2012						Raykov *et al.* 2012

3.7. Aquaculture

Marine aquaculture in the Black Sea has a relatively recent development (since 90's) and is still not widespread. Much of the technology and production in the region is still under development.

- The aquaculture in Romania is predominantly based on freshwater fish farming activity (also in the coastal areas), while mariculture is practically absent, although some studies suggest that there is interest in developing this sector.

- In accordance with the Directive 79/923/EEC on shellfish water quality, along the Romanian Black Sea coast four suitable areas for mussel culture have been identified.

- At present, in Romania only one private company (SC Maricultura Ltd.) has the aim of producing the mussel *Mytilus galloprovincialis* (endemic species) and oysters (accommodated *Ostreea galloprovincialis).* The farm consisted of 10 long-lines and the expected production would be around 150 tons/year of mussels. The first year of production was 2002, when the farm produced around 100 tons of mussels and 1 t of oysters.

○ *Overall infrastructure*

It was evaluated the possibility of creating coastal infrastructures in order to support the aquaculture development on the coast, using marine water.

**Transport:* some road along the Romanian coast become congested only during the summer tourism season and they appear to be adequate for the transport of aquaculture products to local coastal market;
**Land and utilities*: excepting the areas where tourism is most intensive, it seems to exist potentially land parts, available for the aquaculture development on the coast.

During the last twenty years local authorities tried to allocate coastal areas for aquaculture, but it is still not very clear if the delineated areas on the coast belong to government or private sectors. In addition, other conflicts take place in that area, e.g. between new buildings, military areas, coastal tourism and fishing activities. Traditionally, fisheries and tourism are the two main competitors for farming development. But if the location is chosen correctly and the farm is well managed, this activity could create a synergy with fisheries and tourism.

For the marine off-shore areas more research still must be done in order to assess the interaction between maritime activities and environmental components, state of climate instability and the associated impact**.** Concerning:

Human resources:

- following the relatively recent decline of fisheries in the Black Sea, mariculture could be an opportunity for many former fishermen to return to marine activities, even if only offshore. Unfortunately, their number is more and more decreasing over time.
- Young fishermen tend to abandon traditional fisheries (e.g. Danube Delta) and migrate in areas where living conditions are better or even abroad. This is also due to the diminishing of landing places for artisanal fisheries, caused by the creation of new building areas.
- Technical qualified people such as biologists, engineers and mechanics appear to be available in the region. Anyway, the continue development of the field and the necessity to accommodate at international level impose the necessity of a deeper specialisation of such profiles.

***Support industries*: in Romania, one of the local constraints is the lack of the development of a "micro industry" which could provide the equipment for aquaculture.

○ *Candidates for the mariculture*

Romania is prepared by the point of view of research for mariculture, because have been experimented all kind of methods of cultivation for all marine native organisms, elaborating technologies in the old period (30-40 years ago). In particular, the main species for aquaculture are: rainbow trout *Onchorhyncus mikiyss*; grey mullet *Mugil cephalus,* turbot *Psetta maeotica,* plaice *Platichthys flesus luscus,* all native sturgeons; algae and invertebrates (zooplankton, shrimps and bivalves).

For the development of mariculture, the promoting of the autochthonous species must be taken into account, especially because of the tendency of introducing allochthones species.

In the northern part of Constanta (20 km) a marine fish farm with 50 basins was built and it was specially designed to turbot rearing, basing on Norwegian technology. The farm was created under EU funding grant and private investments. After a period of technical problems it will be rehabilitated.

At national level UE imposed:
- Socio-economic analysis of disparities in different periods (including SWOT analysis);
- Strategy and thematic objectives set for funding in connections with national and European strategies);
- The main indicators necessary to be established and respected;
- Financial Programs valorisation and EU rules implementation details.

○ *National strategy, policy, planning, priorities*

The National Strategic Plan 2007-2013 and the present for 2014-2020, both in Romania and Bulgaria, have been developed under the Common Policy for Fisheries and under the Romanian government policy for the sector development, including National Strategic Plan and Operational Programme for Fisheries and Aquaculture, as programming document under which are accessed the amounts allocated to Romania and Bulgaria from the European Fisheries Fund till 2020.

○ *Main challenges – national – and possible solutions*

According to the results of the FOP implementation analysis in terms of aquaculture in 2011, we can say that:

Present problems	*Possible solutions*
- The privatization of land is incomplete - There are changes in consumer preferences - There is a great competition of local products with imported ones - There is a limited attractiveness of the sector for investors - Technical equipment is insufficient and outdated - There is a poor organization of producers - Products Diversity is low and added value is small.	- Rehabilitation of ponds for finfish culture, where is the case; - Market developing for fisheries products; - Support the promotion of fish products required quality standards and procedures for tracking and traceability records of the aquaculture production.

○ *Factors influencing the site selection for mariculture with necessary support from MSP*

Our studies show that Romanian coastal zone has big difficulties in mariculture development because of the natural conditions (traditional weather instability, with high risks and vulnerabilities). Many local features and causes of mentioned climate instability there are.

The Romanian coast is around 245 km long.
- It has only few small areas for mariculture, less closed which are more suitable than others;
- The recently expanded systems of harbours activities are strongly polluted and cannot be used for the cultivation of living organisms.

Concerning the Geomorphology: The very strong geomorphological dynamic is based on a high erosion process, inducing instability of the coast. This situation arises from the variability of alluvial deposits quantities, brought by the Danube, from the increasing frequency of strong storms and the deep currents, significantly modified by hydrotechnical works /constructions.

The wind instability and the severe stormy periods cover October to March (the 6-8° B storms are caused by N-NE winds). In April-September period, S-SE winds are dominants.

Concerning the Topography: The local sea bed topography has a specific considerable influence on strongly wave conditions at each specific site. Therefore it is important to secure any sea–based aquaculture construction against severe storm conditions, not only by examining the possible

abilities of the system, adding to this the information about the seabed consistency, soft and easy degradable. If possible, the wind-wave data and the topography should be analysed to develop a local strategy, which can prove as important as the use of the correct equipment.

The water thermal regime in the shore area is typical for a closed sea basin, a temperate area, with continental climate. In the shallow coastal waters the temperature is very low during the winter time (0,1°C-4°C) and very high during summer (22°C-26°C). During cold winters, the water freezes, especially along the northern coast. During summer the W and SE winds cause upwelling phenomenon, which produces violent sea water cooling (by 10-15°C) over a short time period (5-10 days).

Concerning *salinity*, the coast can be divided into three main sectors:

- The northern sector is characterised by large frequent variations (0-8ppm salinity), due to Danube pressure;
- The central sector: has 8-15 ppm salinity, more often 6-12 in last years or during floods period;
- The southern sector: has a salinity of 14 and 17 ppt.

Romanian marine waters have a high *eutrophication* level. In spite of this, the last decade, a slight decline of the eutrophication level has been observed. The 5-7 microalga blooming events by summer season (followed by anoxia, than marine organisms' mass mortalities) decreased much, instead the macroalgae high development (with big quantities on the beach stocking and degradation, affecting tourists comfort). Algal blooming has in both cases negative and well known effects on the benthic flora and fauna.

There are no records of *toxic* microalgal *blooms* on the Romanian coast. The PSP (paralytic shellfish poisoning) and DSP (diarrhetic shellfish poisoning) which could be harmful to human consumption (also in the blooming periods) are missing in Romanian waters.

The fouling (the unwanted settling and growth of organisms on the culture device) is composed by barnacles, molluscs, hydroids and smaller seaweed types.

Predators are represented, for the molluscs by the gastropod *Rapana venosa* but this is only prey on (natural) bottom living mussel. Free ecological niches met at the Romanian coast are being filled by not indigenous species, mainly recently. Cases of long-term or totally instalment is recorded for few species, as *Rapana.* Unfortunately, they produce big ecological damages, including in this category also the jellyfish species.

Comparing the existing conditions on the Romanian littoral to the ones requested by the European regulation for the adequate sites identification related to the mariculture practicing (adopted by the 49th JACUMAR, with three class of classification: 1 – good; 2 - medium; 3 -bad), the situation of coastal main factors is the following: Exposure of the coast – 3; Waves (≥3 m) – 3; Depth (≥15 m) – 3; Water flow (high) – 1; Pollution (medium) – 2-3; Max.temperature (24 ÷ 27ºC) – 2; Min.temperature (<8ºC) – 3; Average salinity (<15) – 3; Salinity fluctuation (5 ÷ 10) – 2; Dissolved oxygen (%) (70 ÷ 100) – 2; Slope (topography) (‰): (10 ÷ 30) – 2; Substrate (Mixture: sand, gravel and mud) – 2; Trophic state (eutrophic ÷ mesotrophic) – 2; Fouling (moderate) – 2; Predators (some) – 2.

Environment and geographical features and marine space have specifically characteristics at the Romanian coast. Maritime Spatial Planning can help, support and attenuate problems for a good mariculture development.

According to the timetable agreed in the Inter-institutional Committee for the Partnership on 23.08.2012, during October-December 2012, the activities of the Working Group for Fisheries and Aquaculture were focused on achieving the first stage of the programming process, namely the development of the socio-economic analysis.

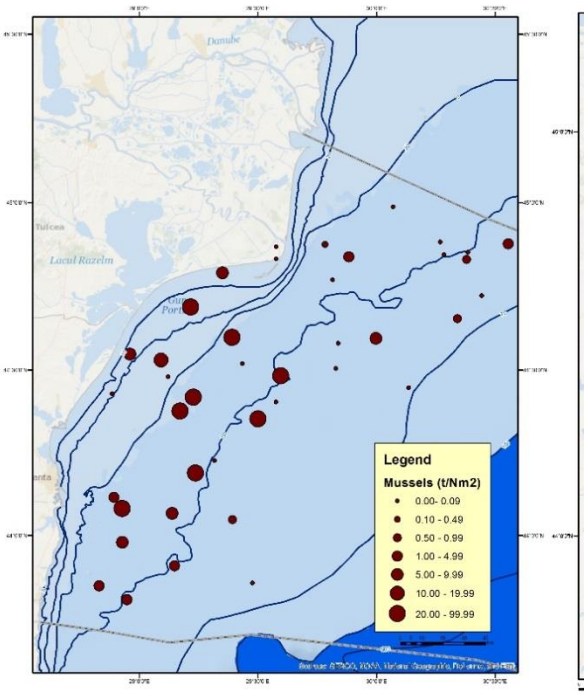


Fig. 3.6.1.1. Mussels biomass distribution, spring 2013 / NIMRD

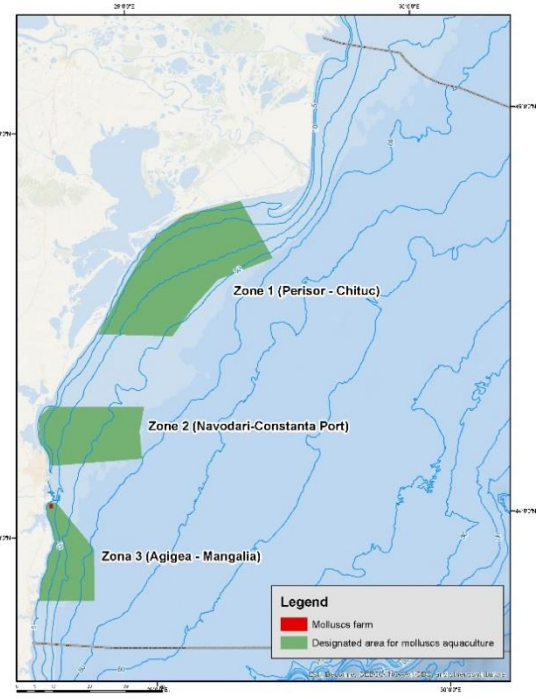


Fig. 3.6.1.2. Aquaculture / NIMRD

On the basis of this analysis, the WG proceeded to the next steps, in particular to the development of a strategy and priorities and also to the financial allocations and to details of implementation. All these include marine fisheries and mariculture.

- ***State of marine aquaculture in Bulgaria***

The Bulgarian coast does not have appropriate gulfs or depths suitable for marine aquaculture, although land based farms on the coast and underwater net cages might represent a potential alternative solution for the future (https://www.southstreamtransport.com/media/documents/pdf/en/2014/07/ssttbv_bg_esia_151_web_en_303_en_20140728.pdf). According to the Executive Agency for Fisheries and Aquaculture near the Bulgarian Black Sea coast are registered 35 mussel productive farms. The average annual production of mussels for 2015 was 3,372 tons. Other non-native species of molluscs, introduced accidently in the past into the Black Sea are also of market interest, such as a sand gaper (*Mya arenaria*) and sea snail (*Rapana venosa*), which are currently subject to commercial fishery, without developing methods for breeding and rearing them.

One of the main objectives of Bulgaria was to increase the collection and quality of the statistical data on aquaculture farms. Questionnaires for the aquaculture sector were updated in 2014 and again in 2015. Measures were taken on raising the awareness of the owners or managers of farms about their obligation to submit the questionnaires and in 2014 we achieved 100% answers from respondents.

4. Legal frame proposed for integrating marine fisheries into spatial planning

4.1. General remarks

During recent years research on the integration of fisheries in MSP has been gaining more importance. The state of the art and the progress achieved was reviewed by many studies around the world, and in Romania and Bulgaria, too. Integration of fisheries in MSP during the MSP stocktaking and plan development includes tools and methods to identify productive areas with relevance for fish resources, fisheries and the management of fish stocks, available or under development. There are models that support analyses on changes in species distribution and of effects of MSP or human uses on existing fisheries. In Romania and these tools, methods and models are still in a scientific stage but, recently ate adoption of MSP methods has started (ERANET-COFASP ECOAST Project).

Spatial management tools are under development both in Romania and Bulgaria and monitoring of marine fisheries is gathering extremely rich data including small-scale fisheries and other uses, underlining the need for integration of fisheries in MSP.

The EU Common Fisheries Policy is at present under thorough revision and development. Based on a Green Paper on the Common Fisheries Policy (CFP) the Commission in 2009 initiated a public consultation asking for advice for reform. Among others, the ecosystem approach was mainly stressed. In present the Blue Growth is the principle coordinating relation between ecological aspect, sustainable and wise development and MSP in the marine space.

Areas are identified where fishing is completely prohibited or only allowed if the fishermen prove that activities are compatible with objectives of area protection. The regulatory regime consists of two steps: the designation by maritime plans of the areas that shall be protected, and the inaction of the regulatory regime.

Developing projects for an ecosystem approach to fisheries (MAREFRAME) has been taken seriously into account whether this can be fully implemented by the Black Sea Member States by EU measures, having enough support to do so. EU institutions, DG MARE, EASME too, can support these. Based on this assumption the distribution of powers between the EU institutions and the MS started to be explored in what follows.

4.2. EU, MS and Black Sea experience concerning fisheries management

Romania completed negotiations with the EU in the area of fisheries in June 2001, and accepted the entire “acquis communautaire” without requesting derogations or transition periods. Fisheries have traditionally been managed through direct restrictions, including seasonal and area closures, minimum mesh size, and access limitations. In recent years, licensing and individual quota system were introduced as effort-control measures, in order to bring fishing effort more in line with the available resources.

In Bulgaria, Present Fishery and Aquaculture Act (FAA) was adopted in 2001 by the Bulgarian parliament and published at State Gazette on 24th April of the same year. After that, the Act has been amended six times (at the time of pre-accession period for membership in EU negotiations, 2005-2006) for the adoption of the legislation of the community in the scope of fisheries. With the last changes, we can assume that the Act is harmonized in the maximum possible extent with “Acquis Commmuniautare” of the EU. Nevertheless, the term “management” is used only in the second chapter title, which in fact regulates (stipulates) administrative procedures for formulation and compilation of the National Program of Fishery and Aquaculture, to gain professional fishing

rights and etc. but do not consider questions on management in its specific aspects. In the other chapter of the FAA (Section 4) the requirements regarding fisheries resources conservation are presented, including scientific research on the fish stock condition, temporary fishing prohibitions, bottom trawling ban, Minimum Landing Size, without mention fishing effort as a management instrument.

There is an ordinance of the Ministry of Internal Affairs in force which specify the introduction of the obligations of the Border Police to carry out control on fishing vessels in accordance with the Fishery and Aquaculture Act.

Table 4.2.1. **What is most amazing**
Romania and Bulgaria didn't established exactly marine borders between them. Here there is a predictable conflicts (on MSP kind of evaluation) regarding marine fishing, because Bulgaria uses EU laws on marine fisheries and Romania uses the own legislation which is more restrictive. This means that, in present, Bulgaria permits fishing in Romanian (open) marine waters, while Romania don't.

Romania and Bulgaria became members of the EU in 2007, which extended the EU Common Fishery Policy (CFP) into the Black Sea. In Romania and Bulgaria the transfer to the CFP has not encounter major problems: these countries have basically accepted and met all the requirements for joining the CFP and are now eligible for support from the European Fisheries Fund (EFF).

Romania and Bulgaria are Contracting Party of the Black sea Commission which has in its structure some Advisory Groups. The Advisory Group on Environmental Aspects of Management of Fisheries and Other Living Resources (AG FOMLR) provides the Commission with best possible advice and the technical support for protection and rehabilitation of marine ecosystem in particular for conservation and sustainable use of the living marine resources (Annex I, BS SAP, 1996, amended in 2002).

The Advisory Group on Environmental Aspects of Management of Fisheries and Other Living Resources is supported by **Regional Fishery Activity Centre, Constanta**, Romania, which coordinates the necessary programmatic support and provisions of practical technical support for its work:

- facilitates the exchange of national information on regulations regarding fishing right allocation, fishery efforts, impact of aquaculture and fisheries on natural ecosystems, and good environmental practices for fisheries and aquaculture;
- creates, maintains and upgrades the Black Sea Fisheries Database including information on fisheries statistics, environmental conditions, stock assessments and interdisciplinary research programs in the Black Sea Region as a component of the Black Sea information system;
- develops and promotes standardized techniques of the catch estimates, assessment methods for stocks and exploitable biomass of key species;
- facilitates annual exchanges of national fisheries statistics data and National Fishery Researches Reports;
- coordinates regular stock assessments and common vessel surveys;
- prepares recommendations for management plans for selected key fish stocks and draft common fisheries management procedures, taking into account those promoted by EU, FAO and other international specialized institutions;
- prepares and coordinates the specific projects for protection and rehabilitation of the critical habitats and threatened key species, in particular spawning and nursery grounds for demersal species like sturgeons, spiny dogfish and turbot;

- prepares and coordinates specific projects for development of marine aquaculture in the Black Sea area;
- reports to the Commission and makes recommendations regarding above-mentioned issues
- cooperates with relevant international and regional fisheries organizations: FAO/GFCM, ICES, BSEC, Fisheries Commission for the Baltic Sea and for the Mediterranean Sea, etc.

Also, Romania is member of **GFCM**, but till now its activity was very limited. In 2012 the GFCM-BSWG was created and it is coordinated by the director of NIMRD "Grigore Antipa" Constanta, Romania. In each country a Focal Point for Fishery was created. The responsible of this Focal Point for Romania is also employed by the NIMRD Constanta.

4.2.1. Black Sea Advisory Council (AC)

The European Commission has formally launched the Advisory Council for the Black Sea based Varna. The decision was announced in the Official Journal of the European Union dated February 26, 2016. Second auxiliary office will be in Constanta.

The Advisory Councils (ACs) are stakeholder-led organisations that provide the Commission and EU countries with recommendations on fisheries management matters. This may include advice on conservation and socio-economic aspects of management, and on simplification of rules. Advisory Councils are consulted in the context of regionalisation. Advisory Councils should also contribute to data for fisheries management and conservation measures. They receive financial support from the EU as a body pursuing an aim of general European interest.

Chair of the Advisory Council is from Romania, and his mandate is three years. It comes as observers and countries that are not EU members - Turkey, Georgia, Russia and Ukraine. 60% of participating in this organization is representatives of private companies from the maritime industry and other non-governmental organizations.

The new structure has 15 member organizations - 9 from Bulgaria and 6 from Romania. Among them the most are those of fishermen fish and aquaculture producers. The new structure is open to other participants. Control bodies of NAFA will be included as observers in the Advisory Board to assist its work.

One of the important themes is the criticism with turbot, for which it is unclear the situation of its population, the age determination, methods of catch, etc. Another topic is associated with the white clam, which is also an important marine resource which requires unified methods and tools to catch it. Serious issues associated with rap. For existing problems with fisheries in Bulgarian and Romanian waters the two neighbouring countries should understand what legislation will apply. The two countries will set a number of issues that are related to the implementation of EU legislation, including how will hunt in protected areas in the sea "Natura 2000" and others.

4.2.2. Recommendations regarding the future management of fishing resources at regional level

Actually, in the context of existing drastic changes in the ecosystem components and increasing of climatic changes influence, it is a real need to improve the knowledge on marine ecosystem, to implement holistic approaches, including ecosystem based fisheries management. The following actions are in the process to be implemented:

- to strengthen the regional legal framework for fishing sustainable management in the Black Sea, through elaboration of legal documents regarding the fishing.
- To develop strategies for the fishing sector harmonized with those of environmental protection, through the implementation of concept regarding the fishing management based on ecosystem approach and FAO Code of Conduct for a responsible fishing.

- Development of specific indicators for the Black Sea, in order to monitor and assess the state of key resources/habitats.
- Selection of key demersal species and their habitats and development of recovery plans for them.
- Basing on the lessons learnt it is necessary to prepare and implement the recovery plans for other fish stocks living in the Black and Azov Seas.
- To follow principles of responsible fisheries and to implement specific measures based on these principles.
- To harmonize methodologies for stock assessments and to establish well defined objectives for fisheries sector.
- To elaborate criteria for selection and designating fishing free zones on a national and regional level.
- To establish marine mammals stranding network on the national and region levels.
- Rapid adoption a regional legally binding document on responsible fisheries.
- To undertake concerted actions to combat illegal fishing and to establish regional consultation mechanisms between the black sea coastal states.
- To extend/designate marine protected areas of regional significance and establish a MPAs network for the Black Sea.
- Cooperation with GFCM, EEA and other relevant organizations on the issues of common interest.
- Protection of living resources in the Black Sea must be realized on the basis of an adequate legal and institutional framework both at national and regional level.
- The transboundary nature of the living resources in the Black Sea (e.g. shared fish stocks) imposes the necessity for coordinated efforts at regional level for their exploiting and protection.

4.3. Black Sea Fisheries and EU Directives

➢ *The specialized communitarian legislation applicable AM FOP*

- Regulation (EC) no. 1198/2006 concerning the support of the European Fisheries Fund;
- Regulation (EC) no. 498/2007of the Commission for the establishment of detailed rules for implementing Council Regulation (EC) nr.1198/2006 regarding the Fisheries European Fund;
- Regulation (EC) no. 2371/2002 of the Conseil on the conservation and sustainable exploitation of fisheries resources under the Common Policy for Fisheries;
- Regulation (EC, EURATOM) No. 1605/2002 of the Council applicable to the general budget of the European Communities;
- Regulation (EC, EURATOM) No. 2342/2002 of 23 December 2002 laying down detailed rules for implementing the Regulation (EC, EURATOM) nr.1605/2002 of the Council regarding the Financial Regulation, applicable to the general budget of the European Communities, with their amended and supplemented follows;
- Regulation (EC) no. 104/2000 on the common organization of the market regarding the fishery and aquaculture products;
- Proposal for a Regulation of the European Parliament and of the Council on the common organization of the markets for products obtained from fishery and aquaculture - COM (2011) 416 final;
- Council Directive No. 92/43/EEC on the conservation of natural habitats and wild fauna and flora. European Habitats Directive (92/43/EEC), regulating the conservation of natural habitats and of wild fauna and flora, requires member states of the European Union to take adequate measures to maintain or restore certain habitats and species by providing their favourable conservation status within their natural distribution area (European Commission, 1992);

- Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament and Council, 2000). The overall objective of this Directive is to achieve good ecological status of surface waters (rivers, lakes/dam lakes) by 2015. To achieve this objective, the Directive introduces a new, integrated approach to assessing the status of surface waters, which is based on the concept of water ecosystems.

➢ *Strategic Documents Plans and Programmes*

- Maritime and Fisheries Programme for Bulgaria and Romania (MFP) 2014-2020;
- Multianual national strategic plan for aquacultures in Bulgaria and Romania 2014-2020;
- National Programme for Collection, Management and Use of Data in the Fisheries Sector;
- Action Plan for the fleet segments, prepared pursuant to Art. 22, para. 4 of Regulation (EU) No. 1380/2013 on the Common Fisheries Policy;
- Maritime Strategy of the Republic of Bulgaria with the implementation measures 2016-2021
- Strategic Plan for Biodiversity 2011-2020 and the Aichi targets for biodiversity;
- EU Strategy on Biological Diversity 2020;
- National priority action framework for Natura 2000;
- National Action Plan for the conservation of the most important wetlands.

➢ *National Strategic Multiannual PLAN regarding Fisheries and Aquaculture 2014-2020*

Bulgaria has developed various management strategies with a view to controlling fishing effort and promoting the restoration and protection of water resources and ecosystems. These measures include (FAO 2002):

– direct limitation of fishing effort through registration of fishers and licensing of fishing gear and fishing vessels;
– rehabilitation of resources through establishment of artificial reefs outside mussel facilities (pending on the Bulgarian Black Sea shelf);
– measures to control the size and power of fishing vessels (by FAA EU-backed project to register data on the fishing vessel management scheme for fishing vessels and measures to control the size and power of fishing vessels in accordance with EU CFP);
– Closed fishing areas and restriction for some gears (bottom trawls and dredges);• Determination of management zones through licensing scheme: Fishing Zone 1 - from coast to 3 nautical miles and Fishing Zone 2 - 3 sea miles from the border of the EEZ. The two management areas are intended to ensure fair distribution of resources and to reduce conflict between traditional and commercial fishermen. Fishing for crabs and sea mammals is prohibited.

NATURA 2000 in Bulgaria, protected areas under Directive 92/43/EEC (Habitats Directive)

- Bulgaria is one of the EU countries with the richest biodiversity. This also determines the size of the protected areas network in Bulgaria. Protected areas under Directive 92/43/EEC in Bulgaria are 234, protected are 90 habitat types and 121 species of plants and animals, including – 24 species of fish. In connection with the implementation of the commitments of the Republic of Bulgaria in accordance with Article 8 of Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, a national framework for priority action under Natura 2000 (NFPA) 2014 – 2020 was developed. The purpose of NFPA is to better define priorities for Natura 2000 at national and regional level, and to determine the financing needs. This document will facilitate the integration of the above mentioned needs into future programs financed by EU financial instruments.

From 234 zones in conformity with the Habitat Directive 3 are completely with marine areas (BG0001500 Aladzha Banka, BG0001501 Emona, BG0001502 Otmanli) with a total area of 560 km2, and 14 include in their borders also marine zones (BG0000154 Durankulak Lake, BG0000621 Shabla Lake – Ezerets, BG0000573 Kaliakra Complex, BG0000103 Galata, BG0000116 Kamchia,

BG0000100 Shkorpilovtsi Beach, BG0001004 Emine – Irakli, BG0000574 Aheloy - Ravda – Nessebar, BG0000620 Pomorie, BG0000271 Mandra-Poda, BG0000242 Chengene Skele Bay, BG0000146 Beach Garden – Zlatna Ribka (Golden Fish), BG0001001 Ropotamo, BG0001007 Strandzha). In 2014 the Natura 2000 sites extended for 2,477.21 km^2. [2]

The specific needs of the protected zones will be taken out in conformity with NPFA and on the basis of the standard Natura 2000 forms and plans for management of protected zones, which are in a process of development.

As recommended in the Prioritized Action Framework (PAF) for NATURA EMFF OP envisages implementing aqua-environmental measures, investments in Natura 2000 were affecting fishing activities and aquaculture production, which have impact on habitats; capacity building among stakeholders for sustainable management and aquaculture production on the territory of protected areas. Another important contribution is Natura 2000 measures for conservation and restoration of aquatic biodiversity and improvement of the ecosystem approach to aquaculture and promotion of aquaculture effective use of resources.

4.4. Example of fisheries regulation on the Bulgarian – Romanian marine space.

For the period of implementation of the National programme for data collection 2011-2013 a bilateral agreement was signed between Bulgaria and Romania in 2010 to conduct joint research in the Community area of the Black Sea. The joint research at sea under the agreement includes: Bottom trawl survey for the stocks of turbot and hydroacoustic surveys to assess the stock of pelagic fish. Experts and scientists from both countries participated in regional coordination meetings, scientific conferences and seminars under the auspice of the DGMARE of the European Commission.

Regarding the continuation of the efforts to conduct joint research in the Community waters of the Black Sea several steps have been undertaken to conclude a new agreement for cooperation between Bulgaria and Romania. The conclusion of a bilateral agreement with Romania and Bulgaria was signed on 25 March 2015 for data collection and management in compliance with the objectives of the Common Fisheries Policy. Main purposes of this Agreement were coordination and harmonization of procedures and methodology for collection of biological data and stock assessments in the Black Sea (including methodology for benthic fish species, methodology for hydroacoustic survey and methodology for collection and analysis of biological parameters). For ensuring better coordination and transparency of researches at least one coordination meeting was scheduled at regional level, as well as the opportunity for a research team from the partner Member-State to participate at the fishing survey in its waters. Data sharing between the two countries is also stipulated in the Agreement. Apart from bilateral meetings between competent authorities of Bulgaria and Romania, activities for coordination, planning and implementation of researches will be discussed also at the meetings of MEDIAS, MEDITS and RCM Med & BS.

[2] Maritime and Fisheries Programme for Bulgaria (MFP) 2014-2020 (EMFF OP).

5. Combined Methods for Spatial Planning with Fisheries

5.1. Stocktaking

○ *Vessels monitoring system*

The activity of fishing vessels having LOA>12m is controlled by means of two systems: VMS (Vessels Monitoring System) and surveillance system SCOMAR..

The complex integrated system of observation, surveillance and border control of traffic and fishing boats in the Black Sea (SCOMAR) has as main objective observation, supervision and control of the Romanian border on the Black Sea and the obtaining, processing and transmission of information for preventing and combating of illegal activities. SCOMAR is installed at the Border Police, the Coast Guard Constanta, and continuously monitors (24 hours a day, 7 days a week) and provides a tactical picture of the surface water in the territorial sea, the contiguous zone and the exclusive economic zone (up to 100 nautical miles offshore), of the aerial activity and terrestrial situation.

ANPA (NAFA) has signed a Protocol with the Border Police for providing information on boats going at sea with time of exiting and returning to the port, for involvement of the Border Police with human and technical resources and a joint action plan to combat illegal fishing.

The Bulgarian Fleet vessel register (FVR) contains and maintains information on registered fishing vessels including their gross tonnage and their maximum continuous engine power according to Council Regulation 26/2004. The information is being updated in real-time, and the data is submitted to DG MARE at the European Commission and will be used to meet this requirement for data

The data on the Bulgarian fishing vessels registered in the FVR contains the following information: i. vessel length overall; gross tonnage; ii. maximum main engine power; iii. registration number; iv. age of the vessel; v. owner of the vessel; vi. number of the active vessels during 2013; vii. days at sea.

There is no size limit for fishing vessels for the registration in FVR and all vessels involved in the commercial fishery have to be registered, therefore including 100% of Bulgarian fishing vessels.

5.2. Remote sensing

○ *Application of Remote Sensing to fisheries*

Remote sensing techniques can be utilized directly, indirectly or as general aids in the detection and assessment of fishery resources.

○ *Direct Methods of Fish Detection*

The most direct and simple method of remote sensing in fisheries is visual fish spotting.

Aerial photography can be of assistance to a fisheries scientist providing information about the distribution and relative abundance of pelagic fish, particularly the schooling species. Echo-sounders and sonars have been in use as remote sensors for at least 50 years and are now widely used by the fishing fleets of the world. Sonars detect fish and estimate biomass. This kind of measurements started to be done in Romania and Bulgaria.

○ *Indirect Methods of Fishery Assessment*

Estimation of a fishery resource can be assisted by the measurement of parameters which affect its distribution and abundance. Correlation of a single parameter with the spatial and temporal distribution of fish is limited. Fish responds to the sum total of environmental factors and is necessary to correlate a large number of parameters, obtained by remote sensing techniques. The environmental parameters are diffuse attenuation coefficient, total suspended matter, yellow substance, chlorophyll pigments and macrophytes (they are called ocean colour); surface temperature; vertical and horizontal circulation features; salinity; oil pollution; and sea state.

Table 5.2.1. SURFACE OPTICAL PROPERTIES
The optical properties in the marine surface layer are determined by the presence of dissolved and suspended matter. Passive sensors working in the visible wavelengths (mainly CZCS but also MSS, TM, HRV) are commonly used to image water colour. The main parameters which can be derived remotely from water emergent radiation, through the use of empirically constructed algorithms, are listed below.
○ ***Diffuse attenuation coefficient,***
The diffuse attenuation coefficient at a specific wavelength is an apparent optical property. Its magnitude depends on the light distribution as a result of spreading, scattering and absorption that exists at the in situ point of measurement. This parameter, provides the means of physically categorizing water according to colour. Its value is water turbidity
○ ***Total suspended matter (seston)***
The total concentration of the absorbing and scattering agents can be used to classify surface waters by means of their colour, by inorganic and/or organic sediments make with important contribution to the optical properties of the surface layer
○ ***Yellow substance***
The term yellow substance may be defined as the material derived from the degradation of land and marine organic matter. It is an important parameter to monitor in the context of polluted coastal waters, since it may be used to identify marine areas where the exploitation of filter feeders, e.g., shellfish, could be hazardous. In certain regions of the world, for example the North Sea, this parameter exhibits some correlation with the salinity of surface waters.
○ ***Chlorophyll pigments***
The concentration of chlorophyll pigments is often considered as an index of biological productivity and, in an oceanic environment, it can be related to fish production. Chlorophyll pigments have a specific and distinctive spectral signature absorbing blue (and red) light and reflect strongly the green, thus affecting ocean colour. Multispectral observations from airborne or space borne sensors, therefore, allow the deduction of phytoplankton concentration.
○ ***Macrophytes***
In coastal areas it is common to find macrophytic vegetation (seaweed). Some species are of economic importance but all species play an important role in supporting marine life. Different kinds of seaweed have different light reflection properties, used to be detected from airborne or space borne passive visible sensors.

All of these can be spatially analysed and have significances in the spatial processes.

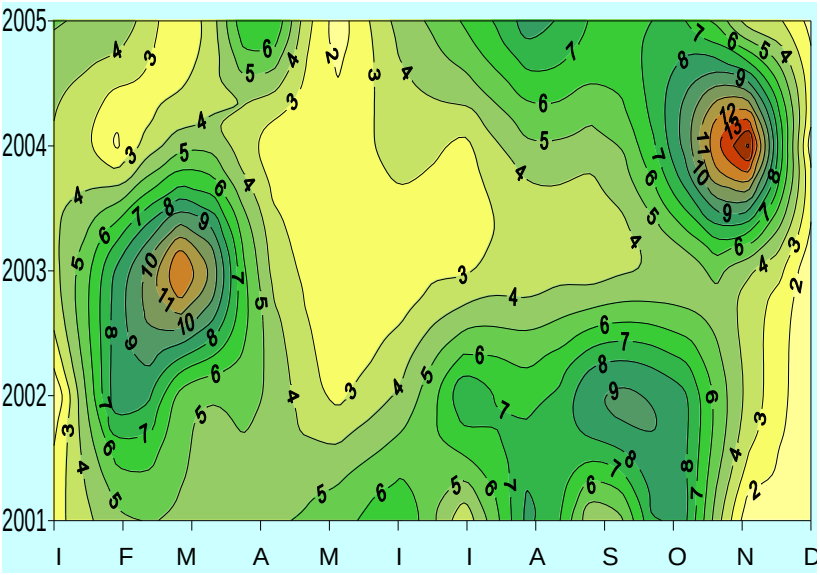


Figure 5.2.1 Chlorophyll concentration example

5.3. Others methods

- Tools 4 MSP

The Tools4MSP is a set of web and open source tools developed to support the implementation of Maritime Spatial Planning (MSP), with a specific focus on the analysis of conflicts between marine uses and the analysis of cumulative impacts (CI) of human activities on marine environments. "Tools4MSP, ADRIPLAN Data Portal, 2016 http://data.adriplan.eu/"

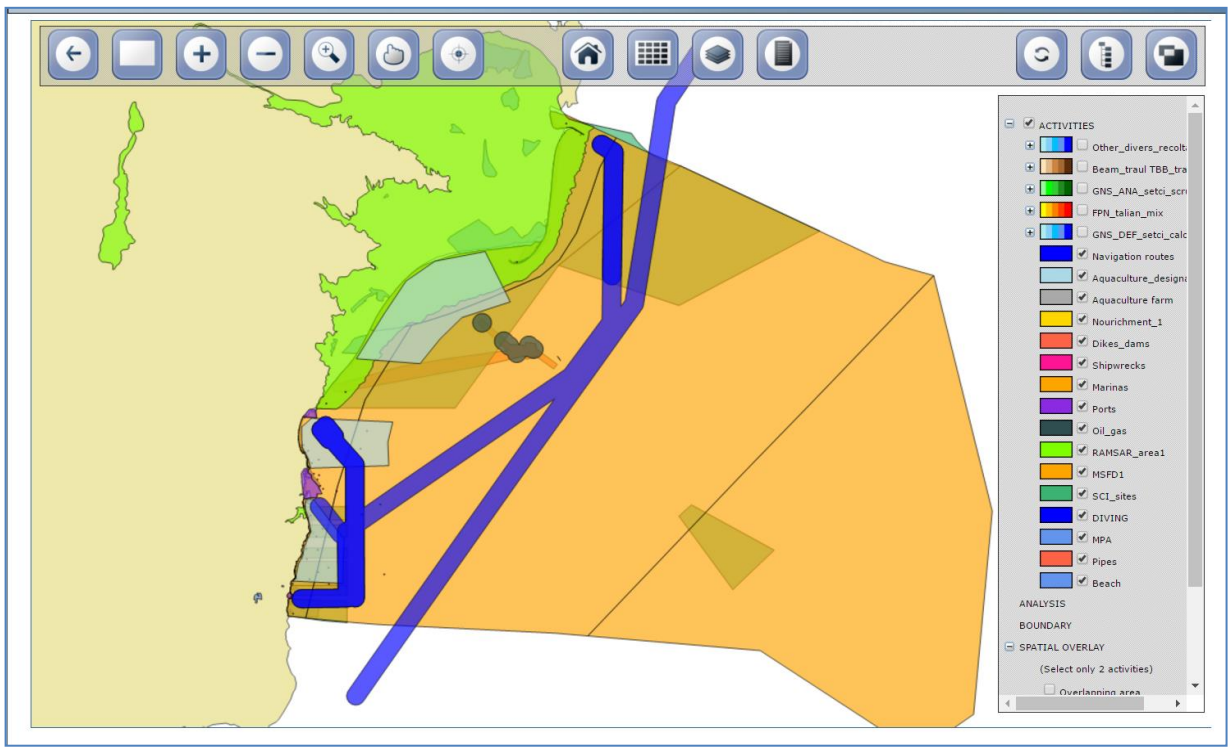


Fig.nr.5.3.3. Fishing zones according to specifical location, Fishing tools and marine activities (GRID) /NIMRD

GeoReferenced Interactions Database (GRID) The GeoReference Interactions Database (GRID; http://www.seagrid.an.ismar.cnr.it/grid)was developed in the framework of FP7 COEXIST Project and has the aim to (1) support MSP process through reallocation of maritime uses, (2) creation of collaborative conflict scores analysis; (3) iteration of the analysis over different time periods trough integration of new conflict scores and geospatial datasets on sea uses, (4) sea use scenario analysis and (5) overlay analysis.

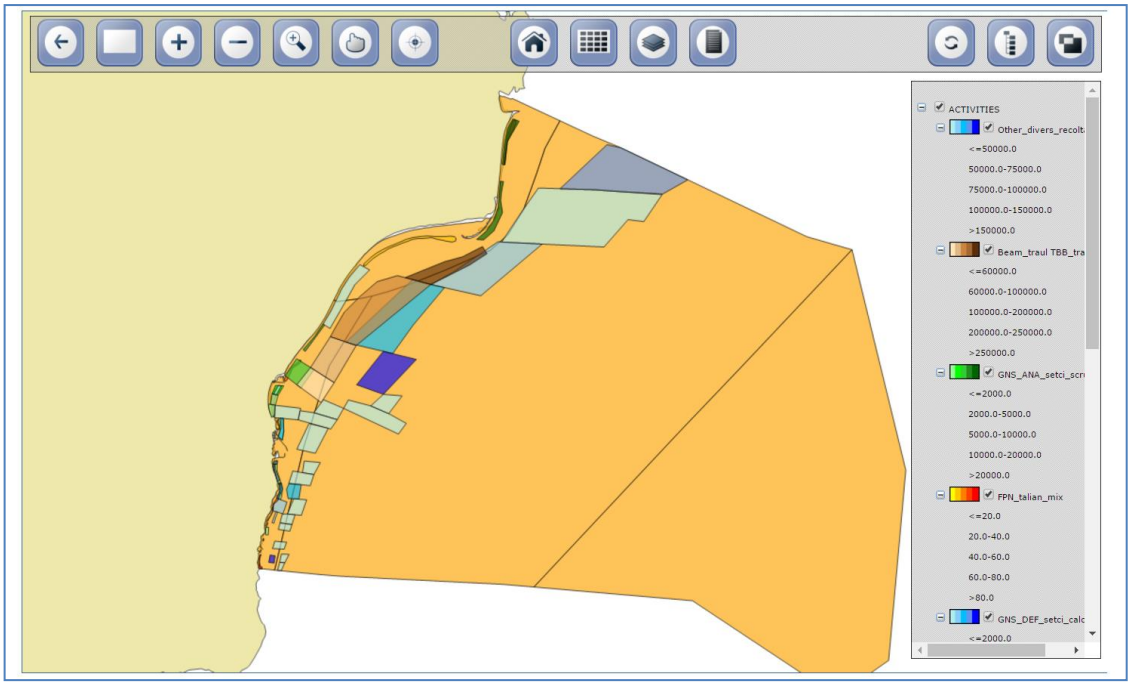


Fig.nr.5.3.4. Fishing Zones according to the main fishing tools (GRID) /NIMRD

➢ *The bio-economic model DISPLACE*

- Maps and data of aquaculture, fisheries, other activities, productive marine areas, and priority areas for fisheries and aquaculture can be stored in GRID. Results obtained by NIMRD are presented in Figs. 531,2,3,4.
- The GIS tool of GRID web-application can manage spatial information that might support a quantitative analysis of conflicts at the regional scale (fisheries, aquaculture sites, shipping lanes or offshore constructions, etc.).
- For the fishery sector has been introduced fishing zoning system for fishing tools based on below attributes: *Fishing effort in days* (effort), *revenues results* (Revenues) *Persons involved* (persons), kg production (PRODUCTION), resulting representation of WEB-GIS portal.

The DISPLACE model framework (Bastardie *et al.*, 2014, 2015) is developing a research- and advisory-based platform to transform fishermen's detailed knowledge and micro-decision-making behaviour into simulation and management evaluation tools. This involves advanced methods to assess and provide advice on the bio-economic consequences for the fisheries and fish stocks of different fishermen decisions and management options. DISPLACE is an agent-based simulation model developed to support maritime spatial planning and management issues, especially from the perspective of the fisheries. Agent-based models aim to consider the socio-economic and ecological processes at the individual scale (e.g., the fishing vessels) to capture the effects of human decisions at that level and then go through the individual processes up to the aggregated dynamics (e.g., the fisheries as a whole or other marine ecosystem components). A particular strength of the agent-based approach is that it is an adequate level to model processes at the spatial (2 by 2 km) and the time scale (hourly time steps) closer to the spatial and time dynamics occurring in human decision-making and fish populations dynamics. It is also closer to the appropriate scale for dealing with management issues such as marine spatial planning (e.g. ECOAST Project). The agent-based approach is also keen on integrating process-based mechanistic relationships that give the advantage of being able to better predict in novel conditions. Accordingly, DISPLACE should be able to

incorporate the spatial and temporal details to obtain a necessary understanding of the integrated fisheries, behavioural and resource dynamics.

➢ MARXAN Method

In order to produce results, the software and GIS based decision support tool needs to be fed with spatial information. This included spatial information on fishing effort, essential fish habitats and areas that offer good economic conditions for fishermen. Limiting factors (termed costs) that indicate less favourable conditions also need to be entered. The tool is then given certain target features by the modeller, such as high fish catches, the operation ranges of vessels, the occurrence of spawning areas or the existence of protected areas. The modeller also sets the tool to weigh the cost features in a certain way. Favourable zones for certain activities are generated when the computer calculates how often the defined conditions are met in spatial planning cells in random calculation runs. The result is a series of maps with clusters of suitable planning cells. In this way, it is possible to model zones that best meet the set of predefined criteria for fishery, indicating for example those areas that should have restricted or no fisheries use. Different scenarios for defined planning units can be produced by slightly altering the sets of targets and costs in different calculation runs.

➢ Geographic Information System (GIS)

GIS system was applied in the process of MSP:

- identifying, locating and visualizing the cover and spatial distribution of bio-geo-physical, socio-economical, governance features, resources, and uses in the form of maps;
- the tools are used as indicators of the state compared in different areas or the change of the effects management has on given biophysical, socio-economical and governance factors state over time.
- GIS tools can combine several types of spatial data by overlaying the spatial distribution of different features (pressure and threats, bio-geo-physical features, sensitive habitats etc.).

The use of GIS for coastal and marine zone management has expanded rapidly during the past decade, consolidating all necessary apparatus. For optimum efficiency, geo-referenced data should be properly stored in geo-databases built on spatial data model design (Prélaz Droux, 1995) (Fig. 4.1). Maps are essential, both for decision-making by field staff, and also for information communication targeting the stakeholders involved (decision-makers, managers, scientists etc.).

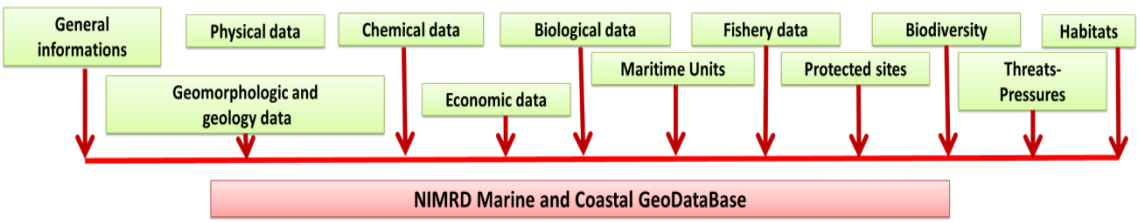


Fig. 5.3.5. Marine and coastal database

5.4. Experience from other projects

Data collected from different projects were related to different aspects of planning, such as: planning structure, geographical location, integrated monitoring data, pollution, natural and built heritage, energy resources, telecommunications and socio-demographic structures. The need for the functional space zonation, the emphasizing and avoiding of interdisciplinary conflicts were the main aims of PSMI field. Results obtained are complex and necessary to support national policy's documentation and decisions for the maritime strategy elaboration. The inventory of impact from cases studies have been realized in the Romanian coastal zones under CADSES-INTERREG-

PlanCoast Project and under national program CEMARE developed under the Ministry of Education and Research during 2009-2012. Maritime Spatial Planning Fields. Fig. 5.4.1-4.

Fig.5.4.1.Harbor activities

Fig.5.4.2 Tourism. Marine Transport. Industry. Energy

Fig.5.4.3 Climate and anthropogenic impact Combined effect of coastal erosion and global warming

Fig.5.4.4 Coastal urban planning

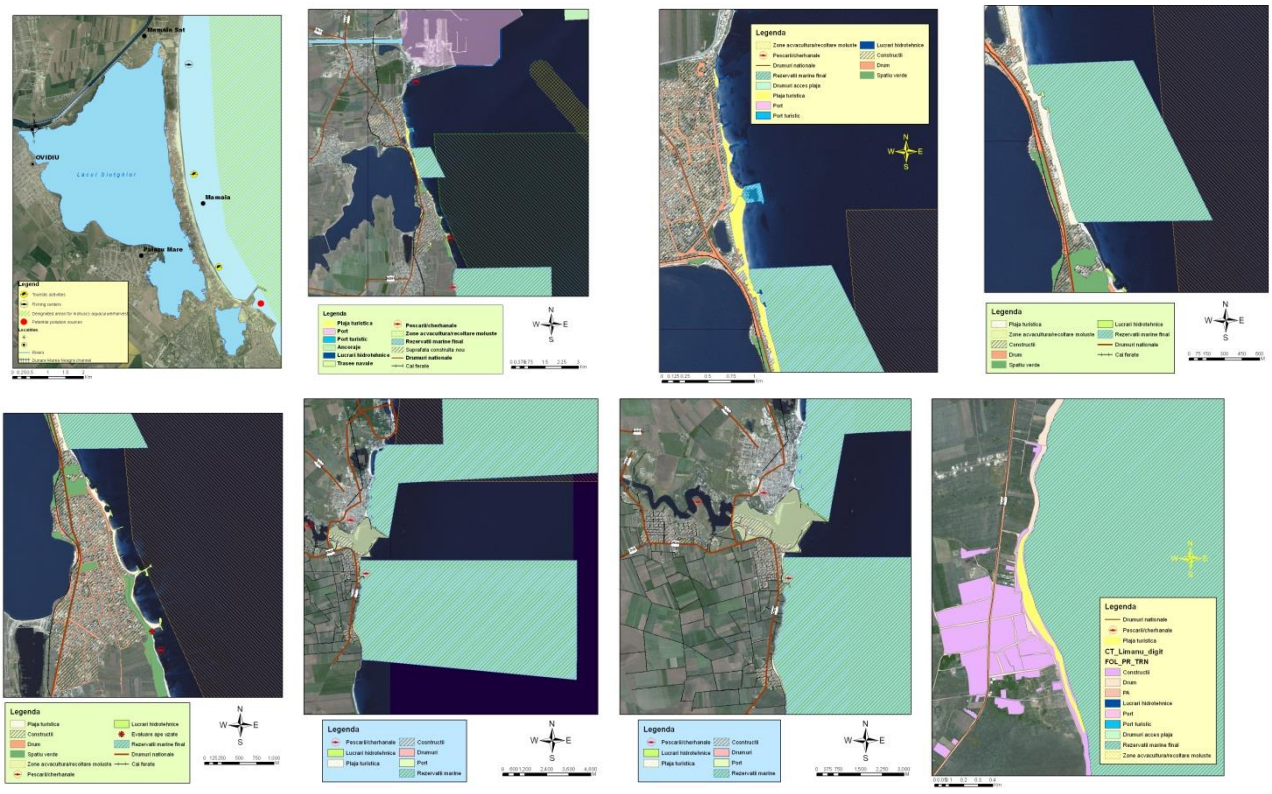


Fig.5.4.5. Romanian Coast MSP Study Cases

Fig.nr.1. MATRICEA REALIZATA PENTRU IDENTIFICAREA CONFLICTELOR, VULNERABILITILOR, PROBLEMELOR SI DISFUNCTIONALITATILOR POTENTIALE in vederea stabilirii directiilor de dezvoltare in zonele studiate (statiuni

Functional zone 2 MAMAIA
Dominant function – economic activities (**tourism**)

Tip de relatie XX - conflictuala X - negociabila O - compatibila	Tourism	Protected areas on land	Inland water transport	Urbanization	Culture/sport activities	Waste deposits, pollution	Fishery	Marine protected area	Sea as a public good	Coastal protection
Tourism		xx	x	xx	0	xx	0	0	0	0
Protected areas on land	xx		0	0	x	xx	0	0	x	0
Inland water transport	0	0		0	0	xx	0	x	x	0
Urbanization	xx	xx	0		0	xx	x	xx	xx	0
Culture/sport activities	0	x	0	0		xx	0	x	0	0
Waste deposits, pollution	xx	xx	xx	xx	xx		xx	xx	xx	0
Fishery	0	0	0	x	0	xx		x	0	0
Marine protected area	0	0	x	xx	x	xx	x		x	x
Sea as a public good	0	x	x	xx	xx	xx	0	x		xx
Coastal protection	0	0	0	0	0	0	0	x	xx	

Functional zone 4 EFORIE
Dominant function - economic activity (**tourism**)

Tip de relatie XX - conflictuala X - negociabila O - compatibila	Harbor activity	Tourism	Protected areas on land	Urbanization	Waste deposits	Shipping routes	Fishery	Coastal protection	Sea as a public good	Marine protected area
Harbor activity		0	0	0	xx	0	0	0	x	x
Tourism	0		x	xx	xx	0	0	0	0	x
Protected areas on land	0	x		xx	xx	0	0	0	0	0
Urbanization	0	xx	xx		xx	0	0	x	xx	x
Waste deposits	xx	xx	xx	xx		xx	xx	xx	xx	xx
Shipping routes	0	0	0	0	xx		0	0	x	x
Fishery	0	0	0	0	xx	0		0	0	xx
Coastal protection	0	0	0	x	xx	0	0		xx	x
Sea as a public good	x	0	0	xx	xx	x	0	xx		x
Marine protected area	x	x	0	x	xx	x	xx	x	x	

Functional zone 6 LIMANU Marine protected area
Dominant function – economic activities (**tourism**)

Tip de relatie XX - conflictuala X - negociabila O - compatibila	Agriculture	Tourism	Protected areas on land	Urbanization	Waste deposits	Marine cables	Shipping route	Fishery	Coastal protection	Sea as a public good	Marine protected area
Agriculture		0	x	xx	xx	0	0	0	0	x	x
Tourism	0		0	xx	xx	0	0	0	0	0	xx
Protected areas on land	x	0		xx	xx	0	0	0	0	0	0
Urbanization	xx	xx	xx		xx	0	0	x	0	x	xx
Waste deposits	xx	xx	xx	xx		xx	xx	xx	xx	xx	xx
Marine cables	0	0	0	0	0		0	0	0	0	x
Shipping route	0	0	0	0	0	x		x	0	0	xx
Fishery	0	0	0	x	xx	x	x		0	0	xx
Coastal protection	0	0	0	0	0	0	0	x		x	xx
Sea as a public good	0	x	0	xx	xx	0	0	0	x		x
Marine protected area	0	xx	0	xx	xx	0	xx	xx	xx	xx	

IDENTIFICTION OF CONFLICTS, PROBLEMS AND DISFUNCTIONS

Functional zone 1 NAVODARI
Dominant function – economic activities (**oil processing, port activity**)

Tip de relatie XX - conflictuala X - negociabila O - compatibila	Processing industry	Harbor activity	Tourism	Protected areas on land	Inland water transport	Urbanization	Dump, waste deposits	Marine oil/gas pipelines	Shipping routes	Fishery	Marine protected area	Sea as a public good
Processing industry		0	xx	x	0	x	xx	0	x	x	xx	xx
Harbor activity	0		x	x	0	x	xx	x	0	x	xx	xx
Tourism	xx	x		0	0	0	xx	0	0	0	0	0
Protected areas on land	x	x	0		0	0	x	xx	0	0	0	0
Inland water transport	0	0	0	0		0	xx	0	0	0	0	0
Urbanization	0	0	0	x	0		xx	0	0	0	0	x
Dump, waste deposits	xx	xx	xx	xx	xx	xx		xx	xx	xx	xx	xx
Marine oil/gas pipelines	0	0	0	0	0	0	xx		x	x	x	x
Shipping routes	x	0	x	0	0	xx	x			x	x	0
Fishery	x	x	0	0	0	0	xx	x	x		x	0
Marine protected area	xx	xx	0	0	0	xx	0	0	0			x
Sea as a public good	xx	xx	0	0	0	x	xx	x	0	0	0	

Functional zone 3 CONSTANTA
Dominant functions – economic activities (**services, industry, port activity, tourism**)

Tip de relatie XX - conflictuala X - negociabila O - compatibila	Industry	Harbor activity	Tourism	Protected areas on land	Inland water transport	Urbanization	Waste deposits, pollution	Culture/sport activities	Shipping routes	Fishery	Coastal protection	Sea as a public good	Military activities	Marine protected area
Industry		0	x	x	0	xx	xx	x	0	0	0	0	0	0
Harbor activity	0		0	xx	0	0	xx	0	0	0	0	0	x	xx
Tourism	x	0		x	0	xx	xx	0	0	0	xx	0	x	x
Protected areas on land	x	xx	x		x	xx	xx	0	0	0	0	0	0	0
Inland water transport	0	0	0	x		0	xx	0	0	0	0	x	0	xx
Urbanization	xx	0	xx	xx	0		xx	x	0	0	xx	xx	0	xx
Waste deposits, pollution	xx	xx	xx	xx	xx	xx		xx	0	xx	0	xx	0	xx
Culture/sport activities	x	0	0	0	0	x	xx		x	0	0	x	0	x
Shipping routes	0	0	0	0	0	0	0	x		x	0	x	0	x
Fishery	0	0	0	0	0	0	xx	0	x		0	0	0	x
Coastal protection	0	0	xx	0	0	xx	0	0	0	0		xx	0	xx
Sea as a public good	0	0	0	0	x	xx	xx	x	x	0	xx		x	x
Military activities	0	x	x	0	0	0	0	0	0	0	0	x		x
Marine protected area	0	xx	x	0	xx	xx	xx	x	x	x	xx	x	x	

Functional zone 5 MANGALIA
Dominant functions – economic activities (**shipyard, port activity, tourism**)

Tip de relatie XX - conflictuala X - negociabila O - compatibila	Industry	Harbor activity	Tourism	Protected areas on land	Urbanization	Waste deposits	Shipping routes	Fishery	Coastal protection	Sea as a public good	Military activities	Marine protected area
Industry		0	x	x	x	xx	0	0	0	0	0	0
Harbor activity	0		x	0	0	xx	0	x	0	x	0	x
Tourism	x	x		0	x	xx	0	0	0	0	x	xx
Protected areas on land	x	0	0		xx	xx	0	0	0	0	0	0
Urbanization	x	0	x	xx		xx	0	x	0	xx	0	xx
Waste deposits	xx	xx	xx	xx	xx		xx	xx	0	xx	0	xx
Shipping routes	0	0	0	0	0	xx		0	0	0	0	x
Fishery	0	x	0	0	x	xx	0		0	0	0	xx
Coastal protection	0	0	0	0	0	0	0	0		0	0	x
Sea as a public good	0	x	0	0	xx	xx	0	0	0		0	xx
Military activity	0	0	x	0	0	0	0	0	0	0		xx
Marine protected area	0	x	xx	0	xx	xx	x	xx	x	xx	xx	

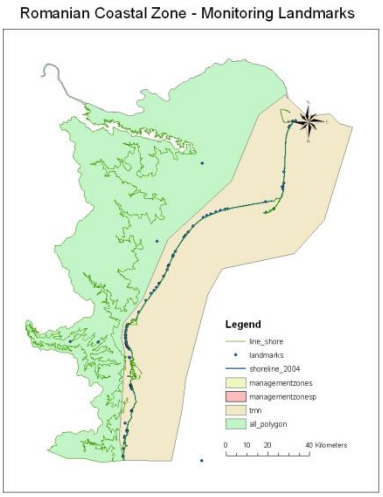
Fig.5.4.6.

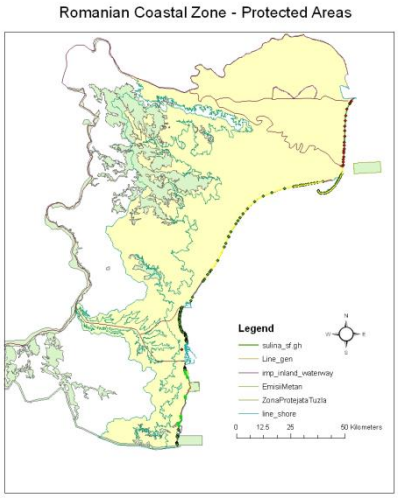
MATRIX of the pilot areas, of reference of conflicts identification in the PSM context

Pilot Project: "*GIS database for 12sm aqua-territorial zone and the coastal zones of Varna Region from Ekrene cape to Paletza cape*"

Stages A. Establishment of the current status of the marine and coastal zones.

a. Geomorphological and morph structural zoning of the coastal vulnerability.
b. Quantitative evaluation of the erosion's and landslide's processes of the coast.
c. Determination of the morph dynamical characteristics of the coastal zone.
d. Determination of the lythodynamical characteristics.
e. Evaluation of the technogenic intervention on the basis of morph dynamical processes' quantitative evaluation.





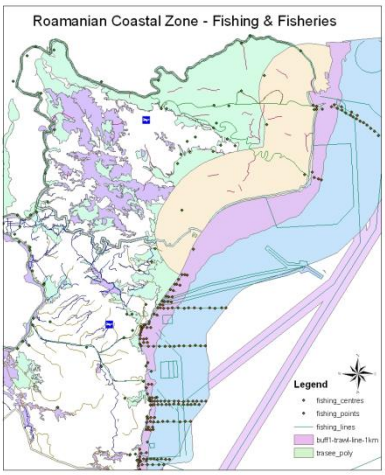
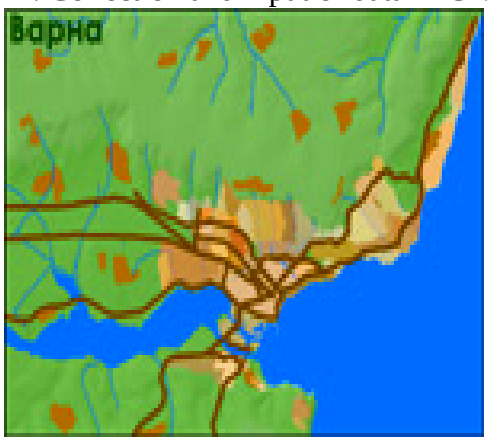


Fig. 5.4.7.Coastal Line; Fig. 5.4.8. Coastal Landmarks and first MPAs; Fig. 5.4.9. Integrated map (2007)

a. 1.6. Natural risks' Evaluation and Level's regime analysis. Forecasts of water levels' increase in perspective of the next 20-25 years.
b. 1.7. Wave influence's Evaluation– a map of wave energy's degree.
c. 1.8. Establishment of the current status of hydrochemical conditions' in the Black Sea.
d. 1.9. Establishment of the current status of biological resources**.**

Stages B:

1. Design of GIS database and information's computer modeling.
2. Collection and input of data in GIS database for the project's territorial scope about:



- Geological and morphological conditions in coastal zones;
- Natural risks;
- State of the hydro-chemical conditions;
- State of biological resources and Marine Hydrobiology Natural areas and resources – a general map of the coastal habitats and of the spread of fauna with priority to be protected;
- GIS database for the coastal zone/the spatial planning zone;
- Information, submitted by other institutions.

Stage C:

- Situation of the hydro-technical equipment for coast protection from abrasion, landslides, storms and rough water;
- Territories and recreational resources in risk, recommendations and setting up of restrictive parameters for spatial planning in risk zones;
- Hydro-technical equipment for tourism, situations' decisions, constructive requirements, ecological recommendations;

- Development of fishery and aquacultures, fishing ports and stopping-places in the coastal zone, restrictend draught's zones, zones for special objects of industrial fishery and shell's breeding.
- Ports.

5.5. Legal and planning options

5.5.1. Normative acts affecting the MSP implementation

- Ordinance no. 18 / 08.24.2016 on Maritime Spatial Planning;
- Law no. 6/2011 approving Government Emergency Ordinance no. 71/2010 establishing marine strategy;
- Law no. 110/1996 which ratified the United Nations Convention on the Law of the Sea, signed at Montego Bay (Jamaica) on 10 December 1982, and adopted the accession to the Agreement on the implementation of Part XI of the United Nations Convention of the Law of the Sea, signed in New York on July 28, 1994;
- Law no. 17/1990 concerning the legal status of internal marine waters, territorial sea, the contiguous zone and exclusive economic zone of Romania, republished, regulates the juridical statute of the internal waters, territorial sea, the contiguous zone and exclusive economic zone in according to the United Nations Convention on the Law of the sea, ratified by Romania by Law no. 110/1996.
- Water Law no. 107/1996, as amended and supplemented, governing the right to use and the corresponding obligations resulting from the protection and conservation of water resources, the use of waters, shores and river beds, regardless of the individual or legal entity that manage as well and the works that are built on waters or related to waters and which directly or indirectly cause temporary or permanent changes to water quality or flow regime.
- Government Emergency Ordinance no. 202/2002 on Integrated Coastal Zone Management, approved with amendments by Law no. 280/2003, as amended, aims: to establish coastal and necessary measures to ensure its integrity; ensuring public use of the Romanian coastal zone, except the situation regarding the national security; regulation of sustainable use of coastal zone based on principles that protect the environment, landscape, cultural heritage, historical and archaeological; reconstruction and coastal conservation by adopting appropriate measures; integration in the frame of coastal zone of environmental policies into sectoral policies on agriculture and forestry, energy, mineral resources, industry, tourism, fisheries and marine aquaculture, transport and development of residential areas and policies for water management and ensuring public access to information and participation in decision-making in the field of integrated coastal zone Romanian.
- Ordonanța de urgență a Guvernului nr. 71/2010 privind stabilirea strategiei marine a transpus Directiva 2008/56 / CE a Parlamentului European și a Consiliului din 17 iunie 2008 de stabilire a unui cadru de acțiune comunitară în domeniul politicii privind mediul marin (Directiva "Strategia pentru mediul marin") a fost publicată în Jurnalul Oficial al Uniunii Europene (JOUE) seria L nr. 164 din 25 iunie 2008.

5.5.2. Other Normative acts supporting the MSP implementation

- Electricity and natural gas Law no. 123/2012, as amended and supplemented;
- Petroleum Law no. 238/2004, as amended and supplemented;
- Law no. 17/1990 on the regime of internal waters, territorial sea, the contiguous zone and exclusive economic zone of Romania, with subsequent amendments;
- Government Emergency Ordinance no. 35/2010 amending and supplementing art. 2 of Government Emergency Ordinance no. 19/2006 on the use of Black Sea Beach and control of beach activities, approved with amendments by Law no. 186/2010;

- Government Emergency Ordinance no. 23/2008 on fisheries and aquaculture, approved with amendments by Law no. 317/2009, as amended and supplemented;
- Government Ordinance no. 67/2000 ratifying the Framework Agreement on the institutional framework for the setting of interstate transportation system of oil and gas, signed in Kiev on 22 June 1999, approved by Law no. 1/2001;
- Government Emergency Ordinance no. 105/2001 regarding the state border of Romania, approved with amendments by Law no. 243/2002, as amended and supplemented, and Government Decision no. 445/2002 approving the Methodological Norms for the application of Government Emergency Ordinance no. 105/2001 regarding the state border of Romania, as amended and supplemented.

5.6. Suitability mapping and fisheries in some specific areas

5.6.1. Introductory remarks (Fig. 5.6.1.1)

The first MPS Maps realised under NIMRD and URBAN Project collaboration were classified in:

- *Thematical Maps*

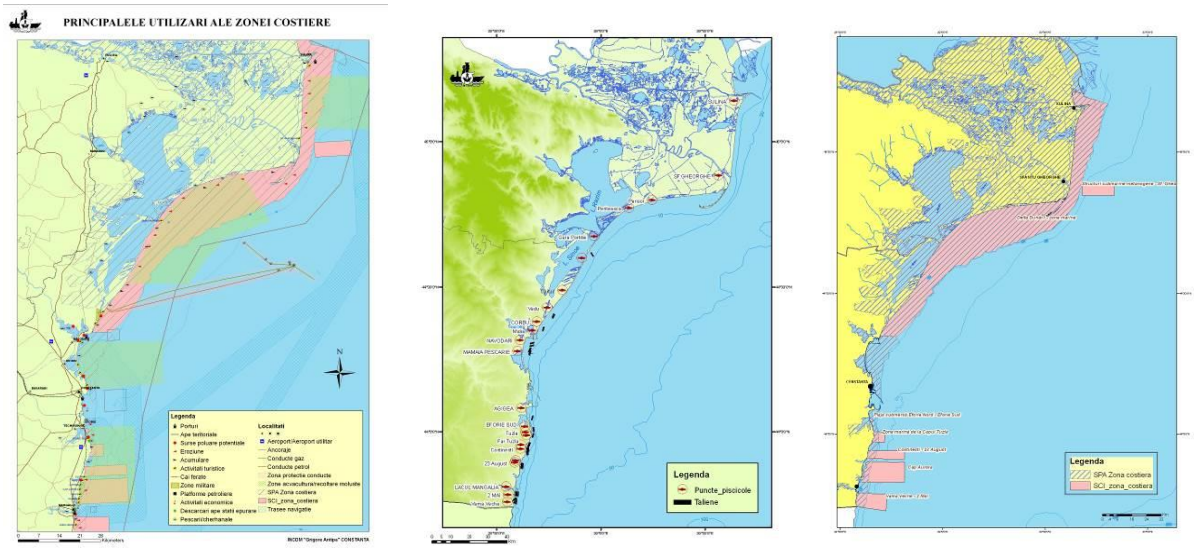


Fig.no.5.6.1. (NIMRD Constanta, 2009-2014) Examples of Integrated MSP maps- a. Main maritime uses b. Marine Fisheries marine Protected Areas

- ***Integrated maps***

  - Fig.no.5.6.2. Romanian coastal and marine activities /PlanCoast Project

5.6.2. Representatives for each location are table, including in rows some specifical key attributes, as: measures, purpose of measures, location, regulating regime, regulative instrument, target uses to be regulated, spatial category in a MDSP planning process, transposition needs, transposition procedures). Examples cases are:

➢ *Spawning grounds*

The commercial fish stocks strongly depends upon availability of wintering and forage resources and undisturbed spawning and nursery grounds (http://www.blacksea-commission.org/_publ-SOE2002-eng.asp#_Toc39914649).

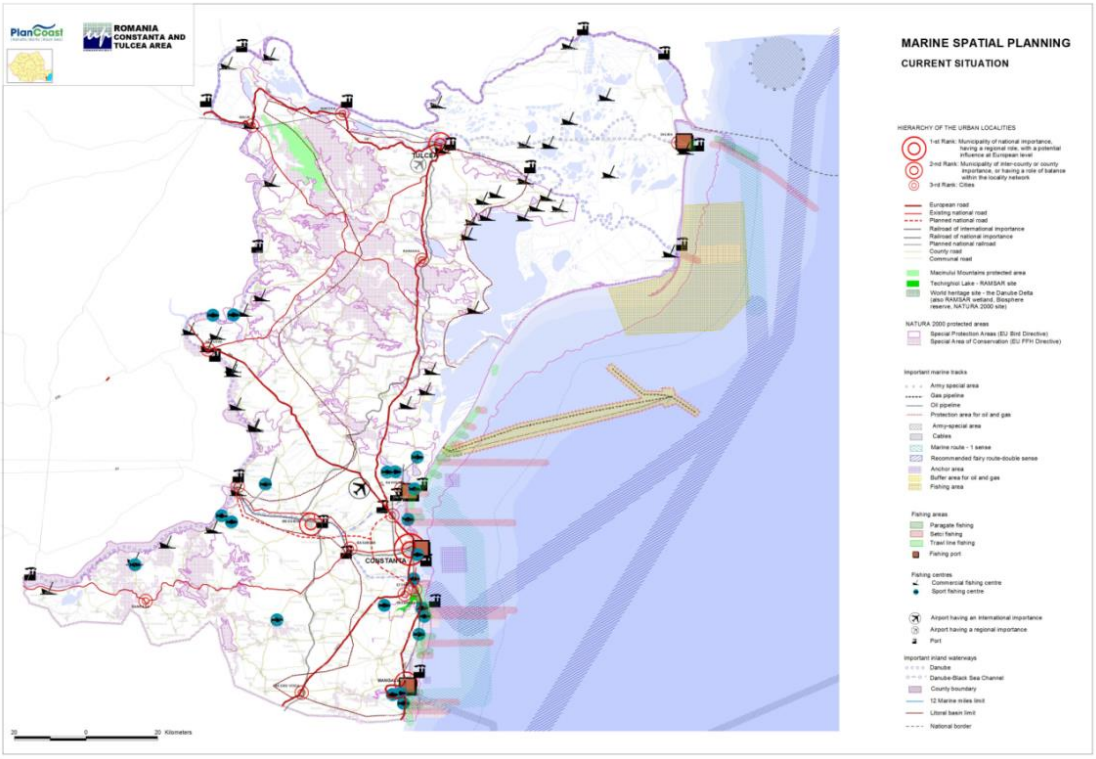


Fig.no.5.6.2. Romanian coastal and marine activities /PlanCoast Project

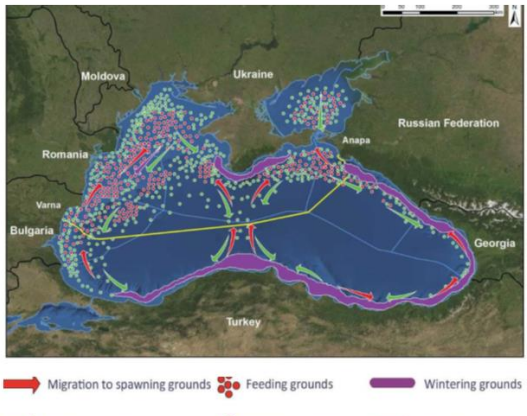
The quality of nursery and spawning grounds plays a crucial role for the sustainable exploitation of fish stocks (http://www.blacksea-commission.org/_publ-SOE2002-eng.asp#_Toc39914649). Construction of dams and hydraulic structures kept the anadromous species like sturgeons far from their natural spawning grounds in the estuaries of Danube and Dnipro Rivers. Therefore, these anadromous fish species currently depend on industrial breeding (http://www.blacksea-commission.org/_publ-SOE2002-eng.asp#_Toc39914649).

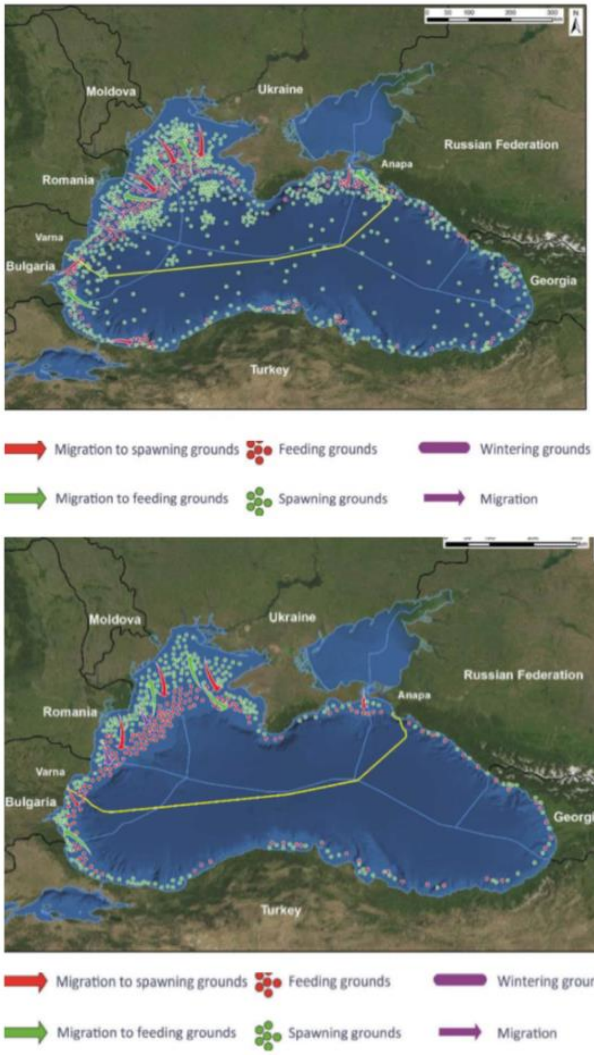
The European anchovy (*E. encrasicolus*) is distributed throughout the Black Sea with the main spawning grounds in the north-western and western continental shelf of the basin, along the coastal waters of Bulgaria, Romania and Ukraine (STECF, 2012, Figure 5.6.2.1). Spawning occurs between May and August (STECF, 2012). Spawning activity is also thought to take place in coastal waters in the southern Black Sea (Radu *et al*., 2011).

https://www.southstreamtransport.com/media/ documents/pdf/en/2014/07/ssttbv_bg_esia_151_web_en_303_en_20140728.pdf,
(Source: adapted from STEFC, 2012). Fig.no.5.6.2.1
Spawning grounds of anchovy in the Black Sea.

The European sprat (*Sprattus sprattus*) undertakes seasonal migrations between inshore feeding grounds and offshore spawning grounds where they spawn near the surface at depths of 10 to 20 m (STECF, 2012) as shown in Figure 5.6.2.2

Fig. 5.6.2.2. Spawning grounds of sprat in the Black Sea.





Whiting (*Merlangius merlangus*) carries out short migrations and the spawning period iswinter (STECF, 2012, Figure 5.6.2.3). It occurs all along the shelf, most often at depths between 60 m to 120 m but sometimes up to 150 m (STECF, 2012). Source: adapted from STEFC, 2012

https://www.southstreamtransport.com/media/documents/pdf/en/2014/07/ssttbv_bg_esia_151_web_en_303_en_20140728.pdf,

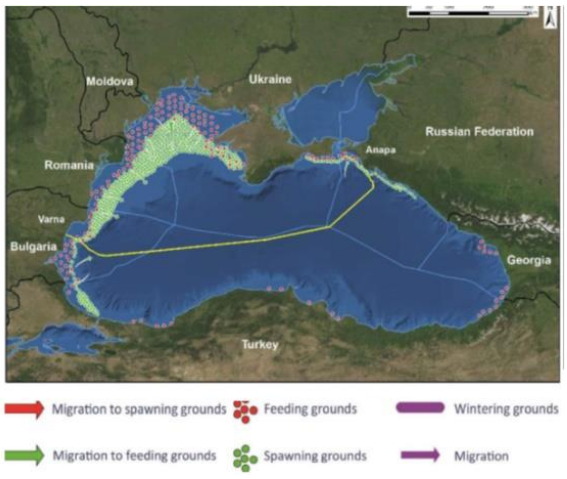
Fig. 5.6.2.3.
Spawning grounds of whiting in the Black Sea.
Source: adapted from STEFC, 2012. https://www.south-streamtransport.com/media/documents/pdf/en/2014/07/ssttbv_bg_esia_151_web_en_303_en_20140728.pdf.

Yearly fishing surveys carried out in Bulgaria and Romania have demonstrated that turbot (*Psetta maxima*) is distributed along the continental shelf with the highest concentration in waters having a depth between 50 m and 75 m (STECF, 2012).
Adults migrate to shallow waters and aggregate during the spawning period in spring, after which they move into deeper waters (100 m to 140 m)(STECF, 2012).

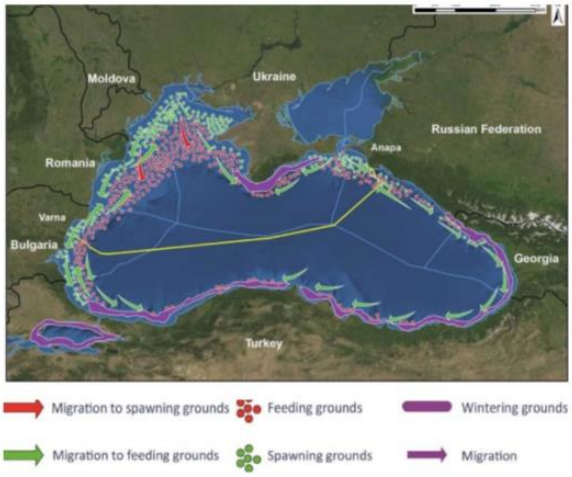
Feeding and spawning areas and the movement between them are shown in Figure 5.6.2.4.

Fig. 5.6.2.4. Spawning grounds of turbot in the Black Sea. Source:https://www.south-streamtransport.com/media/documents/pdf/en/2014/07/ssttbv_bg_esia_151_web_en_303_en_20140728.pdf, adapted from STEFC, 2012.

The main spawning and feeding grounds of horse mackerel (*Trachurus* xxx) are located in the north-western and western continental shelf regions of the Black Sea, but they also spawn in the north east of the Black Sea along Russian coasts (STECF, 2012, Figure 5.6.2.5).



In autumn (September to November) they migrate along the coastal waters to wintering grounds which are situated in the coastal waters of Turkey, Georgia, Russia and the Crimea Peninsula (STECF, 2012). In spring (Mid-April) they migrate back to feeding and spawning grounds (STECF, 2012). The peak of spawning in Bulgarian falls between June and August (Georgiev *et al.*, 1961;.



Georgiev and Kolarov, 1962;Georgiev *et al*., 1962; Stoyanov *et al*., 1963, Karapetkova and Zhivkov, 2006; Yankova and Raykov, 2009; Yankova, 2011). Spawning has been reported to occur 20 miles off the coast (Georgiev *et al*., 1962)Fig. 5.6.2.5. Spawning grounds of horse mackerel in the Black Sea. Source: https://www.southstreamtransport.com/media/documents/pdf/en/2014/07/ssttbv_bg_esia_151_web_en_303_en_20140728.pdf, adapted from STEFC, 2012.

➢ *Case of gillnet fishing*

The gillnet fishing method has proven to kill thousands of species who get caught in the netting, suffocate and die. It is a cheap and effective method of fishing though and many Asian countries have been using it for years. There have been various attempts to curtail the use of gillnet fishing. The United Nations resolution recommended a 50 percent drop in the use of gillnet fishing.

➢ *Protected species: the case of sturgeons*

All sturgeon species are included in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES. In order to implement the procedures of CITES, the general rules for the preservation of sturgeon species are incorporated in the Biodiversity Act. According to the Biodiversity Act, the Ministry of Environment and Water and the Ministry of Agriculture and Forestry issue orders about introducing procedures and conditions for preservation. The species *A. nudiventris* and *A. sturio* should to be considered as extinct (EX), in view of the literature data (Tsekov*et al*., 2008).

Sturgeon species are listed in Appendix No. 3 (ship sturgeon and European sea sturgeon) and Annex No. 4 (Russian sturgeon, starlet, Stellate sturgeon, beluga) of the Biological Diversity Act (BDA); based on the provisions of the Biological Diversity Act was created an Action Plan for Sturgeon Species in Bulgarian Waters of the Danube River and Black Sea.

➢ *Industrial fisheries concept at regional level*

The Black Sea has sustained important fisheries activities since ancient times. Today, industrial, semi-industrial and small-scale fisheries coexist in the region, using a large variety of fishing gears. A characteristic of Black Sea fisheries in contrast with other major fishing areas, generally lack large mono-specific stocks, and instead exploit multi-species stocks including a variety of benthic and pelagic fish, as well as molluscs and crustaceans. Due to the peculiar geographic configuration of the enclosed Sea, the stocks are often shared among fleets from different countries. For this reason, strong regional cooperation is essential for the rational management of fisheries more than in other seas. Despite its relatively low economic output compared with other economic activities in the region (e.g. tourism, oil and gas exploration), fishery sector plays an important role in the region . Industrially speaking this field should offer various employment opportunities to several hundred or thousands people and supplies seafood products for human consumption to local and regional markets.

However, the sustainability of Black Sea fisheries is affected by different threats, including the effects of increased pollution from human activities, habitat degradation, the introduction of alien species, overfishing and the impacts of climate-driven changes in the marine ecosystem, as this study tries to prove here. The dramatic ecosystem changes that have occurred in the Black Sea during the past few decades are testimony of the need to account for these different processes and stressors in the management of fisheries in the region, in line with an ecosystem approach to fisheries (EAF). Recognizing the importance and peculiarities of fisheries in the Black Sea, as part of Mediterranean basin underlined a need for strong regional cooperation for the rational use of fisheries resources. GFCM was established by its member countries with the objective of promoting the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture in the region. Among its various responsibilities, the Commission is charged with regularly reviewing the state of living resources and fisheries, including economic and social aspects of the fishing industry, as a basis for the formulation and recommendation of management and capacity development actions conductive to sustainable and responsible fisheries (http://www.fao.org/3/a-i5496e.pdf).

- ***Prohibition of some fishing gears (e.g. pelagic trawl, demersal trawl, dredges)***

In Romania, technical characteristics and conditions to use the commercial fishing gear and methods are provided in the Order no. 449/2008 of Ministry of Agriculture and Rural Development admitted for commercial fishing in marine and continental waters, as amended and supplemented.
- It is prohibited the use of nets/beach seine in the delta and floodplain of the Danube and Razim-Sinoe and other coastal lakes during 1 April to 30 September inclusive. - Prohibition to use gillnet gear type in ponds, lakes, streams and channels of the "Danube Delta" Biosphere Reserve during 1 June to 30 September inclusive. - Notwithstanding the provisions of previous paragraph can be extend for ban gillnet gear type in the perimeter "Danube Delta" Biosphere Reserve on unfavorable hydrological conditions, by Decision of the Governor "Danube Delta" Biosphere Reserve. - Prohibition to use gillnet gear type in Razim-Sinoe and other coastal lakes, all year round. - For Musura Bay/Lagoon and St. George Meleaua (Bay/lagoons also) comprising freshwater habitats and fish fishing regulations applied correspond to the areas of lakes and ponds. - On "Danube Delta" Biosphere Reserve is allowed the bait hooks fishing (longlines and tethers), being prohibited the use of fish species as bait for other aquatic and protected organisms.

Tools/ Environmental Summary	Table .5.6.2.1. **Demersal trawling**
Habitat damage	- Damage and disturbance to the seabed and bottom living marine animals occurs as the fishing gear comes into contact with the ocean floor. - Sensitive habitats are more susceptible to long-term damage than areas of sand and mud, which tend to be less severely impacted. The heavy gear dragged by beam trawlers is particularly notable in habitat damage.
Mitigation	- Efforts to reduce environmental damage include larger mesh sizes which in theory allow juvenile or small non-targeted fish to escape. Redesigned nets help to reduce bycatch and the use of lighter materials in net construction have helped lessen the damage to the seabed and reduce fuel consumption. The use of rubber discs on the front edge of nets can reduce seabed damage and fish bycatch. These efforts have been successful to varying degrees. - In beam trawls new techniques have been experimented including an electronic pulse in place of 'tickler chains', in order to disturb fish into the net while mitigating damage to the seabed. - Seine netting is operated slowly and for a short time, so faster swimming species can escape.

Tools/	

Environmental Summary	Table .5.6.2.2. **Pelagic/mid-water pair trawl**
Habitat damage	- Pelagic trawls don't come into contact with the seabed so are not associated with damage to marine habitat.
Bycatch of vulnerable species	- Pelagic trawls may unintentionally catch vulnerable species. This fishery has been under scrutiny for accidentally catching dolphins.
Discards	- Pelagic trawling for a particular species can be associated with capture of non-target fish and other marine life and the accidental catch and discarding of juvenile commercial fish species can impact on these populations. However, bycatch levels are typically lower than in demersal trawls
Mitigation	- Technical measures to reduce bycatch of juvenile mackerel should be investigating and fuel efficiency improved. Certain areas have to be closed to pair-trawling to prevent dolphin bycatch.

Tools/ Environmental Summary	Table .5.6.2.3. **Longline (pelagic and demersal) Hook and line (handline)**
Habitat damage	– longlines are passive gears so they are not associated with physical damage to the marine habitat.
Bycatch of vulnerable species	– longlines can unintentionally catch vulnerable species and high seas fisheries have been particularly associated with catching endangered seabirds, sharks and sea turtles.
Discards	– longlines can be associated with capture of non-target fish and other marine life.
Mitigation	Seabird bycatch on longline hooks can be reduced by the use of weighted lines, coloured bird-scaring streamers and fishing at night.

Tools/ Environmental Summary	Table .5.6.2.4. **Dredging**
Habitat damage	- damage and disturbance to the seabed, as well as bottom living marine animals, occurs as the fishing gear is towed along the marine floor. The heavy metal gear of dredgers has come under scrutiny for habitat damage. The damage is related to the size and weight of the dredge.
Bycatch of vulnerable species	- dredging has the potential to unintentionally catch vulnerable species.
Discards	- dredging can be associated with bycatch of non-target fish and other marine life. The accidental catch and discarding of juvenile commercial fish species can impact on these populations.
Mitigation	- New toothless dredges can reduce the impact of dredging on seabed habitat and are being used in some fisheries.

➢ ***Case of illegal fishing unreported, unregulated fishing***

Illegal fishing in Romania and Bulgaria follows the EU legislation and apply its laws and rules:

- Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing (IUU Regulation)

- Commission Regulation (EC) No 1010/2009 of 22 October 2009 laying down detailed rules for the implementation of Council Regulation (EC) No 1005/2008

In spite of this it is well known the traditional illegal fishing in Danube, Danube Delta and coastal zone for which exists legislation, rules and authorities and inspection, but it is still persisting. The illegal fishing, poaching and overfishing contributed dramatically to the fish stock depletion. In this respect Danube Delta is recognized for sturgeons and caviar, in spite of long terms restriction regarding their fishing. The reasons are:

- the huge prize of these products for valorisation at national and international level
- Protection of sturgeons in Romania is not share with other countries along the Danube and Black Sea and this contribute to:
  - the sturgeons stocks density rearing in the environment, as consequence of natural recovery
  - the sturgeons fishing continue by other Black Sea countries than Romania and Bulgaria were protected sturgeons use to migrate.

In Romania there are seven control institutions for caviar and sturgeons, but their traffic is still a tolerated business. Controls are not able to stop a phenomenon that will lead to the disappearance of rare species of sturgeon. Romania was leading producer of caviar in Europe in the past; today this treasure is in danger.

The most dangerous and powerful phenomenon is the uncontrolled marine fishing in Romanian waters by Turkish (mainly) and Bulgarian private vessels and tools. The target catches are big specimens of turbots and sturgeons, mainly breeders. Only a:

- good fisheries management included in MSP, added to legislation application by competent authorities for control could stop this: and also
- a better understanding and implementation of EU legislation.

➢ *Common vision for fisheries and aquaculture*

- Black Sea should have an appropriate status in Community policies, and that to this end appropriate diplomatic and scientific effort should be undertaken and adequate financial resources made available for sustainable fisheries in the basin.
- Dialogue between stakeholders is the basis for successful promotion of the Integrated Maritime Policy in the Black Sea area. Integrated Maritime Policy should also facilitate the establishment of a conflict- and trouble-free link between maritime sectors, taking into account the sustainable development of coastal areas.
- There should be a shared, coordinated, long-term approach by all stakeholders in the region with a view to all parties in the Black Sea pursuing sustainable fisheries, and therefore welcomes the exchange of good practice among the stakeholders involved.
- The transboundary character of the living resources imposes the necessity for coordinated efforts at regional level for their exploiting and protection.
- Cooperation with GFCM, EEA and other relevant organizations on the issues of common interest.
- Protection of resources living in the Black Sea must be realized on the basis of an adequate legal and institutional framework both at national and regional level.
- Creation of a RFMO, which would coordinate scientific research, analyse the situation of fish stocks and carry out special policies regarding observation of endangered species; this organisation could also make suggestions regarding the level of the fisheries multiannual management plans and distribute the quotas for the countries bordering the Black Sea.
- The need to establish a regional Black Sea fisheries management body, separated from the GFCM. The strongest argument for the establishment of such a body is the different characteristics of the two basins that require different approaches to be taken in managing

fisheries resources and fisheries in the Mediterranean and Black Seas. All Black Sea States as well as the EU should be contracting parties in this RFMO.

- Strengthen the regional legal framework for fishing sustainable management at the Black Sea, through elaboration of legal documents regarding the fishing. Rapid adoption a regional legally binding document on responsible fisheries.
- Black Sea should take its proper place amongst Europe's major marine areas, given that it is the youngest and most dynamic of the semi-closed seas.
- New policy mechanism for the Black Sea should aim to preserve and improve biodiversity and the prosperity of the people working in the fisheries sector in the area, which are among the priorities of the European Union.
- Black Sea should take its place in the reformed CFP and in the Integrated Maritime Policy, through harmonize the development strategies of fishing sector with those of environmental protection, through the implementation of concept regarding the fishing management based on exosystemic approaching and FAO Code of Conduct for a responsible fishing.
- Increase the role of bilateral cooperation. The important role of bilateral cooperation and international agreements, given that the majority of the Black Sea states are not EU members and hence not obliged to respect community legislation.
- All the Black Sea states, especially those that are EU Member States or candidate countries, should respect the EU and international law applying to fishing activities, the aim of which is to guarantee the sustainability not only of fish stocks, but also of the fishing sector.
- EU must use its diplomatic resources to convince as many non-EU Black Sea littoral countries as possible of the value of the principles of the EU Common Fisheries Policy, especially with regard to the application of the multiannual management plans.
- EU activities related to Black Sea fisheries, particularly the Integrated Maritime Policy, should focus mainly on small-scale fishing, which is crucial for the region and the economic status of coastal areas.
- EU's Common Fisheries Policy should encourage the establishment of professional fishermen's organisations and inter-branch organisations in the fisheries and aquaculture industries in the Black Sea where they are lacking or very underdeveloped.
- Launch of common initiatives for data collection, promote a more solid and structured dialogue with non-Member States bordering the Black Sea.
- Collection of data in a standardized manner will require that the cooperating partners meet periodically to agree on the data requirements, the methods to collect the data, the amount of data to be collected and to review the sample design within each independent jurisdiction.
- Promote the development of coastal areas by developing sustainable fisheries and aquaculture, which is particularly important for the Black Sea region, with its high unemployment rates.
- Selection of key demersal species and their habitats and development of recovery plans for them.
- For an effective management of fisheries, to be taken decisions and corresponding actions, it is necessary the providing with scientific fundamental information promptly and in due time.
- The main initiatives for regional cooperation relevant to fisheries so far have been in the area of fisheries research, especially in documenting ecosystem and fishery changes.
- EU tools should be used in scientific activities as an instrument to foster and facilitate cooperation and joint work between the European scientific teams and their counterparts from the Ukraine, the Russian Federation, Georgia and Turkey.
- The need for more accurate analytical and scientific research coordinated at a regional, national and European level to preserve and improve fisheries resources and ecosystems in the Black Sea basin.
- All decisions and policies related to the Black Sea should be based on solid scientific data and calls for collaboration among all stakeholders to this end.

- The need for continuous scientific analysis of the state of fish stocks and a stable, long-term system of fisheries observation, and notes that all the Black Sea littoral states need to participate in this analysis.
- The need for science-based decisions must develop the widest possible cooperation between research institutes in all Member States, which is not entirely limited to research teams.
- Fisheries management in Black Sea region would benefit significantly from more coordinated scientific cooperation among the littoral states, as well as from a coherent policy for the preservation and improvement of the state of fish stocks at European level.
- Need to encourage scientific research on Black Sea issues, so that the decisions taken by the European, regional and national authorities responsible can take account of their economic, social and environmental consequences.

6. Future plans for Fisheries Field under Maritime Spatial Planning frame

6.1. Fisheries as special case for MSP

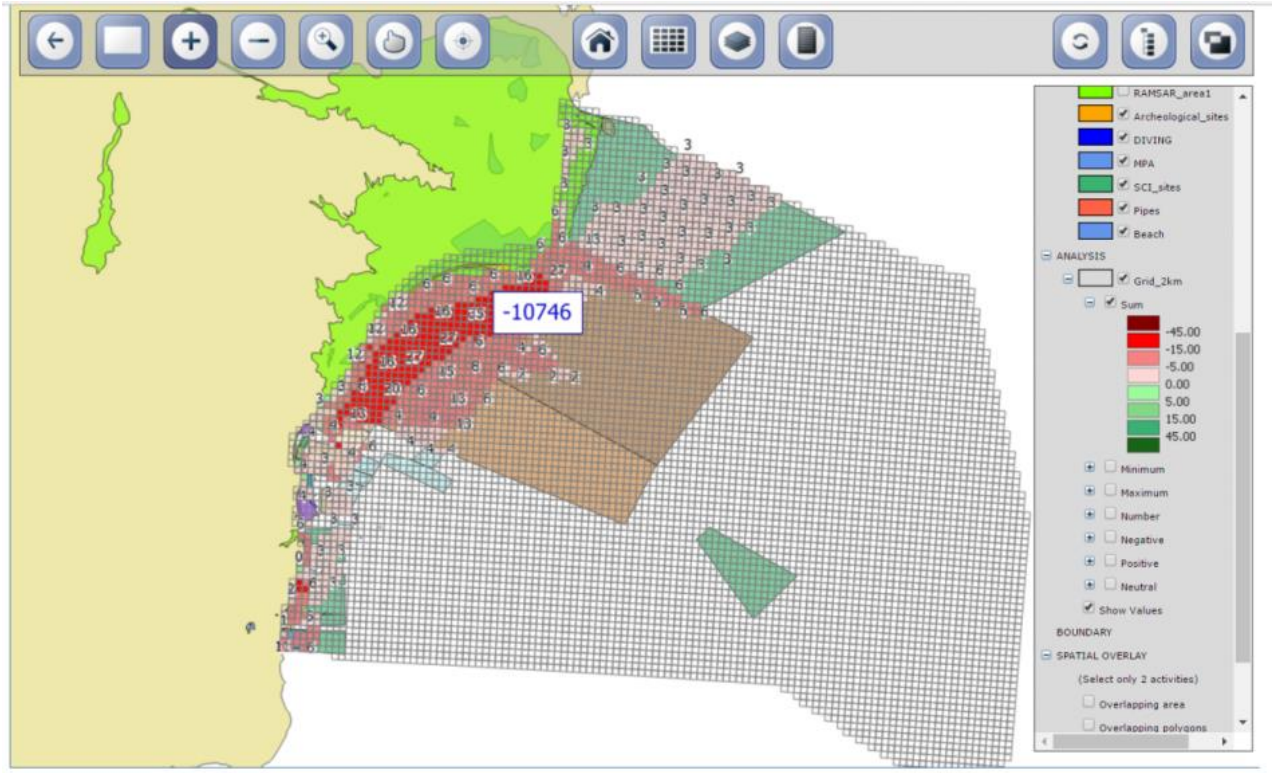


Fig. 6.1.1. The total conflict score was calculated using a 2 km (GRID) /NIMRD

Fisheries represent an important issue for Maritime Spatial Planning. This sector, could be helped by specifical maps which show first of all spatial distribution of its specifical activities, stocks and main important variables related environment, specifical tools and areas.

Integrated map on natural areas including fisheries, protected areas, wetlands and some human activities are presented

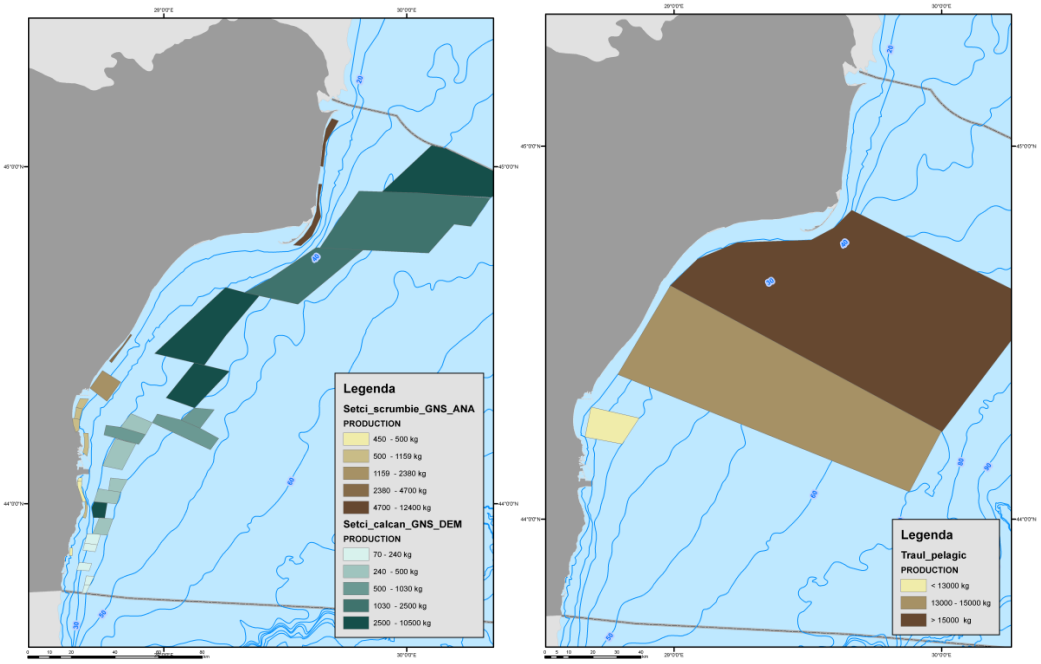


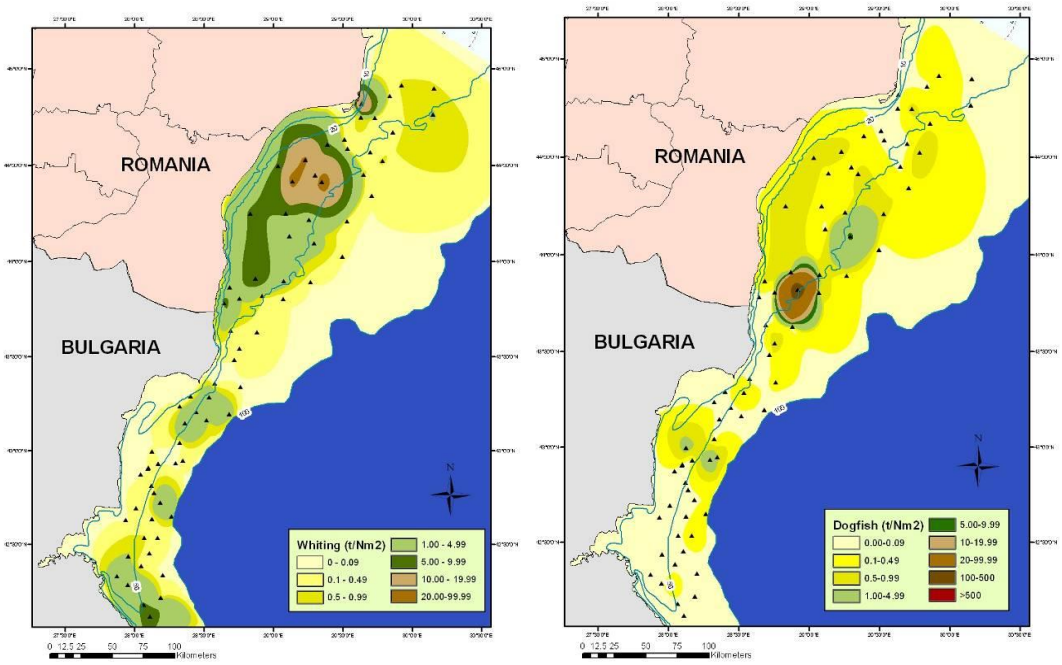
Fig. 6.1.2. Zoning/ Thematical maps related areas for gillnet tools use for shad and turbot

Fig. 6.1.3. Zoning/ Thematical maps related areas for pelagic trawl/NIMRD

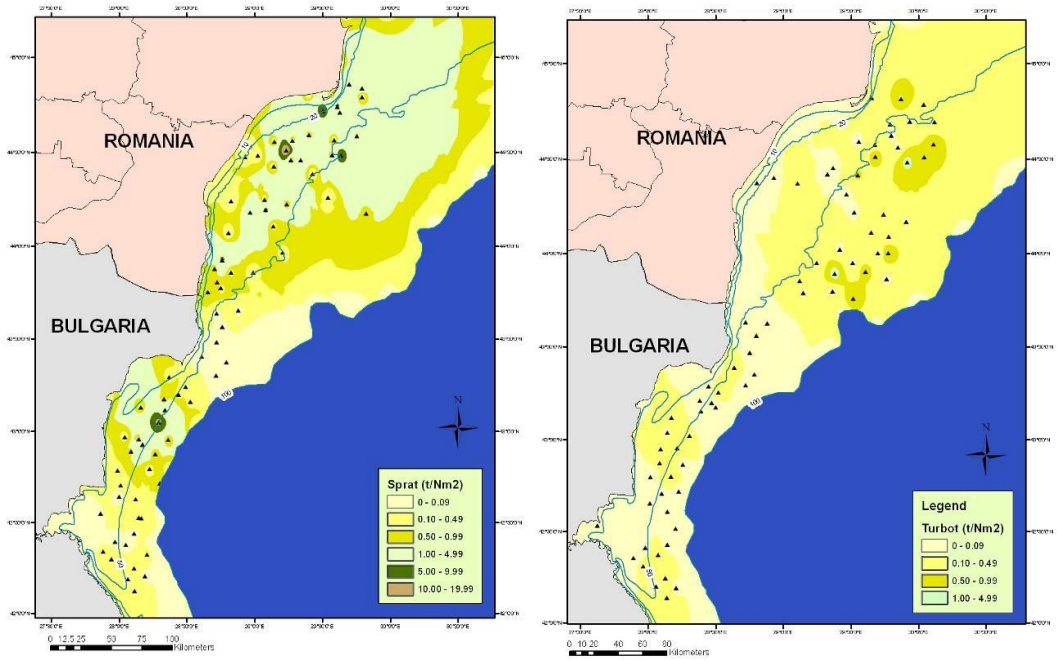
6.2. Needed Processes

Planning and ***Zoning*** processes together with the spatial distribution of fish stocks may contribute to support an effective management of fisheries (Fig, 6.2.1, 2, 3, 4). In particular:

- Spatial distribution of stocks is strongly needed in order to identify and manage fishing areas and seasons;
- Maps of each fishing activity may help to explain and avoid illegal fishing planned by other countries independent fleets.



Fig, 6.2.1, 2



Fig, 6.2.1, 2, 3, 4 – Maps on transboundary distribution (Romania – Bulgaria) of the marine fish stocks (whitening, shark, sprat, turbot) /2013 -NIMRD

7. CONCLUSIONS

The dimension, geographical, geological and ecological peculiarities of the Black Sea give to this basin the features of a large marine ecosystem (LME).

The majority of fish species having economical value and hence exploited by fisheries are shared in the EEZ of several states (sprat, whiting, dogfish, turbot etc.) or are migratory (anchovy, horse mackerel, bluefish, bonito etc.), having spawning, feeding and wintering areas located in different areas of the Black Sea.

The Black Sea ecosystem is highly productive and offers many resources and services for recreation, food, pharmaceuticals, mining and navigation. The impact of such uses on the ecosystem, and especially the impact of fisheries, is the key-task for the sustainable development of the marine environment of this area.
On a larger time scale, the ecosystem is also affected by global climate changes, which will probably influence many aspects of fish spatial distribution, dynamics and abundance of fisheries resources.

At the same time, the recent history of the Black Sea showed, probably more than elsewhere, a tight inter-dependence between fish stocks, eutrophication, pollution, climate changes, habitat changes and opportunistic settlers.

The main historical features is the collapse of pelagic fisheries (at the end of the 80s), which is probably due to the combined effect of successive over-exploitation of fish stocks, increasing pollution and eutrophication, population outbursts of alien planktonic species, strong decadal- scale climatic fluctuations.

The present fish consumption reached a moderate level, with increase in the last 15 years more than 50% to 100% in the different Black Sea coastal states. Reduced share of marine species in total fish products consumption (except TR) is notable. Total fish consumption per capita (fresh water and marine species in kg/year) in 2005-2010.

Total catch in the Black Sea area starting with 2002, the total catches registered a slight but continuous decline from 486,500 to until 361,000 in 2005. After 2007, a sharp decline (28%) of the total catches occurred again by 2009 (395,000 to). In 2010 a slight increase of total fish catches to 421,000 to be registered, followed by 340,000 to/2012. About 96% occurred for anchovy landings, from 378,000 to in 2007, to 192,000 to in 2009. This is an alarming scenario for the Black Sea ecosystem, situation whose impact must be carefully analysed. During the past 5 years, anchovy and sprat accounted for more than 80% of the total catch, horse mackerel 5-8%, whiting 3-5%, Atlantic bonito 3-7%. The most important changes in the volume and structures of catches have been registered in the marine fisheries of Turkey, which continues to lead with 80% from total Black Sea landings.

7.1. The most significant threats for Black Sea Marine Living Resources remain:

● **Overfishing:** the drastic drop of total landings during the past 5 years by over 40% may be a result of significant changes in the structure and functionality of the marine ecosystem, but, to a similar extent, the result of an extremely high rate of fishing effort. The reduction in the number of fishing vessels registered in Turkey, Bulgaria and Romania is insignificant, the fishing effort at regional level being high.

● **Climate changes**, resulting in abnormalities in water mass stratification, circulation and temperature, have determined in certain areas a shift of the fish behaviour (mainly anchovy, sprat, dogfish) and the complete extinction of certain species (E.g. sprat, dogfish and whiting in Georgia). The massive jellyfish agglomerations in certain areas prevent performing trawling hauls during sprat fishing.

● Illegal and unregulated fisheries (IUU): it is a general issue in all BS countries. A Roadmap for reducing IUU fisheries was elaborated.

● Lack in regional cooperation: no progress in the adoption of LBD for fisheries has been achieved so far.

● The recent Stock assessment of GFCM together with STECF, presented during the 37 the session of GFCM, is the following:

- Turbot and spiny dogfish are both overfished and subject to overfishing;
- Sprat, whiting and anchovy - uncertain; however, all stocks are believed to be either partially or fully overfished;
- For turbot, there might be different entities (overall status = status of different stock entities)

AQUACULTURE

Despite the opportunities offered by marine aquaculture, this sector remains undeveloped in the Black Sea:

- Bulgaria: the aquaculture production in 2010 was 202 t (consisting from different fish species and mussels);
- Ukraine: increased from 171 to in 2010 to 553 to in 2012 and decreased from 8,485 to (2010) to 5,087 to in 2012, out of the total of 212,410 to for the whole Turkey (trout, sea bream and sea bass).

Since 2007, the European Commission ensured financial support for the Black Sea subgroup of the Scientific Technical Economic Committee for Fisheries (STECF), which provided recommendations for the annual TAC regulation of Romanian and Bulgarian fisheries in Community waters.

FISHERIES PROJECTS

- In 2010, the preparation of several fisheries related projects started, some of them were approved in 2011:
  - Black Sea fish (GCP/INT) - FAO/Gov is under preparation;
  - EU/ Black Sea CBC - Strengthening the regional capacity to support the sustainable management of the Black Sea fisheries (Romania/NIMRD).
- The 16 the Meeting of AG FOMLRM (Istanbul, 11-12 November, 2013) had important debated documents:

National Reports; Black Sea Assessment: SoE, SAPIR, BSIMAP - fishing component; AG FOMLRM reporting formats; Fisheries indicators development; Black Sea Biodiversity and Landscape Conservation Protocol; Progress with fishery projects; Conservation of cetaceans; AG FOMLRM proposals to implemented MoU between BSC and GFCM.

- 39 participants from Bulgaria, Georgia, Romania, Russian Federation, Turkey, Ukraine, European Commission, FAO, BSC Permanent Secretariat and GFCM.
- A questionnaire collecting info on IUU fishing was compiled by all BS states
- 21 presentations

- **GOALS**

- Assess the nature and the extent of IUU fishing in the Black Sea.
- Collect and review information provided by BS riparian countries on their fleet, experience in the fight against IUU fishing and MCS.
- Enhance cooperation with BSC on the basis of the MoU in the interest of all BS riparian countries.
- Envisage technical assistance and training opportunities through a multiannual roadmap.

- **ROADMAP**

- Agreement to urgently address the problems posed by IUU fishing in the BS on the basis of a roadmap
- Roadmap identifies actions relating to the following aspects: (i) political and institutional, (ii) legal, (iii) scientific, (iv) technical, (v) socio-economic and education related and (vi) MCS.
- Roadmap was submitted to the attention of the 2nd meeting of the GFCM WGBS for review and then transmitted to the 37 th Session of the Commission.

BLACK SEA COMMISSION AG FOMLRM

- Activities BS SAP

¬ Eco Q01: Preserve commercial marine living resources

¬ Eco Q02: Restore/rehabilitate stocks of commercial marine living resources BSC/GFCM - Memorandum of Understanding

- FISHERIES RELATED PROJECTS SESAME, ODEMN, CREAM, KNOW, SEAS, PERSEUS, COCONET, ComFish, MareFrame.
- CBC/BS JOP Strengthening the Regional Capacity to Support the Sustainable Management of Black Sea Fisheries

Cooperation between BSC - GFCM based on the Memorandum of Understanding consists in:

i. Promoting ecosystem based approaches for the conservation of marine environment and ecosystems and the sustainable use of marine living resources;
ii. Assessment of human-marine biodiversity interactions, including in relation to fisheries and aquaculture activities, and mitigation of their impact on marine habitats and species;
iii. Identification, protection and management of marine areas of particular importance in the Black Sea (hot spots of biodiversity, areas with sensitive habitats, essential fish habitats, areas of importance for fisheries and/or the conservation of endangered species, coastal wetlands);
iv. Integrated maritime policy;
v. Legal, institutional and policy related cooperation.

7.2. Lessons Learnt. Important To Know From This Study

- Employment opportunities for coastal communities surrounding it.
- The majority of fish species with commercial value are shared or migratory species.
- The **transboundary character** of the living resources from the Black Sea imposes the necessity for coordinated efforts at regional level for their exploiting and protection, for sustainable development of fisheries.
- The Black Sea needs a special policy to preserve and improve the situation of fisheries resources and ensure that the fisheries sector is suited to the Black Sea basin, bearing in mind the specificities of the Black Sea region, as well as the fact that the Black Sea fisheries policy should be integral part of the CFP.
- The Black Sea provides a mosaic of habitats for the continued survival and reproduction of all native species.
- Marine ecosystems in general and the ecosystem of the Black Sea in particular, are seriously affected by dynamic changes directly related to fishing, climate change and pollution.

- At regional level, catches and fishing effort increase beyond the natural recovery capacity of stocks in spite of evident decline of stocks, in particular in the case of threatened species as sturgeons, turbot, spiny dogfish, bonito, etc., even in same country fishing effort and other management instruments are used currently.
- Illegal, unreported and unregulated fishing in the Black Sea should be tackled immediately.
- No adequate measures have been taken to control catches and, in particular, cross-border fishing.
- Illegal fishing practices increase the effect of inadequate fisheries management, because are focused on height value species, increasing already existing pressure.
- No regionally agreed system to adjust the catches to the status of these stocks; fisheries regulatory framework promoted by each country is not harmonized regionally (prohibition periods, minimum admissible fish length, etc.).
- Fisheries statistics, fish stock assessment and monitoring activities are fragmented and irregular at national level.
- Some data and methodologies used at national level are not compatible for regional purposes.
- Extensive use of non-selective fishing gear (small mesh size trawls and pound nets) increase the rate on non-target species in particular the juveniles of big size threatened species as sturgeons, bluefish, turbot, etc.

- The problems of the Black Sea is the result of the lack of an appropriate institutional structure that coordinates and carries out the management of Black Sea fisheries at a professional and specialised level.
- Lack of a common agreement among the six countries bordering the Black Sea could be remedied by a framework agreement negotiated, in which the interests of all parties would be expressed and taken into consideration.

- Black Sea mariculture is poor developed.
- Development of marine aquaculture can represent an important additional way to cover the increasing demand of fish market and also a sustainable instrument for reduction of fishing pressure on the natural marine living resources.
- Absorption of EU funds for marine aquaculture is a challenge for Romania.
- Cooperation with riparian countries is not developed, regarding the aquaculture activities, production, marketing, processing.

- The need for more accurate analytical and scientific research coordinated at a regional, national and European level to preserve and improve fisheries resources and ecosystems in the Black Sea basin.
- Continuous scientific analysis of the state of fish stocks and a stable, long-term system of fisheries observation, and notes that all the Black Sea littoral states need to participate in this analysis.
- Need to encourage scientific research on Black Sea issues, so that the decisions taken by the European, regional and national authorities responsible can take account of their economic, social and environmental consequences.

8. MEASURES and RECOMMENDATIONS

Extending the experience gain in the frame of MARSPLAN BS Project in a new MSP study cases for fisheries, concerning the most important fish species, interaction with other organisms, pressures and conflicts evaluation, ways and possibilities identification for aquaculture development should take into account the following.

- An enhanced system of monitoring, control and surveillance of fishing activities, which will contribute to long-term sustainable exploitation of fish stocks and to combating illegal, unreported and unregulated fishing in a more effective way.
- More effective cooperation in the control, inspection and surveillance of the Black Sea area.
- To undertake concerted actions to combat illegal fishing and to establish regional consultation mechanism between the Black Sea coastal states.
- Restructuring fishing fleets as response to changing of fish stocks state, is very slow and no benefit or benefit very limited aid from governments.
- Promote a more solid and structured dialogue with non-Member States bordering the Black Sea;
- Cooperation between the Black Sea riparian countries for knowing and rationally managing the marine ecosystem and its resources, carrying out diagnostics of fish stocks status as well as advice on management strategies.

- Creation of a common policy mechanism for the six countries bordering the Black Sea should be examined from a long-term perspective in order, among other things, to guarantee protection of the environment and facilitate the economic and social development of littoral areas.
- Multiannual management plans are of very great interest for both the economic situation of the fishing sector and the environmental situation of the Black Sea ecosystems; believes that the multiannual management plan approach should be accompanied by effective control of catches;
- The needs of fishermen, and of the fishing, producing and processing industries, should be taken adequately into consideration in the new financial framework of the European Fisheries Fund after 2013.
- In view of obtaining the competitive and comparable data is necessary the standardization at regional level and in conformity with the international practice of the methods and tool for sampling, processing, analysing and interpreting the data and information, as well as the fish stock assessment.
- Joint training of staff involved in data collection will be certainly very important.
- The collection, collation and dissemination of data should be carried out in the most cost-effective manner possible so as to minimize costs while acquiring the required information.
- Collection and analysis methods should be based on appropriate statistical designs to ensure that sufficient but only necessary data are collected.
- Taking into account that, the systematic collection of reliable basic data on fisheries is a cornerstone for fish stock assessment and scientific advice supporting decision making in fisheries management, states should, where appropriate, support the establishment of mechanisms, including, inter alia, the adoption of uniform guidelines, to facilitate research at the sub-regional or regional level and should encourage the sharing of the results of such research with other regions (Code of Conduct).
- Creation of a specialized regional data base gathering available information.
- Facilitate the dimensioning of the fishing activity depending on the ecosystem's capacity of support.
- Development of indicators specific for the Black Sea in order to monitor and assess the state of key resources/habitats.
- To harmonize methodologies for assessments and to establish well defined objectives for fisheries sector. To assess the transboundary distribution stocks it is difficult to combine the data from many sources and countries if they are not compatible.
- Standardization at regional level and in conformity with the international practice of the methods and tools for sampling, processing, analysing and interpreting the data and information as well as the fish stock assessment, in view of obtaining the competitive and comparable data, scientific support of marine fishery management which must to be economically efficient, socially responsible and healthy for environment.
- Develop methods for joint-regional stock assessment for the Black Sea that will ultimately enable researchers to determine the condition of stocks and advice on management strategies.
- Recommendations for the most practical and appropriate method for regular, multi-species, stocks assessment in the Black Sea with suggestions on how to fill knowledge / data / information gaps in the future.
- Establish of the total admissible catch depending on the stock status, permitting the efficient allocation of the fishing quotas and the corresponding dimensioning of the fishing effort.
- Support the achievement of the maximum sustainable yield (MSY) without threatening the environment and living marine resources.
- The regional committee should monitor the state of stocks in the entire Black Sea, and determine the TACs and quotas for all countries in the region on the basis of scientific advice.
- Principles of annual TACs and quotas currently applied should not be the only option for the management of Black Sea fisheries; multiannual management plans should be fostered and

could provide for more clarity on the EU's objectives in the field of fisheries in the Black Sea region and its vision for the future of the basin.

- Attracting international partners in the Romanian marine aquaculture. Romanian farmers are looking for attracting foreign capital investors to invest in marine aquaculture.
- The site selection for mariculture at the Romanian Black Sea coast are emphasised from the European recommendations. Romanian coastal zone has big difficulties in mariculture development because of the natural conditions (traditional instable, with high risks and vulnerabilities).
- Elaborate criteria for selection and designating fishing free zones on the national and regional levels.
- Extend/designate protected marine areas of regional significance and establish a network for the Black Sea.
- It is necessary to conduct detailed, coordinated research in order to give a clear and unequivocal answer to the questions of fisheries management and the possible impact of fishing methods (e.g. trawling on the seabed), since in the absence of studies on their effects no serious conclusions can be drawn.
- It is essential to deepen cooperation among all stakeholders in the fisheries sector, including the representatives of the industry, scientists, and policy makers from fishing regions to stimulate the investments in scientific activities and research.
- Promote the use of research results as a basis for the setting of management objectives, reference points and performance criteria, as well as for ensuring adequate linkages between applied research and fisheries management.
- Continuous scientific analysis of the state of fish stocks and a stable, long-term system of fisheries observation, and notes that all the Black Sea littoral states need to participate in this analysis.
- Conduct detailed, coordinated research in order to give a clear and unequivocal answer to the questions of fisheries management and the possible impact of fishing methods (e.g. trawling on the seabed), since in the absence of studies on their effects no serious conclusions can be drawn.

Fisheries management measures related to turbot in the Black Sea Members and cooperating non-Members of GFCM shall ensure that turbot in Black Sea waters is exclusively fished using:

- bottom-set gillnets and that the following conditions are respected:
    - Mesh size is equal to or larger than 400 mm stretched. The mesh size of the net shall be determined as the mean value of the series of 20 selected meshes;
    - To be landed, turbot shall have a minimum size of 45 cm measured from the tip of the snout to the end of the tail fin (total length).

Fisheries management measures for the mitigation of marine mammals' by-catch,

- mitigate the impact of bottom-set gillnet fisheries on marine mammals;
- monofilament or twine diameter shall not exceed 0.5 mm; monofilament or twines shall be assessed when unfrozen.
- set-up adequate monitoring in order to collect reliable information on the impact that bottom-set gillnets targeting picked dogfish have on cetaceans' populations in Black Sea

- Identification of common principles and instruments for the implementation of the ecosystem approach to fisheries and marine environment management;
- Development of common indicators to assess the status of MLR and the impact of fisheries on the marine environment;
- Joint contribution for further elaboration/revision of BSIMAP;
- Elaboration and implementation of a harmonized scheme for reporting at national level and exchange of data between BSC and GFCM;

- Joint contribution to the delineation of some fish stock boundaries (E.g. spiny dogfish, turbot etc.);
- Development of rules and procedures to organize and implement the fish stock surveys together with the relevant environmental parameters in situ;
- Delineation of shared and migratory species groups at the regional and sub-regional levels, as well as the identification of their migration routes;
- Standardization of fishing gear construction and methods to use them in scientific surveys;
- Identification of additional ways to reduce fish mortalities (steps to reduce total fishing effort, improvement of selectivity etc.);
- Option for using alternative fishing methods to reduce cetacean by-catch and other impacts on the marine environment (demersal biocoenoses etc.)

Preparation of new fishery projects which must be focused on priority areas:

- joint surveys for demersal an pelagic fish (hydroacoustic);
- delineation of fish stocks boundaries based on Integrated Maritime Spatial Planning methodologies included in this study;
- use the opportunity offered by EU funds, like Black Sea FAO Fish Project funded by the Turkish government;
- Study of the influence of *climate change* on fish populations behaviour (E.g. changes of thermocline, zooplankton population dynamics);
- identification of hot spots for climatic anomalies in the Black Sea;
- Socio-economic considerations to the fisheries management, in particular to small-scale fishery;

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CASE STUDY 5
MARINE FISHERIES AND AQUACULTURE
under Maritime Spatial Planning
Approach toward integration

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Case studies with major challenges within the Romanian and Bulgarian maritime space