

## MEASURES AND ACTIONS FOR THE PROTECTION OF THE BIODIVERSITY FROM THE MARINE RESERVE 2 MAI – VAMA VECHÉ

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**Abstract.** *The marine reserve 2 Mai - Vama Veche represents an almost unique environment, comprising a variety of habitats for the sessile species. Through its geographical location – the South of the Romanian littoral down to the Bulgarian border – the reserve presents a special, scientific and socio-economic importance. Implementing the management plan of 2 Mai - Vama Veche marine protected area is made possible through the elaboration and the implementation of a Management Plan, according to the protection and the preservation requirements, and through the consultation of all the stakeholders. National Institute for Marine Research and Development « Grigore Antipa » Constanta, the custodian of the marine reserve, for a period of five years, starting June 11 2004, has elaborated a management plan proposal put under public debate and obtained the approval from The Romanian Academy and the Ministry of Environment and Sustainable Development. The purpose of this plan is to transform this area into a natural protected area dedicated to the sustainable management of the marine ecosystems, the preservation of the landscape and the local traditions, and the encouragement of tourism based on these values.*

**Keywords:** *marine reserve, biodiversity, protection.*

**Rezumat. Măsură și acțiuni de conservare a biodiversității în Rezervația marină 2 Mai – Vama Veche.** *Rezervația marină 2 Mai – Vama Veche reprezintă o combinație aproape unică, cuprinzând o varietate de habitate specifice formelor sesile. Prin locația sa, în vecinătatea graniței cu Bulgaria, rezervația prezintă o importanță specială, științifică și socio-economică. Implementarea Planului de management este posibilă prin elaborarea acestuia în acord cu cerințele de protecție și conservare, precum și prin consultarea tuturor factorilor interesați. Institutul Național de Cercetare-Dezvoltare Marină “Grigore Antipa” Constanța, custodele rezervației, pentru o perioadă de cinci ani, începând cu 11 iunie 2004, a elaborat propunerea planului de management, a supus-o dezbaterii publice, aprobării Academiei Române și a Ministerului Mediului și Dezvoltării Durabile. Planul de management își propune transformarea acestei zone într-o arie naturală protejată, dedicată managementului durabil al ecosistemelor marine, protejarea peisajului și a tradițiilor locale, precum și încurajarea turismului bazat pe aceste valori.*

**Cuvinte cheie:** *rezervație marină, biodiversitate, protecție.*

### INTRODUCTION

The Marine Reserve “Littoral Marine Aquatory 2 Mai - Vama Veche“ was established through Decision No. 31/1980 of the Constanta County Council and confirmed as a protected area by Law No. 5/2000 regarding the approval of the National Territory Management Plan, code 2.345. The reserve has a surface of 5.000 ha along 7 km of coastline, between the village 2 Mai and the Bulgarian border. According to the modern principles in nature preservation, the management plan must integrate the interests regarding the preservation of the biodiversity with those regarding the socio-economical development of the local communities in the reserve area, taking into account simultaneously the traditional, cultural and spiritual characteristics of the reserve. Consequently, the final elaboration of the management plan by the NIMRD “Grigore Antipa“ Constanta was carried out within a wide consultative process, with the involvement of all interested factors. In the process of elaborating the Management Plan, we also took into account the impact of human activities on the reserve, the negative impact that an inadequate tourism may have on the biodiversity, but also the benefits that organized tourism may bring to local communities. In this direction, the existence of a tourism strategy allows the obtaining of the advantages that this activity can generate, simultaneously protecting and preserving the specific attributes of the area.

The management of the reserve aims at maintaining the harmonious interaction between man and nature through the protection of the marine habitats and landscapes diversity, promoting the preservation of the traditional usage of the surrounding marine waters, the encouragement and consolidation of traditional activities, practices and culture of the local population. In addition, the public is offered leisure and tourism opportunities and scientific and traditional activities are being encouraged.

### MATERIAL AND METHODS

The elaboration and approval of the Management Plan was carried out according the Emergency Ordinance No. 57/2007 regarding the regime of natural protected areas, the preservation of natural habitats, of the wild flora and fauna.

According to this ordinance, the Marine Reserve 2 Mai – Vama Veche belongs to the “Natural Reserve” category (corresponding to the IV IUCN category – Protected area managed mainly for conservation through management intervention /Habitat/Species Management Area), with the purpose of protecting and preserving marine habitats and the natural marine species which are important from the floristic and faunistic point of view. In addition,

the marine landscape will be preserved and protected. The management of the reserve is being carried out in a differentiated manner, according to the characteristics of the existing habitats and species. Apart from scientific activities, a series of organized touristic and educational activities will be allowed, as well as certain activities aiming the sustainable use of traditional natural resources.

Even though the Vama Veche – 2 Mai Marine Reserve is delimited, it is useful to see beyond these limits and bear in our minds the fact that, for a proper management, we must identify the areas which:

- are efficient for the preservation of key-species, communities and ecological processes;
- allow the durability of the project;
- form a manageable protected area;
- are accepted by as many interested factors as possible.

The reserve must not be regarded as an isolated island and, consequently, we must see beyond its administrative boundaries.

The marine protected area comprises the following areas (according to the principles of preserving and protecting the biodiversity in marine protected areas):

- zone A: the fully protected area, aimed mainly for scientific research, has a surface of 3.150 ha;
- zone B: the buffer area, the sustainable management area, where certain traditional economical activities are allowed, has a surface of 1.850 ha.

## **RESULTS AND DISCUSSIONS**

### **Elaborating the management plan, its approval and revision**

Elaborating the management plan adapted to the situation represents one of the most important activities and an essential condition for the development of a proper management system of the reserve. The plan was elaborated by the custodian together with local and national interested factors, and regional ones, having in view its transboundary extension (TRAYANOV et al., 2007).

In order to ensure a wide participation, a series of activities will have to be carried out during the preparation stage, as well as during the proceedings:

- Informing the public by the means of mass-media regarding the beginning of the management plan elaboration process;
- Inviting the groups of interests, the representatives of the custodian of the reserve and their involvement in the process of elaborating the plan in all its stages, through workshops and sessions;
- Ensuring the adequate environment for the expressing of opinions and suggestions of all participants during the workshops;
- Disseminating for consultation, to all those interested, the results obtained by the work group for the elaboration of the plan.

The management plan is submitted for approval to the Ministry of the Environment and Sustainable Development, after the Approval of the Romanian Academy through the Commission for the Protection of Nature's Monuments. The revision of the management plan is done every 5 years after its approval.

### **Procedures for modifying the plan**

The internal frame, as well as the external one in which the Administration of the 2 Mai-Vama Veche Reserve will carry out its activity is continuously changing, on the long and short terms. Unpredictable natural phenomena, on a smaller or wider surface, may cause changes that impose the re-thinking of the biodiversity preservation measures. The presence of man and his activities may emphasize and accelerate these changes.

In addition, new orientations as far as the issue is concerned politically, as well as technico-scientifically, may cause changes in the approach of the management of a protected area.

Declaring the area a site of community interest (as part of the Natura 2000 ecological network, according to the stipulations of Order No. 1964/13.12.2007 regarding the introduction of the protected area regime upon sites of community importance, as an integrating part of the European ecological network Natura 2000 in Romania, code ROSCI0269), will determine a series of modifications of the plan, according to the requirements of this act.

Also, the socio-economical factor is continuously changing, influencing the human and economical resources available to the Custodian of the Marine Reserve.

Having in view the above mentioned, the management plan must be built upon the basic principles of an adaptive management, able to determine a certain flexibility of decision according to the changes that occur.

The detailed action plans are elaborated annually by the Custodian of the reserve, being based on the stipulations of the management plan, yet taking into consideration the current situation of the surface of the reserve, as well as management resources and the interests of local communities are concerned.

### **Proceedings for the implementation of the management plan**

After the participative elaboration and the approval of the management plan, we will proceed to its implementation. For this purpose, based upon the approved management plan, every year, a work plan will be

elaborated, detailing the actions included in the management plan and allowing the effective fulfillment of the specific objectives. The annual work plan is elaborated by the custodian of the reserve and aims at putting into practice the management plan for each action taken separately, as well as fulfilling and updating, where the case, certain requirements of the management plan, priorities or deadlines. By presenting and analyzing the annual work plan within the group of custodians, consultations with the interested factors will be made, concerning the way of putting into practice the management plan and opportunities for any modifications.

### Description of the Reserve

#### a) Location

The 2 Mai-Vama Veche Littoral Marine Aquatory is situated in the South of the Romanian littoral, being administratively located in the village of Limanu, Constanta County (Figs. 1-2).



Fig. 1. Image from satellite of the Marine Reserve.

Fig. 1. Imagine satelitară a Rezervației marine.

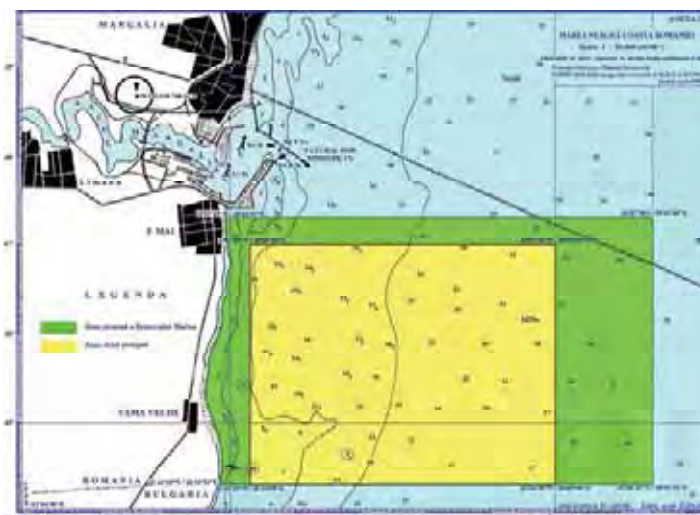


Fig. 2. The coordinates of the 2 Mai - Vama Veche Marine Reserve.

Fig. 2. Coordonatele Rezervației marine 2 Mai – Vama Veche.

The limits of the marine reserve are:

- Northern limit: it is an imaginary line, traced on the geographic coordinate  $43^{\circ}47'18''$  N lat., starting in 2 Mai and continuing into the sea, under the mole of the Mangalia Naval Dockyard, at about 100 m, on a distance of 9 km, at open sea;
- Southern limit: it is represented by the Bulgarian border, continuing straight forward from the meeting point of the terrestrial border with the sea water on a distance of about 9 km, at open sea;
- Western limit: it is represented by the shore line, on a distance of about 5,6 km, starting in the South from the Bulgarian border and ending in the North, under the mole of the Mangalia Naval Dockyard, at about 100 m, in the village of 2 Mai;
- Eastern limit: it is the imaginary line, parallel with the shore line, at about 9 km offshore, on the  $28^{\circ}41'30''$  E long. Geographical coordinate, at the 40 m isobath.

## b) Acces

The acces in the Reserve is done from the littoral area of the 2 Mai and Vama Veche villages. The acces in the departing area is done from the national road connecting Mangalia with the Bulgarian border area.

**Description of the biotic environment**Phytoplankton

The phytoplankton in the 2 Mai-Vama Veche area includes 110 registered algae species, belonging to 8 different branches. The best represented were the Diatomeae (Bacillariophyta) and Peridinieae (Pyrrophyta) groups, which represent about 40% of the total number of species. The autochthonous marine and brackish-marine compenence of the planktonic micro-flora represents, in this area, about 66% of the total number of species. The allochthonous fresh and brackish-fresh compenence, resulting from the flow of continental waters, was more weakly represented, only about 34%.

Zooplankton

In the Vama Veche area, species from 12 systemic groups were registered. Meroplanktonts were dominant (59,9%) through balanid and bivalve larvae, followed by copepodes (17%) and the *Noctiluca miliaris* cystoflagellate (14%). The copepodes and the cladoceres proved the presence of a zooplankton that is rich from a trophic point of view, but poor quantitatively, even if 14 systemic groups were signaled. In the 2 Mai area, higher densities than in the Vama Veche area were registered, based upon the following groups of organism: copepodes, dominant in number (70%) and meroplanktonts (23%), followed at a long distance by the *Noctiluca miliaris* cystoflagellate. In this area, cladoceres registered very low densities, being represented by only one dominant species, *Penilia avirostris*. The *Evadne* and *Pleopis* genres are quantitatively insignificant. The number of taxonomic groups identified was 13.

Benthos and benthic habitats

From the point of view of benthic biocenoses, the Reserve has a mosaic aspect, on a relatively small surface, which causes the organisms that populate it to a diversified biodiversity character (Fig. 2).



Fig. 3. Wonderful underwater lanscape from the reserve (photo D. MICU).

Fig. 3. Frumoasă imagine subacvatică din rezervație (photo D. MICU).

The *Spisula* subcenosis: characteristic for the rocky and muddy-rocky bottoms which are part of the infra-littoral psamobiontic biocenoses that mark the passage towards the deep water mussel biocenosis, as well as of the sandy enclaves resulting from the agglomeration of sand moved by marine currents on the rocky bottom.

Compared to the studies carried out 20-30 years ago, when *Spisula* was present on the Romanian littoral on a relatively narrow stretch compared to *Mytilus* sau *Modiolus*, presently we noticed an enlargement of its areal (GOMOIU, 199). The densities it reaches go up to 30.000 ex/sqm, which represents a source of food used by benthic fish species, especially by the trubot, an extremely valuable fish species.

The *Mytilus galloprovincialis* subcenosis: is the typical subcenosis of rock mussels, which characterize the inferior stretch of the rocky infra-littoral, down to the depth of 20-25 m.

The surface occupied by this subcenosis corresponds spatially to the irregular platform and occupies 52,83 % of the total surface of the reserve. Due to the hard character of the substratum and the less dynamic hydrological conditions, the subcenosis is characterized through the homogenous aspect of the *Mytilus* populations regarding the continuity of the surfaces occupied, as well as far size classes are concerned.

The abundance of large *Mytilus* individuals, as well as the moderate dynamics of the waters, offered the intruder *Rapana venosa* a favourable ecological niche (Fig. 3). This great predator appeared in our waters in 1964; today, it is present all along the rocky infra-littoral, strictly located within the typical limits of the *Mytilus* subcenosis. Even though it does not overcome 50 ex/sqm in none of the stations analyzed, the mussel reaches extremely high densities up to 6.750 g/sqm.

Along with the mussel, another bivalve is present, that is *Mytilaster lineatus* (reaching extremely high densities of 48.800 ex/sqm, with impressive biomasses 6,4 kg/sqm), as well as other organisms.

As far as the fish fauna is concerned, this cenosis also hosts fish species ususally living in extremely deep waters, in the mitiloido-faseolid area, such as the sharks *Squalus acanthias* (V) and *S. Blainvillei*, as well as the *Raja clavata* (K) and the *Dasyatis pastinaca* manteray (Nt.). Individuals of *Acipenser stellatus* (V) are encountered more and more rarely.

Between the algae bushes fixed on a rocky substratum, representatives of the Syngnate family are encountered, without economic importance, but extremely ornamental, such as the *Hippocampus ramulosus* (V) (Fig. 4) sea horse, together with the sea needles belonging to the *Syngnatus typhle* (V), *S. variegatus* (V), *Nerophis ophidion* (V) species. Nevertheless, the most common are the goby species, characteristic for rocky bottoms (such as *Mesogobius batrachocephales* (V) - the sea gudgeon, *Neogobius cephalarges* (V)).



Fig. 4. *Rapana venosa* (photo D. MICU).  
Foto 4. *Rapana venosa* (foto D. MICU).



Fig. 5. *Hippocampus ramulosus* (the sea horse) in the Reserve (photo D. MICU).

Foto 5. *Hippocampus ramulosus* (căluțul de mare) în rezervație (foto D. MICU).

Regarding the habitats with an European conservative interest (protected through the Natura 2000 ecological network), 16 Natura 2000 elemental habitats present in the reserve. Most important elemental habitats:

1170-2 *Mytilus galloprovincialis* biogenic reefs (rep.) (Fig. 5)

1170-7 Lower midlittoral rock (un., rep.)

1170-8 Sublittoral rock with photophylic algae (rep.)

1170-10 Sublittoral hard clay banks with Pholadidae (un., rep.)



Fig. 6. *Mytilus galloprovincialis* biogenic reef in Vama Veche (photo D. MICU).  
Foto 6. Recif biogenic de *Mytilus galloprovincialis* la Vama Veche (foto D. MICU).

Most important species species of special conservation interest (European, regional, national) present:

*Corallina officinalis* (regional – BS TDA 2006) (Fig. 6)

*Cystoseira barbata* (regional – BS TDA 2006)

*Pholas dactylus* (Bern & Barcelona Conventions, national-Micu, 2007a)

*Teredo navalis* (regional – BS TDA 2006)

*Clibanarius erythropus* (regional – BS TDA 2006)

*Hippocampus guttulatus* (IUCN, regional – BS TDA 2006)



Fig. 7. *Corallina officinalis* (photo D. MICU).

Fig. 7. *Corallina officinalis* (foto D. MICU).

### Socio-cultural and economic aspects of the area

The four communities that form the village of Limanu (Vama Veche, 2 Mai, Limanu and Hagieni) are relatively distinct “worlds“, with slightly different problems (there are visible differences within the same community, mainly in 2 Mai), from economical development based on tourism to subsistence economy based on agriculture and fishing (Fig. 7).

Fig. 8. Traditional fishery in Vama Veche.

Fig. 8. Pescărie tradițională la Vama Veche.

Here is also a social perception of these differences, which leads to tensions between the communities, especially between Limanu and the coastal settlements. (Fig. 8)



Fig. 9. The beach from Vama Veche (photo NIMRD).

Foto 9. Plaja de la Vama Veche (foto INCDM).

According to statistics, in 2002 the population of Limanu was of 4730 person, of which 2165 in the village of Limanu, 2236 in 2 Mai, 178 in Vama Veche and 151 in Hagieni. This population lives in 717 households in Limanu, 862 in 2 Mai and 126 in Vama Veche. Evaluations done in the area show that the autochthonous population (people born in the village) represents 32% in Limanu, 40% in Vama Veche and 33% in 2 Mai. Yet, the

percentage of foreigners, registered as “residents“ by the city hall, is more important. Their percentage is extremely high in Vama Veche (59%) and only 15%, respectively 16%, in 2 Mai, respectively Limanu. In 2 Mai, there was a significant flow of population in the ‘60’s (approximately 13% of the present population) (MIHAILESCU, 2004)

### CONCLUSIONS

The Marine Reserve 2 Mai – Vama Veche represents an almost unique combination at the Romanian littoral, comprising the biggest variety of elementary habitats, the area being considered a real mosaic. The extremely rich benthic and pelagic life, reported to the biodiversity in the area, is the reference point for the Romanian sea shore, and the refuge and reproducing area for many marine organisms.

It is an important area both due to its biodiversity and location (the south limit being the border with Bulgaria), and considering the interest of the scientific world in the neighbour country, there are some trans boundary extending perspectives.

For the application of an efficient management plan, the Operational Plans for the Implementation of the Management Plan, the Monitoring Programme for the Implementation of the Management plan, as well as the Functioning Regulation of the Reserve were created (all documents are available on the Internet on the website [www.rmri.ro](http://www.rmri.ro), link „Rezervatia marina”).

The purpose of this management plan is to transform this area into a natural protected area dedicated to the sustainable management of the marine ecosystems, the preservation of the scenery and the local traditions, and the encouragement of tourism based on these values.

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