







Ente Gestore: WWF per conto Ministero

**ANNOTATED FORMAT FOR THE PRESENTATION  
REPORTS FOR THE AREAS PROPOSED  
FOR INCLUSION IN THE SPAMI LIST**

**MPA “MIRAMARE”**



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Index:

- 1- Presentation report
- 2- SDF
- 3- EMAS II Environmental Declaration (in italian; only in electronic form)
- 4- Miramare Regulation (in italian; only in electronic form)
- 5- Maps
- 6- Photographs

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## 1. AREA IDENTIFICATION

### 1.1. COUNTRY/COUNTRIES (in the case of transboundary areas)

Italy

### 1.2. ADMINISTRATIVE PROVINCE OR REGION

Region Friuli Venezia Giulia, Province of Trieste

### 1.3. NAME OF THE AREA

Area Marina Protetta "Miramare"

Miramare Marine Protected Area

### 1.4. GEOGRAPHIC LOCATION

Describe its geographical boundaries, e.g. rivers, roads, geographical or administrative boundaries (do not describe the co-ordinates here; please make a separate annex with a map and a description of geographical co-ordinates as stated in the legal declaration of the area).

The protected area is located at the foot of the Miramare promontory, a section of coast between the tourist port of Grignano and the Barcola riviera, a summer resort for local residents. The environment of the area is a section of shore made up of rock at the coast itself, becoming blocks, pebbles and sandy bottoms, that are increasingly muddy progressing offshore. The rocks are Carso type descending down to the sea, covered with an extremely rich Mediterranean vegetation (a mixture of blueberries, oleanders, broom, holm oaks, cypresses, maritime pines, olives, figs, elders, rosemary bushes and laurels).

### 1.5. SURFACE OF THE AREA (total)

30 ha + 97 ha

(in national unit)

30 ha + 97 ha

(in ha)

### 1.6. LENGTH OF THE MAIN COAST (Km)

1.8 km



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## **2. EXECUTIVE SUMMARY** (maximum 3 pages)

The Marine Reserve at Miramare was established in 1986 and is managed by the Italian Association for the WWF. The Reserve covers an area of 30 hectares and is surrounded by a 90-hectare section of sea subject to the provisions of the Port Authority (no. 28/98), and making up a *buffer zone*.

The protected area is located at the foot of the Miramare promontory, a section of coast between the tourist port of Grignano and the Barcola riviera, a summer resort for local residents. The environment of the area is a section of shore made up of rock at the coast itself, becoming blocks, pebbles and sandy bottoms that are increasingly muddy progressing offshore. The seabed consists of rock, pebbles and sand down to a depth of about 8 meters, and then mud, to a maximum depth of 18 meters. The coast is made up of limestone rock typical of the Carso, a territory of which the Miramare promontory represents a small extension of the coastline.

The rocky shoreline areas of the Triestino coast generally represent a very disturbed environment, which has been transformed by man's presence; the natural populations are thus very deleted. However, if the Miramare reef is taken as an almost complete reference environment, it is easy to recognise the richness of the communities there. The special geomorphological features of the coastal promontory where the Marine Reserve is located are reflected in the flora and fauna of the waters there: the protected area constitutes a unique environment, in itself able to represent the full complement of special features of the Gulf of Trieste. In addition, there is an important tidal zone with an excursion of about 2 m, which is an unusual feature for the Mediterranean, where tidal excursions are not so large.

The most representative habitats of the Marine Protected Area are: the mediolittoral rock biocenosis, in particular the association with *Lithophilum bissoides* and *Fucus virsoides*; the biocenosis of the well sorted fine sands; the biocenosis of the surface muddy sands in calm waters, in particular the association with *Nanozostera noltii*; the biocenosis of the coarse sands and gravel affected by bottom currents with the Maërl facies; the association of the infralittoral algae with *Cladocora caespitose*, *Cystoseira crinita* and *C. compressa*, and *Sargassum vulgare*; and finally the biocenoses of the bathyal muds.

The flora is depleted due to the recent activity of sea-urchin feeding, but there are two fairly well populated planes of vegetation – the mesolittoral plane and the upper part of the infralittoral plane. The vegetation is quite strongly limited on the uppermost bionomic planes, owing in part to the combined affects of factors such as: turbidity; poor light penetration; and the sandy and muddy nature of the seabed. These conditions encourage shade-loving (sciaphila) populations, even close to the surface (- 3 m). In this environment, there is very strong heterogeneity, with establishment of pre-corallicenic sciaphila populations, *Peyssonnelietum squamariae*, and almost single-type situations typical of port waters, with *Ulva laetevirens*, *Gracilaria armata*. A residual meadow of *Cymodocea nodosa* is present.

The waters of the Gulf of Trieste are mainly affected by fresh water brought down seasonally by the Isonzo and Timavo rivers, as well as the large number of springs



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and small seasonal streams (torrents) present along the Trieste coast. The largest influx from the mainland is brought with the spring and autumn rains.

The aim of establishing a protected area is conservation of the environment, and the flora and fauna inhabiting it. The Marine Reserve has always acted as a 'mouthpiece' to promote a policy of experimenting with alternative systems for studying the marine environment; the research makes use of non-invasive instruments. Over the years, increasingly sophisticated instruments have been employed to investigate and protect the area in question.

As well as carrying out scientific studies, the reserve also lays great emphasis on its teaching role. In 1989, in fact, a Centre for Education in Marine Environment (*Centro di Educazione all'Ambiente Marino*, CEAM) was opened. The Centre's goals are to organise and execute educational programmes for schoolchildren at all levels, to give them an opportunity to discover and study the marine ecosystem. The CEAM Centre has succeeded in marrying its activities, using education to bring about conservation; that is, teaching, educational activities and understanding the environment carried out within the area are tools for conservation, the primary goal of the protected marine area. It should, however, be pointed out that Miramare is a 'pilot' project in the field of marine environment education: there are no examples in Italy of similar existing structures, and indeed very little bibliography exists on the topic.

The educational facilities at Miramare begin at the Visitors Centre, a 'communicate through play' area that takes the visitor on a virtual trip to the various habitats of the Marine Protected Area (rock, sand, mud and tidal zone), making full use of the senses.



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### 3. SITE DESCRIPTION

#### 3.1. TYPOLOGY OF THE SITE

3.1.1. Terrestrial surface, excluding wetlands (ha):

Not applicable to the proposed area

3.1.2. Wetland surface (ha):

Not applicable to the proposed area

3.1.3. Marine surface (Sq. Km): Marine internal waters

Territorial sea

30 ha + 97 ha

High sea

Not applicable to the proposed area

#### 3.2. MAIN PHYSICAL FEATURES

##### 3.2.1. Geology/Geomorphology

Give a brief description of: (i) geological aspects (lithologic and tectonics); (ii) processes of sedimentation and erosion observable in the area; (iii) coastal geomorphology and (iv) island system. Indicate bibliographical sources.

The coast is made up of limestone that is typical of the Carso, whose territory includes the small coastal extension of Miramare.

The seabed consists of rock, pebbles and sand down to a depth of about 8 meters, and then mud, to a maximum depth of 18 meters.

More details, are encompassed in the document '*PTRP- Relazione geologica*' (geological report).

The Reserve's two outermost zones have a bed with average inclination of 35°- 40° which is made up, down to a seabed depth of 3 meters, of a substrate that is prevalently pebbly, with interstitial sand, giving way to pelitic sand down to a depth of about 12 meters; instead, the seabed of the Reserve's central zone has an average inclination of 55°-60°, and is made up of a substrate of angular blocks and slabs, down to a depth of about 4-5 meters, where it then becomes completely sandy down to the seabed depth of 19 meters.





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3.2.2. Other interesting physical features: Such as hydrodynamics, volcanic formations, caves, underwater formations, etc.

The rocky shoreline areas of Trieste province's coast generally represent a very disturbed environment, which has been transformed by man's presence; the natural populations are thus very deleted. However, if the Miramare reef is taken as an almost complete reference environment, it is easy to recognise the richness of the communities there. The special geomorphological features of the coastal promontory where the Marine Reserve is located are reflected in the flora and fauna of the waters there: the protected area constitutes a unique environment, in itself able to represent the full complement of special features of the Gulf of Trieste.

Miramare Marine Protected Area forms part of the Gulf of Trieste, a small and shallow basin (average depth 17 m, maximum 25 m), lying to the extreme north-east of the Adriatic Sea.

The Gulf of Trieste enjoys a special meteorological regime, with very high winds and the presence of many rivers that flow in. These two factors distinguish it very markedly from the rest of the northern Adriatic sector, and have strong influence on circulation in the basin (very much determined by the winds) and water stratification (largely determined by the inflow of fresh water).

The nature of these influences, clearly subject to strong seasonal variation, leads to parallel variations in the oceanographic characteristics of the basin.

As regards river inflows, the main river coming into the Gulf of Trieste is the Isonzo; in addition there are the Timavo on the Italian side, and the Dragonja and Riana on the Slovenian side; there are also many springs along the Carso on the north-east coast. The flow of fresh water into the Gulf at the river estuaries is obviously affected by variations in meteorological conditions in the neighbouring regions of Friuli and the Carso.

The most significant wind in this area is most certainly the Bora, mainly present in the autumn and winter, though it is still the commonest in spring and summer too, albeit less intense. This is a wind from east-north-east, which brings in masses of Balkan or Russian air. In the Gulf the Bora can be associated with high pressures and clear skies (the so-called 'Bora chiara' or clear Bora), or else with low pressures and dark skies (the 'Bora scura' or dark Bora). The Bora tends to push the waters from west to north-west (including deep waters when it is especially strong) – with a consequent deepening of the Gulf waters, which encroach on the coast to the east. As well as representing the main factor influencing circulation, the Bora is obviously also fundamental in terms of mechanisms for refreshing the water within the Gulf.

Of the other winds, the Scirocco is the only one that actually affects the circulation of the currents. This wind is very stable and constant, even though it is relatively light. It is warm and wet, and blows from the south towards the coast, pushing the waters from outside the Gulf from south to north, causing a rise in sea level, balanced to some extent by deep waters leaving to the west.

The structure of the water column can be described in terms of three layers: the surface layer (to a depth of 3-5 m), strongly affected by the wind – which, as mentioned, typically has cyclonic circulation for winds from the east or north-east. Within the inlets or close to promontories, there are large fluctuations with respect to the general directions; however, the predominant direction of the surface current is in all cases parallel to the coastline: the dynamics of the surface current can be affected by the river Isonzo and other inflowing water, as well as by the wind.

Below this layer are the transition and deep layers (down to 10-13 m and to the seabed, respectively), which follow the general circulation of the northern Adriatic, in particular the coastal currents along the Istrian coast from south-west towards north-east. This induces a cyclonic circulation in the Gulf. Typical speeds measured at the protected marine area range from 10-15 cm/s at the surface to 0-2 cm/s at the sea floor.



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The three layers can be quite distinct, depending on the season and meteorological conditions: in the summer, in fact, the stratification is counter-balanced by ventilation of the bottom-layer waters, provoking hypoxic conditions. At the river estuaries, the presence of fresh water at the surface leads to a further increase in stratification, with consequent intensification of the effects mentioned above. In contrast, strong winds can cause the water column to homogenise very quickly, in view of its shallowness, thus representing an efficient mechanism for refreshing the waters.

Furthermore, situations where there is strong inflow of fresh water can lead to an estuary-type mixing of fresh river water with that of the intermediate layer: this causes the layers of saltier water below to be driven towards the river estuaries.

Finally, it is known that the maximum excursion of the tides along the Italian coastline are found here, in the northern Adriatic: in the Gulf of Trieste, the maximum tidal (astronomical) amplitude exceeds 80 cm; the tidal currents can reach 10 cm/s, but their contribution to exchange of water is very limited, this being mainly brought about by the low residual currents.

### 3.2.3. Length of beaches (in Km), including islands:

a) Length of sandy beaches:

0.150 km

b) Length of pebble or stony beaches:

1.650 km

c) Length, height and depth of active sand-dunes:

Not applicable to the proposed area

## 3.3. FRESHWATER INPUTS

### 3.3.1. Mean annual precipitation (in mm)

Trieste city: 976 mm/year

### 3.3.2. Main water courses (permanent and seasonal)

Timavo river (permanent): 30 m<sup>3</sup>/s (annual mean flow)

Rosandra torrent (seasonal): up to 5,800 mc/day

Isonzo river (permanent): 170 m<sup>3</sup>/s (annual mean flow)

Tagliamento river (permanent): 70 m<sup>3</sup>/s (annual mean flow)

### 3.3.3. Estuarine areas: Existence and brief description

On the western side of the gulf of Trieste, at the mouth of Isonzo river, starts the Grado-Marano lagoon, followed by the Caorle-Venice one. These are the most important estuarine and lagoon areas of the northern Adriatic sea.



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#### 3.3.4. Freshwater springs: Existence and brief description, including marine offsprings

The waters of the Gulf of Trieste are mainly affected by fresh water brought down seasonally by the Isonzo and Timavo rivers, as well as the large number of springs and small seasonal streams (torrents) present along the Trieste coast. The largest influx from the mainland is brought with the spring and autumn rains.



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### 3.4. BIOLOGICAL FEATURES (B2, Annex I)

3.4.1. Habitats: A brief description of dominant marine and terrestrial habitats, on the basis of the habitat classifications adopted within the framework of MAP (and their coverage in ha)

#### **Principal biocenosis present**

II. 4. 2. Biocenosis of the lower mediolittoral rock

II.4.2.1. Association with *Lithophyllum byssoides*

II.4.2.7. Association with *Fucus virsoides*

III.2.2 Biocenosis of well sorted fine sands

III.2.3. Biocenosis of superficial muddy sands in sheltered waters

III.2.3.5 Association with *Zostera noltii* (*Nanozostera noltii*) on superficial muddy sands in sheltered water

III.3.2. Biocenosis of coarse sands and fine gravels under the influence of bottom currents

III.3.2.1. Maërl facies (= Association with *Lithothamnion coralloides* and *Phymatolithon calcareum*) (can also be found as facies of the coastal detritic biocenosis)

III.5. POSIDONIA OCEANICA MEADOWS

III.6.1. Biocenosis of infralittoral algae

III.6.1.14. Facies with *Cladocora caespitosa*

III.6.1.16. Association with *Cystoseira crinita*

III.6.1.20. Association with *Sargassum vulgare*

III.6.1.25. Association with *Cystoseira compressa*

IV. 1. 1. Biocenosis of bathyal muds

#### **Other biocenosis are:**

- Biocenosis of coarse sands and fine gravels under the influence of bottom currents
- Biocenosis of superficial muddy sands in sheltered waters
- Biocenosis of well sorted fine sands

### 3.4.2. List of regionally important species (flora and fauna) (B-2a, Annex I)

List here ONLY those species protected by international agreements, particularly those marine species included in Annex II of the Protocol, which are present in the area. Any other species may be listed if it is clearly considered of regional importance given its high representation in the area. Display the species list under the headings Marine Plants, Terrestrial Plants, Marine Invertebrates, Fish, Amphibians and Reptiles, Birds, and Mammals. For each species state:

- a) its relative abundance as Common (C), Uncommon (U) or Occasional (O),
- b) Its global status as rare (r), endemic (e) and/or threatened (t), and
- c) its status as an important resident population (R), or important for its breeding (B), feeding (F), wintering (W) or migratory passage (M)



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SPECIES	Rel. Abundance (C) (U) (O)	Global STATUS (r) (e) (t)	Local STATUS (R) (B) (F) (W) (M)
<b>MARINE INVERTEBRATES</b>			
<b>PORIFERA</b>			
<i>Spongia (Spongia) officinalis</i>			(R)
<i>Spongia (Spongia) zimocca</i>			(R)
<i>Aplysina aerophoba</i>		(t)	(R)
<i>Geodia cydonium</i>		(t)	(R)
<i>Hippospongia communis</i>			(R)
<i>Ircinia foetida (Sarcotragus spinosulus)</i>		(t)	(R)
<i>Ircinia pipetta (Sarcotragus pipetta)</i>		(t)	(R)
<i>Tethya aurantium</i>		(t)	(R)
<b>MOLLUSCA</b>			
<i>Dendropoma petraeum</i>		(t)	(R)
<i>Luria lurida</i>		(t)	(R)
<i>Lithophaga lithophaga</i>		(t)	(R)
<i>Pinna nobilis</i>		(t)	(R)
<i>Pinna rudis</i>		(t)	(R)
<i>Pholas dactylus</i>		(t)	(R)
<b>CRUSTACEA</b>			
<i>Homarus gammarus</i>			(R)
<i>Scyllarides arctus</i>			(R)
<i>Maja squinado</i>			(R)
<b>ECHINODERMATA</b>			
<i>Paracentrotus lividus</i>			(R)
<b>PISCES</b>			
<i>Cetorhinus maximus</i>		(t)	(M)
<i>Prionace glauca</i>			(M)
<i>Alosa fallax</i>			(R)
<i>Aphanius fasciatus</i>			(R)
<i>Hippocampus hippocampus</i>		(t)	(R)
<i>Hippocampus guttulatus</i>		(t)	(R)
<i>Sciaena umbra</i>			(R)
<i>Umbrina cirrhosa</i>			(R)
<b>REPTILIA</b>			
<i>Caretta caretta</i>		(t)	(M)
<b>AVES</b>			
<i>Phalacrocorax aristotelis</i>		(t)	(R)
<b>MARINE PLANTS</b>			
<b>MAGNOLIOPHYTA</b>			
<i>Zostera noltii (Nanozostera noltii)</i>		(t)	(R)
<i>Cymodocea nodosa</i>			(R)
<b>RHODOPHYTA</b>			



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<i>Lithophyllum lichenoides</i> ( <i>Lithophyllum byssoides</i> )		(t)	(R)
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### 3.4.3. Flora: Describe in a few sentences the main plant assemblages significant in the area.

As distinct from the well-represented fauna here, the flora – although in rapid evolution – has been depleted by the recent feeding activities of the sea urchins. The result is that only two vegetation planes are adequately populated – the mesolittoral plane and the upper part of the infralittoral plane. Furthermore, the vegetation is found to be very much limited to the higher bionomic planes through the combined effects of factors such as: turbidity (sometimes particulate in suspension, whether organic or from water brought in from human-generated waste-water, or inorganic, from rainwater, fed or dispersed by passage currents); low light penetration; the sandy and muddy nature of the seabed. These conditions encourage shade-loving (sciaphila) populations on the solid substratum (rock, reefs, pebbles), even close to the surface (-3 m). Some changes that have occurred in recent years, including rationalisation of inflowing waters and their entry offshore after primary treatment, have improved the environment considerably, marking a transition that also takes account of the changes in climatic conditions.

In this environment, therefore, there are conditions of very strong heterogeneity, some in counter-tendency with respect to measurements and observations from just a few years earlier. For example, there is the regression of the pre-coralligenic sciaphila population, *Peyssonnelietum squamariae* (Feldmann 1937), which tends to colonise the deepest parts of the seabed, at one time subject to greater hypersedimentation, while situations of almost single-type typical of port waters, with *Ulva laetevirens* Areschoug, *Gracilaria armata* J. Ag. arise only in limited areas and in particular temperature ranges. The heterogeneity is found with the gradual reappearance of Cystoseireto with *C. compressa* and *C. barbata* as the accessory species, in sites formerly suffering intense depletion by sea urchins.

The mediolittoral, characterised by brown algae such as *Fucus virsoides* (endemic in the Adriatic), clearly reflects these changes, and the range of this species is increasingly restricted.

Instead, the infralittoral zone is represented by the red algae: *Corallina elongata*.

There is a residual meadow of *Cymodocea nodosa*.

*Nanozostera noltii* Hornem, *Zostera marina* L. and *Cymodocea nodosa* Asch. used to form submerged meadows that were relatively extensive (Benacchio 1938; Simonetti 1973), though these are described in detail only by more recent authors (Simonetti 1973; Ghirardelli et al. 1975). During the 80s, these plants underwent a reduction in range. Some areas have been studied and the regression in range observed (Odorico, 1993), this being linked to inflowing torrents. At present, a gradual revegetation of the sandy floor by residual meadows of *Cymodocea nodosa* is being noted



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#### 3.4.4. Fauna: Describe in a few sentences, which are the main fauna populations present in the area.

The species found in the Reserve are characteristic of some typical biocenoses (in the sense of Pérès and Picard, 1964): calm mode muddy sands; coastal deposit; coastal terrigenous muds; well sorted fine sands; coarse sands subject to seabed currents; *Posidonia* meadows; incoherent (or mobile) sediments; photophilic algae; mud deposit; and finally moderately sheltered sands.

Fish commonly found include the Blennoides (with top spreading and typification), all saragus types, *Dicentrarchus labrax* and *Corvina nigra*.

The crustaceans present include: *Eriphia spinifrons*, *Maya squinado*, *Maya verrucosa*, *Homarus gammarus*.

The cnidaires are well represented by *Cladocora caespitosa*.



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### 3.5. HUMAN POPULATION AND USE OF NATURAL RESOURCES

#### 3.5.1 Human population

a) Inhabitants inside the area:

	Number	Date of data
Permanent	209,520	2001
Seasonal number (additional to permanent)	ca 14,000	2006

Description of the population

The working population of the city of Trieste is engaged as follows:  
 Number employed in industry: 11,758  
 Number employed in commerce: 13,662  
 Number employed in the service industry: 27,404  
 Number employed in other institutions: 23,724

Main human settlements and their populations

Trieste : 209,520

#### 3.5.2 Current human use and development

a) Briefly describe the current use of the area by subsistence, artisan, commercial and recreational fishing, hunting, tourism, agriculture and other economic sectors.

The proximity of the city of Trieste gives the area an urban marine identity. The limited dimensions of the area mean that in general it reflects the structure and activities of the city. These are primarily linked to fishing and industry. As regards fishing, this is carried out by around a dozen vessels making use of surrounding nets and lamps; occasionally (autumn), when permission is given, these vessels come in close to the promontory coastline. However, the main fishing season is the summer (for 'blue', or oily-fish, fishing), when the vessels are further offshore (6-10 miles). Some fishing with permanent nets and pots is carried out along the coast, but this is local and limited.





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b) Enter how many of the users depend on these resources, seasonality, and assessment of the social and economic importance of their use and of the perceived impact on the conservation of the area, in a score of 0-1-2-3 (meaning null, low, medium, high).

ACTIVITY AND CATEGORY	ASSESS IMPORTANCE OF		Estimated No. of Users	Seasonality
	Socio-economic	Conserv. Impact		
<b>FISHING</b>				
Subsistence	2	2		
Commercial, local	2	2		
Commercial, non-local	1	1		
Controlled recreational	3	3		
Un-controlled recreational	0	0		
Other				
<b>TOURISM</b>				
Regulated	2	3		
Unregulated	0	0		
Indicate the type of tourism				
Boating/sailing	3	3		
Diving	2	2		
Tourism facilities	3	3		
<b>FOREST PRODUCTS</b>				
Subsistence	0	0		
Non-timber commercial, local	0	0		
Non-timber commercial, non-local	0	0		
Timber commercial, local	0	0		
Timber commercial, non-local	0	0		
Agriculture	1	0		
Stockbreeding	1	0		
Aquaculture	3	3		
<b>EXTENSIVE STOCK GRAZING</b>				
Subsistence	1	1		
Commercial, local	1	1		
Commercial, non-local	0	0		
<b>OTHER ACTIVITIES</b>				
-	0	0		
-	0	0		



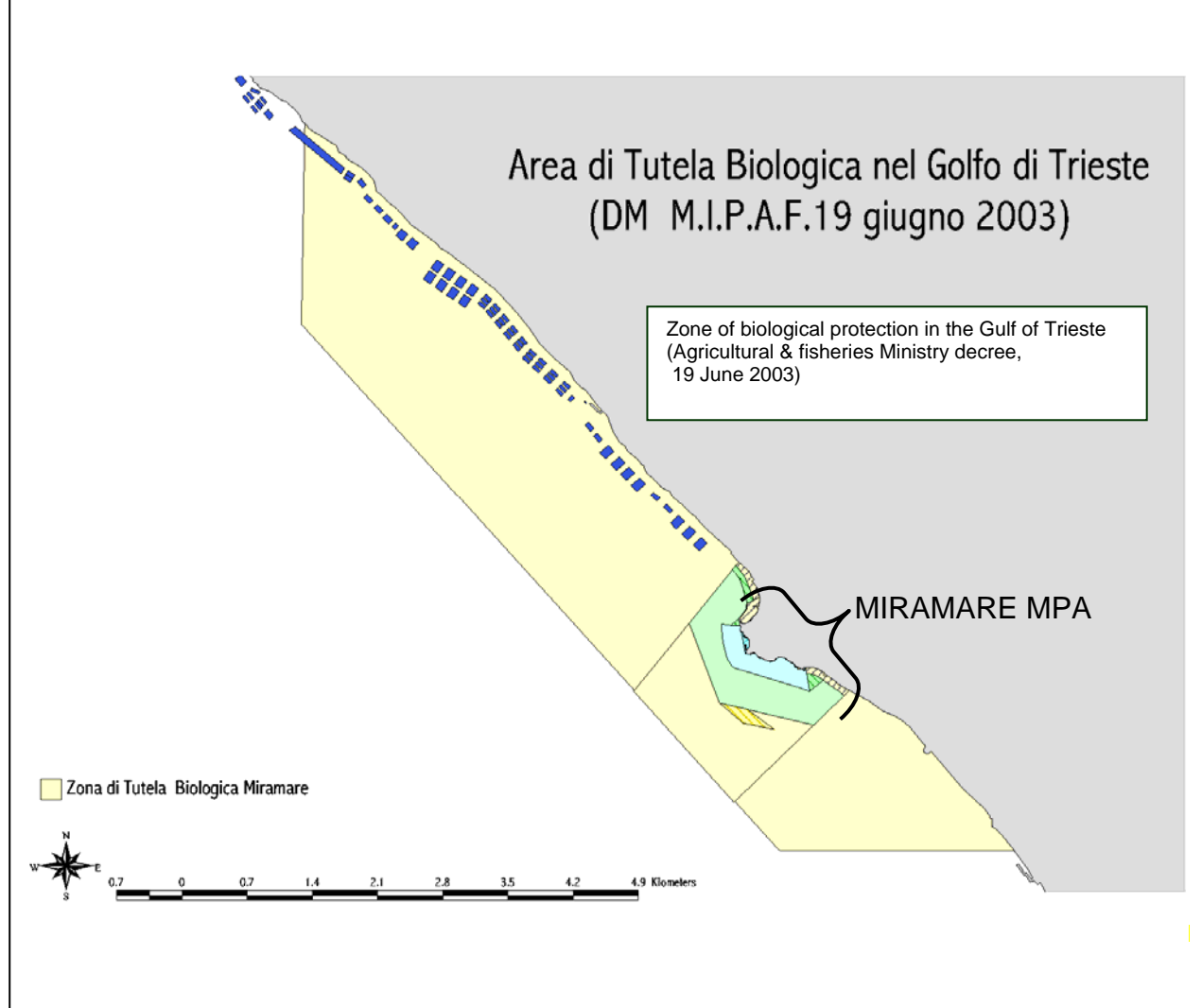
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### 3.5.3. Traditional economic or subsistence uses

Name any environmentally sound traditional activities integrated with nature, which support the well being of the local population. E.g. land, water use, target species, if closed seasons or closed zones are used as management techniques.

There are many extensive areas for mussel-farming, an integral part of activities here, and one that can be viewed as traditional. The activities of the local residents vary widely, owing to the closeness of the city of Trieste, and include the well-established service sector and industry. Also worthy of note are the area's many sailing events, which draw considerable interest locally.

Miramare forms part of the Zone of Biological Protection (ZBP) 'Miramare', covered in a decree issued by the ministry responsible for fishing in 2003. The existence of joint interests of both mussel-producers (in that their permitted areas fall under the ZBP) and individual fishermen operating under an umbrella consortium, implies the need to monitor the environmental conditions and resources together, as well as the need for drawing up plans for common management.





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## **4. MEDITERRANEAN IMPORTANCE OF THE SITE**

This Section aims at stressing the importance of the site for conservation at the regional or global scales, as set in Art. 8 para. 2 of the Protocol and B2-a, B2-b and B2-c in Annex I.

### **4.1. PRESENCE OF ECOSYSTEMS/HABITATS SPECIFIC TO THE MEDITERRANEAN REGION**

Name the type of habitats considered of Mediterranean specificity, on the basis of the habitat classifications adopted within the framework of MAP, and their estimated cover (Ha).

There is a significant tidal zone (about 2 m of tidal excursion): in the Mediterranean sea, the Gulf of Trieste is the only place (together with Gabes) where the mediolittoral is of such importance.

Infralittoral with passage zone for (commercial) fish species.

The tidal zone encompasses endemic species, such as *Fucus virsoides* and other species at the boundaries of their diffusion zone.

Cliffs not disturbed by fishing and anthropic activities and used for special habitat by fish populations.

II. 4. 2. Biocenosis of the lower mediolittoral rock

II.4.2.1. Association with *Lithophyllum lichenoides* (*L. byssoides*)

II.4.2.7. Association with *Fucus virsoides*

III.2.2 Biocenosis of well sorted fine sands

III.2.3. Biocenosis of superficial muddy sands in sheltered waters

III.2.3.5 Association with *Zostera noltii* (*Nanozostera noltii*) on superficial muddy sands in sheltered water

III.3.2. Biocenosis of coarse sands and fine gravels under the influence of bottom currents

III.3.2.1. Maërl facies (= Association with *Lithothamnion coralloides* and *Phymatolithon calcareum*) (can also be found as facies of the biocenosis of coastal detritic)

III.5. POSIDONIA OCEANICA MEADOWS

III.6.1. Biocenosis of infralittoral algae

III.6.1.14. Facies with *Cladocora caespitosa*

III.6.1.16. Association with *Cystoseira crinita*

III.6.1.20. Association with *Sargassum vulgare*

III.6.1.25. Association with *Cystoseira compressa*

IV. 1. 1. Biocenosis of bathyal muds

### **4.2. PRESENCE OF HABITATS THAT ARE CRITICAL TO ENDANGERED, THREATENED OR ENDEMIC SPECIES**

A critical habitat is an area essential to the conservation of the species concerned. These species should be those included in Annex II of the Protocol. E.g. Islets and sea stacks, as small islands in the sea or in large bodies of water, mostly important for water-bird colonies; caves appropriate for monk seals; undisturbed sand beaches where marine turtle nesting occurs; coastal lagoons where threatened fish or bird species feed or breed; tidal flats, coastal or benthic substrates important for marine invertebrates, etc.

Name the habitat types and the species linked to it.



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- II.4.2.1. Association with *Lithophyllum lichenoides* (*L. byssoides*)
- II.4.2.7. Association with *Fucus virsoides*
- III.6.1.14. Facies with *Cladocora caespitosa* (*Pinna nobilis*)
- III.6.1.16. Association with *Cystoseira crinita* (*Cystoseira crinita*)
- III.6.1.20. Association with *Sargassum vulgare*
- III.6.1.25. Association with *Cystoseira compressa* (*Cystoseira compressa*)



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### **4.3. OTHER RELEVANT FEATURES (Art. 8 paragraph 2 in the Protocol)**

#### **4.3.1. Educational Interest (B-3 in Annex I)**

E.g. particular values for activities of environmental education or awareness

The institutional goals of the Miramare Marine Protected Area include provision of opportunities for establishing programmes for education about the environment and for training in natural resource management. Within the Reserve, therefore, a Centre for Education in Marine Environment (CEAM) was opened in 1989. The Centre's goals are to organise and execute educational programmes for schoolchildren at all levels, to give them an opportunity to discover and study the marine ecosystem. The experience of CEAM at Miramare has thus developed within a protected marine area, and is noteworthy for its twin specialisation: the specific nature of the activities proposed satisfy the requirement to develop a cultural tool for management of the marine area, but at the same time these act as a support for teaching about the marine ecosystem. Indeed, the CEAM Centre has succeeded in marrying its activities, using education to bring about conservation; that is, teaching, educational activities and understanding the environment carried out within the area are tools for conservation, the primary goal of the protected marine area. It should, however, be pointed out that Miramare is a 'pilot' project in the field of marine environment education: there are no examples in Italy of similar existing structures, and indeed very little bibliography exists on the topic. Working with an ecosystem that is little known has been, however, an extremely interesting and stimulating aspect, and has required considerable effort in succeeding in shifting teaching that was vague and without firm foundation over to a teaching method that involves direct contact between user and environment, as well as 'experimentation' with that environment itself. For this reason, the teaching activities at the Miramare Reserve not only provide the necessary theoretical basis, but also allow extensive opportunity for personal involvement and in particular understanding, i.e., they aim to provide the tools necessary for study and understanding of the surrounding environment. The topics covered include specific topics on the marine and/or coastal environment, specific ecosystem components, biodiversity, the man-sea relationship.

In detail, the objectives pursued are:

Impart knowledge about the environmental and ecological features of the areas, with technical/scientific activity.

Develop relationships with the adult population through the schools. Here, schoolchildren visiting CEAM can spread knowledge and values within their own social nuclei.

Broaden the physical limits of the protected area. This concept can be included considering that the action of education and consequent response in behaviour can be expressed beyond the limits of the Reserve itself – "if I don't pollute within a protected area because it is wrong, I won't do it outside either". Extending educational activities beyond the limits of the Reserve means a cultural broadening of the protected area.

Propose a new environmental tourism, offering new ways to use the sea.

Modify positively the existing, widespread forms of marine environmental tourism.

Act as a support instrument for schools, offering field activities.

Update and train teachers and/or operators working within areas of a similar kind. The proposals include experimental training courses using simulation to present the methodologies applied in the CEAM activities.

These goals are reached through proposals incorporated in a set of activities that form part of CEAM's ordinary management. They range from simple visits to the Reserve, where the aim is to provide information on why the protected area has been set up, to activities lasting one and a half days, in which not only is information given, but the intention is to secure personal involvement and an understanding of the environment. This latter is the main goal of the so-called 'Settimane Azzurre' (Blue Weeks) residential courses, of duration 3, 4 or 5 days.



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The educational facilities at Miramare begin at the Visitors Centre, a 'communicate through play' area that takes the visitor on a virtual trip to the various habitats of the Reserve (rock, sand, mud and tidal zone), making full use of the senses: vision, observing the various aquariums in which the different environments are proposed; touch, at the open 'touch-tank', where live invertebrates can be handled; and hearing, through the sounds of the sea and divers' breathing played back in the various rooms. Then, especially to encourage a 'contact' with the seabed underfoot, visitors walk bare-foot on a floor covered in sand, shells and marine plants. The experience is therefore first of all tactile, then becoming one of 'observation' of the depths of the sea. Before reaching the area for putting shoes back on, visitors are invited into the 'immersion dome': seated in reclining armchairs made of neoprene (the material wet-suits are made of), they are surrounded by images of fish swimming in front, behind and above them.

The visit finishes with computers offering games to check how much has been learnt during the visit, monitors with photos and videos of the species present in the protected area, and aquariums focused on camouflage and symbiosis.

The observation is extended directly on the shore itself, making use of simple measuring instruments to learn about the main chemical/physical parameters that govern the marine ecosystem. In addition, the significant excursion of the tide here allows study and recognition of the organisms of the intertidal band, with focus on how they have adapted for survival out of the water. The beach in front of the *Bagno Ducale* and the Castle's former stables (ex *Scuderie*) act as true outdoor lecture halls and laboratories.

#### 4.3.2. Scientific Interest (B-3 in Annex I)

Explain if the site represents a particular value for research in the field of natural or heritage sciences.

In view of the logistics and secure conditions for instrumentation and equipment, the zone has been used over the years as an experimental 'gym' by research institutes and universities. Activity of research applied to the marine environment and production (fishing and shellfish-farming) acts as a bridge between the area and the main local activities. Activity of monitoring specifically targeting species and associations, and their dynamics related to the climate, has developed through information exchange with laboratories and institutes in Slovenia and Croatia.

Specific agreements with local administrative bodies (Chamber of Commerce, the Region, the Province, ARPA) govern scientific activities of gathering data and local information, as well as their distribution.

#### 4.3.3. Aesthetic Interest (B-3 in Annex I)

Name and briefly describe any outstanding natural features, landscapes or seascapes.

Scenes of outstanding beauty include the area of the coast within the Reserve in which Miramare Castle is located. This is a rare example of a royal home conserved with very little architectural alteration; the scenery at this site is noteworthy for its conservation and sustainability. There is in fact a small port below the Castle, which leads to the park; however, both navigation and mooring are prohibited. Built in eclectic style between 1856 and 1860 at the request of Archduke Maximilian of Hapsburg – later Emperor of Mexico – as a project by Carl Junker, its interior maintains the original furnishings and decorations of that era. The Castle boasts a large park, of around 22 hectares, in an exquisite location on the sea, created by a promontory originally without vegetation, now home to numerous botanical plants of tropical origin.



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#### 4.3.4. Main cultural features

Indicate if the area has a high representative value with respect to the cultural heritage, due to the existence of environmentally sound traditional activities integrated with nature which support the well-being of local populations.

The MPA overlooks the famous Castle of Miramare, which in turn is part of the Miramare botanical park. The site is one of immense cultural value in terms of the cultural tradition of the area.



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## **5. IMPACTS AND ACTIVITIES AFFECTING THE AREA**

### **4.1. IMPACTS AND ACTIVITIES WITHIN THE SITE**

#### **5.1.1. Exploitation of natural resources**

Assess if the current rates of exploitation of natural resources within the area (sand, water and mineral exploitation, wood gathering, fishing, grazing...) are deemed unsustainable in quality or quantity, and try to quantify these threats, e.g. the percentage of the area under threat, or any known increase in extraction rates.

Possible impact could result from illegal fishing whether as a sport/hobby or as underwater fishing.

#### **5.1.2. Threats to habitats and species**

Mention any serious threats to marine or coastal habitats (e.g. modification, desiccation, disturbance, pollution) or to species (e.g. disturbance, poaching, introduced alien species...) within the area.

Management of Miramare MPA has to take account of the fact that the area lies in an urban but industrialised context – that of the city of Trieste – with the commercial port of Trieste in the bay of Muggia with its oil tankers terminal, the ancient oil refinery, the ironworks plant. The biodiversity protected by the MPA is thus exposed to the classic threats of these two contexts (urban and industrial pressure), where contamination by heavy metals is common to all mobile sediments (muds) of the Gulf of Trieste, as described in studies published by the ICRAM Institute (Afrodite project).

A further phenomenon typical of the waters of the Gulf of Trieste is their low transparency, due to the high levels of production, increased by suspended matter brought in by the rivers and discharges. These affect the development of the vegetation, in particular the marine phanerogams.

Illegal fishing is nowadays very infrequent, since there is good surveillance of the Reserve's outer buffer zone as well as diligent controlling by the marine authorities responsible. If anything, there might be some limited fishing on the area's edges, using surrounding nets and light sources, those these attract only fish close-by along the coast.

#### **5.1.3. Demand by an increased population and infrastructures**

Assess whether the current human presence or an expected increase in frequentation (tourism, passage of vehicles and boats) and any human immigration into the area, or plans to build infrastructures, are considered a threat.

The Miramare promontory is an area witnessing a high flow of tourists throughout the year, partly due to the attraction of the well-known Castle of Miramare. However, the disturbance is concentrated on the mainland, and does not affect the MPA, especially since all discharge from tourist hygiene facilities is channelled directly to collecting sewers. Instead, the phenomenon of boats passing close to the Reserve is not related to tourism but rather to local leisure craft, mainly yachts, and occurs only at particular times when there are organised regattas, the best known of these being the Barcolana.





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#### 5.1.4. Historic and current conflicts

Make a brief statement of any historic or current conflicts between users or user groups.

At present there are no relevant local conflicts.

### 4.2. IMPACTS AND ACTIVITIES AROUND THE SITE

In Art.7.2-e the Protocol calls for the regulation of activities compatible with the objectives for which a SPA was declared, such as those likely to harm or disturb species or ecosystems (Art.6.h), while Section B4 in Annex I asks to consider “the existence of threats likely to impair the ecological, biological, aesthetic or cultural value of the area” (B4-a in Annex I), recommending the existence, in the area and its surroundings, of opportunities for sustainable development (B4-d) and of an integrated coastal management plan (B4-e).

#### 5.2.1. Pollution

Name any point and non-point sources of external pollution in nearby areas, including solid waste, and especially those affecting waters up-current.

Presence of a small port for leisure craft on the western edge (anti-fouling paints, heavy metals)  
Discharge (occasional heating fuels) brought in by streams along the eastern and western edges of the Reserve  
Risks connected with shipping (daily mooring of oil tankers at the SIOT and SILONE berths, three miles from the Reserve)  
Sediments (peilitic) contaminated by heavy metals throughout the Gulf of Trieste, in particular from the industrial port in the bay of Muggia, three miles from the Reserve

#### 5.2.2. Other external threats, natural and/or anthropogenic

Briefly describe any other external threat to the ecological, biological, aesthetic or cultural values of the area (such as unregulated exploitation of natural resources, serious threats on habitats or species, increase of human presence, significant impacts on landscapes and cultural values, pollution problems, any sectorial development plans and proposed projects, etc.), likely to influence the area in question.

There are (spring 2006) two separate, independent projects, each one concerning the building of a GNL vaporisation plant in the waters of the Gulf of Trieste (each one of them producing a flow of 24,000 m<sup>3</sup>/hour of cold chlorinated water, equal – in a year – to 5% of the volume of water of the entire Gulf).  
This hypothesis is bringing some concern on the future of sea-water quality and on the consistency of the food chain (as chlorine could oxydate and disrupt nutrients).

#### 5.2.3. Sustainable development measures

Comment whether the area is covered by an integrated coastal management plan, or bordering upon a zone under such a plan. Are there other opportunities for sustainable development provided for in the neighbouring areas?

The area is largely associated with projects designed to ensure sustainable management of the area. The management plans are tuned to current approaches of policies for protection.



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## **6. EXPECTED DEVELOPMENT AND TRENDS<sup>1</sup>**

The foreseeable development and trends of the site do not appear in the list of common criteria for the choice of protected marine and coastal areas that could be included in the SPAMI list, as established in the Protocol and its Annex I. Moreover, this is not always easy to assess and it is necessary to have knowledge about the site, which is not always available to all managers of protected areas; Thus, it is not obligatory to fill in the boxes in this Section 6.

On the other hand, the assessment of this foreseeable evolution and trends constitutes a dynamic supplement to the static knowledge of the site, as it appears in Sections 3, 4 and 5 above. Moreover, it is of significant importance for the definition of the objectives and the management plan of the site.

It thus appears desirable to bringing out the main outlines at least in respect to the following points:

### **6.1. EXPECTED DEVELOPMENT AND TRENDS OF THREATS TO AND PRESSURES UPON THE AREA**

Deal briefly in succession with:

- The demographic development in and around the site
- The development of economic activities (other than tourism and recreation) within the area
- The development of local demand on tourism and recreation
- The development of tourism pressure on the area

Demographic development is in line with the national standard.

- there are no relevant economic development indicators present
- the development of industrial plants (GNL vaporisation plants, see point 5.2.2) could represent a risk, in the future, for the water quality parameters
- development of tourism in the area has proved constant over recent years
- tourist pressure on the area does not trigger any alarms, except in certain periods of high tourist/sailing traffic.

### **6.2. POTENTIAL CONFLICTS IN THE AREA**

Make a brief statement of potential use conflicts between the users or group of users of the site.

At present there are no relevant local conflicts.

### **6.3. EXPECTED DEVELOPMENT AND TRENDS OF THE NATURAL LAND ENVIRONMENT AND LANDSCAPES OF THE AREA:** as expected arising from the evolution of the pressures

The area has limited dimensions, and forms part of the urban context of the city of Trieste. The possibility of excessive pressure on the area therefore has to be addressed through the management policies of the city itself, which at present do not have relevance.

<sup>1</sup> By expected development and trends are meant the development, which is thought most likely to occur in the absence of any deliberate intervention to protect and manage the site.



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#### **6.4. EXPECTED DEVELOPMENT AND TRENDS OF THE MARINE ENVIRONMENT AND SEASCAPES OF THE AREA:** as expected arising from the evolution of the pressures

The threat of alteration to the marine and landscape environment at the moment exists as regards plans for interventions planned out to sea and on the coast: e.g. vaporisation plants, management of Trieste's treatment plants, etc.

As regards leisure boating, the small port has a pilot plant - set up thanks to the intervention of Miramare MPA - for water treatment and disposal of bilge water.



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## **7. PROTECTION REGIME**

### **7.1. LEGAL STATUS** (General Principles “e” and Section C-2 both in Annex I)

#### 7.1.1. Historical background of the protection of the site

The history of the Miramare Marine Nature Reserve dates from 1968 with the newly conceived idea of a ‘Marine Park’; this was an area given in concession by the State at the request made by Trieste Section of WWF-Italy to the local Port Authority. In view of the unusual nature of the request for the concession, the Trieste Port Authority made a request to the Transport Ministry. Finally, in 1973, the request for the concession was granted to WWF, so the ‘Marine Park of Miramare’ was established on 30 hectares – the current ‘A’ zone – on payment of an annual fee for maritime State concession.

The annual fee and all the running expenses were covered thanks to WWK-Italy funds, with no other external help. Personnel were voluntary workers, students and civil servants.

Experience gained through this scheme for protecting the sea led to the Italian law of 1982 ‘*Disposizioni per la difesa del mare*’ (Provisions for defence of the sea), under which the first protected marine areas were created. The area of Miramare was one of the first, having been set up twenty years previously, on 12 November 1986. The management was granted to WWF-Italy (due to its historical presence in this area which helped starting conservation initiatives), while the funding, from this moment onwards, came mainly from the Ministry of Environment.

Still today it is one of the few examples of management of protect marine areas of a private nature – WWF being an NGO – while all others are public or public-private. Over the years, the area of 30 hectares of this State-owned / privately managed Marine Protected Area has remained unaltered, and only in 1996 was a buffer zone (where fishing is prohibited) of around 90 hectares created under Port Authority regulation.



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### 7.1.2. Legal texts currently ruling the protection on the site

Enter the national conservation category, the dates and the present enforcement status of the legal instrument declaring the protection of the area. Consider both the land and the marine areas of the site. Include the full text(s) as an annex.

- Law 31 December 1982, no. 979  
Provisions for defence of the sea  
(G.U. – official gazette – of the Italian Republic no. 16 – Ordinary Supplement - of 18 January 1983)
- Law 8 July 1986, no. 349  
Institution of the Ministry of the Environment and regulations regarding damage to the environment  
(G.U. – official gazette – of the Italian Republic no. 162 – Ordinary Supplement no. 59 - of 15 July 1986)
- Interministerial decree 12 November 1986  
Institution of the Miramare Marine Nature Reserve in the Gulf Trieste  
(G.U. – official gazette – of the Italian Republic no. 77 of 2 April 1987)
- Provisions of the Trieste Port Authority 28/98
- Regulations for organisation of the Reserve; interministerial decree 20 July 1989
- Law 6 December 1991, no. 394  
Framework law on protected areas  
G.U. – official gazette – of the Italian Republic no. 292 – Ordinary Supplement - of 13 December 1991)
- Law 8 October 1997, no. 344  
Provisions for the development and qualification of interventions and occupation in the environment sector  
(G.U. – official gazette – of the Italian Republic no. 239 of 13 October 1997)
- Law 9 December 1998, no. 426  
New interventions in the environment sector  
(G.U. – official gazette – of the Italian Republic no. 291 of 14 December 1998)
- Art. 114 Law 23 December 2000, no. 388  
Provisions regarding drawing up the annual and multi-annual State budgets (finance bill 2001)  
(G.U. – official gazette – of the Italian Republic no. 302 of 29 December 2000 – Ordinary Supplement no. 219)
- Law 23 March 2001, no. 93  
Provisions regarding the environment  
(G.U. – official gazette – of the Italian Republic no. 79 of 4 April 2001)
- Law 11 October 2001, no. 391
- Art. 8 and art. 9 Law 31 July 2002, no. 179  
Provisions regarding the environment  
(G.U. – official gazette – of the Italian Republic no. 189 of 13 August 2002)



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### 7.1.3. Objectives (General Principles “a” and D-1 in Annex I)

Name in order of importance the objectives of the area as stated in its legal declaration.

The ‘Miramare Marine Nature Reserve’ in the Gulf of Trieste has the following goals in particular:

- protection and enhancement of the environment and geomorphological characteristics, the benthic and pelagic fauna and flora of the area concerned;
- a systematic development and pursuit of the research programme, partly underway already, carried out by the marine biology laboratory of Aurisina in Trieste, institutes and departments of the University of Trieste, the civic natural history museum of Trieste, as well as the national research council (CNR) talassographic institute in Trieste;
- awareness-raising about the biology of the zone’s marine environments and its special mineralogical and geomorphological features;
- pursuit of information campaigns and educational programmes to improve general culture in the field of biology and marine ecology.

7.1.4. Indicate whether the national protection regime arises from international treaties enforced or from implementation measures of treaties (Art. 6.a in the Protocol).

## 7.2. INTERNATIONAL STATUS

### 7.2.1. Transboundary or high seas areas

Complete this section only if the area is transboundary, totally or partially in the high sea, or within areas where the limits of national sovereignty or jurisdiction have not yet been defined. In this case, mention the modalities of the consultation (Art. 9 para. 3A in the Protocol and General Principles “d” in Annex I).

### 7.2.2. International category

Mention if the area, or part of it, has been designated and on what date, with an international conservation category (e.g. Specially Protected Area, Biosphere Reserve, Ramsar Site, World Heritage Site, European Diploma, Natura 2000, Emerald network, etc.).

Miramare is a UNESCO – MAB Biosphere Reserve since 1979 (registration number ITA 03)

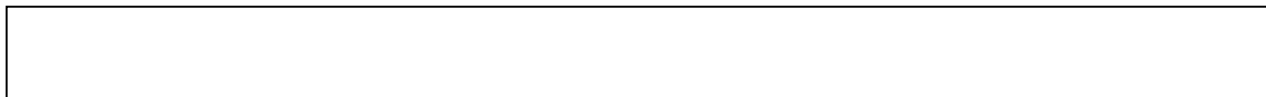
<http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?code=ITA+03&mode=all>



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### 7.3. PREVIOUS LEGAL BACKGROUND AND LAND TENURE ISSUES

Briefly mention if the area or part of it is subject to any legal claim, or to any file open in that connection within the framework of an international body. Describe the land tenure regimes within the area, and append a map if existing.



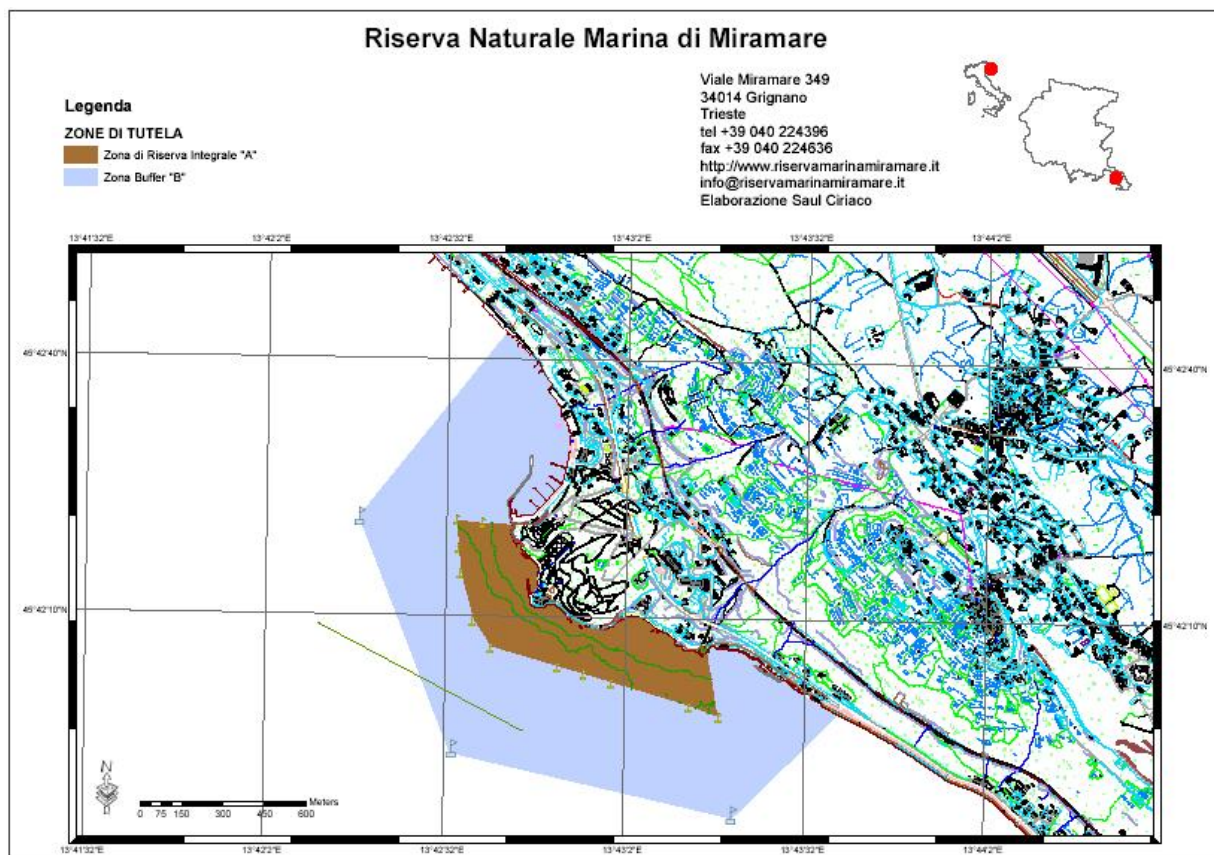
### 7.4. LEGAL PROVISIONS FOR MANAGEMENT (Section D-1 in Annex I)

#### 7.4.1. Zoning

Briefly state if the legal text protecting the area provides for different zones to allocate different management objectives of the area (e.g. core and scientific zones in both land and sea, fishing zones, visitation, gathering, restoration zones etc) and in this case the surface area in ha of these zones. Include a map as an annex

The State Reserve currently comprises a zone 'A' of integral reserve with an area of 30 hectares; this is surrounded by a section of sea of 97 hectares subject to Port Authority Order (no. 28/98).

#### ZONING MAP





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#### 7.4.2. Basic regulations

Mention the provisions, which apply to the area concerning the implementation of Article 6 of the Protocol (paragraphs a to i), Section D5 (a to d) in the Annex I and Article 17 of the Protocol.

In Miramare MPA, the following activities are forbidden:

- removal of, even partial, or any damage to, rock formations, minerals, flora and fauna in the coastal sub-area and underwater, except for cases of sampling for scientific research, carried out under the supervision of a person in charge for the research itself and authorised by the body responsible for managing the Reserve;
- navigation, access, stopping of boats and floating means of any type, as well as bathing, except for reasons of surveillance, research and visits that are authorised and under the direct control of the Reserve authorities;
- fishing, whether professional or for sport, using whatever any means that might be employed;
- hunting, capture, collection, damage, and in general any activity at all that may constitute a risk or disturbance to the protection of the animal or vegetal species, including the introduction of extraneous species, except through special authorisation issued for the purposes of study or research;
- alteration through any means whatsoever, whether direct or indirect, of the geophysical environment and of the biochemical characteristics of the water, as well as discharge of solid or liquid refuse or in general the introduction of any object or substance that could modify, even temporarily, the characteristics of the coastal marine environment;
- the introduction of weapons (including underwater devices), explosives, or any means for destroying or capture, or toxic or polluting substances;
- activities that might in any way lead to damage, obstacle or disturbance to realisation of the objectives of protection and the study and scientific research programme envisaged for the area.





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### 7.4.3. Legal competencies

Section D4 in Annex I states that the competence and responsibility with regard to administration and implementation of conservation measures for areas proposed for inclusion in the SPAMI List must be clearly defined in the texts governing each area. Additionally Art.7.4. of the Protocol calls for the provision of clear competencies and co-ordination between national land and sea authorities, with a view to ensuring the appropriate administration and management of the protected area as a whole. Mention in which way do the legal provisions clearly establish the institutional competencies and responsibilities for the administration and conservation of the area, and if being the case, their co-ordination means, including those between land and sea authorities.

Management of the MPA is entrusted by the Ministero dell'Ambiente e della Tutela del Territorio e del Mare (Ministry for the Environment and Protection of the Territory and the Sea) through a decree to WWF- Italy, which draws on a number of agreements for the management of ordinary, educational and scientific matters, including technical (scientific and administrative). Within the protected marine area there are general bans on access, transit and fishing, with the exception of activities carried out by the managing body. The WWF guarantees delimitation of the area, while monitoring and respect of the bans imposed are carried out by the Coast Guard. The WWF also guarantees the meeting of institutional objectives that are educational, scientific, cultural and conservation in nature, in accordance with the decree of 12 November 1986 and related circulars issued successively by the Ministry for the Environment (19 April 2002 and 23 May 2003).

### 7.4.4. Other legal provisions

Describe any other relevant legal provisions, such as those requiring a management plan, the establishment of a local participation body, binding measures for other institutions or economic sectors present in the area, allocation of financial resources and tools, or any other significant measures concerning the protection and management of the area or its surrounding zones.

The local community's participation body is the "Commissione di Riserva". See further point 8.1.2 for details.

As from EU legislation, the Zones of Biological Protection (ZBP) requires a management plan meant to establish common rules for the exploitation of fishing grounds and stocks. Miramare MPA is surrounded by a ZBP (see previous point 3.5.3 for details) and should be taking part to the management board of this area.



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## **8. MANAGEMENT**

Through the General Principles, para. (e) in the Annex I, the Parties agree that the sites included in the SPAMI List are intended to have a value as examples and models for the protection of the natural heritage of the region. To this end, the Parties ensure that sites included in the List are provided with adequate legal status, protection measures and management methods and means.

### **8.1. INSTITUTIONAL LEVEL**

#### **8.1.1. Authority/Authorities responsible for the area**

Ministero dell'Ambiente e della Tutela del Territorio e del Mare

Fosterage: WWF Italia  
Viale Miramare 349, 34136 Trieste - Italy  
Tel +39 040.22.41.47  
Fax +39 040.22.46.36  
E-mail: [info@riservamarinamiramare.it](mailto:info@riservamarinamiramare.it)

#### **8.1.2. Other participants in the management body**

Such as other national or local institutions, as stated in Section D6 in Annex I.

The Reserve Commission nominated through DEC/DPN no. 1145 of 18/06/2004 works alongside the Body entrusted with management of the Reserve, making proposals and suggestions regarding its operation. In particular, it expresses its opinion regarding the drawing up of regulations for management and organisation of the protected marine area, including spending forecasts for the annual management programme, and for any other proposal concerning changes to the perimeter and/or zoning of the protected marine area.

The Reserve Commission comprises:

- a) the President, who chairs it;
- b) two specialists nominated by the Ministry for the Environment;
- c) a representative of the nature associations that are most representative;
- d) a representative from the Ministry for the Environment;
- e) two representatives from the local coastal municipalities;
- f) a representative from the Regions that are affected in terms of territory;
- g) a representative from the economic-productive categories concerned, nominated by the chambers of commerce of each of the provinces through whom the Reserve was established;
- h) a representative from the local education authority;
- i) a representative from the cultural heritage and environment administration;
- j) the head of the local Port Authority.

The Technical-Scientific Committee comprises:

- the person in charge of the Reserve;
- two representatives from the Marine Biology Laboratory at Aurisina (Trieste) ;
- two specialists nominated by the Ministry for the Environment.

The Board of Auditor comprises:

- a representative from the Treasury, who acts as chairman;
- two representatives from the Ministry for the Environment.



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### 8.1.3. Participants in other committees or bodies

Such as a scientific committee, or a body of representatives from the local stakeholders, the public, the professional and non-governmental sectors, as in Sections B4-b and B4-c in Annex I.

Each year, the Reserve organises a technical roundtable involving various public local institutions, to present the programme activities and financial accounts. The scientific activities are supervised by the Department of Biological Oceanography – OGS. In addition, the Reserve has excellent relations with the Coast Guard and the marine farming and fishing consortia in the Gulf of Trieste in terms of management of local marine resources.

### 8.1.4. Effectiveness

As stated in Section B4 of Annex I, assess as very low, low, moderate, satisfactory, very satisfactory, and comment as needed on the following aspects:

a) Effectiveness of the co-ordination, where existing:  
Satisfactory

b) Quality of involvement by the public, local communities, economic sectors, scientific community:  
Very good



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## 8.2. MANAGEMENT PLAN (as set out in D7 of Annex I)

### 8.2.1. Management Plan

State if there is a management plan (MP) and in this case include the document as an annex. In the absence of a MP, mention if the main provisions governing the area and the main regulations for its protection are already in place and how (D7 in Annex I) and if the area will have a detailed management plan within three years (D7 in Annex I).

The managing body draws up a three-year programme of management activities that meet the goals of the founding decree and related circulars from the Environment Ministry (see 7.1.2.). In addition, since 2004 all management activities have been included in the EMAS II programme and environmental policy with annual audit and three-yearly certification. Together with the aspects described under 8.2.3, this programming makes up the management plan for the Miramare protected marine area.

Since 2002, the management plan has also been monitored as case studies by the IUCN-WCPA-NOAA-WWF group, with specific indicators (biological, socio-economical and governance) for assessing the management effectiveness.

### 8.2.2. Formulation and approval of the Management Plan

Mention how the MP was formulated, e.g. by an expert team and/or under consultation and/or participation with other institutions or stakeholders. State the legal status of the MP, whether it is officialized, and how, and if it is binding for other institutions and sectors involved in the area.

Not applicable

### 8.2.3. Contents and application of the Management Plan

State the degree of detail in the MP by entering YES or NO in the following list of potential contents, and assess the degree of implementation of the MP by using the 0-1-2-3 score on the right hand side:

	Existing in MP	Degree of application
Detailed management objectives	YES	3
Zoning	YES	3
Regulations for each zone	YES	3
Governing body(ies)	YES	3
Management programmes as:		
Administration	YES	3
Protection	YES	3
Natural resource management	YES	3
Tourism and Visits	YES	3
Education and Training	YES	3
Research and Monitoring	YES	3



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Services and Concessions	YES	3
Fund raising activities	YES	3
Periodic revisions of the MP	YES	3

### 8.3. PROTECTION MEASURES

By Art. 6 of the Protocol the Parties agree to take all the necessary protection measures required for the conservation of the area, particularly the strengthening the application of the other Protocols to the Convention, and through the regulation of any other activity likely to harm the natural or cultural value of the area, such as economic, recreation or research activities. As per Section D2 in Annex I, the protection measures must be adequate to the site objectives in the short and long term, and take in particular into account the threats upon it.

#### 8.3.1. Boundaries and signing

Briefly, state if the boundaries of the area and its zones are adequately marked in the field, both on land, in the sea, and at the principal points of access.

The area is delimited externally by day-time and night-time signs marking the perimeter, in accordance with Coast Guard and the Ministry for the Environment requirements. Signs indicate the coastal perimeter, and also describe the bans that have to be respected.

#### 8.3.2. Institutional Collaboration

Name the different national and local institutions or organisations with legal responsibilities or involved in the protection and surveillance of land and sea zones, and any measures or mechanisms through which their co-ordination is pursued.



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<b>Miramare MPA institutional collaboration</b>
<b>Scientific and monitorino activity</b>
- Istituto Nazionale per l'Oceanografia e Geofisica Applicata – Dipartimento di Oceanografia Biologica (National Institute for Oceanography and Applied Geophysics – Dept of Biological Oceanography)
- SISSA (Scuola Internazionale Superiore di Studi Avanzati – International School for Advanced Studies)
- University of Trieste – Biology Dept
- University of Udine – Economic Sciences Dept
- University of Bologna <i>Alma Mater Studiorum</i> – Faculty of Medicine and Veterinary
- ICRAM – Istituto Centrale per la Ricerca Scientifica e Tecnologica Applicata al Mare (Central Institute for Scientific and Technological Research Applied to the Sea)
- SIBM – Società Italiana di Biologia Marina (Italian Society for Marine Biology)
- CNR Istituto Talassografico Sperimentale (Experimental Talassographic Institute) F. Vercelli
- APAT – Comitato per l'Ecolabel e per l'Ecoaudit (Committee for Ecolabel and Ecoaudit)
- AREA Science Park Trieste – Science System FVG
- Parco Regionale del Delta del Po Veneto (Regional Park of the Po Estuary, Veneto)
- Faculty of Environmental Sciences – University Ca' Foscari of Venice
- FederParchi – Federazione delle aree protette italiane (Federation of protected areas of Italy)
- Chamber of Commerce of Trieste – ARIES agency
- Faculty of Engineering, University of Trieste
- Fondazione Internazionale Trieste per il Progresso e la Libertà delle Scienze (International Foundation Trieste for the Progress and Freedom of Science)
<b>Communication, Governance</b>
- RTV Koper Slovenian television company
- Autonomous Region of Friuli Venezia Giulia – Agency for Regional Parks and Forests
- Autonomous Region of Friuli Venezia Giulia – Laboratorio di educazione Ambientale (Environmental education lab)
- Trieste Municipality – offices for environment and education on the environment
- Ministry for Agricultural and Forest Policy – Dept Fishing and Aquaculture
- Ministry for Foreign Affairs, Ministry for Education - Universities and Research AREA Science Park, Trieste
- Province of Trieste – Environment office
- Ministry of Cultural Heritage – Local office
- Trieste Port Authority
- Chamber of Commerce, Trieste – Presidency and Special Agency ARIES
- Ministry for Environment and Protection of the Territory and Sea
- School head offices and Trieste schools



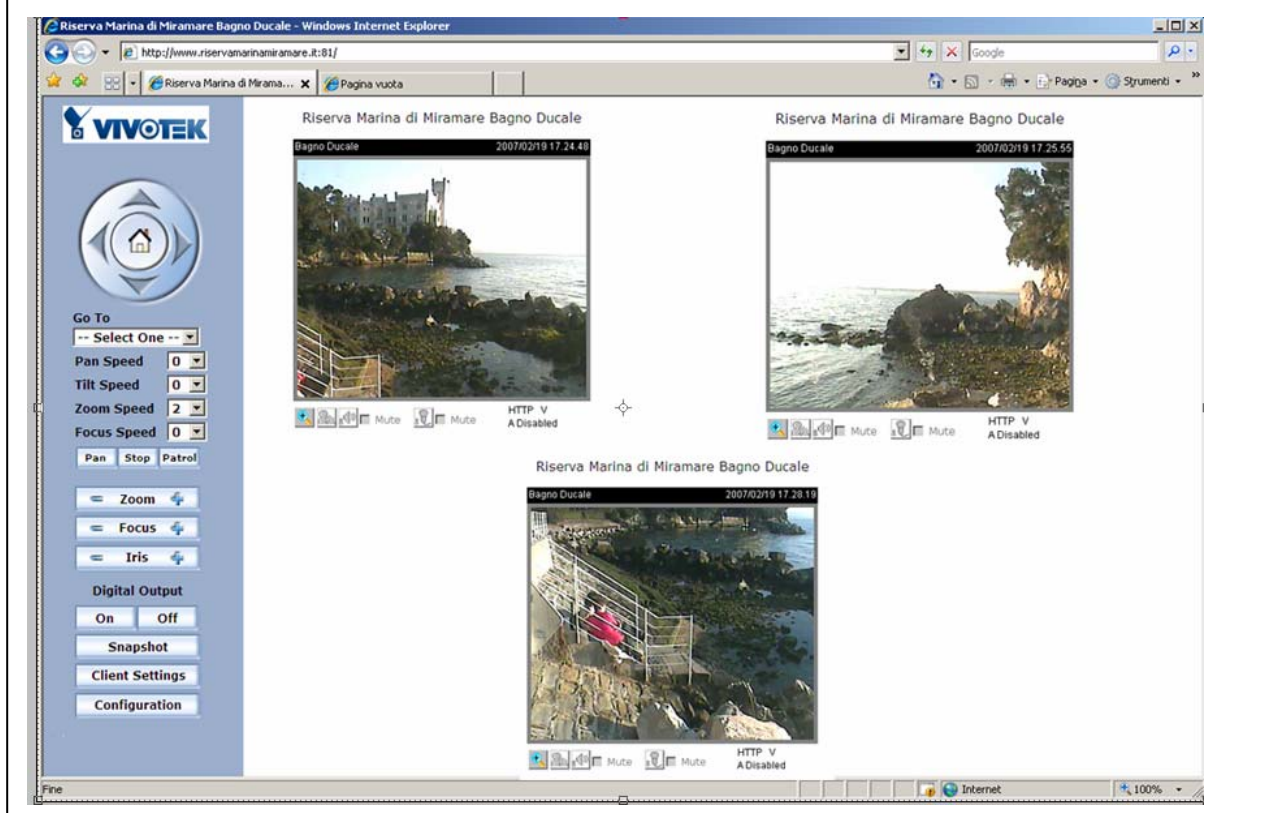
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### 8.3.3. Surveillance

Consider the adequacy of the existing protection means (human and material), and your present ability to survey land and sea uses and accesses

The area falls under the protection of the Port Authority Police, which provides regular patrolling activity.

Miramare MPA is completing the installation of a video-surveillance network operated by "Web-cameras" with 3 observation points (2 on land, 1 at sea): images will be made available on the internet both to the Port Authority Police and to MPA personnel.



### 8.3.4. Enforcement

Briefly, consider the adequacy of existing penalties and powers for effective enforcement of regulations, whether the existing sanctions can be considered sufficient to dissuade infractions, and if the field staff is empowered to impose sanctions.

Enforcement and sanction's application are effective.

Miramare MPA keeps the recording of sanctions and fines operated by the Port Authority Police:

The total number of administrative sanctions carried out by the Port Authority Police (years 2001-2005) is 17, 3 of which are relative to the anchorage and/or navigation within the protect area, 1 for improper underwater activity inside of the MPA, 4 for activity of professional fishing within the MPA, 3 for activity of underwater sport-fishing, 6 for bathing inside of the MPA. The highest percentage (34%) has been carried out in 2005, 22% both in 2001 and 2002 and 11% both in 2003 and 2004.



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## 9. AVAILABLE RESOURCES

### 9.1. HUMAN RESOURCES (Art. 7.2.f in the Protocol)

#### 9.1.1. Available staff

Assess the adequacy of the human resources available to the management body, in number of employees and training level, both in central headquarters and in the field. Indicate if there are staff training programmes.

Twelve people are employed in the area: teaching secretary, underwater-activity secretary, visitor welcome, administration, scientific monitoring, management, accompanying visitors, management of the various spaces and structural maintenance, management of nautical vehicles, production of educational material.

The human resources available at the Reserve are adequate – in terms of both number and training – allowing it to be run properly. The staff comprise: Marine Reserve Director, secretariat and administration (1), activities in the sea (1), chemical/physical sector (2), educational sector (2), awareness-raising sector (2), marine acoustics sector (1), eco-ethology sector (4).

Eight people collaborate with the area, accompanying visitors, in the welcome/infopoint, and in scientific monitoring.

#### 9.1.2. Permanent field staff

Answer YES or NO on the current existence of the following FIELD staff categories. If YES, enter the number of staff either permanent or part-time in that category, and evaluate on a 0-1-2-3 score (0 is low, 3 is high) the adequacy of their training level.

	YES/NO	NUMBER Permanent/Part-time	ADEQUACY OF TRAINING LEVEL
Field Administrator	YES		3
Field Experts (scientific monitoring)	YES		3
Field Technicians (maintenance, etc)	YES		3
Wardens	YES		3
Of which marine wardens	YES		3
Guides	YES		3
Other	YES		3

#### 9.1.3. Additional Support

Briefly, describe if the area currently has the advantage of other external human resources in support of its objectives, either from other national or local institutions, volunteer programmes, non-governmental organisations, academic or international organisations. Mention if there are any significant changes in prospect for the near future.

The MPA has excellent relations with local research centres and universities.





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## 9.2. FINANCIAL RESOURCES AND EQUIPMENT

By Art. 7 in the Protocol, the Parties agree to adopt measures or mechanisms to ensure the financing of the specially protected areas (Art.7.2.d), and the development of an appropriate infrastructure (Art.7.2.f). The General Principles para. "e" in the Annex I call upon the Parties to provide the areas with adequate management means.

### 9.2.1. Present financial means

Note if the basic financing is ensured: a core funding for basic staff, protection and information measures. Who provides this core funding? Briefly assess the degree of adequacy of the present financial means for the area, either low, moderate, satisfactory; e.g. the implementation of the management plan, including protection, information, education, training and research.

The funding is adequate; this derives mainly from the Italian Ministry for the Environment, integrated by the Regione Friuli-Venezia Giulia, by WWF-Italy and from autonomous incomes (visiting and educational activity, services provided to the local scientific community such as on-the-field support to monitoring activity).

### 9.2.2. Expected or additional financial sources

Briefly describe any alternative sources of funding in use or planned, and the perspectives for long-term funding from national or other sources.

### 9.2.3. Basic infrastructure and equipment

Answer YES or NO to the following questions, and if YES, assess with a score of 1-2-3 (1 is low, 3 is high) the adequacy of the basic infrastructure and equipment.

	YES/NO	ADEQUACY
Office and/or laboratory in the field	YES	3
Signs on the main accesses	YES	2
Guard posts on the main accesses (replaced by webcams network, see 8.3.3)	NO	2
Visitors information centre	YES	3
Self guided trails with signs	YES	2
Terrestrial vehicles	YES	2
Marine vehicles	YES	3
Radio and communications	YES	2
Environmental awareness materials	YES	3



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Capacity to respond to emergencies	YES	2
<p>Comment on basic infrastructure and equipment</p> <ul style="list-style-type: none"> <li>– Miramare educational activities require more classrooms to face the increasing demand coming from public schools.</li> <li>– More storage room (warehouse) is needed to keep scuba and technical equipment and to store goods such as booklets edited and printed by the MPA.</li> </ul>		

### 9.3. INFORMATION AND KNOWLEDGE

By Section D3 of Annex I, the Parties agree that the planning, protection and management of a SPAMI must be based on an adequate knowledge of the elements of the natural environment and of socio-economic and cultural factors that characterize each area. In case of shortcomings in basic knowledge, an area proposed for inclusion in the SPAMI List must have a programme for the collection on the unavailable data and information.

#### 9.3.1. State of knowledge

a) Assess the general state of knowledge of the area.

0	1	2	<b>3</b>
---	---	---	----------

b) Briefly describe the extent of knowledge of the area, considering at least specific maps, main ecological processes, habitat distribution, inventories of species and socio-economic factors, such as artisan fishing.

Miramare MPA has completed the mapping and follows the data collection (updating) on:

- Quality of sediments
- Water physical-chemical parameters
- Biocenoses
- Fish communities
- Fishing grounds surrounding the MPA
- Use of land and sea in the surrounding areas
- Fishing effort, revenue of artisanal fishermen

See the following pages for some specimen of thematic maps generated by MPA's GIS



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### 9.3.2. Data collection

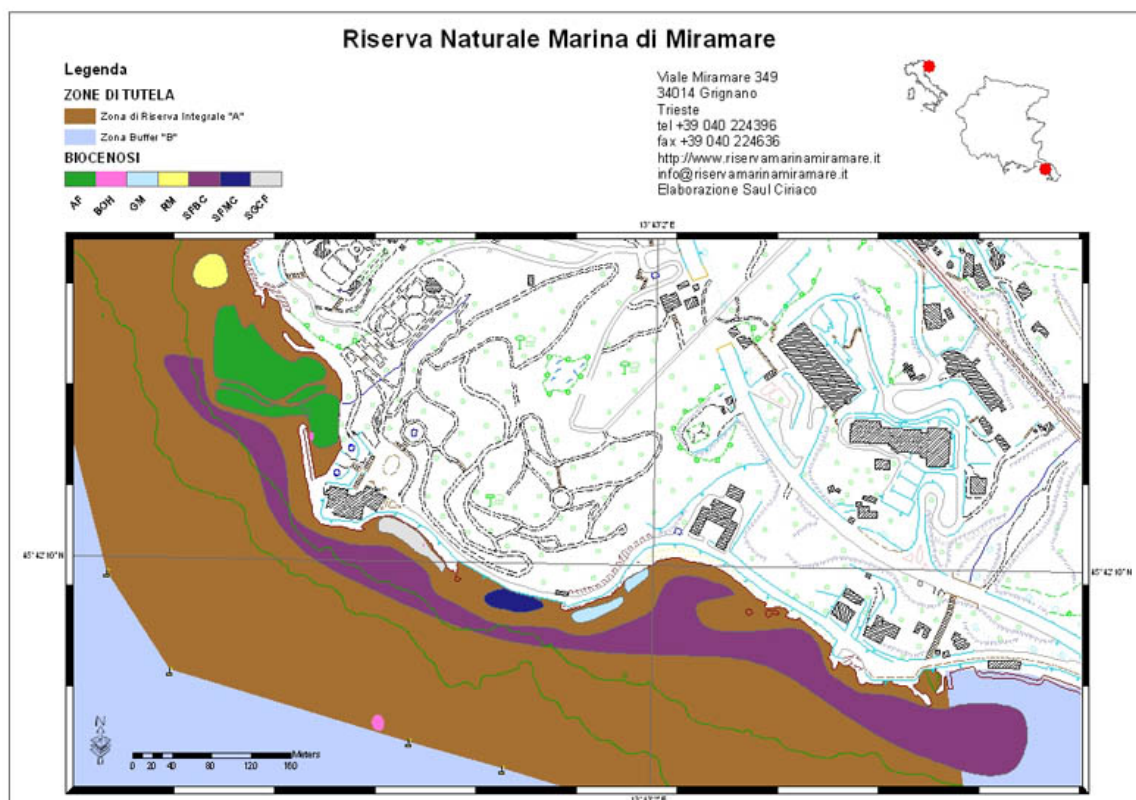
Describe and assess the adequacy of any programme and activities to collect data in the area.

Miramare MPA has been taking part and still is involved in national monitoring programs launched by the Ministry of Environment, ICRAM, Universities such as “Afrodite”.

Miramare’s EMAS certification requires a regular update of data concerning the quality of its environment and its footprint.

The Fish and Invertebrate species database is regularly updated thanks to the visual census activity (minimum of 35 observations per year on 2 sites: inside /outside the MPA).

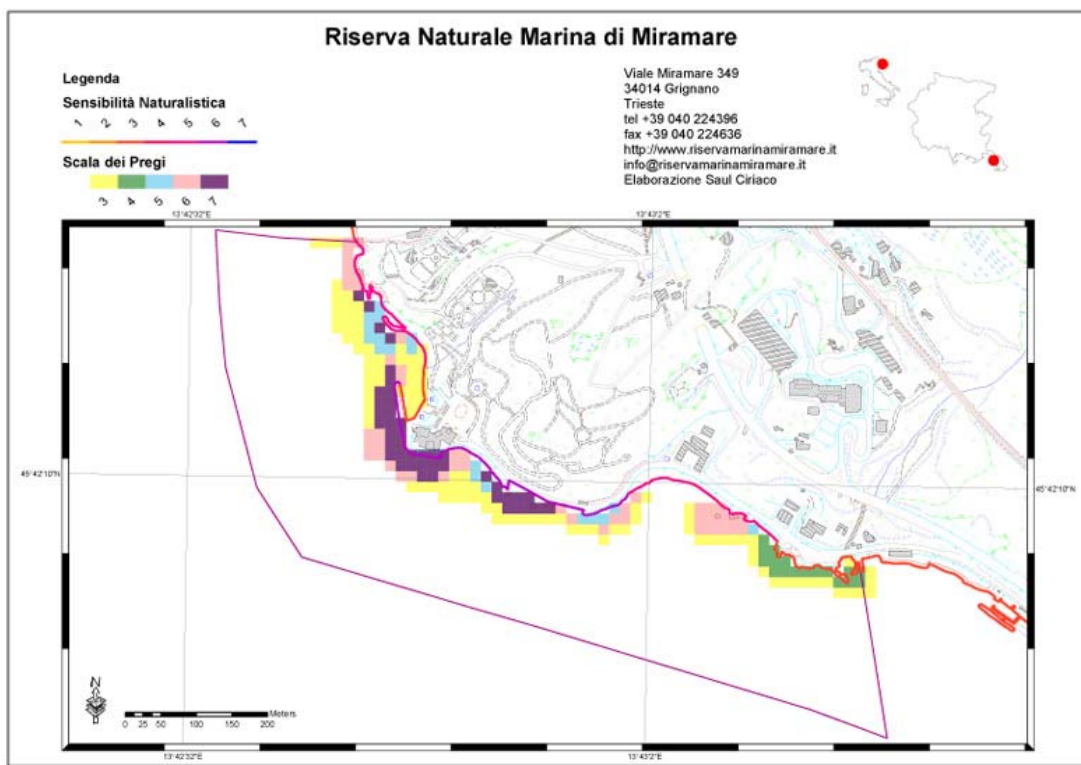
Biophysical, socio-economic and governance data are collected after the indication of IUCN-WWF guidebook “How is your MPA Doing?” in order to assess MPA’s management effectiveness.



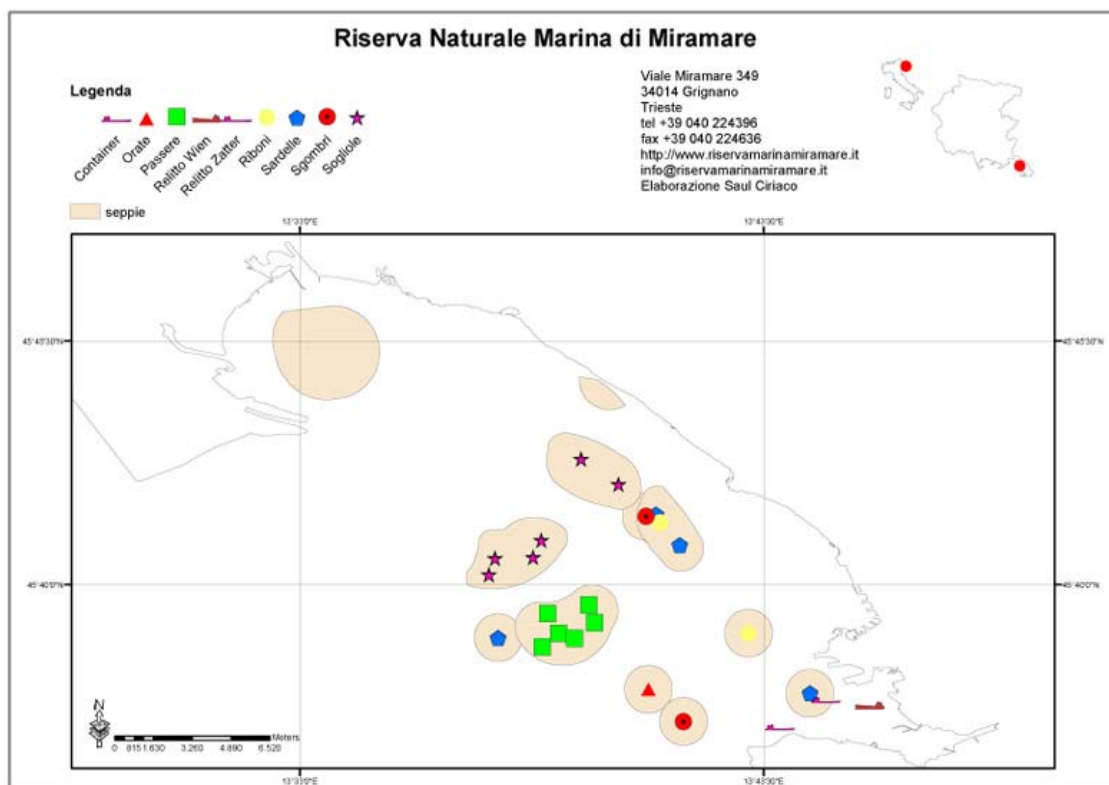
Map of Miramare biocenoses



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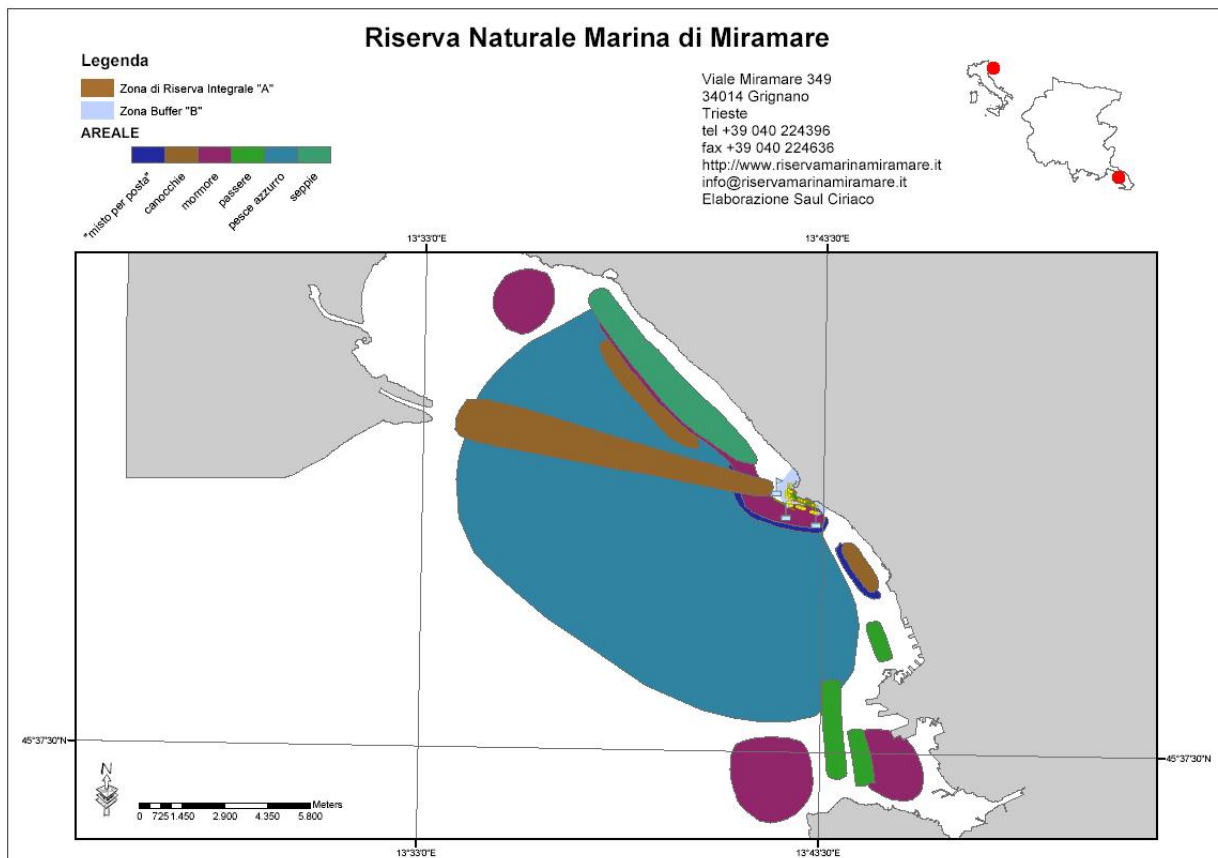
Map of Miramare naturalistic values



Maps of main Fishing Grounds in the Gulf of Trieste (both images)



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**20** RISERVA NATURALE MARINA DI MIRAMARE 1986-2006

LA RISERVA    PROGETTO MAREA    RICERCA    IL GOLFO DI TRIESTE    SUBACQUEA    DIDATTICA    EDUCATIONAL

CHIMICO - FISICO    GIS    ECO - ETOLOGIA    BOLLETTINO SCIENTIFICO    REPORT    DATABASE

Home / Ricerca / Bollettino Scientifico . Secondo trimestre 2006

## Secondo trimestre 2006

**Caratteristiche idrologiche del secondo trimestre 2006:**

### Temperatura (°C)

fig.1

Nel mese di aprile le temperature si mantengono piuttosto basse ed uniformi lungo la colonna d'acqua.  
Il valore minimo, registrato il giorno 5 in prossimità del fondale, è di 8,2°C.  
Successivamente, nella prima metà di maggio, si nota un rapido innalzamento della temperatura con successiva stratificazione della colonna, che viene meno all'inizio del mese seguente, a causa di una perturbazione atmosferica caratterizzata da precipitazioni e venti di bora che hanno raggiunto i 30 nm/s di velocità.

Nel mese di luglio, in corrispondenza di condizioni di elevata stabilità, riprende il progressivo riscaldamento del mare con ricomparsa della stratificazione (situazione tipica del periodo estivo).  
La temperatura massima di 26,5°C è stata rilevata il 27 giugno in superficie.

### Salinità

**BOLLETTINO**

- » Ultime dal Golfo
- » Eventi straordinari
- » Ricerche eco-etologiche
- » Secondo trimestre 2006
- » Primo trimestre 2006
- » Quarto trimestre 2005
- » Terzo trimestre 2005
- » Secondo trimestre 2005
- » Primo trimestre 2005
- » Quarto trimestre 2004
- » Terzo trimestre 2004
- » Secondo trimestre 2004
- » Primo trimestre 2004
- » Dati temperatura 2003
- » Dati salinità 2003
- » Dati 2002
- » Analisi storica dei dati

**ARCHIVIO**

- » Ritrovamento-tartarughe
- » "Polmone di mare"
- » Episodio di ipossia
- » Avistamento Balenottera
- » Liberazione di *C. caretta*
- » Ritrovamento di *C. caretta*
- » Avistamento pesce luna
- » Mucillagini nel Golfo
- » Marea rossa
- » Mareggiata

**UTILITIES**

- Stampa questa pagina
- Invia ad un amico
- Aggiungi ai preferiti

Water quality monitoring data, made available on internet  
([http://www.riservamarinamiramare.it/ricerca/bs/secondo\\_trimestre06.htm](http://www.riservamarinamiramare.it/ricerca/bs/secondo_trimestre06.htm))



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### 9.3.3. Monitoring programme

Section D8 in Annex I states that to be included in the SPAMI List, an area will have to be endowed with a monitoring programme having a certain number of significant parameters, in order to allow the assessment of the state and trends of the area, as well as the effectiveness and protection and management measures, so that they may be adapted if need be (indicators may, for instance, supply information about species status, condition of the ecosystem, land-use changes, extraction of natural resources -sand, water, game, fish-, visiting, adherence to the provisions of the management plan, etc.).

a) Is there a monitoring programme?

YES	<input type="checkbox"/>
-----	--------------------------

b) If NO, are there plans to start one, and when?

--

c) If YES, assess as low, medium, satisfactory, its adequacy and present level of development.

Satisfactory with a high level of development
---

d) If YES, who is/are carrying out the monitoring programme?

Miramare personnel is carrying out the monitoring programme. The results of the monitoring plan are examined yearly by the Technical-Scientific Committee and by the Reserve Commission (refer to 8.1.2)
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e) If YES, briefly describe how the monitoring programme will be used in reviewing the management plan.

In 2000 the IUCN-World Commission on Protected Areas-Marine (IUCN-WCPA-Marine) and the World Wide Fund for Nature (WWF) initiated the MPA Management Effectiveness Initiative (MEI). A major product of this initiative is the guidebook **“How is your MPA Doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness”**, edited in 2004.

During the program, eighteen pilot MPAs, with diverse management objectives and environments, were selected to field test a draft of the guidebook.

Miramare MPA participated since the beginning to the field-testing process of the Guidebook.

The management body of Miramare marine reserve has set 5 high priority objectives for the three-years period program 2005-2007:

1. Conservation of the specific diversity of the tidal zone.
2. Conservation of the naturalness of the underwater and terrestrial landscapes.
3. Conservation of the ecological integrity of the communities living in the Gulf of Trieste.
4. Part of the people attending the Reserve gets acquaintance with the marine environment and its management, in view of a participative protection of the area shared among all the economic categories which are operating hereby.
5. To help the conversion of fishing activities and pleasure boating habits which are not longer sustainable and/or to lead their adaptation to the environmental directions.

Miramare is keeping up the program: following the “Marine Effectiveness Initiative”, the following indicators have been selected to evaluate the management performance:

MPA's objective	Objective(s) & Indicator(s), as from IUCN's guidebook
1 - Conservation of the specific diversity...	Biophysical 1D ; B 1
2 - Conservation of the naturalness...	Biophysical 1D ; B 1
3 - Conservation of the ecological integrity of the communities...	Biophysical 1E; B 7 Socio-economic 5A; S 1
4 - People getting acquaintance with the marine environment and its management...	Socio-economic 3D, 3E ; S 6 Socio-economic 6A ; S 13 Governance 4C ; G 11
5 - Conversion of fishing activities and pleasure boating habits...	Governance 4A ;G 13 Governance 4E ; G 4





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## 10. Other information, if any

Since 2004, Miramare is awarded of the EMAS certification, which guarantees that its System for Environmental Management is compliant to EU regulation CE 761/2001.

Miramare visiting and educational activities are carried out following a code of conduct compliant to ISO 9001 quality insurance rules, certificated in 2003.

## 11. CONTACT ADDRESSES (name(s), position(s) and contact address(es) of the person(s) in charge with the proposal and that compiled the report)

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Fax +39 040 224636

## 12. SIGNATURE(S) ON BEHALF OF THE STATE(S) PARTY/PARTIES MAKING THE PROPOSAL

## 13. DATE