

**Template for Submission of Scientific Information  
to Describe Areas Meeting Scientific Criteria for  
Ecologically or Biologically Significant Marine Areas**

**Title/Name of the area:**

Mali Ston Bay-South Western Coastline of the Klek Peninsula in B&H

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**Abstract (in less than 150 words)**

Coastal area of Bosnia and Herzegovina has a total length of 25.6 km. This area is the only way out to the sea of Bosnia and Herzegovina. Neum-Klek Bay and Mali Ston Bay seem as a natural breeding place for certain types of fish species. Seabed of the coastal area of B&H varies, but it is dominated by small mud particles. Since part of the Mali Ston Bay in Bosnia and Herzegovina represents almost intact area, it will be wise to consider this part of the bay to be under the list as a potential protected area. Several researches were conducted regarding the register of important and sensitive habitats, presence of 176 fish species and presence of several invertebrate species. There are also some land habitats recognized as valuable to be included into the NATURA 2000 network. The site may possibly be ideal for protection because of its naturalness and the potential for life development.

**Introduction** (*To include: feature type(s) presented, geographic description, depth range, oceanography, general information data reported, availability of models*)

Coastal area of Bosnia and Herzegovina has a total length of 25.6 km. In administrative terms, this area belongs to the entity Federation of Bosnia and Herzegovina, Herzegovina-Neretva Canton, Municipality of Neum. The Neum Municipality area also covers the marine waters of the Bay of Neum-Klek and part of B&H territorial waters of the Mali Ston Bay. The depth of the Neum-Klek Bay varies, but the depth in the coast vicinity is approximately 15 meters and in the vicinity of the coast on the top of the Klek peninsula is approximately 4.5-5 meters (Lopata, Klek; Urbanistički zavod BiH, 1986). In part of B&H coast in Mali Ston bay, average depth are 23 – 28 meters, while average depth of the Neum-Klek bay is 23 – 25 meters (Urbanistički zavod BiH, 1986). In the Neum-Klek Bay and the Mali Ston Bay, there are rhythmical occurrence of the tides and the turbulent currents of the waters.

**Feature description of the proposed area** (*This should include information about the characteristics of the feature to be proposed, e.g. in terms of physical description (water column feature, benthic feature, or both), biological communities, role in ecosystem function, and then refer to the data/information that is available to support the proposal and whether models are available in the absence of data. This needs to be supported where possible with maps, models, reference to analysis, or the level of research in the area*)

Numerous freshwater springs located under sea level have an impact on the creation of special site conditions which affect the appearance of a number of young fish and other plankton species as the Bay of Neum-Klek and Mali Ston Bay seem natural breeding place for certain types of fish species (Urbanistički zavod BiH, 1986). Seabed of the coastal area of B&H varies, but it is dominated by small mud particles (**Error! Reference source not found.**; Gajić, 2012):

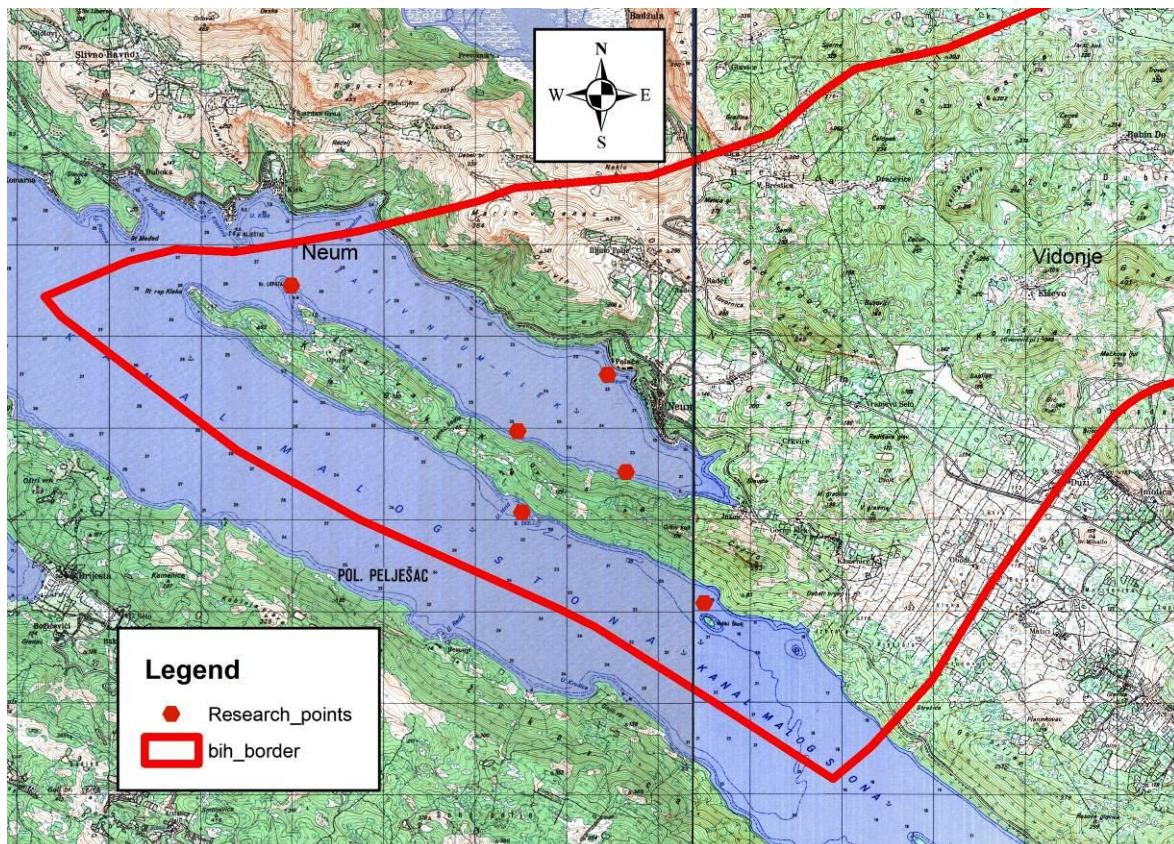
**Table 1. Wenterwoth scale of the sediment division and the average presence of sediment in the B&H sea**

Sediment type	The average presence in B&H sea	Particle size
Rock	Small distribution	< 2 mm
Sand	Partly distributed	62 µm-1 mm
Mud	Very distributed	4-31 µm

Sediment type	The average presence in B&H sea	Particle size
Clay	Partly distributed	> 1.5 µm

Since part of the Mali Ston bay in Bosnia and Herzegovina represents almost intact area, it will be wise to consider this part of the bay to be included in the list as a potential area for protection, but the lack of scientific data precludes the inclusion of the area under a certain regime of protection because it disables estimating its real potential for its protection (endangered or sensitive habitats and species). Several researches were conducted regarding the evidence of some important and sensitive habitats in Neum -Klek bay and part of the Mali Ston Bay in coastal waters of Bosnia and Herzegovina. These researches indicate the presence of *Cymodocea nodosa* (Ucria) Asch. meadows in Neum-Klek bay, *Zostera marina* L. meadows (UNEP/MAP, 2010), *Zostera noltei* Hornem meadows (UNEP/MAP, 2010) and *Cystoseira* forests (*Cystoseira barbata* (Stackhouse) C. Agardh and *C. crinita* Duby; UNEP/MAP, 2012). In addition, several algae species from genera *Fucus*, *Padina*, *Caulerpa* and *Posidonia* (Stanić, 2011) are also present in the bays. . Presence of the genus *Posidonia* may indicate the presence of *Posidonia oceanica* meadows but additional research on the abundance and disturbance of this meadow should be carried out. All of these habitats are under significant human impact regarding too intensive urbanization (directly connected to tourism expansion) and rapid development of different aquacultures (fisheries, mussels, etc.). The entire area is also under potential risk of the introduction of invasive species.

Regarding present animal species, there is a lack of data since there was no research of its coastal areas. However it is assumed that the coastal area of B&H is inhabited by 176 fish species (UNEP/MAP, 2012). Some research of the classis Chondrichtyes Huxley, 1880 has also been conducted. This research (**Error! Reference source not found.**) shows the existence of seven species of sharks and five raja species which are registered in the coastal area of B&H, while 21 species are expected or possible. (Gajić, 2011).



**Figure 1. Fauna species research (Gajić, 2012, Stanić, 2012)**

The most interesting species found is blue shark *Prionace glauca* (Linnaeus, 1758) and *Mustelus mustelus* Linnaeus, 1758

Data about invertebrate species are lacking, but also some individual research (Stanić, 2011) shows the presence of several species of Echinodermata (*Coscinasterias tenuispina* Lamarck, 1816 and *Echinus*

*acutus* Lamarck, 1816). The most abundant invertebrate species were: *Arbacia lixula* Linnaeus, 1758, *Anemonia viridis* Forskal, 1775, *Holothuria tubulosa* Gmelin, 1791, *Marthasterias glacialis* Linnaeus, 1758, *Ophioderma longicauda* Bruzelius, 1805.

**Feature condition and future outlook of the proposed area** (*Description of the current condition of the area – is this static, declining, improving, what are the particular vulnerabilities? Any planned research/programmes/investigations?*)

Current condition of the area is unknown. The area does not have permanent settlements, but only one facility for sailing and fishing boats. Land vegetation mainly consists of several important habitats (Drešković, 2011) such as: Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium* sp. and Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*. There are also some remains of the *Quercus ilex* and *Quercus rotundifolia* forests. All of these terrestrial sites are recognized as valuable and in the EU countries included in Natura 2000 network.

Sea communities are mostly unknown and biological research is necessary to establish adequate criteria for site. Major vulnerabilities include the spreading of tourist facilities such as motels, hotels and residential apartment areas, and rapid development of marine aquaculture (fish or mussel). Moreover, additional threat to the marine ecosystems includes still legal collection of *Lithophaga lithophaga* (Linnaeus, 1758) species. This is the big threat because of permanent destruction of underwater rocks and reefs in searching for this species. B&H does not have any plans regarding research or investigation programmes. This is mostly due to the lack of funding necessary for this type of research. Big problem is also the lack of adequate equipment and marine biology experts for different fields of research (benthic fauna, marine ichtiology etc.). Bosnia and Herzegovina still has to improve its capacity in expertise needed for investigation/research of marine ecosystems and it may be necessary to coordinate research with the marine institutes from the Republic of Croatia or/and the Republic of Montenegro.

**Assessment of the area against CBD EBSA Criteria** (*Discuss the area in relation to each of the CBD criteria and relate the best available science. Note that a proposed area for EBSA description may qualify on the basis of one or more of the criteria, and that the polygons of the EBSA need not be defined with exact precision. And modelling may be used to estimate the presence of EBSA attributes. Please note where there are significant information gaps)*

CBD EBSA Criteria (Annex I to decision IX/20)	Description (Annex I to decision IX/20)	Ranking of criterion relevance (please mark one column with an X)			
		No information	Low	Medium	High
<b>Uniqueness or rarity</b>	Area contains either (i) unique (“the only one of its kind”), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.	X			
<i>Explanation for ranking</i>					
	There is no scientific data about the presence of unique, rare or endemic species, population or communities in coastline of B&H or proposed area. It can be possible that there are meadows of <i>Posidonia oceanica</i> , <i>Cymodocea nodosa</i> (Ucria) Asch. meadows, <i>Zostera marina</i> L. meadows and <i>Zostera noltei</i> Hornem meadows. <i>Posidonia oceanica</i> meadows are not officially registered so far, while other meadows types are registered in the Neum-Klek bay.				
<b>Special importance for life-history stages of species</b>	Areas that is required for a population to survive and thrive.	X			
<i>Explanation for ranking</i>					
	The proposed site can be potentially natural breeding place of certain types of fish due to the presence of less saline water under the influence of freshwater springs under the sea. The site can also be potentially good place for the development of plankton communities and marine invertebrate species. Furthermore, the site can be				

inhabited by several invertebrate species like mussels ( <i>Litophaga litophaga</i> (Linnaeus, 1758)) which must be protected from human exploitation since it destroys large areas of underwater habitats.					
<b>Importance for threatened, endangered or declining species and/or habitats</b>	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.	X			
<i>Explanation for ranking</i> As the site is a potential place of higher plankton community abundance, it can be important for the survival and recovery of some species of invertebrate or fish, but due to the lack of scientific data on the presence of endangered, threatened or declining species, it cannot be told much about the influence of proposed site for the survival of threatened, endangered or declining species.					
<b>Vulnerability, fragility, sensitivity, or slow recovery</b>	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.	X			
<i>Explanation for ranking</i> Lack of research does not allow talking much about vulnerability, fragility, sensitivity, or slow recovery of the site. Possibility of occurrence of <i>Posidonia oceanica</i> , <i>Cymodocea nodosa</i> (Ucria) Asch. meadows, <i>Zostera marina</i> L. meadows and <i>Zostera noltei</i> Hornem meadows gives this site its vulnerability, fragility and sensitivity to higher level. Existence of <i>Litophaga litophaga</i> (Linnaeus, 1758) gives this site a reason for successful survival of the species and survival of the habitat since this species is under the threat of overfishing which threatens not only the species, but the whole marine ecosystem survival in the area.					
<b>Biological productivity</b>	Area containing species, populations or communities with comparatively higher natural biological productivity.	X			
<i>Explanation for ranking</i> The Site is potential natural breeding place for certain types of fish and a good place for the development of plankton communities and marine invertebrate species developing due to the less water salinity. The site can contain species, populations or communities with comparatively higher natural biological productivity. For the relevant data, adequate research of fish and plankton communities should be conducted. .					
<b>Biological diversity</b>	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.	X			
<i>Explanation for ranking</i> Since the site is potential natural breeding place for certain types of fish species and a good place for the development of plankton communities and marine invertebrate species, it can be assumed that to contain higher diversity of marine flora and fauna species and to have higher genetic diversity. Due to the lack of scientific biological data, it cannot be told much about the site or genetic diversity. But due to the naturalness of habitat it can be assumed that the site is natural reservoir of different habitats, biodiversity and genetic diversity.					
<b>Naturalness</b>	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.		X		
<i>Explanation for ranking</i> The proposed site does not suffer from any greater influence (historically or present) of human activities, so its naturalness is not questionable. Any kind of degradation is absent and biologically this area is ideal for preserving. Since there is no actual scientific data about this area, it cannot be told more about its biodiversity but terrestrial habitats consist mostly of Vegetated sea cliffs of the Mediterranean coasts with endemic <i>Limonium</i> sp. and Pseudo-steppe with grasses and annuals of the <i>Thero-Brachypodietea</i> and remains the <i>Quercus ilex</i> and <i>Quercus rotundifolia</i> forests, all three valuable for NATURA 2000 network of the EU habitats. The site can also consist of <i>Posedonia</i> meadows communities as well as <i>Cymodocea nodosa</i> (Ucria) Asch. meadows, <i>Zostera marina</i> L. meadows, <i>Zostera noltei</i> Hornem meadows and Cistoseira forests ( <i>Cystoseira barbata</i> (Stackhouse) C. Agardh and <i>C. crinita</i> Duby). The site can be inhabited by several invertebrate species like mussels ( <i>Litophaga litophaga</i> (Linnaeus, 1758)) which must be protected from human exploitation since it destroys large areas of underwater habitats.					

## Sharing experiences and information applying other criteria (Optional)

Other Criteria	Description	Ranking of criterion relevance (please mark one column with an X)			
		Don't Know	Low	Medium	High
Add relevant criteria					
<i>Explanation for ranking</i>					

**References** (e.g. relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

- Drešković, N., et all. 2011. NATURA 2000 in Bosnia and Herzegovina. Centre for Environmentally Sustainable Development. Sarajevo.
- Gajić, A., 2012. Aquatorium of Bosnia and Herzegovina as an adaptive zone of classis Chondrichthyes Huxley, 1880. Third Congress of Geographers of Bosnia and Herzegovina. Tuzla.
- Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols Paris (France), 8-10 February 2012.
- Stanić, M. et all. 2012. The evaluation of scientific research project "Neum 2011," Research of the Marine parts of Bosnia and Herzegovina. Symposium of young scientist's ideas. SPUS. Sarajevo.
- UNEP/MAP, 2010. The Mediterranean Sea biodiversity: State of the ecosystems, pressures, impact and future priorities
- UNEP/MAP, 2012. Initial assessment of the Mediterranean sea: Fulfilling step 3 of the ecosystem approach process. 17th Ordinary Meeting of the Contracting Parties to the Convention for the Urbanistički zavod BiH, 1986. Spatial plan of Neum municipality. Analytical-documentation basis. The synthetic material. Sarajevo
- Vučijak B., 2010. Bosnia and Herzegovina national document aiming at the identification of important ecosystem properties and assessment of ecological status and pressures to Mediterranean marine and coastal biodiversity.

## Maps and Figures

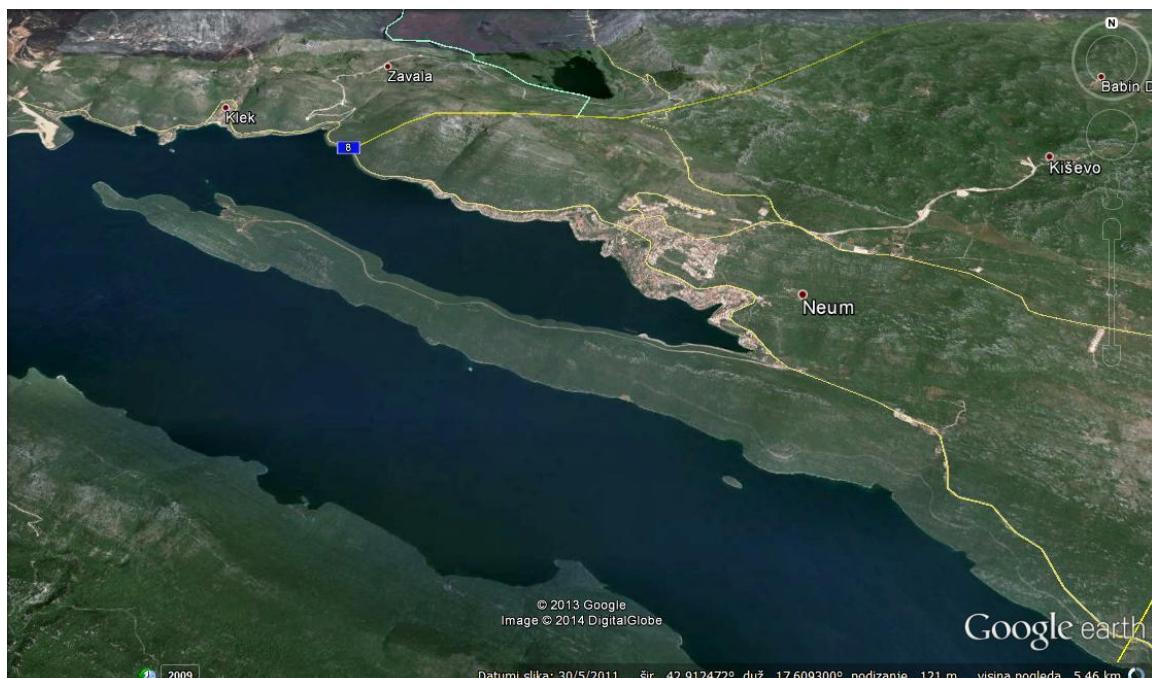


Figure 2. Satellite view over B&H coastline (Google earth, 2009).

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