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

Title/Name of the area: Malan-Gwader Complex, Islamic republic of Pakistan

Presented by (Muhammad Moazzam Khan, Ex-Director General, Marine Fisheries Department, Government of Pakistan, Karachi, Pakistan, *Phone, +92-21-34544791, Email: mmoazzamkhan@gamil.com*)

Abstract (*in less than 150 words)*

Malan-Gwader Complex located along the Balochistan coast is significantly important as it cover two Ramsar sites i.e. Ormara Turtle Beaches and Astola (Haft Talar) Island. A large lagoon is also a part of the Complex. The area is known for rocky headland located at Malan, Ormara, Pasni and Gwader whereas largest island of Pakistan is also located within the Complex. Because of uniformity of the diversity of the area this complex stretching over an area of about 8,750 sq. km is constituted. This complex is specifically known for presence of population of a number of cetaceans species including dolphins and whales. Arabian humpback whale (*Megaptera novaeangliae indica*), blue whales (*Balaenoptera musculus*) and Bryde's whale (*Balaenoptera brydei*) are regularly recorded from the Complex. Although the importance of the area has two important Ramsar sites but it international recognition as an EBSA will ensure conservation of the biodiversity of the Malan-Gwader Complex.

Introduction

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

Malan-Gwader Complex located District Gwader along the Balochistan coast. It lies along drylands of coast which is known for its headlands and bays. Main rocky headland of the area are Malan, Ormara, Pasni and Gwader. Gwader and Ormara have prominent tombolos having bays on both sides. The other important bays in the area is Pasni Bay and Sur. Largest island of Pakistan i.e. Astola is also located in the Malan Gwader Complex (Fig.2). A large lagoon known as Kalmat Khor is one of the prominent feature of the area. This Complex is significantly important as it has two Ramsar sites i.e. Ormara Turtle Beaches and Astola (Haft Talar) Island. The complex is stretched to a length of 350 km and breadth of 25 km making over an area of about 8,750 sq. km is constituted.

The area harbors a variety of habitat making is rich in biological diversity. It has sandy, rocky and muddy habitat along its shore whereas the subtidal habitat are also very rich because of presence of coral assemblages especially around Astola Island. The area is known to rich is fisheries resources. Bays and sandy cum muddy fishing grounds along entire stretch of this complex are home of large number of commercially important fish and shellfish species which is harvested by fishing boats based within the Complex but from other areas of Pakistan. The most significant feature of the complex is the presence of highly diversified cetacean fauna. Large school of dolphins can be frequently located in the area whereas individuals or small groups of Indo-Pacific humpback dolphin (*Sousa chinensis*) and finless porpoise (*Neophocaena phocaenoides*) are also quite common in the area. This complex is specifically known for presence of population of large whales including Arabian humpback whale (*Megaptera novaeangliae indica*), blue whales (*Balaenoptera musculus*) and Bryde's whale (*Balaenoptera brydei*).

Considering the diversified ecological habitats and high marine biodiversity especially being a hotspot for large whales, the Malan-Gwader Complex deserves international recognition. It is located in Gwader District, Balochistan.

Location

(Indicate the geographic location of the area/feature. This should include a location map. It should state if the area is within or outside national jurisdiction, or straddling both.)

Malan-Gwader Complex is located entirely within the jurisdiction of Islamic Republic of Pakistan.

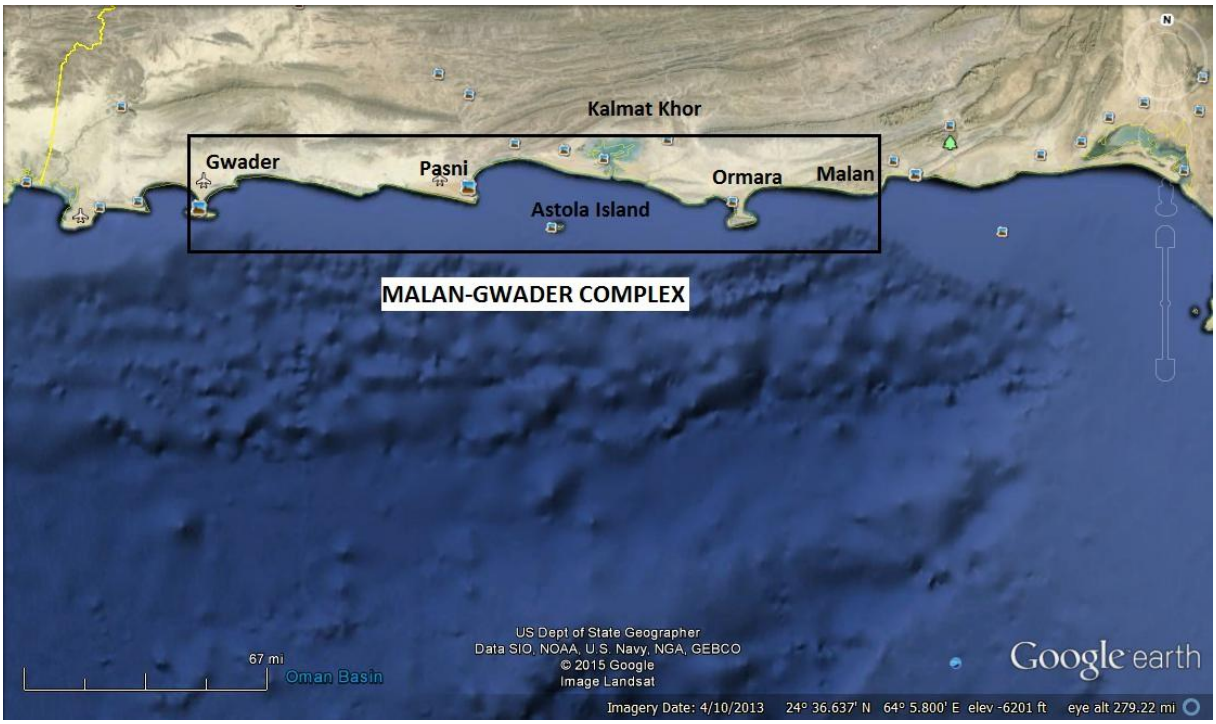

Fig. 1. Malan-Gwader Complex Islamic Republic of Pakistan.

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)

Malan-Gwader Complex is known to rich in biological diversity which is mainly because of the prevailing oceanographic and physiographic features of the area. The continental shelf is very narrow in the complex. At Gwader the continental shelf is about 6 km wide whereas at Malan it is about 13 km. The widest continental shelf is about 25 km at Pasni-Astola Island. The area is influenced by the repeated reversal of monsoon which causes deep convective mixing especially during the north-east monsoon bringing nutrient rich water to the surface supporting high productivity in the Arabian Sea (Mara and Barber, 2005; Wiggert *et al.*, 2000).The wave action, for most part of year in intense especially during southwest monsoon (mid May to mid September), however, during rest of the period the sea conditions remain calm or with moderate wave action. During November and February the current in the area flows in anticlockwise direction whereas during remaining part of the year it is clockwise. There is no major river in the area, however, a number of ephemeral streams including Balara, Basul, Rumbra, Shadi Khor, Raini, Karwat, Sur and Akara stream discharge in the area.

There are three main towns located in the area of which Gwader is the largest followed by Pasni and Ormara. In addition to these there are many small fishermen settlements which includes, Malan, Had, taq, Sakoni, Karwat, Bidok, Chur, Karwat, Sur and Dor. Major population of Malan-Gwader Complex is primarily engaged in fishing and related business. Khor Kalmat is an important feature of the area. It is a lagoon located in the north of Malan-Gwader Complex. Kalmat Khor resembles the shape of a tree with its trunk representing the entrance which is about 2 km wide. It widens 19 km long and 27 km wide lagoon. There are large mudflats and a small part is covered with one species of mangrove i.e. *Avicennia marina* (Saifullah and Rasool, 1996). No major river or ephemeral stream discharge in the area. It lies about 350 km west of Karachi. There are many permanent settlements in the area viz. Kalmat, Chundi, Gursant, Sirki, Kiwari and Makola. It is also known for shrimp fisheries which is major source of income for population residing in the area.

Malan-Gwader Complex is rich in fisheries resources making it attractive for various categories of fishing boats to exploit demersal and pelagic resources. Because of narrow continental shelf, large pelagic resources (tuna, billfishes and pelagic sharks) are also big enough to support a large fisheries. There are a number of studies on the stock assessment of the area including Fanning *et al.* (2011), Abildgaard, *et al.* (1986) and Ahmad *et al.* (1988). All these studies have covered the area under Malan-Gwader Complex and a number of species of fish and shellfish were found to be in abundance. Fish fauna of Astola Island has been listed by Anonymous (2011) and reported 75 fin fish species belonging to 36 families. Similarly the fish resources alongwith seasonal landings were reported by Burney et al., (1986).

Astola Island which is 4 km long, 0.6 km wide is a unique feature of the area The island has were calcareous plain on the top of the island and noticeable slopes and wide shoreline. It has dense patches of vegetation in depressed areas. Common species in the area are *Convolvulus glomeratus, Convolvulus prostratus, Launaea procumbens, Maerua arenaria, Cadaba heterophylla, Haloxylon stocksii, Cenchrus penesitiformis, Commicarpus boiserii, Abutilon fruticosum, Pentatropis* sp., *Medicago lupalinea* and *Sonchus asper*, In addition, *Maerua arenaria, Sporobolus kentrophyllus, Atriplex stocksii* and *Inual grantioides*, are sparsly found in the area. On the shoreline *Suaeda fruticosa, Cistanche tubulosa, Haloxylon stocksii, Zaelya pentandra, Azoon canarensis, Heliotropium crispum, Lotus sp, Zygophyllum propenquum,* and *Prosopis juliflora*.

More than 20 species of birds are in record from various studies at this particular area (Hussain, 2013). The summer/winter migratory birds create a striking setting to view the marvellous diversity. Some of the abundant species are great egret, grey heron, osprey, common kestrel, lesser crested tern, sooty gull, yellow-legged gull, crested lark, Spanish sparrow, desert wheatear and black redstart of which great egret, grey heron, common kestrel and crested larks are resident, osprey, yellow-legged gull, Spanish sparrow, black redstart and desert wheatears are winter visitor, sooty gulls are summer visitors and lesser crested tern are passage migrant and irregular year round visitor in the area. Birds found in offshore waters of the area are covered by Moazzam and Ziaullah (2001).

Two species of small mammal are reported from Astola Island i.e. house mouse (*Mus musculus*) and house rat (Rattus rattus). Astola Island sustains eight species of herpetic fauna including green turtle (*Chelonia mydas*) and Olive Ridley turtle (*Lepidochelys olivacea*), In addition fours species of lizards and two species of snakes are found on the island (Hussain, 2013). A subspecies of saw scale viper (*Echis carinatus astolae*) is an endemic species found on Astola Island. Banded small-head sea snake (Microcephalophis gracilis) and spotted small-head sea snake (*Coluber lacteus*) are also reported from the area. Ormara Turtle Beaches is a stretch of 10 km of sandy beach is declared as Ramsar Site on 10 May 2001 because of abundance of green turtle (*Chelonia mydas*) and Olive Ridley turtle

(*Lepidochelys olivacea*). Nesting of turtles is also reported from many other beaches of the Complex. However, no nesting of Olive Ridley turtle has been reported from the area in last ten year. Recently leatherback (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*) have also been reported from Gwader and Malan respectively.

The area is rich is coral resources (Ali et al., 2013 and Khan and Hasan, 2012). Corals have been reported from Ormara (Roadrigues Shoals) and at Astola. There are report of occurrence of coral patches at Gwdaer and Jiwani areas as well. At Roadrigues Shoals, Ormara the bottom has gently undulating rock with sandy pockets, occasional fissures and small gullies. Hard coral (cover 5%) has patchy distribution and *Favites complanata* dominates the site. Soft corals consisting of four species i.e. cover approximately 10%. Other areas in this area may less coverage of hard and soft corals. Among hard corals *Goniopora albiconus, Goniopora cf. savignyi, Coscinaraea monile,, Dendrophyllia robusta, Acanthastrea hillae* and *Antipathes sp.* are found in the area whereas among soft corals *Echinogorgia sp., Echinogorgia sp. ? Bebryce sp., Menella sp Paraplexaura sp.* and *Annella sp*. are reported from the area (Ali *et al.*, 2013)

At sheltered side of Astola Island the bottom is rocky with no soft corals but hard coral were common. Northern sheltered sides had extensive mounds of *Porites nodifera* and extensive cover of *Pocillopora damicornis* growing on coral rocks and forming proto-reefs. On the Triple Fin Rocks area of Astola Island the bottom is rocky with boulders overgrown with thick algal turf. Scattered small colonies of *Favites sp.* and *Porites sp.* and three species of soft corals were observed. Among hard corals *Goniopora djiboutiensis, Goniopora cf. savignyi , Goniopora somaliensis, Porites harrisoni, Porites lutea/lobta, Porites monticulosa., Porites nodifera, Porites solida, Alveopora sp.,Favites complanata, Favites pentagona, Favites spinosa, Leptastrea pruinosa, Plesiastrea versipora, Coscinaraea monile, Coscinaraea sp., Psammocora obtusangulata, Turbinaria sp., Acanthastrea hillae, Acanthastrea maxima, Pocillopora damicornis* and *Montipora molli* are reported from the Astola Island whereas among soft corals *Echinogorgia sp., Bebryce sp., Paraplexaura sp.* and *Clathraria sp.* are also reported. Coral in the Malan-Gwader Complex is threatened by extensive gillnetting and small scale coral mining.

Most significant feature of the Malan-Gwader Complex is high biodiversity of the cetacean Large schools of spinner dolphin (*Stenella longirostris*), common bottlenose dolphin (*Tursiops truncatus*), Indo-Pacific bottlenose dolphin (*T. aduncus*) and striped (*Stenella coeruleoalba*) and Pantropical spotted dolphin (*Stenella attenuata*) can be frequently seen in the area. This complex is specifically known for presence of population of large whales including Arabian humpback whale (*Megaptera novaeangliae indica*), blue whales (*Balaenoptera musculus*) and Bryde's whale (*Balaenoptera brydei*).

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?)

Marine biodiversity of the Malan-Gwader Complex is generally protected, however, because of uncontrolled fishing operations, some fisheries resources have shown sign of decline (Fanning *et al.*, 2011). Although a number of fishing gears including, gillnets, longlines and traps were used but presently fishermen of Balochistan are only using gillnets. Fishing for Indian mackerel using monofilament net is the main fishing activity of the area. Need not to mention that monofilament is known to be prone for getting dislodged and turning into derelict fishing (ghost fishing). Fishing boats based in Karachi excessively poach in the area resulting in not only depletion of the fish stocks but the habitat is also serious affected. Bottom trawling for fish and shellfish by these boats has seriously

damaged the bottom of the fishing grounds in Malan, around Astola, Shumal Bundar and Gwader area. Additionally use of seine net of fishermen from Sindh (a few based in Damb) has also depleted stocks of small pelagic in the area.

Since population along the Malan-Gwader Complex is sparse and the communities are conservative, therefore, they do not allow excessive fishing in areas around their villages. There are no major source of pollution except solid waste from major population centres finds its way in the ocean. As compared to other areas of the coast of Pakistan, marine biodiversity of Malan-Gwader Complex is comparatively is least affected by anthropogenic factors. It may, however, be added that no comprehensive study on the marine biodiversity of the area is available except some reports that cover either animal and plants of a certain area or deal with specific group of plant or animals. The need for a detailed assessment of marine biodiversity, ecological phenomena and production mechanisms cannot be over-emphasized. Saw scale viper (*Echis carinatus astolae*) is an endemic subspecies having restricted distribution. There is need to study the population of this snake and other biological features which may be used for development of a management plan for its protection and survival.

There is also a need to develop a conservation plan for the protection of important species, reduction in disposal of solid waste and debris in sea and management of fisheries and control on other human activities has to be developed and implemented. Constant monitoring of the area is necessary to ensure protection of threatened and vulnerable species especially coral, turtles, marine birds and cetaceans in the Malan-Gwader Complex which have to be based on sound ecological principles.

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 modeling may be used to estimate the presence of EBSA attributes. Please note where there are significant information gaps)

<table>
<tr><td rowspan="2">CBD EBSA Criteria
(Annex I to decision IX/20)</td><td rowspan="2">Description
(Annex I to decision IX/20)</td><td colspan="4">Ranking of criterion relevance
(please mark one column with an X)</td></tr>
<tr><td>No information</td><td>Low</td><td>Medium</td><td>High</td></tr>
<tr><td>Uniqueness or rarity</td><td>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.</td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="6">Explanation for ranking
Presence of coral habitat and abundance of cetaceans are two unique feature of the Malan-Gwader Complex. Uninhabited Astola Island, tombolos of Gwader and Ormara and parched Kalmat Khor need special attention because of their unique geomorphological and ecological characteristics. Saw scale viper (Echis carinatus astolae) is an endemic subspecies that is known from Astola Island and needs especial attention.</td></tr>
<tr><td>Special importance for life-history stages of species</td><td>Areas that are required for a population to survive and thrive.</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="6">Explanation for ranking
Kalamt Khor is an important breeding and feeding area of a number of species of fish and shellfish which needs to be protected. Similarly, there are many beaches on which marine turtle lay their eggs.</td></tr>
</table>

Protection of these beaches is warranted to ensure that endangered population of turtle is not affected. There are evidences that many species of cetaceans breed in the Malan-Gwader Complex which is evident from presence of calf in many cases.					
Importance for threatened, endangered or declining species and/or habitats	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.				X
Explanation for ranking Malan-Gwader Complex is important feeding and breeding area for cetaceans especially baleen whales are regularly seen assembled in the area for feeding and possibly for breeding. A large number of seabirds were reported to be nesting on mass scale on Astola Island but now no such nesting activity is notices. There is a need to determine the cause of the decline and for making the habitat suitable for nesting of these species of bird.					
Vulnerability, fragility, sensitivity, or slow recovery	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
Explanation for ranking The population of most cetaceans is highly limited and as such Malan-Gwader Complex is very important for protection of these endangered animals. The population of Arabian humpback whale is considered to be critically endangered because of their small size (about 60 to 80) in northern Arabian Sea. Additionally coral species and saw scale viper (*Echis carinatus astolae*) has restricted distribution on Astola Island which is highly fragile because of its small size. A management plan for protection of this Island is immediately required.					
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.		X		
Explanation for ranking No doubt the Malan-Gwader Complex is highly productive especially in terms diversity of marine fishes and birds. Assessment of fisheries resources reveals that the area is rich is productivity of many species of fish and shellfish.					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.		X		
Explanation for ranking There is no doubt that the area has many diverse habitats including sandy, muddy and rocky shore, productive subtidal environment, rich coral assemblages, mangrove habitat as well as rich and highly productive oceanic environment which support diverse marine life.					
Naturalness	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	
Explanation for ranking Since there are only a few settlements therefore, most part of the Malan-Gwader Complex is its natural form and major part of this complex does not have any human-induced disturbance. There are only a few habitats such as trawlable ground which have be degraded else almost entire Malan-Gwader Complex has serene and undisturbed environment.					

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					
Explanation for ranking					

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.)

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Maps and Figures

Fig. 1.Map of Malan-Gwader Complex .

Fig. 2. Map of Astola Island

Fig. 2 map of Astola Island

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