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

Title/Name of the area: Churna-Kaio Islands Complex, Balochistan Coast, 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)*

Churna –Kaio Islands Complex which is located west of Karachi has an area of about 400 sq. km. It consists of a Churna island which is a medium sized island facing the Hub River Delta whereas a small islet Kaio Island located near town of Gaddani. The area is known for high biodiversity because of a variety of habitats. It has diversified coral assemblage around Churna and Kaio Islands whereas at the mouth of the River hub there are rich mudflats and oyster reefs. Churna–Kaio Islands Complex is known to be important basking and feeding area for marine megafauna including baleen whales, whale shark, mobulids and sunfishes. Because of power plants and a substantially large ship breaking industry, the ecology of the area is seriously being affected. Considering high biodiversity and the threats it is facing the area requires international recognition as an EBSA.

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

Churna –Kaio Islands Complex is located west of Karachi has an area of about 400 sq. km. The major important features of the area are two islands (Churna Island and Kaio Island), delta of the River Hub, sandy shores stretching between Khalifa Point and Gaddani and rocky stretches south of Hub River mouth and intermittent rocky outcrops. Since major part of the area is located in the territorial waters, therefore, it is under the jurisdiction of provincial government. Small area in the south of the River Hub is under the jurisdiction of the Sindh Government whereas remaining area comes under the control of Government of Balochistan.

Churna Island which is located in the southern part of the complex is a small uninhabited island. The area around this island has rocky cum sandy bottom which is ideal for the growth of coral and coral assemblages. Kaio Island is located near the town of Gaddani is very small rocky island surrounded by sandy bottom. A few coral patches are found around this island. Churna–Kaio Islands Complex has an area of about 400 sq. km. It has marine waters with a maximum depth of 30 m whereas major part of the bottom is predominantly sandy in nature. There are coral assemblages around the islands and subtidal rocky patches. The coast 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 are three settlement in the area including Gaddani, Bundewari and Manjhar. Manjhar is located on the Sindh, side at the extreme southern part of the Churna-Kaio Complex and consists of about 100 households. It is fishermen village and about entire work force is engaged primarily in gillnet fishing in the area. Bundewari located on the Balochistan side consists of about 300 households is also a fishing settlement. A few people of the village is engaged in rain-fed agriculture whereas most of the workforce is engaged in fishing in coastal waters, mainly using gillnets. Gaddani is comparatively a large village having a population of 8,000. Majority of the workforce is engaged in fishing operations. There is a refinery in the southern part of the area in the lower reaches of the River Hub. Next to this located one of the largest private sector power plant called HUBCO whose intake is located on the open side of the coastline and discharge the effluents include thermal discharge near the mouth of the River Hub. There are plans to establish power plants along the Gaddani coastline which will have severe bearing in the ecology of the area because of thermal and other effluents. Construction of fuel reception facilities (single mooring or jetties) will also have impact on the marine biodiversity of the area. The major industrial activity in the area is ship breaking industry. The ship recycling area at Gadani is a stretch of about 10 km in length. It presently consists of about 130 operating yards with each yard having a uniform water front of 70 m. Gadani currently has an annual capacity of breaking up to 125 ships of all sizes, including supertankers, with a combined LDT of 1,000,000 tons. Gadani ranks as the world's third largest ship breaking yard. The pollutants mainly in form of solid wastes find its way in the marine environment.

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.)

Churna –Kaio Islands Complex is located entirely within the jurisdiction of Pakistan.

Fig. 1.Churna-Kaio Island Complex, Balochistan coast, 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)

Intertidal flats, sandy and rocky beaches, headlands and delta are the main features of the Churna–Kaio Islands Complex. These habitats support considerable biodiversity in intertidal areas and offshore waters. River Hub which is ephemeral river used to discharge large quantities of freshwater in the area, however, because of construction of a dam on this river, the flow is restricted to period of heavy rains only. There is a small delta at the mouth of the river which is specifically known for oyster beds (Asif, 1975; Siddiqui and Ahmed, 2002). *Crassostrea grayphoides* and *C. madrasensis* are two main species of oyster occurring in the area (Siddiqui and Ahmed, 2002), however, the beds are disappearing in the area because of reduction i the flow of freshwater from the River Hub and also because of discharge of effluents from power plant and oil refinery in the area.

Churna Island had fairly abundant coral diversity (Ali *et al*., 2013). North side of the Churna Island has rocky bottom constituted of uplifted rocks. Hard corals assemblages, growing on coral rock mounds and ridges. Dominant species found on the northern side of Churna Island includes *Goniopora albiconus, Alveopora sp., Favites pentagona, Leptastrea cf. bottae, Coscinaraea monile, Psammocora superficialis, Psammocora sp*. And *Dendrophyllia robusta.* On the north western side only two species were found i.e. *Goniopora columna* and *Alveopora sp.* No species of soft coral was reported by Ali et al. (2013), however, recently a number of soft corals and antipatharians (black corals) are observed in the area. The information about corals found around Kaio Island is limited, however, *Porites harrisoni* and *Goniopora albiconus* have recently been reported.

Churna–Kaio Islands Complex is known to be important basking and feeding area for megafauna including whale shark (*Rhincodon typus*), mobulids (*Manta sp. and Mobula spp.*), sunfish (*Mola mola* and *Mola ramsayi*) and baleen whales (blue, Bryde's and Arabian humpback whales). There used to a aimed sport fisheries for whale shark and manta in the area (Heisch, 1938; Tombazi, 1934). However, there is no aimed sport or commercial fisheries targeting these megafauna. A diversified cetacean fauna is reported from the area. There was only one authentic record of sperm whale (*Physeter macrocephalus*) stranding in Pakistan which was reported from Sonara Beach at the mouth of Hub River. Churna–Kaio Islands Complex is known to be rich in population of dolphins as their school are frequented in the area.

Fishery is most important economic activities for the population residing in the area. Major fishing activity include gillnetting for Indian mackerel using monofilament net. In addition, gillnetting for demersal fishes is also being carried out by fishermen of the adjacent areas and Karachi. Churna–Kaio Islands Complex is an important area for seine fisheries aiming small pelagic. Line gears are employed around Churna Island for catching bottom dwelling and reef fishes. There is an organized sport fishing activities around Churna Island starting from September and closing in May. Amateur diving, snorkelling and jet skiing is getting popular in the area. Some of the beaches including Gaddani and Sonara (at the mouth of Hub River) are throng by picnickers especially on weekends.

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?)

Although the area is ecologically significant because of unique habitat, there is no management plan in place. There are no planned studies that have been carried out in the area, except in case of some Environmental Impact Assessment surveys carried out for major developmental products. However, the information contained in these reports is not readily available. A number of thermal power plants are being planned to be established in the Churna–Kaio Islands Complex area which may pose serious

threats to the ecology and marine biodiversity of the area because of discharge of thermal and other effluents. Additionally fuel reception facilities are planned to be constructed in the area which may further affect the habitat and ecology of the area. Construction of other infrastructure such as landing facilities at Bundewari and extension of Gaddani Harbour may also bearing on the ecology and biodiversity of the area. For the protection of the vulnerable ecosystem in the Churna–Kaio Islands Complex there is a need to undertake planned studies including long-term study on the assessment of biodiversity of various habitats in the area. It requires a integrated management plan involving all major stakeholders to reduce impact of pollution and habitat alternation on the biodiversity of the area. There is a need to control human activities (especially uncontrolled jet skiing, diving and snorkeling) , and monitor and study the population of vulnerable species such as whale sharks and cetaceans in the area.

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)

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**
Uniqueness or rarity	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
Explanation for ranking (unique, rare, endemic, populations or communities). Churna–Kaio Islands Complex is unique because of having coral assemblages and being important basking and feeding ground for megafauna (cetaceans, whale shark, mobulids and sunfishes). There are only one or two more places which have isolated coral population along Pakistan coast, therefore, declaring Churna–Kaio Islands Complex as ecologically and biologically significant area.					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.			X	
Explanation for ranking Population of vulnerable and threatened species inhabiting Churna–Kaio Islands Complex such as cetaceans and whale shark needs to be protected because their population is dwindling in the area. Protection of coral habitats because of the diverse nature is also needed on priority basis.					
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 Underwater habitat around Churna and Kaio Islands needs immediate attention because of their limitation as well as delta of the river Hub also requires special attention as has one of the last active oyster bed along the coast of Pakistan.					
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 Because of restriction of coral and associated assemblages in small area around Churna and Kaio Islands, their protection is necessarily need to ensure their survival and proliferation. Similarly the fishing activities and ship traffic in the area is required to be managed considering it to be basking and feeding area for megafauna.					
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.			X	
Explanation for ranking Coral reefs and estuarine areas in the Churna–Kaio Islands Complex are consider to be highly productive, therefore, declaring the area as EBSA is warranted.					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.		X		
Explanation for ranking It is presumed that Churna–Kaio Islands Complex because of high diversity of both marine invertebrates and vertebrates has higher genetic diversity, therefore, it may be declared as EBSA.					
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 both Churna and Kaio Islands are uninhabited, therefore, natural conditions are prevailing in the area.					

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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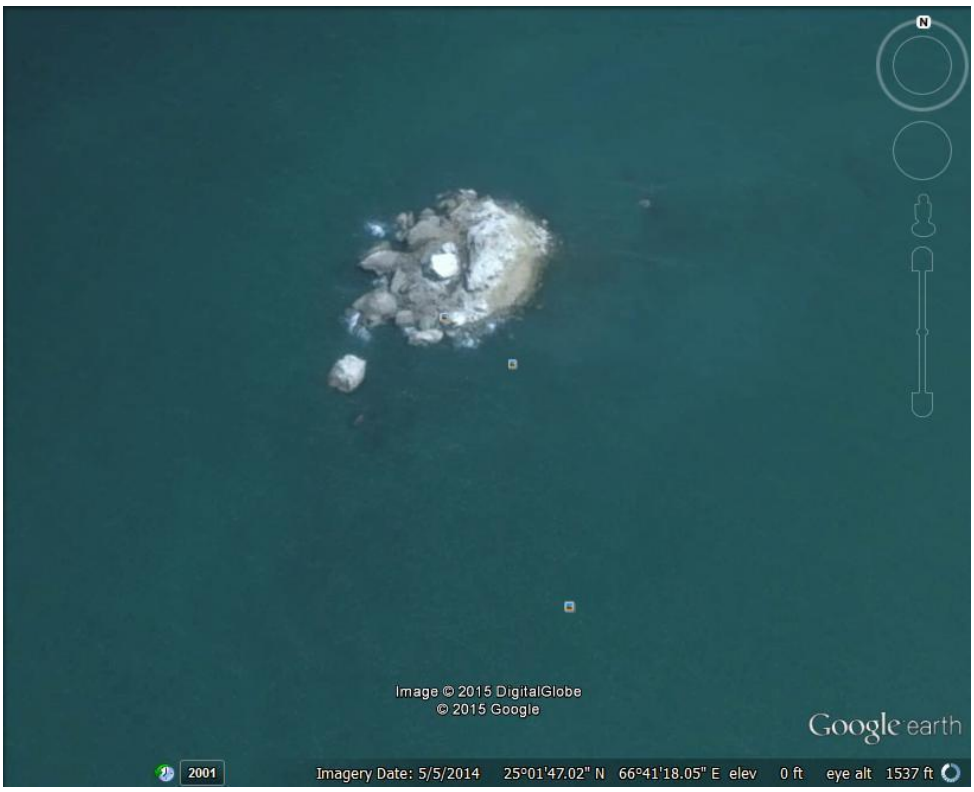
Maps and Figures

Fig, 2. Map of Churna Island



Fig, 3. Map of Kaio Island

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