

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

**Title/Name of the area:** Coastal water of Western and Northern Chukotka

**Presented by** (*names, affiliations, title, contact details*) Vassily A.Spiridonov, P.P. Shirshov Institute of Oceanology of the Russian Academy of Sciences; [vspiridonov@ocean.ru](mailto:vspiridonov@ocean.ru)  
Maria Gavrilov, national park “Russian Arctic”.

**Abstract** (*in less than 150 words*) The Coastal water of Western and Northern Chukotka EBSA data presented here are based on synthesizing, extending and updating the assessment done by the WWF Barents Ecoregion Biodiversity Assessment (Larsen et al., 2003), IUCN/NRDC and AMSA workshop reports (Speer and Laughlin, 2011; Skjoldal et al., 2012). This EBSA is characterized by medium uniqueness, high level of importance for life history stages of key or iconic species, high level of importance for endangered or threatened species, high level of biological productivity, medium level of diversity, high vulnerability and high level of naturalness.

### **Introduction**

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

The IUCN/NRDC Workshop to Identify Areas of Ecological and Biological Significance or Vulnerability in the Arctic Marine Environment (Speer and Laughlin, 2011) identified a super-EBSA named “Chukchi and Beaufort Sea Coast” as meeting nearly all CBD criteria. “The lead system at the transition between landfast and drifting ice was described by workshop participants as “a wonder of nature,” providing a spring migratory pathway for hundreds of bowhead whales daily, as well as beluga whales, polar bears, Pacific walrus and gray whales during summer and autumn. The Chukchi Sea has massive phytoplankton blooms, which along with annual sea ice algae production, cannot be fully exploited by the zooplankton communities. Hence, much of this high production is exported unmodified to the benthos, resulting in an impressively high biomass of benthic infauna and epifauna. Capelin occurs in summer along the sandy seaward beaches of barrier islands in the area of Point Lay and also near Point Barrow. Coastal waters provide whitefish nursery areas and migration corridors for juvenile and adult humpback whales and broad whitefish, least and Bering ciscoes and Dolly Varden Char. Gray whales of the large migratory eastern population (about 20-25,000 animals) have important benthic feeding grounds in coastal areas in the eastern Chukchi Sea, primarily near Point Hope and along the coast between Icy Cape and Point Barrow.” (Speer and Laughlin, 2011: A). The report on identifying Arctic marine areas of heightened ecological significance (AMSA) revealed the coastal waters of the eastern East Siberian Sea i.e. Chaun Bay (Chaunskaya Guba) and the coastal waters of Chukotka Peninsula in the Chukchi Sea as important areas as well (Skjoldal et al., 2012: Figures 8, 9 A and B, Table 13, 14). Subsequent analysis led to suggestion to emphasize the continuity of environmental conditions and condition change in the coastal waters of the eastern East Siberian and the western Chukchi seas and combine them in a single EBSA.

### **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.)*

The area extends from the western and northern extremities of Ayon I. in the East-Siberian Sea, includes the Chaun Bay (Chaunskaya Guba), Kolyuchin Bay (Kolyuchinskaya Guba) and

conventionally extends to 35 miles from the typical shore. It lies entirely within Russia's jurisdiction (internal marine waters of inlets, territorial sea and EEZ).

### **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)*

The coastal zone of western and northern Chukotka extends from the large Chaun Bay with its own oceanographic regime in the East Siberian Sea to the southwestern Chukchi Sea. It is not strongly impacted by the freshwater input of great Siberian rivers and maintains marine conditions except of limited number of estuaries and lagoons. This is a shallow shelf area lying entirely within 50 m isobaths (usually less than 20 m). In the East Siberian Sea stratification of coastal waters is generally weak but may increase owing to summer warming and surface transport of estuarine waters. The upper layer warms up in summer to 0 – 2 C but in the inner part of the Chaun Bay and other estuarine habitats temperature may increase to 4 – 8 C (Denisenko et al., 2010). Salinity of both surface and near bottom layers increases from west to east (28 psu in the bottom layer of the Chaun Bay and yet 32 psu in the De Long Strait) The current goes generally eastward and part of the East Siberian water enters the Chukchi Sea through De Long Strait (Zalogin and Kosarev, 1999; Denisenko et al., 2010). Bottom topography is relatively even, sediment are largely muddy sand in the East Siberian Sea and sand in the Chukchi Sea so that the fraction of mud particle generally decreases from Chaun Bay to the Chukchi Sea (Denisenko et al., 2010). In the inshore zone hard substrates are also present (Golikov et al., 2009).

The waters are covered with ice for most part of the year, however sea ice conditions differ in the west to east and the south to north directions. On the eastern boundary the Ayon sea ice massif is formed which in previous year persisted nearly round year. The bays and coastal waters to about 10 m isobaths have been covered with fast ice for about 9 month in a year, recently the ice free period extended.

The formation of flaw polynyas in the East Siberian Sea is a result of the interaction between the Arctic and the Siberian Anticyclones. Strengthening of the Arctic Anticyclone creates a wind pattern which facilitates the development of polynyas in the western part of the East Siberian Sea and, simultaneously, their depression in the eastern part of the East Siberian Sea and the Chukchi Sea. Development of polynyas in the Chukchi Sea is supported by cyclones originating in the Aleutian Low. The different and changing year to year interactions of the processes originating in these centres of atmospheric activity explains the inter-annual variability of polynyas in the East Siberian and the Chukchi seas. During warm years the Arctic Anticyclone weakens and shifts to the Canadian sector of the Arctic; this results in the dominance of a system favouring polynya development in the Chukchi Sea. The monthly mean frequency of polynya occurrence is significant throughout the entire cold season of the year but it is on average lower than in the neighbouring Laptev Sea and varies from 41 to 89% (Gavrilo and Popov, 2011).

### **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?)*

The conditions in the area appear to be dynamic, and ecological processes are very sensitive to climate changes, in particular variability in sea ice.

### **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
<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 are no proven endemic species in the area, however several species have been described from the Chukchi Sea and so far known only for this region (Sirenko, 2009). Some communities are particularly rare, i.e. fucoid communities, kelp and mussel beds along the eastern shore of Chaun Bay which are relics of the Holocene warmer conditions and are maintained owing to a specific oceanographic regime of the bay (Golikov et al., 1994).					
<b>Special importance for life-history stages of species</b>	Areas that are required for a population to survive and thrive.				X
<i>Explanation for ranking</i> In winter, most of the Chukotka Peninsula coastal zone and the polynyas adjacent to Wrangel Island form the area of high concentration of ringed ( <i>Phoca hispida</i> ) and bearded ( <i>Erignathus barbatus</i> ) seals and their predators: the polar bears ( <i>Ursus maritimus</i> ) (Belikov et al., 1998). Short_tailed shearwaters ( <i>Puffinus tenuirostris</i> ) migrating from Tasmania and Western Australia to the North Pacific (in the Northern Hemisphere summer) may also go as far as the boundary of drifting ice in the region (Gavrilo, 2009). The system of polynyas and leads along the Chukotka coast serves as a spring migration path for cetaceans and seabirds including eiders, long_tailed ducks ( <i>Clangula hyemalis</i> ) and alcids (Gavrilo and Popov, 2011). Shallow bays with its specific regime and marsh coast serve as staging, molting and nesting areas for numerous aquatic birds.					
<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> Gray whales ( <i>Eschrichtius robustus</i> ) of the Californian-Chukchi population migrating from their wintering grounds show up near the eastern coast of Chukotka in the second half of May. Most of them move to the Chukchi Sea in June. In this season both gray and bowhead ( <i>Balaena mysticetus</i> ) whales use polynyas and leads for migration. In summer and autumn bowhead whales forage and travel up to Wrangel Island and along the Chaunskaya Guba — as far as the ice edge allows (Bogoslovskaya et al., 1982; Belikov et al., 2002; Gavrilo, Popov, 2011); in particularly favorable years (when the ice massif to the west of Ayon Island breaks up in summer) bowhead whales may reach the New Siberian Islands (Gavrilo and Tretyakov, 2008).					
<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> Sea ice habitats are particularly sensitive to climate changes; polar bears are particularly suffering from decaying sea ice. Both sea ice habitats and bays					
<b>Biological productivity</b>	Area containing species, populations or communities with comparatively higher natural				X

	biological productivity.				
<i>Explanation for ranking</i> Coastal Chukchi Sea show increased pelagic primary production and the carbon flux to the bottom in comparison to the seas of Siberian shelf and there is a trend to its increase (Vetrov and Romakevich, 2011). Chaun Bay and other inlets and lagoons are housing kelp communities (Golikov et al., 1994; 2009) which significantly increase productivity in coastal areas compared to most part of the Siberian shelf seas. Benthic biomass in the coastal areas is high in protected bay and inlets (i.e. Chaun Bay, Kolyuchin Bay) and decreases by order of magnitude in the open areas (Sirenko et al., 2009; Denisenko, 2010; Denisenko et al., 2010). However in the areas with moderate biomass amphipods (Golikov et al.) which have high P/B coefficient and biomass turnover rate are particularly important.					
<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> Species richness is relatively low in the East Siberian Sea but with some hotspots such as Chaun Bay (Golikov et al., 1994) but increases in Chukchi Sea where many species of Pacific origin occur (Sirenko, 2009, 2010, Spiridonov, 2011; Spiridonov et al., 2011). The diversity of habitats, communities and ecosystems along the east-west and local gradients of oceanographical and sedimentological conditions is significant (Golikov et al., 1994; 2009; Sirenko et al., 2009; Denisenko et al., 2010).					
<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> This largely untouched area except local impact of pollution in the Chaun Bay (Golikov et al., 1994).					

### 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
<i>Add relevant criteria</i>					
<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.)

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## **Maps and Figures**

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