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

Title/Name of the area: Great Siberian Polynya and the the water of New Siberian Islands.

Presented by Vassily A. Spiridonov (P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences, Moscow), Maria V. Gavrilo (National Park "Russian Arctic", Arkhangel).

Abstract (*in less than 150 words)*

The system of polynyas in the Laptev Sea and specific conditions of the waters of New Siberian Islands form ecologically and biologically significant area with medium level of uniqueness, high level of importance for life history stages of key or iconic species, medium level of importance for endangered or threatened species, medium (at the scale of the Arctic) levels of biological productivity and diversity and high vulnerability.

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

Polynyas in the Russian Arctic have been recognized as extremely important for ecosystem processes and maintaining biodiversity (Spiridonov et al, 2011). The IUCN/NRDC Workshop to Identify Areas of Ecological and Biological Significance or Vulnerability in the Arctic Marine Environment (Speer and Laughlin, 2011) identified Super-EBSA 13 "Great Siberian Polynya" that can be divided into two "elementary" EBSA 33 (Great Siberian Polynya proper) and 35 (Waters of New Siberian Islands) (Speers and Laughlin, 2011). The report on identifying Arctic marine areas of heightened ecological significance (AMSA) also revealed these areas (Skjoldal et al., 2012: fig. 7).

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.)
This area cover super EBSA 13 in the Laptev Sea as mapped in the Section C of the IUCN/NRDC Workshop Report (Speers and Laughlin, 2011) and in fig. 7 in the AMSA Workshop Report (Skjoldal et al., 2012). This is the area that is entirely covered by the jurisdiction of Russian Federation.

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 area occupies central part of the Laptev Sea shelf and coastal waters of the New Siberian (Novosibirskie) Islands which separate the Laptev Sea from the East Siberian Sea.
Near the Asian shore of the Laptev Sea, depth varies between 10 m and 40 m. Seabed topography of the Laptev Sea shelf is relatively smooth in contrast with western Arctic seas. It gently slopes to the north of the accumulative-denudation plain that is disrupted by three trenches of approximately 40 m depth. On the shelf muddy sediments dominate that are substituted by sand around the River Lena delta (Nikiforov, 2006). Sediments largely determine the distribution of benthic communities and thus together with seabed topography can be regarded as an important driver that shapes composition and biomass of benthos (Pogrebov et al., 2002; Petryashov et al., 2004), which in turn are critical factors affecting walruses and semi-anadromous fish populations.
The Laptev Sea is covered with ice for nearly 9 months of the year, from October to June. Owing to the system of flaw polynyas the Laptev Sea plays a major role in production of drifting ice in the Arctic Ocean (Popov and Gavrilo, 2011). One of remarkable features of the Laptev Sea shelf region is

a constant, to a varying degree, stratification of the water column regardless of its small depth. In summer a worm intermediate layer is formed and can persist until the beginning of next summer. It can be observed under the colder and fresher water layer from River Lena discharge. Around polynyas, this intermediate layer is degraded and substituted by a different structure due to cooling and salinization during constant ice formation (Bauch et al., 2009).
At present six flaw polynyas have been identified in the Laptev Sea (Zakharov, 1996; Popov, Gavrilo, 2011; Gavrilo et al., 2011). Mean monthly occurrence frequency of the Laptev polynyas is high over the entire cold period (57 to 100%). As a result, all these polynyas are classed as either recurring or stable depending on the month. In November the frequency of occurrence is generally lower than in other months and all polynyas are considered stable. The Great Siberian Polynya developing in the south and east of the Laptev Sea occurs most frequently (not less than 65-70%). The Anabar-Lenskaya and the Western Novosibirskaya polynyas are least stable in early winter, while in February their frequency of occurrence reaches its maximum (96-100%). Western Novosibirskaya polynyas has a second maximum of occurrence in April. The Northern Novosibirkskaya polynyas' appearance is at its minimum in January and at its maximum in April-May (96%).
Phytoplankton distribution values calculated by Vetrov et al., (2008), has shown significant seasonal fluctuations. In April-May there is an increase in primary productivity (up to 200-300 mg C day^{-1}) which can be observed in areas where flowing polynyas can be found (Anabar-Lenskaya and Novosibirskaya polynyas).

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 Laptev Sea is affected by a general trend towards decreasing of summer sea ice and average thickness of ice (Frolov et al., 2009; Gavrilo and Spiridonov, 2011; http://www.nasa.gov/content/goddard/arctic-sea-ice-minimum-in-2013-is-sixth-lowest-on-record/#.Uvf3p4U1W5U), and increasing intrusion of the Atlantic water that even penetrates to the 20 m depth contour (Dmitrenko et al., 2010). However for developing scenarios of environmental changes in teh region winter processes appear to be not less important. Flaw polynyas of the Laptev Sea and their spatial-temporal inter-annual variability are a product of the interaction of processes associated with three atmospheric centres: the Icelandic Minimum, the Arctic and the Siberian Maxima. Deepening of the Icelandic Minimum intensifies the Atlantic cyclones, which receive their energy from the Kara Sea polynyas, to cross the Taymyr Peninsula and form a wind system which facilitates the development of polynyas in the western Laptev Sea (Popov, Gavrilo, 2011; Gavrilo et al., 2011). Strengthening of the Arctic Maximum leads to the development of polynyas in the eastern Laptev Sea.
Comparison of the characteristics of the Laptev Sea polynyas during the period 1936–1970 with the modern day indicates that the frequency of occurrence and the numbers of recurring polynyas in the last two decades have increased. In particular, the episodic (30–40%) Eastern Severozemelskaya (in May) and the Eastern Taymyrskaya polynyas (in April and May) have now become stable (Gavrilo et al., 2011).
Trends in productivity changes throughout 2003–2007 were considered in the Kara, Laptev, and East Siberian seas using satellite and field data. According to the MODIS data, slight positive trends of average and total phytoplankton production were revealed in the Laptev Sea, i.e. 4.1 and 2.5% respectively in relations to the average values over the observation period. On the other hand total ice algae production has shown a slight decrease, and thus the resulting overall production remains almost unchanged (Vetrov, Romankevich, 2009; 2011).

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	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance** (please mark one column with an X)

(Annex I to decision IX/20)		**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 Walruses that winter in the polynyas from East Taymyr to the north of the New Siberian Islands have been long time considered as an endemic subspecies *Odobenus rosmarus laptevi*. The latest molecular_genetic studies have failed to prove its isolation from the Pacific subspecies (*O. rosmarus divergens*) (Lindquist et al., 2008). However, the Laptev walrus is indeed a peculiar population differing from the neighbouring Pacific populations by the absence of long seasonal migrations and the location of wintering grounds.					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				X
Explanation for ranking Polynyas play a particularly important role in the recruitment of polar cod, *Boreogadus saida*, which is a key food item for most of the top predators in the high Arctic ecosystems. If polynyas open up early, polar cod could start spawning as early as January. Open water provides the first-feeding larvae with the minimum light necessary to detect and capture plankton prey and thereby obtain better nutrition. Thus they grow to larger pre-winter sizes and provide protection against predators. On the whole, years with well-developed polynyas tend to be characterized by the highest levels of polar cod recruitment (Bouchard and Fortier, 2008). Laptev polynyas support a chain of colonies dominated by Thick-billed Murre (*Uria lomvia*) and Black-legged Kittiwake (*Rissa tridactyla*) that stretches from Preobrazheniya Island in Khatanga Gulf across Stolbovoy and Belkovsky islands through to De Long islands in the Novosibirsk archipelago. All polynyas are used by birds during the spring migration period (Gavrilo et al., 2011). The Laptev polynyas network also sustains stable, high populations of seals which in turn draw in its main predator: polar bear (Gavrilo et al., 2011).					
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 Laptev Sea polynyas supports the regional non-migrating population of walruses which are listed in the Russian Red Book and the IUCN Red List (Chapsky, 1941, Belikov et al., 1998; Gavrilo et al., 2011). Polynyas are also a feeding area of Ivory gull (Gilg et al., 2010) and migration areas for Steller eider.					
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 Sea ice habitas and communities are extremely vulnerable to climate changes. Polynyas as corridors that are shared by both wildlife and vessels susceptible to all threars associated with intensive ship traffic, inclusing noise pollution, and, of course catastrophic oil spills which consequences can hardly be underestimated.					
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.			X	
Explanation for ranking					

In ice covered seas, polynyas are often regarded as oasis. Early, for the Arctic, and lasting vegetation growth season in the Laptev Sea polynyas supports high productivity, substantial zooplankton growth and population stability at high trophic levels (Gavrilo et al., 2011). Due to strong vertical circulation and organic matter inflow into the near bottom water layers and sediments, benthic communities in polynyas' regions also have high productivity and species richness (Gukov, 1999; Petryashov et al., 2004; Schmid et al., 2006).					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.			X	
Explanation for ranking With regard to the number of species in marine fauna and sea ice flora the Laptev Sea holds intermediate position among the Arctic seas of Eurasia. The species richness is lower than in the Barents and Chukchi seas because the latter two are open either to the Atlantic or to the Pacific species inflow. On the other it is higher than in the Kara and East Siberian Seas (Sirenko, 2001; Petryashov et al., 2004; Ilyash, Zhitina, 2009; Spiridonov et al., 2011). Similar trends can be observed in marine vertebrate species (fish, nesting on shore sea birds and marine mammals) richness from the Barents Sea towards seas of the Siberian shelf. It decreases more than twice from the Barents to the Kara Seas; it remains more or less similar in the Laptev Sea (54 species of fish, 13 species of obligate- and facultative colonial seabirds and 8 mammals). Most of these fish species and nearly all sea birds and marine mammals are associated with the polynya system. New Siberian Islands with its complex coastline and regional peculiarities of oceanographical regime form a diversity of types of benthic habitats and communities including high latitude kelp (Gukov, 1999; Petryashov et al., 2004).					
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 The area holds high degree of naturalness with limited shipping as the only human activity.					

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

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