

Ecologically and biologically significant areas within Russia's marine jurisdiction and adjacent waters of the North Pacific I.: Eastern and Southern Chukotka coastal zone

Title/Name of the area:

Eastern and Southern Chukotka coastal zone (Bering Strait and Sireniki Polynyas)

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Abstract

The uniqueness of the coastal waters of the western Bering Strait and the southern Chukotka Peninsula is associated with the largest and most well known in the North Pacific and the Chuckchi Sea polynya system. This is a wintering ground for bowhead whales, beluga whales, and Pacific walrus, numerous seabirds. In spring polynyas are used as migration routes. In summer the southern and south-western coast of Chukotka Peninsula houses the biggest in Chukotka breeding colonies of sea birds which are supported by significant productivity of the water column ecosystem in the north-western Bering Sea and the Bering Strait. With regard to biological diversity this area with its complex coastline and diverse sea ice regime holds high diversity of littoral and sublittoral habitats and a relatively high for Arctic areas diversity of marine species. The system holds high naturalness but is very sensitive to climate changes and offshore industrial activity.

Introduction

The coastal area off the eastern and southern Chukotka Peninsula (north-western Bering Sea and the Bering Strait) is nominated as a result of several assessment projects including the WWF Bering Sea Biodiversity assessment, physiographical regionalization of the Far Eastern Seas of Russia initiated by WWF Russia (Ivanov, 2003), preparation of the Atlas of Marine and Coastal Biodiversity of the Russian Arctic (Spiridonov et al., 2011) and the gap-analysis for MPA planning within the GEF/UNDP project "Strengthening of Marine and Coastal Protected areas in Russia" (Mokievsky et al., 2012). It includes coastal waters of Chukotka Peninsula from Krest Bay to Dezhnev Cape. It is a relatively restricted but highly important area representing part of gateway from the North Pacific to the Arctic and a crossroad of faunal migration routes between the Bering and the Chuckchi Seas. It is a relatively studied area although most of data refer to higher trophic levels of the ecosystem, i.e. sea birds and marine mammals while the structure and dynamics of benthic and pelagic ecosystems is relatively less studied.

Location

The area extends from the Krest Bay (Zaliv Kresta), the north-western part of the Bay of Anadyr along the complex coastline of Chukotka Peninsula to Dezhnev Cape (Fig. 1). The offshore boundary coincides with the border of Russia's EEZ in the Bering Sea and the maritime border of Russia in the Bering Strait and is thus entirely in the zone of Russia's jurisdiction. It merges to similar areas in the US part of the northern Bering Sea and the Bering Strait that can be considered as ecologically significant as well but the conditions in the Russian part are in several respects peculiar and even unique.

Feature description of the proposed area

The shelf of eastern and southern Chukotka Peninsula is a relatively shallow (mostly within 35 m depth) underwater plain which topography was strongly influenced by glaciations events and sea level changes in the Quaternary. Numerous fjords of Chukotka coast are continued underwater as glacial troughs with depth up to 100 m. This is the area of strong tidal currents impacting seabed geomorphology and sediments which are predominately sandy and rocky substrates. Water transport through the Bering Strait is generally directed to the north facilitating penetration of Pacific biota to the Arctic with transformed surface water mass of the Bering Sea.

The uniqueness of the coastal zone of the western Bering Strait (off the eastern coast of Chukotka Peninsula) and southern Chukotka Peninsula is based on the existence of the largest and most well known in the North Pacific and the Chuckchi Sea the Anadyr' – Sireniki polynya system (Gavrilo, Popov, 2011). This polynya system develops in winter and is particularly pronounced in late winter (February – April) when an extensive belt of open water or water covered by nilas is developed between landfast ice and drifting ice floes. These polynyas are broader off the southern coast of Chukotka Peninsula and more narrow in the Bering Strait. The multiyear statistics of polynya areas similar to the ones derived for polynyas of the Siberian shelf (Gavrilo et al., 2011) are not unfortunately available. The stability of polynya location over more than thousand years is indicated by archaeological records of ancient Inuit culture exploiting highly productive marine ecosystem associated with polynyas (Arutyunov et al., 1982; Dinesman et al., 1996).

As several other polynyas the Anadyr – Sireniki polynya system is extremely important for life history stages of numerous species, including threatened, endangered and declining ones. This is a wintering ground for bowhead whales (*Balaena mysticetus*), beluga whales (*Delphinapterus leucas*), and Pacific walrus (Bogoslovskaya et al., 1982, 2007); the latter are breeding on the the ice floes of the Anadyr Bay to the south of developinh polynyas (Melentyev, Chernook, 2010). Several species of seabird also spend winters there including long_tailed ducks, eiders and alcids (Konyukhov et al., 1998). The system of polynyas and leads along the Chukotka coast serves as a spring migration path for seabirds including eiders, long_tailed ducks (*Clangula hyemalis*) and alcids. All these areas, along with the sea ice edge in the Bering Sea, are important wintering grounds for seabirds, in particular ivory (*Pagophila eburnea*) and Ross gulls (*Rhodostethia rosaea*), and alcids.

The coastal waters of southern and eastern Chukotka Peninsula are particularly rich in nutrients that may be partly associated with river discharge to the Gulg of Anadyr' (Ivanenkov, 1964; Sapozhnikov, 1995; Cooper et al., 1997). This along with favourable light regime in the polynya areas is precondition for high biological productivity. The data on primary productivity and production of zooplankton and zoobenthos are not particularly detailed nor there is much information on the abundance and production of micronekton (euphausiids and small pelagic fish) and such mass nektobenthic fish as sand eel (for available information see Shuntov, 2001). However, in summer the southern and south-western coast of Chukotka Peninsula houses the biggest in Chukotka breeding colonies of mostly fulmar (*Fulmarus glacialis*), black legged kittiwake (*Rissa tridactyla*), guillemots and others in total over 4 million breeding pairs (Konyukhov et al., 1998; Gavrilo, Popov, 2011) which are apparently supported by significant productivity of the water column ecosystem in the north-western Bering Sea and the Bering Strait.

With regard to biological diversity this area with its complex coastline and diverse sea ice regime holds high diversity of littoral and sublittoral habitats (Mokievsky et al., 2012). Species diversity

shows a gradient from Krest Bay to Lawrence Bay, remarkable in the littoral (Kussakin, Ivanova, 1978) but probably less remarkable in the sublittoral. The number of benthic macrophytes exceeds 70 being relatively high for the low Arctic zone. Therefore in terms of diversity this area should be also regarded as significant.

Feature condition and future outlook of the proposed area

The Sireniki polynya has been critically important for the development and subsistence of the indigenous culture of the marine hunters of Chukotka for more than a thousand years (Arutyunov et al., 1982; Dinesman et al., 1996) but no marine hunting and fishing except the traditional marine resources exploitation by indigenous people are conducted. The coastal pollution is restricted to small areas of coastal settlements so that the area still holds high level of naturalness. Polynya systems are sensitive to the climate change although no specific models and scenarios were developed for this system. In the last two decades in the adjacent northern Bering Sea area off St. Lawrence Island geographic displacement of marine mammal population distributions has coincided with a reduction of benthic prey populations, an increase in pelagic fish, a reduction in sea ice, and an increase in air and ocean temperature (Grebmeyer et al., 2006). Since polynyas are used as shipping lanes they are highly vulnerable to the antropogenic impact associated with shipping and offshore oil and gas development (risk of accidents and spills and noise pollution).

Part of the coastal zone will be included in the Beringia National Park (an expected year of establishment 2014 according to the National Conception of Specially Protected Areas development up to 2020) but no marine areas will be under park jurisdiction on the eastern and southern Chukotka side. It is highly important to extend the buffer zone of the park to the polynya zone and to organize marine ecological research and monitoring programme on the basis of national park in order to understand better the organization of this highly important ecosystem and its possible changes.

Assessment of the area against CBD EBSA Criteria

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)			
		Don't Know	Low	Some	High
Uniqueness or rarity	Area contains (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features				X
<i>Explanation for ranking</i>					
The area contains the largest and most well known in the North Pacific and the Chuckchi Sea the Anadyr' - Sireniki polynya system. Also it is an area of remarkable gradients in the diversity of littoral (and to lesser extent) biota					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				X
<i>Explanation for ranking</i>					
The Anadyr' - Sireniki polynya system is extremely important for life history stages of numerous species, including threatened, endangered and declining (see below). This is a wintering ground for bowhead whales, beluga whales, and Pacific walruses (Bogoslovskaya et al., 1982, 2007; Melentyev, Chernook, 2010). Several species of seabird also spend winters there including long_tailed ducks, eiders and alcids (Konyukhov et al., 1998). The system of polynyas and leads along the Chukotka coast serves as a spring migration path for seabirds including eiders, long_tailed ducks and alcids. All these areas, along with the sea ice edge in the Bering Sea, are important wintering grounds for seabirds, in particular ivory and Ross gulls, and alcids. In summer the southern and south-western coast of Chukotka Peninsula houses the biggest in Chukotka breeding colonies of mostly fulmar, black legged kittiwake, guillemots (Konyukhov et al., 1998; Gavriilo, Popov, 2011) which are apparently supported by significant productivity of the water column ecosystem in the north-western Bering Sea and the Bering Strait.					

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
<p><i>Explanation for ranking</i></p> <p>The area is critically important as a wintering ground and migration pathways for bowhead whale, migration pathways and feeding ground for grey whale (Chukchi –California population); it may be also exploited by other endangered great whales, i.e. finwhales. The northern part of the area is also an important foraging area of polar bear. Several endangered aquatic birds are associated with adjacent with the present area wetlands (Sergienko, Gavrilov, 2011).</p>					
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
<p><i>Explanation for ranking</i></p> <p>Polynya systems are sensitive to the climate change although no scenarios exist for this particular system. Since polynyas are used as shipping lanes they are highly vulnerable to the antropogenic impact associated to shipping and offshore oil and gas development (risk of accidents and spills and noise pollution). With the current intensity of shipping and other industrial activity offshore the risk is relatively low but it considerably increases with increasing the intensity of operations along the Northern Sea Route and the North-West Passage. The recovery after a significant oil or chemical spill in the conditions of complex coastline and long landfast ice persistence may take decades while several vertebrate species will be seriously threatened either directly or their food basis.</p>					
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.				

<i>Explanation for ranking</i>					
<p>Wintering populations of marine birds and mammals as well as the breeding colonies of seabirds are apparently supported by greater than average biological productivity of the area.</p>					
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.			X	
<i>Explanation for ranking</i>					
<p>With regard to biological diversity this area with its complex coastline and diverse sea ice regime holds high diversity of littoral and sublittoral habitats (Mokievsky et al., 2012). Species diversity shows a gradient from Krest Bay to Lawrence Bay, remarkable in the littoral (but probably less remarkable in the sublittoral). The number of benthic macrophytes species exceeds 70 being relatively high for the low Arctic zone (Kussakin, Ivanova, 1978).</p>					
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
<i>Explanation for ranking</i>					
<p>The Sireniki polynya has been critically important for the development and subsistence of the indigenous culture of the marine hunters of Chukotka for more than a thousand years (Arutyunov et al., 1982; Dinesman et al., 1996) but no marine hunting and fishing except the traditional ones of indigenous people are conducted. The coastal pollution is restricted to small areas of coastal settlements so that the area still holds high level of naturalness.</p>					

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Fig. 1. The position of the Eastern and Southern Chukotka coastal candidate EBSA among other candidate EBSAs in the waters under Russia's jurisdiction of the North Pacific.