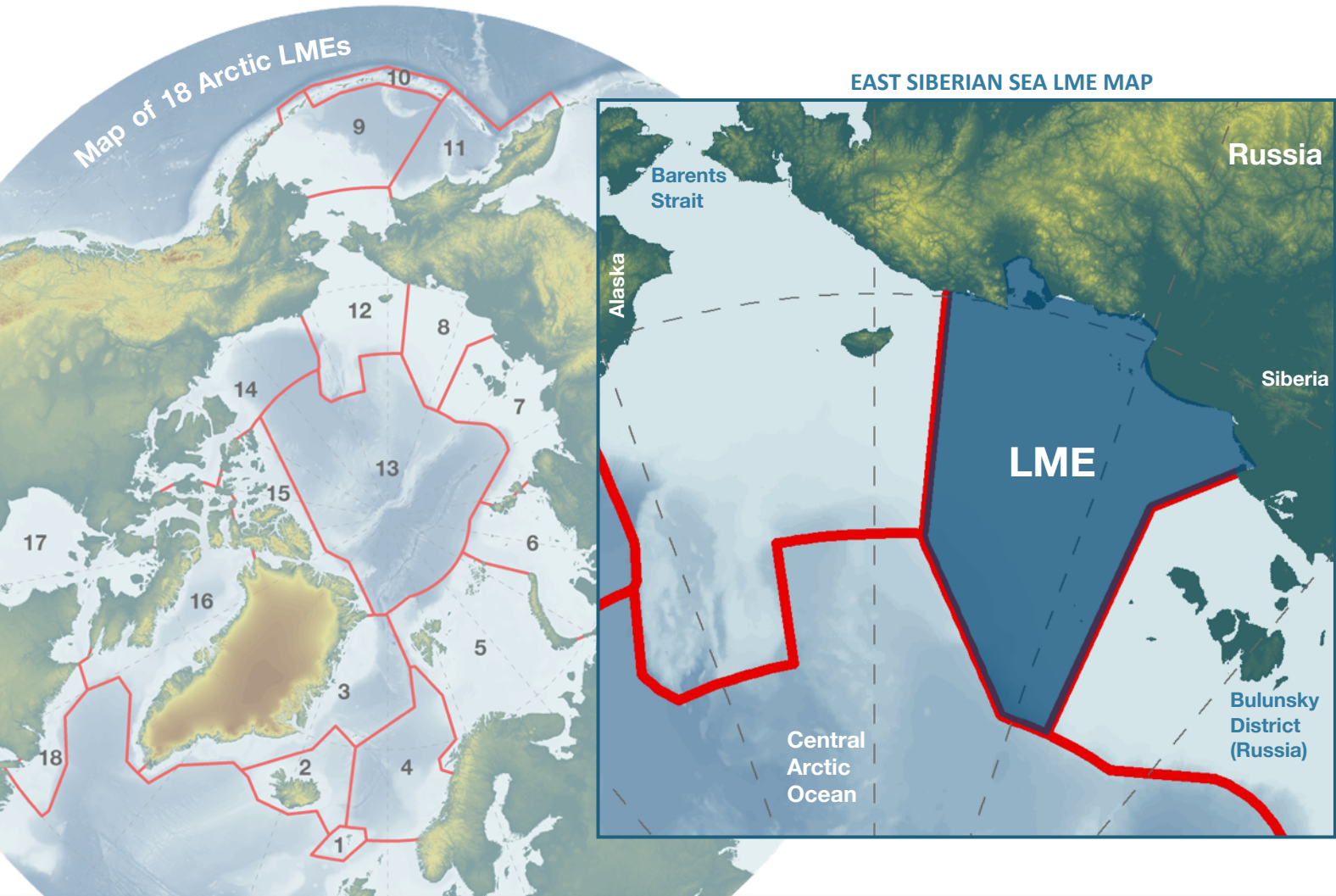


EAST SIBERIAN SEA LME



ARCTIC LMEs

Large Marine Ecosystems (LMEs) are defined as regions of ocean space of 200,000 km² or greater, that encompass coastal areas from river basins and estuaries to the outer margins of a continental shelf or the seaward extent of a predominant coastal current. LMEs are defined by ecological criteria, including bathymetry, hydrography, productivity, and trophically linked populations. PAME developed a map delineating 17 Arctic Large Marine Ecosystems (Arctic LME's) in the marine waters of the Arctic and adjacent seas in 2006. In a consultative process including agencies of Arctic Council member states and other Arctic Council working groups, the [Arctic LME map was revised in 2012](#) to include 18 Arctic LMEs. This is the current map of Arctic LMEs used in the

work of the Arctic Council in developing and promoting the Ecosystem Approach to management of the Arctic marine environment.

Joint EA Expert group

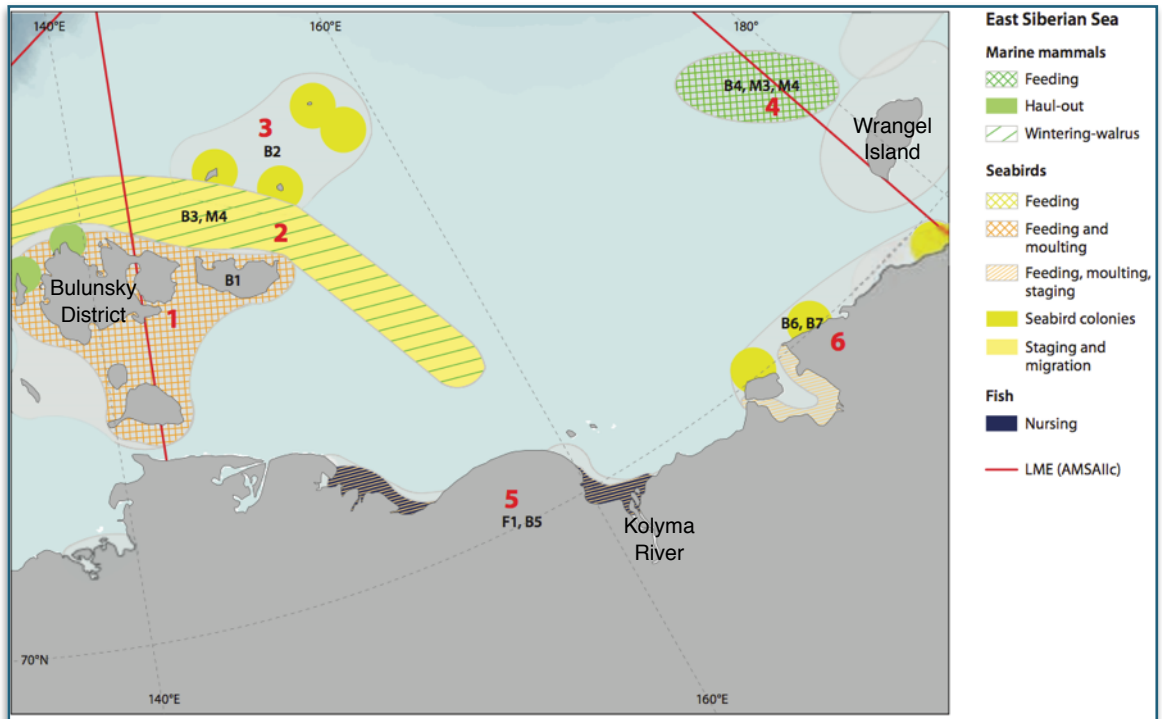
PAME established an Ecosystem Approach to Management expert group in 2011 with the participation of other Arctic Council working groups (AMAP, CAFF and SDWG). This joint Ecosystem Approach Expert Group (EA-EG) has developed a [framework for EA implementation](#) where the first step is identification of the ecosystem to be managed. Identifying the Arctic LMEs represents this first step.

This factsheet is one of 18 in a series of the Arctic LMEs.

OVERVIEW: EAST SIBERIAN SEA LME

The East Siberian Sea is located on the eastern Siberian Shelf between the New Siberian Islands in the west and Wrangel Island in the east. Its boundaries are not very distinct.

The East Siberian Sea is a very wide and shallow shelf region with a large area less than 50 m deep. The seafloor is a fairly even plain with few features, sloping very gently from the shallowest part in the southwest to somewhat deeper water in northeast.



The East Siberian Sea is heavily influenced by ice and the whole sea is frozen during winter. Freeze-up starts in late September and proceeds quickly so that the ice-cover forms during a few weeks time. Ice-melt starts in June but most of the ice clearing takes place in July and August to minimum ice cover in September prior to freeze-up.

In summer, multi-annual sea ice usually remains over the outer shelf area. Much of the western area may clear of ice in a normal year, while much ice may remain in the eastern area. This is partly due to transport of drift ice into this area.

This area is characterized as a transition zone for the Pacific influence from the eastern side. The southern coast with the deltas and estuaries of Indigirka and Kolyma rivers constitute important breeding, feeding and staging areas for birds of migratory populations that winter on the Pacific side. Bowheads and belugas from the migratory populations that winter in the Bering Sea may also move into this area in the summer season. The East Siberian Sea LME is a High Arctic and low productive area and there are no separate subpopulations of polar bears or other marine mammals in this LME.

Map: The East Siberian Sea LME.

Source: AMSALIC Report



MARINE MAMMALS

The East Siberian Sea is a transition zone between populations of marine mammals migrating east from the Barents, Kara and Laptev Seas, and west from the Bering, Chukchi and Beaufort Seas. Individuals from these separate populations may meet but the extent of this is limited. The heavy ice conditions with the Ayon ice massif usually persisting through summer in the eastern East Siberian Sea, forms a barrier for the migrations.

The adjacent Chukchi Sea contains large populations of some marine mammal species and these extend their distributions and migrations into the eastern part of the East Siberian Sea.

This is the case for **beluga** and **bowhead** whales from the Bering-Chukchi-Beaufort populations that often migrate north in the Chukchi Sea and west into the eastern part of the East Siberian Sea during summer and early autumn.

In August-September, belugas are regularly sighted in this area. This is also the case for bowheads that may reach the Laptev Sea in the warmest years with light ice conditions. Belugas from the Karskaya population appear not generally to migrate further east than the Laptev Sea so encounters between individuals from the two populations seem to be rare.

Gray whale extends its feeding area from the western Chukchi Sea into the eastern East Siberian

Sea where they are observed along the coast and in the area of Wrangel Island. **Pacific walrus** also extend their summer distribution into the eastern part where they are common and abundant around Wrangel Island. Walrus from the Laptev population occur around the New Siberian Islands and extend their distribution into the western part of the East Siberian Sea.

Ringed seal and **Bearded seal** are resident species in the East Siberian Sea although there are little specific information from this area. The vast area of fast ice extending east from the New Siberian Islands offer a potential large breeding area for ringed seal, while the extensive shallow waters offer feeding opportunities for bearded seals. However, the low productivity and lack of large fish populations may be limiting factors for these seals.

Polar bears of the Alaska-Chukotka subpopulation are widely distributed on the pack ice of the northern Bering, Chukchi, and eastern portions of the East Siberian seas. The western boundary of the subpopulation was set near Chaunskaya Bay in northeastern Russia while the eastern boundary was set at Icy Cape, Alaska. The area around Wrangel Island is used by relatively large numbers of individuals. The population size is estimated to be about 2,000 individuals. The estimate has wide ranges and is considered to be of little value for management.





FISH

The fish communities of the East Siberian Sea contain marine, estuarine, and anadromous fish species that occur in coastal waters, estuaries and rivers. Several coregonid whitefish species are common in the Indigirka, Kolyma and other rivers, including Arctic cisco or omul, least, muksun, broad whitefish, European whitefish, and nelma or inconnu.

Arctic char occurs in the area, while pink salmon and dog or chum salmon may enter Kolyma and Indigirka Rivers. Siberian sturgeon also occurs in these rivers. Asiatic smelt is found in part of the area but is absent from the region of the Indigirka and Kolyma rivers.

Polar cod is the most common and important marine fish species in the East Siberian Sea. There is possibly a local stock of polar cod in this area, as indicated by the occurrence of young fry. Schools of polar cod have been observed along the shores of the eastern part of the sea, migrating eastwards towards the Chukchi Sea. Arctic cod occurs in the East Siberian Sea, both along the coast and over deeper waters in north.

Safron cod may extend its distribution west from the Bering Sea to Chaunskaya Inlet. The marine fish fauna of the East Siberian Sea has been little studied, but the euryhaline species Four-horned sculpin, Nine-spine stickleback and Arctic flounder are assumed to be common in the coastal waters.



SHOREBIRDS

The low-lying coasts and adjacent tundra and wetlands of the East Siberian Sea constitute important habitats for shorebirds during breeding and migration seasons. Extensive lowlands are found from the Yana Delta in the eastern Laptev Sea via the Indigirka Delta to the Kolyma Delta in the East Siberian Sea. Further east a prominent feature is the Chaun Bay with the adjacent Chaun Lowlands.

The shorebird fauna of the East Siberian Sea is largely similar to that of the Laptev Sea, also in terms of subspecies (the Wrangel Island fauna is treated as part of the Chukchi Sea). New species which do not occur in the Laptev Sea area are great knot and buff-breasted sandpiper, and also Baird's sandpiper, which may occur in the eastern part of the East Siberian Sea, whereas Eurasian golden plover and purple sandpiper extend their distributions eastwards only to the westernmost parts of the Laptev Sea. Many of the northern sandpipers are common on coastal tundra of the East Siberian Sea such as little stint, temminck's stint, pectoral sandpiper, and dunlin. Grey plover and Pacific golden plover are also common breeding species. Red phalarope and red-breasted phalarope are abundant species in coastal waters after breeding. Species which breed on southern tundra are also common in parts of the areas adjacent to the East Siberian Sea, notably in the Kolyma Delta and the Chaun Lowlands. These include ruff, spotted redshank, common snipe, and short-billed dowitcher.





Seabirds inhabiting the East-Siberian Sea are typical for the mid-Siberian Arctic with some differences. There is a lack of Atlantic species like little auk or ivory gull, while some few species from the Pacific penetrate the area (e.g., the pelagic cormorant). Thus, the species composition is limited and the number of individuals is relatively low, about the same order of magnitude as in the Laptev Sea. About 17 species of seabirds breed at the East-Siberian Sea coasts.

Colonies of cliff-breeding seabirds (auks, kittiwakes, and cormorants) are found on the islands, mainly on the high-Arctic New Siberian Islands and on Wrangel Island, but also on smaller islands of the Medvezhiy Ostrova (Bear Islands) archipelago (located north of the Kolyma delta), and east of Chaun Bay on the mainland coast. Only two species form the core populations of the seabird colonies, black-legged kittiwake and thick-billed murre, while black guillemot is also numerous in the East Siberian Sea. The largest seabird colonies are associated with the Great Siberian polynya and western Wrangel polynyas.



The East Siberian Sea is bounded in south by a low-lying coast with large deltas and swampy plains that are important habitats for waterfowl. The two major rivers are Indigirka in the western part and Kolyma in the central part. The whole area from Yana in the southeastern Laptev Sea to Kolyma is an extensive wetland area with maritime tundra, swamps, and an accumulative coast with deltas, shoals, beaches and spits. In addition to Indigirka and Kolyma, there are several more rivers in this area including Khroma, Alaseja, and Tsjukotsje.

The Chaun Lowlands around Chaun Bay in the eastern part is another area with important waterfowl habitats. The coast further east on Chukotka is more hilly and rocky with cliffs. Rocky shores are also found on some of the islands of the New Siberian archipelago, which otherwise contain tundra and low-lying and accumulative coasts which are used as breeding and molting habitats by several waterfowl species.

The species composition of waterfowl in the East Siberian Sea is fairly similar to that of the Laptev Sea. The same 3 species of geese (brent, greater white-fronted, bean), about 12 species of ducks, tundra swan, and 3 divers (red-throated, black-throated, white-billed) occur commonly or regularly as breeders also in the East Siberian Sea area. The ducks include 7 sea duck species: all four eiders (common, king, spectacled, Steller's), long-tailed duck, and black and white-winged scoters, 4 dabbling ducks (northern pintail, Eurasian wigeon, common teal, Baikal teal), and the diving duck greater scaup).

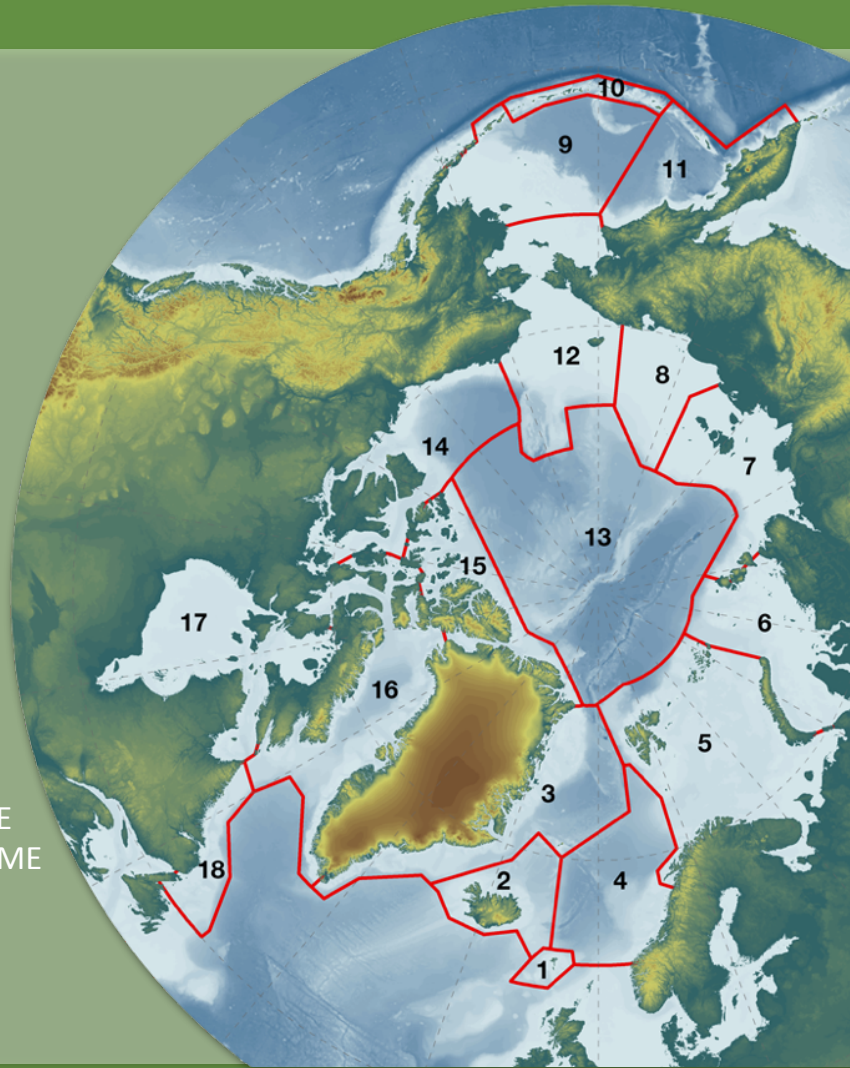
Pacific eider, which is the subspecies *v-nigrum* of common eider, breeds on the New Siberian Islands, Wrangel Island, and the mainland coast eastwards from Kolyma delta. The Pacific eider subspecies nest usually solitary on maritime tundra, often away from the coasts to larger extent than the nominate *mollissima* which is more strongly tied to the sea coast. Loose colonies with breeding densities of up to 30-40 pairs per km² are observed in optimal habitats on Wrangel Island, while west of Chaun Bay Pacific eiders are scarce.

The total world population of Pacific eider has been estimated at 20,000, having declined three- to fourfold since the early 1970s. After breeding the Pacific eiders move to coastal habitats but there is limited information on molting and migration. They winter in the Bering Sea and migrate there via the Chukchi Sea. Many molt on the way or at the wintering quarters, but molting males and non-breeders have been found at sea over shoals in the New Siberian Islands.

Non-breeders remain in coastal habitats during summer and do not move onto the tundra breeding habitats. Staging aggregations prior to fall migration have been observed off the south coast of Wrangel Island. Fall migration along the eastern Chukchi Peninsula takes place in September-October, while the Pacific eiders return back in May, arriving at the New Siberian Islands in late May and the first part of June.

ARCTIC LMEs

1. Faroe Plateau LME
2. Iceland Shelf and Sea LME
3. Greenland Sea-East Greenland LME
4. Norwegian Sea LME
5. Barents Sea LME
6. Kara Sea LME
7. Laptev Sea LME
- 8. East Siberian Sea LME**
9. East Bering Sea LME
10. Aleutian Islands LME
11. West Bering Sea LME
12. Northern Bering-Chukchi Sea LME
13. Central Arctic Ocean LME
14. Beaufort Sea LME
15. Canadian High Arctic - North Greenland LME
16. Canadian Eastern Arctic - West Greenland LME
17. Hudson Bay Complex LME
18. Labrador-Newfoundland LME



LITERATURE REFERENCES

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- *Large Marine Ecosystems (LMEs) of the Arctic area Revision of the Arctic LME map - PAME (2013)*

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