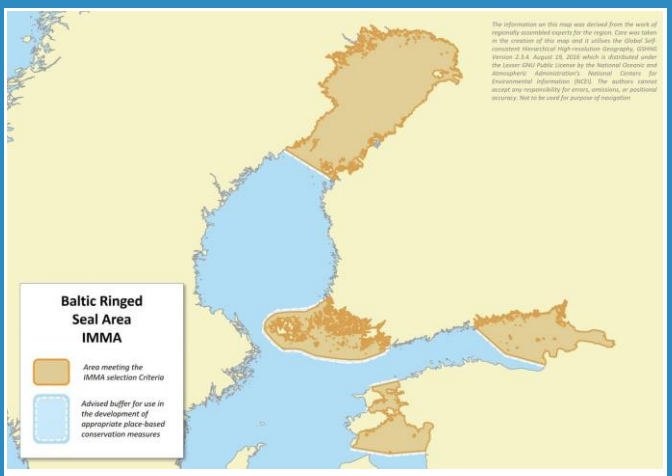

Area Size

76 322 km²

Qualifying Species and Criteria

Baltic ringed seal – *Pusa hispida botnica*

Criterion B (1)

Summary

The Baltic Ringed Seal Area IMMA includes all of the main ice field breeding habitat, as well as moulting areas and continuously used haul outs for the Baltic ringed seal (*Pusa hispida botnica*) population. Ringed seal pups are born and raised on ice and stay in snow lairs until weaning. The ideal habitat for pupping is stable fast ice with hummocks and ridges, and the ringed seals' primary breeding locations depend on ice formation patterns and the extent of stable ice in any given year. The winter ice fields found in the Gulfs of Bothnia, Finland and Riga, and the Archipelago Sea are the exclusive breeding habitats for the Baltic ringed seal population. The current population of 20,000 individuals today is down from formerly 200,000 over 100 years ago. The recovery rate is slow due to the adverse effects of climatic change. Ice fields are shrinking and icebreaking operations to allow shipping during the winter months pose immediate threats to the seal breeding habitat. Other anthropogenic

Baltic Ringed Seal Area IMMA

Summary, continued.

activities such as fishing, shipping, and industrial development of the Baltic Sea watershed area and coast also have severe negative impacts on the ringed seal population.

Description:

The Baltic region has the greatest concentrations of ringed seals within tightly packed, contiguous fast ice formations. These particular ice formations, annually found within the Gulfs of Bothnia, Riga and Finland, as well as in the central part of the Baltic Sea (the Bothnian and Archipelago seas) serve as the vital breeding grounds for the seals since they accumulate snow, allowing for the creation of robust lairs (Härkönen et al., 1998). These lairs are essential for the survival of the seal pups, as they rely heavily on the ice and snow cover throughout the few months of lactation (Helle, 1980; Laidre et al., 2008).

In mild winters, the concentrations of ice that seals can use for breeding are limited to deep inside the gulfs of Finland and Bothnia, as well as in the straits and inlets of the northeastern portion of the Gulf of Riga (Dyrcz, 2017). These areas of ice concentration have become critical reproductive habitats for seals (Sundqvist et al., 2012; Härkönen et al., 2014; HELCOM HOLAS 3 Dataset, 2023). Outside of the Gulf of Bothnia, the Gulf of Finland, and the Gulf of Riga, only low numbers of ringed seals are found in the Bothnian Sea (Harkonen & Heide-Jørgensen, 1990) and in the southwestern archipelago (the Archipelago Sea) of Finland (Helle & Stenman, 1990). It is projected that by 2034, only the Bay of Bothnia will

Figure 1: Baltic ringed seal (*Pusa hispida botnica*) in the Gulf of Finland. Photo credit: Irina Trukhanova

have fairly good winter sea ice habitat for ringed seals (Meier et al., 2004).

During the summer open-water season, Baltic ringed seals prefer to occupy sites surrounded with extensive shallow waters with access to partially submerged rocky ridges, reefs, and boulders. Such habitats are typically located at a certain distance from the mainland, providing an additional level of protection from terrestrial predators and anthropogenic disturbances.

Criterion B: Distribution and Abundance Sub-criterion B1: Small and Resident Populations

The Baltic ringed seal (*Pusa hispida botnica*) is one of five ringed seal subspecies, which occurs only in the Baltic Sea (Wilson & Reeder, 2005; Härkönen et al., 2015). Palo et al. (2001) found low genetic diversity in the subspecies, which was relatively recently dispersed into the Baltic Sea during the Holocene era. A morphometric study found that the Baltic, Ladoga (*P. h. ladogensis*) and Saimaa (*P. h. saimensis*) ringed seal populations are distinct (Hyvarinen & Nieminen, 1990; Amano et al., 2002), and there is no evidence of Baltic ringed seal mixing with its Arctic counterpart. As such, the subpopulation should be considered as a stand-alone management unit.

Ringed seals were once the most abundant seals in the Baltic Sea, with a population of approximately 200,000 individuals over a century ago. However, the current population has drastically declined to only 15,000-20,000 individuals after a major population collapse in the mid-20th century (Halkka & Tolvanen, 2017).

Baltic ringed seals are strictly pagophilic, using fast ice as a platform to give birth and nurse their young (Helle, 1980; Härkönen, 2015). The pups, which are white-coated, are born in snow lairs and remain there with their mothers for up to six weeks, as documented by Helle (1980) and Lydersen and Smith (1989). Following the collapse of the snow lairs in late spring, both adult seals and pups remain on the ice to molt. Traditionally, four distinct subpopulations of Baltic ringed seals are recognized: those that breed in 1) the Gulf of Bothnia (up to 20,000 seals; HELCOM, 2018), 2) the Gulf of Finland (200-300; Trukhanova et al., 2012; 2015, according to unpublished data this is might be down to ~100 animals, pers. comm), 3) the Archipelago Sea (~200-300 seals, Halkka & Tolvanen, 2017), and 4) the Gulf of Riga (1,000; Halkka & Tolvanen, 2017). Earlier studies, such as Palo et al. (2001), found no significant genetic differences among these subpopulations, but satellite tagging data (Härkönen et al., 2008) suggested that the exchange of individuals between them is very limited. The lack of movement between subpopulations has serious consequences for the small and unstable Gulf of Finland subpopulation in particular, for which warm winters and the absence of suitable ice for reproduction have been linked to reported reproductive failures (Härkönen et al., 2008).

Figure 2: Baltic ringed seal (*Pusa hispida botnica*) in the Gulf of Finland. Photo credit: Irina Trukhanova

Ringed seals in the Gulf of Finland form haul out sites on rocky ridges, individual rocks, and reefs between April and June and from September to November (Tormosov & Esipenko, 1990; Dmitrieva, 2000; Verevkin & Sagitov, 2004). The haul out sites are mainly located in the southern and central parts of the Russian waters of the Gulf of Finland, with the waters adjacent to the Kurgalsky Peninsula and Malyy and Moschnyy islands being characterized by large aggregations of seals (Verevkin & Sagitov, 1997, 2004; Loseva & Sagitov, 2015). Although other haul out sites are known in the Gulf of Finland, such as the Berezovyy Archipelago, the Vyborg Bay, and the Luga Bay, the aggregations in the Kurgalsky – Malyy – Moschnyy area are the largest. During the 1970s and 1980s, these aggregations consisted of 100-200 seals hauling out on the Kurgalsky and Kiskolsky Reefs, the Moschnyy and Bolshoy Tyuters islands, and the Vigryund Reef (Tormosov & Esipenko, 1986). Today, despite experiencing a significant decline in their population, Baltic ringed seals can still be observed gathering at various locations within the Kurgalsky – Malyy – Moschnyy area. Several authors (Verevkin & Sagitov, 1997, 2004; Loseva & Verevkin, 2012) have documented dozens of seals hauling out near the Kurgalsky Peninsula during the open-water season. The largest haulouts currently occur in the spring on the Kurgalsky Reef in the vicinity of Remisaar Island and Kiskolsky Reef, with group sizes reaching up to 70 individuals around Remisaar Island and 40-50 individuals on Kiskolsky Reef (Loseva & Sagitov, 2015). Moreover, mixed aggregations of ringed seals and grey seals are seen in the area of the Hitamatola tidal flat and an unnamed tidal flat close to the Ostrovnoy passage. Surveys conducted during April-June and September-November have reported periodic sightings of small groups of resting ringed seals at Luto, Pikhlisar, Kurgalsky capes, Kiryamo locality, and the Reymosaar Island (Loseva & Sagitov, 2015).

Figure 3: Baltic grey seals (*Halichoerus grypus*) in the Gulf of Finland. Photo credit: Anna Loseva

Figure 4: Baltic ringed seal (*Pusa hispida botnica*) in the Gulf of Finland. Photo credit: Anna Loseva

Figure 5: Baltic grey seals (*Halichoerus grypus*) close to the Ostrovnoy passage. Photo credit: Anna Loseva

The warming of the climate (IPCC, 2022) is causing an increase in mild winter frequency in the Baltic Sea region, which is leading to a decline in breeding habitat for ringed seals (Sundqvist et al., 2012). The sea ice is freezing later, breaking up earlier, and melting faster, resulting in a rapid decrease in the total amount of suitable habitat for ringed seals to whelp, nurse their young and molt. As the amount of breeding and molting ice diminishes, the density of seals on the remaining ice fields increases, resulting in overcrowding in breeding habitats for females (Sundquist et al., 2012). This problem is further aggravated by the expanding industrial activities in the area, such as icebreaking operations and shipping, which leads to habitat fragmentation, disturbance to breeding animals, as well as increased risks of collisions and pollution (Wilson et al., 2017, 2020). Thus, the decrease in ice fields triggers a density-dependent process that negatively impacts the weaning weight and survival rate of pups (Sundquist et al., 2012).

Supporting Information

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