

‘Russian Arctic flyway’ – another possible route for Short-tailed Shearwater to access North Atlantic?

Short-tailed Shearwater *Ardenna tenuirostris* is a species of the Pacific Ocean. It breeds on islands off southern Australia, from October-November to April-May, and migrates to productive feeding grounds off Japan and in the Bering Sea for the non-breeding season. Short-tailed seems an unlikely candidate for vagrancy to the North Atlantic. Nevertheless, a moribund individual was found in July 2000 in Florida, USA (Kratter & Steadman 2003). More recently, a spate of North Atlantic records occurred from 2015 to 2020: four sightings of at least two birds from 18 August to 14 October 2017 off Massachusetts, USA (Flood & Fisher 2020); single birds in September 2015 and August 2020 off Bretagne, France (Février et al in press); and a moribund individual in June 2020 in Waterford, Ireland (Archer et al 2021). Several of these

birds were identified retrospectively. Improved knowledge about field identification of Short-tailed and its separation from Sooty Shearwater *A. grisea* and Balearic Shearwater *Puffinus mauretanicus* undoubtedly underlie these records (Flood & Fisher 2019, 2020, Howell & Zufelt 2019). However, the improved knowledge could well be coincidental with an increased likelihood of vagrancy, as follows.

There are three inclusive explanations for these records. First, research and field sightings have recently demonstrated that 1000s of Short-tailed Shearwaters travel to high latitudes of the South Atlantic in the latter part of the breeding season, in March-April (Ryan et al 2017, Flood & Fisher 2020). Therefrom, some of these birds could enter the main body of the Atlantic and continue northwards. Second, millions of Short-tailed migrate to the Bering Sea in the non-breeding season, from April-May to September-October. Northern-summer ice melt in the Canadian Arctic Archipelago

(CAA) has increased significantly in recent years due to climate warming. It is creating open water, peaking in September, and Short-tailed could use this route to pass from the Bering Sea to the north-western Atlantic. Records as far east as Nunavut, roughly in central CAA, demonstrate that this is entirely possible (Flood et al 2021). A third possibility, introduced herein, and comparable with the CAA route, is that northern-summer ice melt in the Russian Arctic is permitting westward passage from the Bering Sea to the North Atlantic. Records summarised below demonstrate that this is also entirely possible.

Ice melt in Russian Arctic

As indicated in Flood et al (2021), there has been an unprecedented modern-day ice melt in the Arctic Ocean due to climate warming. In the Arctic, over 40 years of satellite records show that today, compared with 40 years ago, melt onset commences 12 days earlier and freeze-up 28 days later (Stroeve & Notz 2018). As a result, in Arctic Russia, minimal areas of sea ice in the last decade were recorded in September-October 2012, 2016, and 2018 (Solovyeva et al 2020; eg, figure 1). This has given rise to a greater expanse of open water at the time when Short-tailed Shearwaters are in the eastern sector of the Russian Arctic (eg, figure 2). Looking to the future, models predict that, by 2050, perhaps as early as 2035, the Arctic Ocean

in its entirety could be completely ice free during September (McKeon et al 2016, Thorniley-Walker 2017, Clairbaux et al 2019). This increases the chances of Short-tailed and other fauna crossing the Russian Arctic Ocean, from east to west, and entering the north-eastern Atlantic. The two Short-tailed off Bretagne and one in Waterford (see above) may well have arrived via this route.

Records in Russian Arctic

Sites and specific records mentioned below are shown in figure 3. It is well established that Short-tailed Shearwater is a regular passage migrant in large numbers to the Russian Far East (eg, Shuntov 1982, Koblik & Arkhipov 2014). There are numerous reports for the Russian sector of the far north Bering Sea, eg, c 100 000 birds on 21 September 2017 (Flood & Fisher 2019), while smaller numbers, probably involving non-breeding birds, are found further north in the Chukchi Sea from July to November (Divoky 1972). Portenko (1972) reports seeing many 1000s of birds off Kosa Dvukh Pilotov Island, on the north coast of Chukotka, in September 1939, stating that, 'it is clear that such flocks may fly into the more western parts of the Chukchi Sea.' In July of the same year, Portenko collected two immature birds on Wrangel Island (located in the Arctic Ocean between the Chukchi Sea and East Siberian Sea). Earlier, in August 1928, Short-tailed was recorded at sea east of nearby Herald Island, and between 23 August and 4 September shearwaters (presumably Short-tailed) were common in the Chukchi Sea from the Bering Strait northwards to 69°30'N (Jacques 1930, Portenko 1972). There were several records of Short-tailed near Wrangel Island in September 1980 and September 1984, while 690 corpses

FIGURE 1 Sea ice extent in Arctic Ocean on 16 September 2021 (white area) and median ice edge 1981-2010 (marked by orange line) (National Snow and Ice Data, University of Colorado Boulder, USA)

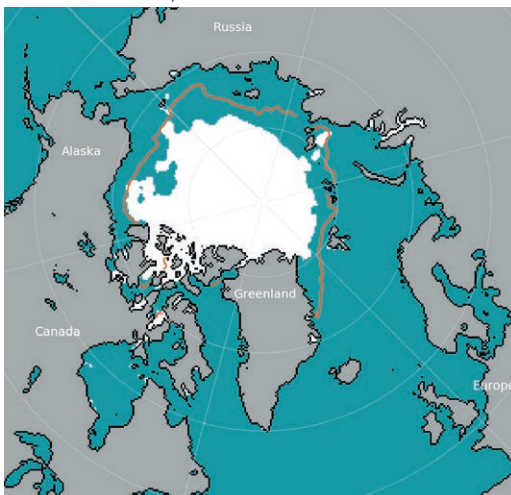


FIGURE 2 Variability in southern border of drift ice in Russian Arctic, September 1954-98 (red line) and 1999-2018 (blue line) (Vinogradnyaya et al 2020)

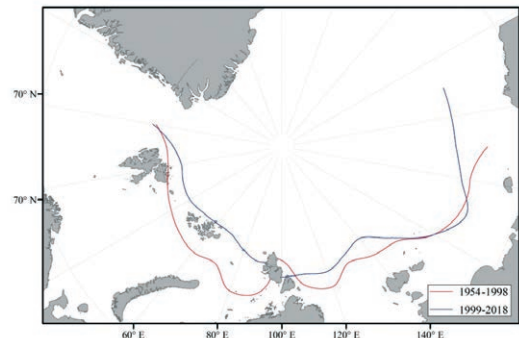




FIGURE 3 Arctic Russia showing sites mentioned in text including following locations of Short-tailed Shearwater *Ardenna tenuirostris*: **A** Knipovich Bay; **B** Chaun Bay; **C** Lake Tytyl; **D** Wrangel Island; **E** Kosa Dvukh Pilotov Island; **F** Herald Island. Yellow circle: at-sea sighting, 13 November 2018, c 30 km from border of Western Palearctic; green circle: at-sea sighting, 3 October 2020; orange, red and blue circles: at-sea sightings, 6, 7 and 10 November 2018. Grey line indicates border between Western Palearctic and Eastern Palearctic; blue line adjacent to Wrangel Island 'D' represents approximate typical annual limit of non-breeding range.

were found on 12 September 2017 in Rogers Bay, southern sector of Wrangel Island, the result of a seabird wreck following stormy weather. The birds had died of starvation (Stishov et al 1991, Babi 2018). BirdLife International (2022) shows, without supporting evidence, the non-breeding range extending westward to the eastern sector of the East Siberian Sea. However, less than 10% of c 70 birds fitted with a geolocator moved west of Wrangel Island (Carey et al 2014; Duncan Sutherland in litt). Thus, historically, Wrangel Island approximately marks the westward range limit in the Russian Arctic.

Recent documented sightings, however, confirm penetration farther west in the Russian Arctic. In July 2012, two corpses of Short-tailed Shearwater, which presumably had died the previous year, were found on the northern coast of Ayopechan Island in Chaun Bay, on the northern coast of the Chukotka Autonomous District, c 450 km west of Wrangel Island (Solovyeva et al 2020). On 27 October 2018, flocks of Short-tailed were observed in the vicinity of the Chaun Bay Biological Station at 68°05'N, 170°03'E. Presumably, this resulted from an unprecedented high temperature of the surface waters of the Bering Sea (3°C above average for 1981-2010) and the Chukchi Sea (4°C above average for 1981-2010) in September 2018 (Weather Nation 2018). A mass die-off was noted from 28 October 2018, with numerous corpses on the tundra (Solovyeva et al 2020). On 2 November 2018, corpses were found along a route between Rytkuchi and Chaun. On 4 No-

vember 2018, flying and dying birds were in the vicinity of the village Ayon, Ayon Island. On 7 November 2018, a moribund individual was found far inland on Lake Tytyl, Western Chukotka at 67°04'N, 169°04'E. Many other corpses were found and the estimated die-off in late October and early November 2018 in Western Chukotka was over half-a-million birds. Severe frosts caused the mass deaths. Birds had moved far west by late summer due to ice melt and on 26 October 2018 were caught by rapid cooling over three days, from -8.6°C (minimum temperature -12°C) to -18.5°C (minimum temperature -26°C) (Solovyeva et al 2020). Larger expanses of open water caused by increased ice melt in the summer have increased the likelihood of rapid ice-growth events during autumn (Stroeve & Notz 2018) as here.

In early November 2018, at least 106 Short-tailed Shearwaters were observed from a research vessel in the Laptev Sea, c 1000 km west of Wrangel Island. C 10% of them were on the ice and could not take off (Adishcheva et al 2021). Some birds remained with the vessel as it continued farther west into the Kara Sea. In worsening sea ice conditions, these birds were forced to follow in the ice-free wake of the ship. Many birds broke away in a futile search for ice-free waters and some returned to the wake. Several exhausted birds ditched on the ship's deck where most, if not all of them perished (plate 512; Aleksandr Dyomin pers comm). By 13 November 2018, only six birds continued to follow the vessel. The position at 76°50'N, 71°13'E in the Kara Sea is c 2880 km

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west of Wrangel Island. This is the first record of Short-tailed in the western sector of the Russian Arctic, close to the Barents Sea, and only c 30 km from the border of the Western Palearctic.

On 25 June 2019, a dead male Short-tailed Shearwater was found on the tundra 4 km off Knipovich Bay, northern Taimyr Peninsula, Siberia, at 76°05'18"N, 98°26'29"E by a joint Russian/Dutch expedition (Golovnyuk et al 2019). The location is also in the western sector of the Russian Arctic, c 2300 km west of Wrangel Island. This individual may well have been a victim of the 2018 die-off, although the site is considerably farther west than the Chaun Bay Biological Station. On 3 October 2020, sightings from a research vessel included 52 Short-tailed in the Laptev Sea, east of the Taimyr Peninsula, at 75°27'24"N, 119°11'23"E, c 1800 km west of Wrangel Island (plate 513).

Unlike the Canadian Arctic, there are no other known records of faunal exchanges to the north-eastern Atlantic via the Russian Arctic flyway. This is probably explained by virtually nil observers in the region.

Conclusion

The conclusion for the Russian Arctic follows the conclusion drawn for the CAA (Flood et al 2021). Given the sightings and specimens from the Laptev Sea and Kara Sea, with six birds recorded just c 30 km from the border of the Western Palearctic, small numbers of Short-tailed Shearwaters may already have travelled across the Russian Arctic Ocean to the north-east Atlantic.



512 Short-tailed Shearwater / Dunbekpijlstormvogel *Ardenna tenuirostris*, Laptev Sea, Russia, early November 2018 (Andrei Tretyakov)

Minimal areas of sea ice in 2012, 2016 and 2018 are examples of years in which such transits are increasingly likely. Indeed, predictions for a completely ice-free Arctic Ocean in late summer in coming decades point to the inevitability of increasing numbers of Short-tailed reaching the North Atlantic from the Bering Sea, from the east and the west, via the Arctic Ocean.

References

Adishcheva, O S, Kozlov, M S, Ermilova, Y V & Shabalin, N V 2021. Ship-based observations in autumn 2020 of avifauna of the Seas (Barents, Kara and Laptev) and Bays (Gulf of Ob). *Russian J Ornithol* 30: 206-211.

513 Short-tailed Shearwaters / Dunbekpijlstormvogels *Ardenna tenuirostris*, Laptev Sea, Russia, 3 October 2020 (Maksim Kozlov)



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- Archer, P, Flood, R L, Allen, A, Jacques, A, Acampora, H, Senfeld, T, Shannon, T J & Collinson, J M 2021. Short-tailed Shearwater at Tramore, Ireland, in June 2020. *Dutch Birding* 43: 183-197.
- Baby, U V 2018. [On the seabird wreck in the seas around Wrangel Island in September 2017.] *Russian J Ornithol* 27, Express Issue 1605: 2136-2137. [In Russian.]
- BirdLife International 2022. Species factsheet: Short-tailed Shearwater *Ardenna tenuirostris*. Website: <https://tinyurl.com/2wm7935c>. [Accessed 6 August 2022.]
- Carey, M J, Phillips, R A, Silk, J R D & Shaffer, S A 2014. Trans-equatorial migration of Short-tailed Shearwaters revealed by geolocators. *Emu* 114: 352-359.
- Claireaux, M, Fort, J, Mathewson, P, Porter, W, Ström, H & Grémillet, D 2019. Climate change could overturn bird migration: transarctic flights and high-latitude residency in a sea ice free Arctic. *Sci Rep* 9: 17767.
- Divoky, G J 1972. The pelagic birds and mammals of the Chukchi Sea in fall. Thesis Michigan State University, Michigan.
- Février, Y, Reyt, S & Roques, S in press. Première mention du puffin à bec grêle *Ardenna tenuirostris* en France. *Ornithos*.
- Flood, R L & Fisher, E A 2019. Identification of Short-tailed Shearwater in the North Atlantic Ocean. *Br Birds* 112: 250-263.
- Flood, R L & Fisher, E A 2020. North Atlantic seabirds: shearwaters, Jouanin's & White-chinned Petrels. Scilly.
- Flood, R L, Richards, J M, Gaston, A J & Zufelt, K 2021. 'Canadian Arctic flyway' – possible route for Short-tailed Shearwater to access North Atlantic. *Dutch Birding* 43: 198-202.
- Golovnyuk, V V, Popovkina, A B, Van Horn, J, & Kuehn, S 2019. [The first record of the Short-tailed Shearwater (*Puffinus tenuirostris*) in the western sector of the Russian Arctic.] *Ornithol* 43: 110-111. [In Russian.]
- Howell, S N G & Zufelt, K 2019. *Oceanic birds of the world*. Princeton.
- Jacques, F L 1930. Water birds observed on the Arctic Ocean and the Bering Sea, in 1928. *Auk* 47: 353-366.
- Koblik, E A & Arkhipov, V Yu 2014. [Bird fauna of the countries of Northern Eurasia within the boundaries of the former USSR: lists of species.] *Zool Issledovaniya* 14: 1-171. [In Russian.]
- Kratler, A W & Steadman, D W 2003. First Atlantic Ocean and Gulf of Mexico specimen of Short-tailed Shearwater. *North Am Birds* 57: 277-279.
- McKeon, C S, Weber, M X, Alter, S E, Seavy, N E, Crandall, E D, Barshis, D J, Fechter-Leggett, E & Oleson, K L L 2016. Melting barriers to faunal exchange across ocean basins. *Glob Change Biol* 22: 465-473.
- Portenko, L A 1972. [The birds of the Chukotka Peninsula and Wrangel Island 1.] Leningrad. [In Russian.]
- Ryan, P G, Le Bouard, F & Lee, J 2017. Westward range extension of Short-tailed Shearwaters *Ardenna tenuirostris* in the Southern Ocean. *Polar Biol* 40: 2323-2327.
- Shuntov, V P 1982. [Order Tubenoses Procellariiformes. In: Il'ichev, V D & Flint, V Ye (editors), *Birds of the USSR: History of the study, loons, grebes, tubenoses*], Moscow, p 352-427. [In Russian.]
- Solovyeva, D V, Regel, K V, Pavluykov, K G & Pavluykov, G K 2020. [Case of mass mortality of the Short-tailed Shearwater *Puffinus tenuirostris* (Temminck, 1835) in Western Chukotka.] *Bull North-East Sci Center, Russia Acad Sci Far East Branch* 2020 (2): 93-97. [In Russian.]
- Stishov, M S, Pridatko, V I & Barabyuk, V V 1991. [The birds of Wrangel Island.] Novosibirsk. [In Russian.]
- Stroeve, J & Notz, D 2018. Changing state of Arctic sea ice across all seasons. *Environ Res Lett* 13: 103001.
- Thorniley-Walker, R 2017. Briefing: updates on Arctic Ocean ice graphs for 2016/2017 indicate very short timescales. *Proc Inst Civ Eng* 170: 58-60.
- Vinogradnyaya, E S, Egorova, E S, Sheveleva, T V & Yulin, A V 2020. [Variability of the spring old ice and fall residual ice boundary in the Arctic Ocean over the current period of climate changes.] *Russian Arctic* 9 (9): 41-55. [In Russian.]
- Weather Nation 2018. Alaska's 2018 early fall extremes. Website: <https://tinyurl.com/2p8p6xh6>.

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