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1 RARELY RECORDED SEABIRD SPECIES

1.1 Black-headed gull

1.1.1 Ecology and status

1. Black-headed gulls form breeding colonies from just a few birds to over 10,000 AON. Breeding colonies may be located by the sea or inland. 46% of the population was found to be breeding inland during the Seabirds Count (2015-2021) census (Burnell et al. 2023). High densities of breeding colonies are present in Orkney, but fewer colonies are present along the northern coast of mainland Scotland (Burnell et al. 2023; Balmer et al. 2013). Black-headed gull populations are dispersive in the non-breeding season. This species is more coastal in its distribution in Scotland than other small gulls (Balmer et al. 2013).

2. Black-headed gull is an Amber-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). The last seabird census, Seabirds Count (2015-2021), estimated Britain and Ireland's black-headed gull breeding population to be 105,102 AON of which approximately 10% were in Scotland (Burnell et al. 2023). Overall, this latest British and Irish population represented a 26% decline since Seabird 2000 when 142,045 AON were recorded (Burnell et al. 2023). Declines in Scotland have been particularly severe, with the black-headed gull population decreasing by 75% since Seabird 2000, from an estimated 43,063 to 10,785 AON. In Orkney, the number has declined by 53% since Seabird 2000 (Burnell et al. 2023).

3. The HPAI virus (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 2.3**) is now known to have impacted black-headed gull survival at some breeding colonies around the UK between 2021 to 2023 (Tremlett et al. 2024). In a study of UK seabird colony counts following the 2021-22 outbreak of HPAI, Tremlett et al. (2024) considered black-headed gull to be a medium priority target species for additional colony monitoring, in part due to moderate levels of observed HPAI related mortalities in 2022. HPAI mortalities did not occur at all black-headed gull colonies around the UK, and where the virus did occur, it did not impact all colonies equally. At Caithness, on the northeastern coast of mainland Scotland, the number of breeding black-headed gulls decreased by 11% to 50% between the baseline pre-HPAI years (2018-2021) to 2023. However, in Orkney, the number of breeding black-headed gulls increased by 11% to >100% at a number of colonies between the baseline pre-HPAI years (2018-2021) to 2023 (Tremlett et al. 2024). Elsewhere in the UK, some breeding black-headed gull colonies decreased in size, while other colonies increased between the baseline pre-HPAI years (2018-2021) to 2023, the highest decreases were recorded at some colonies in mid- and eastern England and Northern Ireland (Tremlett et al. 2024).

4. The decline of black-headed gull has been most notable in inland areas, whereas declines in the coastal breeding population have been less pronounced (Burnell et al. 2023). Black-headed gulls are opportunistic feeders. Their diet can be wide ranging, including terrestrial and marine invertebrates, agricultural grain and seeds as well as domestic food waste and fishery discards (Mitchell et al. 2004; Jakubas et al. 2020). This species often feeds locally near breeding sites and has a mean maximum foraging range of only 18.5 km (Woodward et al

2019). There are many pressures that could be driving Britain's black-headed gull breeding population decline, e.g. it is likely that changes in agricultural practice and human disturbance at inland breeding colonies are contributing to the decline (Burnell et al. 2023).

1.1.2 Seasons

5. Black-headed gull seasons (breeding season and non-breeding season) are illustrated in **Table 1-1**. September is defined as being split between the breeding and non-breeding seasons for black-headed gull (NatureScot Guidance Note 9, 2023).

Table 1-1 Black-headed gull seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												

1.1.3 Raw observations

6. Out of 27 baseline aerial surveys, one black-headed gull was recorded in flight during one breeding season survey in April 2022 in the south-west corner within the OAA (**Figure 1-1**).

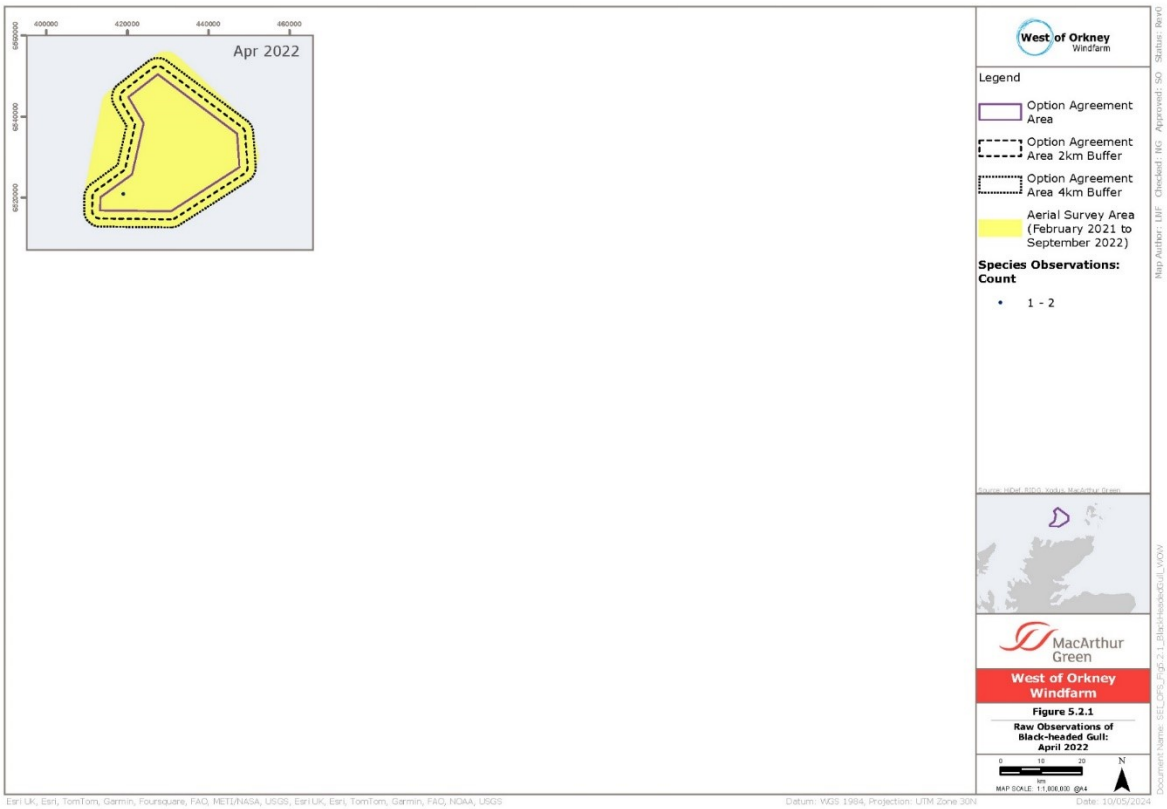

Figure 1-1 Raw observations of black-headed gull: April 2022.

1.1.4 Design-based density estimates

7. A density estimate (± S.D.) of 0.01 ± 0.01 black-headed gull in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report 3.3.1**) for one breeding season month in April 2022. The bootstrap mean, upper & lower C.I. and CV values for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds**.

1.1.5 Design-based abundance estimates

8. An abundance estimate (± S.D.) of 7.74 ± 7.44 black-headed gulls was estimated in the OAA plus 2 km buffer for one breeding season month in April 2022, this species was not recorded in a second breeding season during baseline surveys. The bootstrap upper & lower C.I. and CV value for this abundance estimate is presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

9. An MSP abundance estimate of 3.87 birds was estimated for the breeding season (calculated as the mean of 7.74 + 0).

10. The single abundance estimate with lower & upper C.I. values recorded for black-headed gull in the OAA plus 2 km buffer in April 2022 is illustrated in **Figure 1-2**.

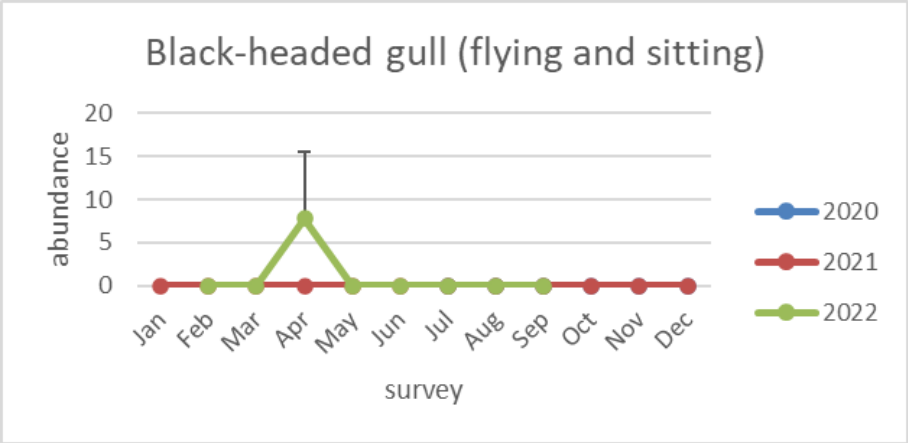

Figure 1-2 Estimated abundance and 95% confidence intervals of all black-headed gulls (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

1.2 Little gull

1.2.1 Ecology and status

11. Little gull is primarily a passage migrant to Britain and Ireland, occurring in both spring and autumn, small numbers winter off the British and Irish coast, particularly in the Irish Sea (Stone et al. 1995; Wernham et al. 2002).

12. Little gull is a Green-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024).

1.2.2 Seasons

13. Little gull seasons (breeding season and non-breeding) are illustrated in **Table 1-2.** April is defined as being split between the breeding and non-breeding seasons for little gull (NatureScot Guidance Note 9, 2023).

Table 1-2 Little gull seasons taken from NatureScot 2023 (Guidance Note 9).

Season	Jan	Feb	Mar	Apr*	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												

*April is a split-month including both breeding and non-breeding seasons (NatureScot Guidance Note 9)

1.2.3 Raw observations

14. Out of 27 baseline aerial surveys, one little gull was recorded in flight during one non-breeding season survey in September 2020 within the southern area of the OAA (**Figure 1-3**).

Figure 1-3 Raw observations of little gull: September 2020.

1.2.4 Design-based density estimates

15. A density estimate (± S.D.) of 0.01 ± 0.01 little gull in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**) for one non-breeding season month in September 2020. The bootstrap mean, upper & lower C.I. and CV value for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds.**

1.2.5 Design-based abundance estimates

16. An abundance estimate (± S.D.) of 7.75 ± 7.51 little gulls was estimated in the OAA plus 2 km buffer for one non-breeding season month in September 2020, this species was not recorded in a second non--breeding season during baseline surveys. The bootstrap mean and CV value for this abundance estimate is presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

17. An MSP abundance of 3.87 birds was estimated for the non-breeding season (calculated as the mean of 7.75 + 0).

18. The single abundance estimate with lower & upper C.I. values recorded for little gull in the OAA plus 2 km buffer in September 2020 is illustrated in **Figure 1-4**.

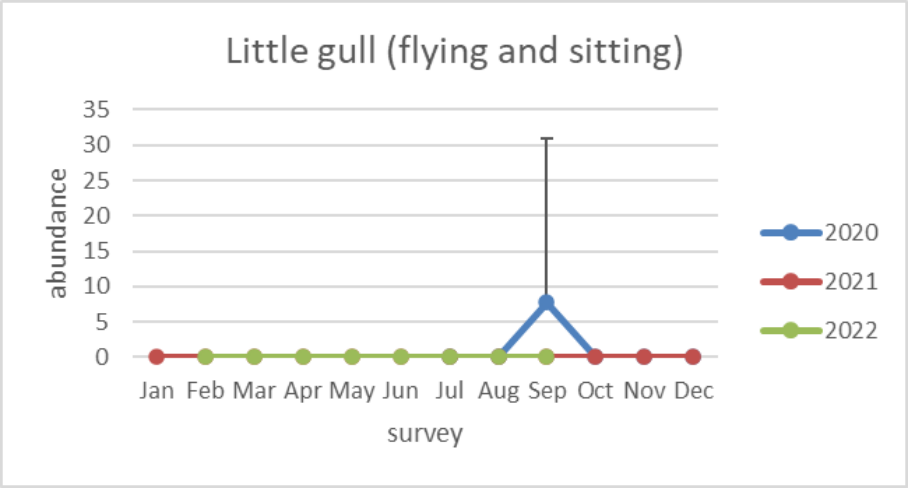

Figure 1-4 Estimated abundance and 95% confidence intervals of all little gulls (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

1.3 Common gull

1.3.1 Ecology and status

19. Common gulls typically nest in small colonies in a wide range of inland and coastal habitats. Birds in Orkney occur in a large number of small colonies scattered across the islands (Burnell et al. 2023). Common gull populations are dispersive, in the non-breeding season this species is more coastal in its distribution in Scotland than other gulls (Balmer et al. 2013).

20. Common gull is an Amber-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). Since Seabird 2000 (1998-2002), the population of common gulls in Britain has fallen by more than half to a current estimate of 22,782 AON. The overall population in Britain and Ireland over the past 20 years has declined by 49% (Burnell et al. 2023). Scotland continues to hold the largest proportion of the British and Irish population (89%). Orkney, as well as Moray and Gordan (north-east Scotland), remain the most important areas for common gulls, despite significant declines, and support 59% of the total breeding population (Burnell et al. 2023).

21. Common gulls have a wide-ranging diet which changes seasonally (Kubetzki et al. 1999) including terrestrial and marine invertebrates, small mammals and fruits as well as fishery discards (Burnell et al. 2023). This species generally feeds near breeding sites and has a mean maximum foraging range of 50 km (Woodward et al 2019). There are many pressures that could be driving Britain's common gull breeding population decline, e.g. declines in productivity have been linked to increases in invasive mammalian predation, although this is not the only pressure driving population decline. A review of changes to common gull colonies in Orkney shows that islands both with and without stoats have experienced dramatic declines in common gulls. Increases in natural predation (e.g. otter and white-tailed eagle), changes in land use, reduction in fishery discards and climate change impacting fish distribution likely all play a role in the population decline (Burnell et al. 2023).

1.3.2 Seasons

22. Common gull seasons (breeding season and non-breeding season) are illustrated in **Table 1-3**.

Table 1-3 Common gull seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												

1.3.3 Raw observations

23. Out of 27 baseline aerial surveys, one common gull was recorded in flight during one breeding season survey in April 2021 within the 2 km buffer surrounding the OAA (**Figure 1-5**).

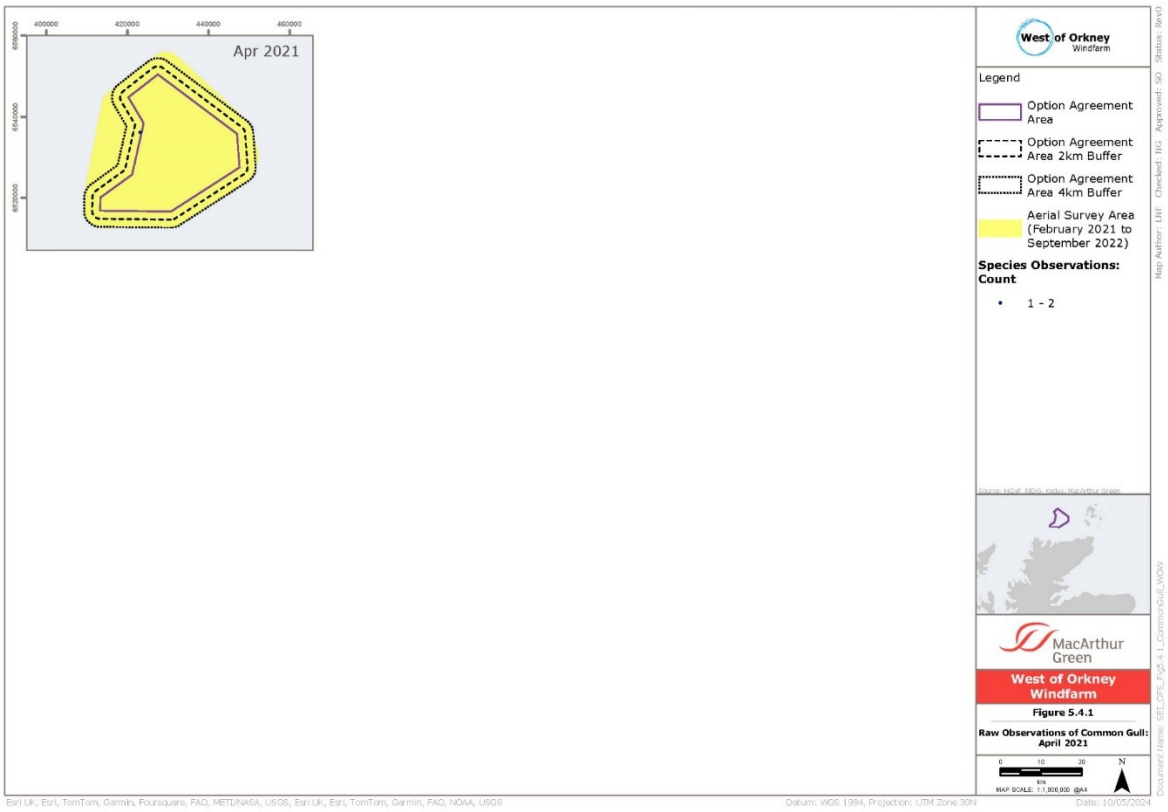

Figure 1-5 Raw observations of common gull: April 2021.

1.3.4 Design-based density estimates

24. Density estimates within the OAA are not presented for common gull because no observations of this species were recorded in the OAA in any of the 27 surveys.

1.3.5 Design-based abundance estimates

25. An abundance estimate (± S.D.) of 7.76 ± 7.15 common gulls was estimated in the OAA plus 2 km buffer for one breeding season month in April 2021, this species was not recorded in a second breeding season during baseline surveys. The bootstrap mean and CV value for this abundance estimate is presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

26. An MSP abundance of 3.88 birds was estimated for the breeding season (calculated as the mean of 7.76 + 0).

27. The single abundance estimate with lower & upper C.I. values recorded for common gull in the OAA plus 2 km buffer in April 2021 is illustrated in **Figure 1-6.**

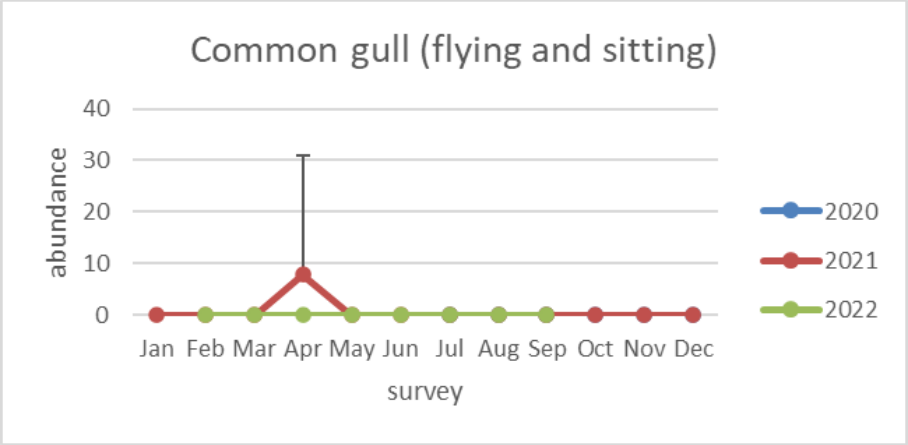

Figure 1-6 Estimated abundance and 95% confidence intervals of all common gulls (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

1.4 Lesser black-backed gull

1.4.1 Ecology and status

28. Lesser black-backed gulls now commonly breed in inland urban habitats although this species still breeds in natural coastal habitats (Burnell et al. 2023). In Scotland, some of the highest density breeding colonies are present on Orkney, although only 17% of the Britain and Ireland's natural-nesting lesser black-backed gull population breeds in Scotland (Burnell et al. 2023). Lesser black-backed gull populations are dispersive, in the non-breeding season this species can be observed at the coast as well as at inland and lowland sites (Balmer et al. 2013).

29. Lesser black-backed gull is an Amber-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). Since Seabirds 2000 (1998-2002), the population of natural-nesting lesser black-backed gulls in Britain has fallen by 43%. The greatest declines have been recorded mainly in coastal areas in Britain and Ireland, whereas the inland population has increased by 5%. A large part of the decline in Britain's natural-nesting lesser black-backed gull numbers is attributable to changes at four large colonies in England (Balmer et al. 2013). On Orkney, natural nesting lesser black-backed gulls have declined by 414% between Seabird 2000 (1998-2002; 1,044 AON) to Seabirds Count 2015-2021; 617 AON).

30. In a study of UK seabird colony counts following the 2021-22 outbreak of HPAI, Tremlett et al. (2024) considered lesser black-backed gull to be a low priority target species due to low levels of observed HPAI related mortalities in 2022. HPAI mortalities did not occur at all lesser black-backed gull colonies around the UK, and where the virus did occur, it did not impact all colonies equally. Lesser black-backed gull breeding colonies in the far north of Scotland appeared to be little affected by the HPAI virus, colonies in Orkney and Caithness increased in size between the baseline pre-HPAI years (2015-2021) to 2023 (Tremlett et al. 2024). Some lesser black-backed gull breeding colonies did decrease in the Western Isles, but the biggest decrease (29%) in Scotland was within the Forth Islands SPA. Elsewhere in the UK, some breeding lesser black-backed gull colonies decreased in size, while other colonies increased

between the baseline pre-HPAI years (2015-2021) to 2023, the highest decreases were recorded at some colonies in Wales, Norfolk and the Isles of Scilly (Tremlett et al. 2024).

31. Lesser black-backed gulls have an omnivorous diet of both marine and terrestrial foods including vertebrates, invertebrates, plant material and human waste (Ross-Smith et al. 2014). This species has a mean maximum foraging range of 127±109 km (Woodward et al 2019). There are many reasons that could be influencing Britain's lesser black-backed gull breeding population decline; it is possible cessation of fishery discards and closure of landfill sites as well as human disturbance contributes to the decline (Burnell et al. 2023).

1.4.2 Seasons

32. Lesser black-backed gull seasons (breeding season, non-breeding season, BDMPS spring and autumn migration and winter period) are illustrated in **Table 1-4.** March is defined as being split between the breeding and non-breeding seasons for lesser black-backed gull (NatureScot Guidance Note 9, 2023).

Table 1-4 Lesser black-backed gull seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar*	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												
Spring migration												
Autumn migration												
Winter												

*March is a split-month including both breeding and non-breeding seasons (NatureScot Guidance Note 9)

1.4.3 Raw observations

33. Out of 27 baseline aerial surveys, one lesser black-backed gull was recorded sitting on the sea during one breeding season survey in August 2021 in the southern area of the OAA (**Figure 1-7**).

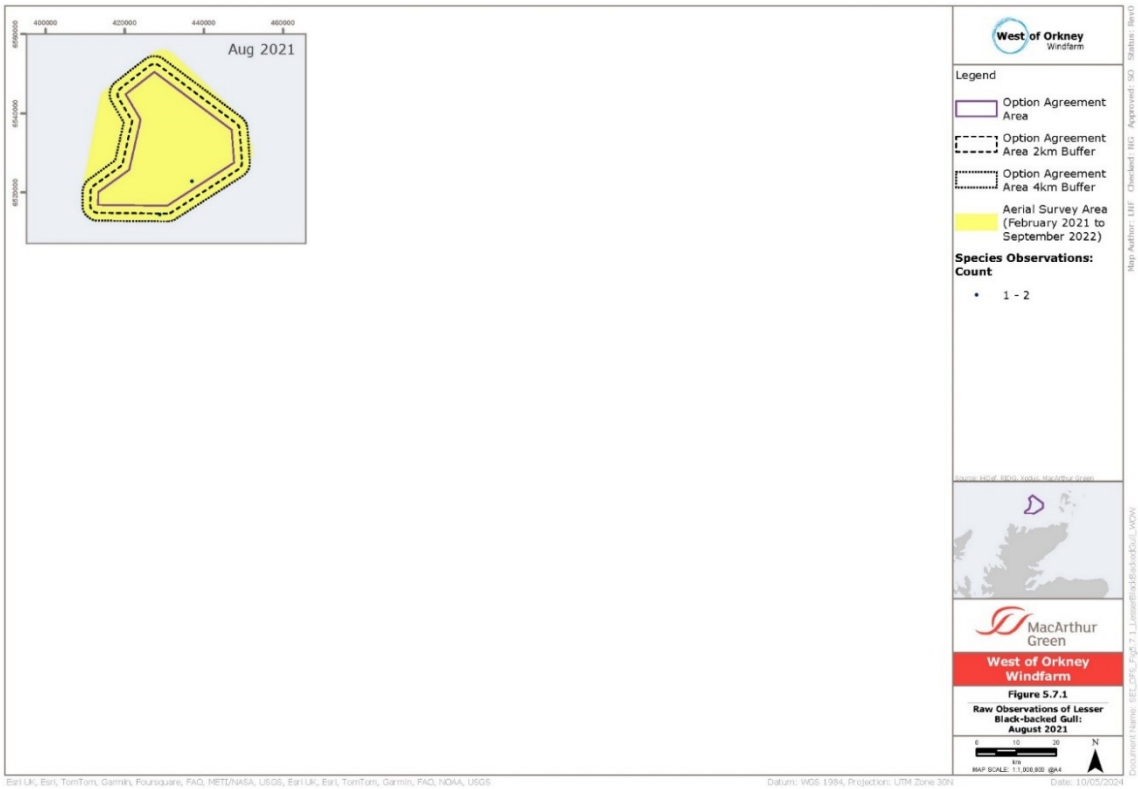

Figure 1-7 Raw observations of lesser black-backed gull: August 2021.

1.4.4 Design-based density estimates

34. Tables of density estimates within the OAA are not presented for lesser black-backed gull because no observations of birds in flight for this species were recorded in the OAA.

1.4.5 Design-based abundance estimates

35. An abundance estimate (± S.D.) of 7.74 ± 7.16 lesser black-backed gulls was estimated in the OAA plus 2 km buffer for one breeding season month in August 2021, this species was not recorded in a second breeding season during baseline surveys. The bootstrap mean, upper & lower C.I. and CV value for this abundance estimate is presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

36. An MSP abundance of 3.87 birds was estimated for the breeding season (calculated as the mean of 7.74 + 0).

37. The single abundance estimate with lower & upper C.I. values recorded for lesser black-backed gull in the OAA plus 2 km buffer in August 2021 is illustrated in **Figure 1-8**.

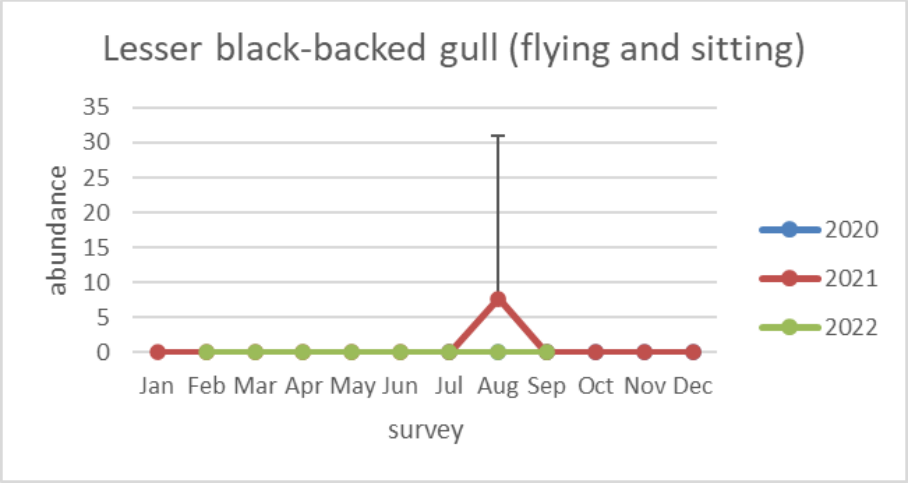

Figure 1-8 Estimated abundance and 95% confidence intervals of all lesser black-backed gulls (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

1.5 Common tern

1.5.1 Ecology and status

38. Common terns breed around the coastline as well as at inland waterbodies, this species will also nest on human structures such as docks, rafts and occasionally rooftops (Balmer et al. 2013). Breeding colonies are present on Orkney and the northern coast of Scotland (Burnell et al. 2023). Common tern is a migratory species. Birds typically arrive in Britain and Ireland between early April and mid-May. After breeding they disperse to complete their moult before migrating between late August and mid-October (Burnell et al. 2023). UK breeding populations primarily winter along the Gulf of Guinea coast between Sierra Leone and Ghana (Wernham et al. 2002).

39. Common tern is an Amber-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). The last seabird census, Seabirds Count (2015-2021), estimated Britain and Ireland's common tern breeding population to be 17,089 AON of which approximately 24% were in Scotland (Burnell et al. 2023). In Scotland, the common tern population of 4,071 AON is the lowest ever recorded by any national census and represents a 24% decline in Scotland since Seabird 2000 (Burnell et al. 2023). Many small colonies across Orkney have disappeared although there has been a 2.6% mean annual increase in the number of breeding terns in Orkney between Seabird 2000 (1998 – 2002) and Seabirds Count (2015-2021).

40. The HPAI virus (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report 2.3**) is now known to have impacted common tern survival at breeding colonies around the UK between 2021 to 2023 (Tremlett et al. 2024). In a study of UK seabird colony counts following the 2021-22 outbreak of HPAI, Tremlett et al. (2024) considered common tern to be a high priority target species in part due to high levels of observed HPAI related mortalities in 2022. Closest to the offshore Project, numbers of breeding common terns at a colony in Caithness decreased between 11 to 50% between the baseline pre-HPAI years (2018-

2021) to 2023 (Tremlett et al. 2024). Other colony decreases in Scotland were recorded in the Western Isles, Banff and Buchan, Forth Islands SPA and Imperial Dock Leith SPA (Tremlett et al. 2024). Elsewhere in the UK, the majority of common tern colonies reduced in size between the baseline pre-HPAI years (2018-2021) to 2023, the highest decreases were recorded in Wales, Norfolk and Northern Ireland (Tremlett et al. 2024).

41. In Britain, common terns forage for sandeel primarily, as well as juvenile herring and cod within 10 km of a breeding colony (Perrow et al. 2011; Wilson et al. 2014), mean maximum foraging range is considered to be 18.0±8.9 km (Woodward et al 2019). There are many reasons that could be influencing Britain's common tern breeding population decline including changes in sandeel availability, mammalian predation pressures and human disturbance (Burnell et al. 2023).

1.5.2 Seasons

42. Common tern seasons (breeding season, non-breeding season, BDMPS spring and autumn migration and winter period) are illustrated in **Table 1-5.** September is defined as being split between the breeding and non-breeding seasons for common tern (NatureScot Guidance Note 9, 2023).

Table 1-5 Common tern seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep*	Oct	Nov	Dec
Breeding season												
Non -breeding												
Spring migration												
Autumn migration												

*September is a split-month including both breeding and non-breeding seasons (NatureScot Guidance Note 9)

1.5.3 Raw observations

43. Out of 27 baseline aerial surveys, two common terns were recorded in flight during one breeding season survey in August 2020, one within the 2 km buffer surrounding the OAA and one within the 4 km buffer surrounding the OAA (**Figure 1-9**). One additional common tern was recorded within the 4 km buffer surrounding the OAA in August 2020, but this tern was outside of the survey area (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report**).

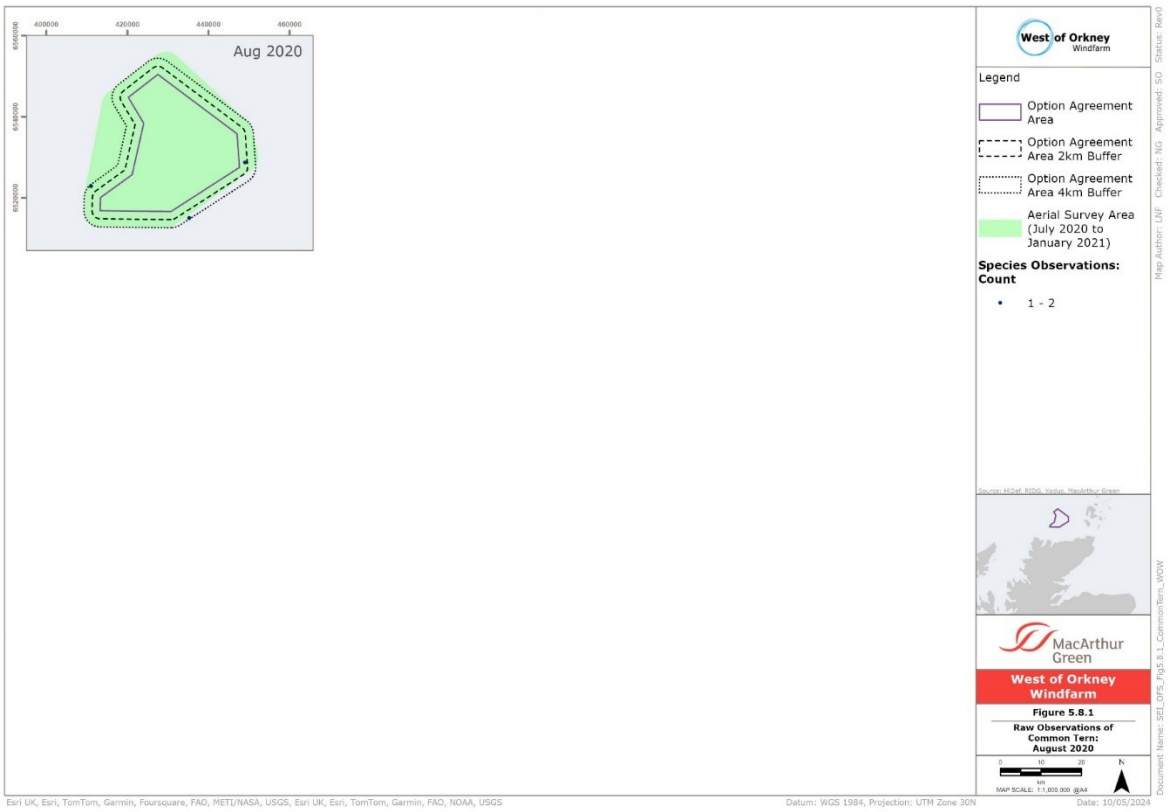

Figure 1-9 Raw observations of common tern: August 2020.

1.5.4 Design-based density estimates

44. Tables of density estimates within the OAA are not presented for common tern because no observations of birds in flight were recorded in the OAA.

1.5.5 Design-based abundance estimates

45. An abundance estimate (± S.D.) of 7.96 ± 6.55 common terns was estimated in the OAA plus 2 km buffer for one breeding season month in August 2020, this species was not recorded in a second breeding season during baseline surveys. The bootstrap mean, upper & lower C.I. and CV value for this abundance estimate is presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

46. As the aerial survey in August 2020 was not part of a complete breeding season for common tern, the abundance estimated in August 2020 was not included in the MSP calculation for this species. An MSP abundance of zero common terns was recorded for the breeding season (**Table 1-6**).

47. The single abundance estimate with lower & upper C.I. values recorded for common tern in the OAA plus 2 km buffer in August 2020 is illustrated in **Figure 1-6**.

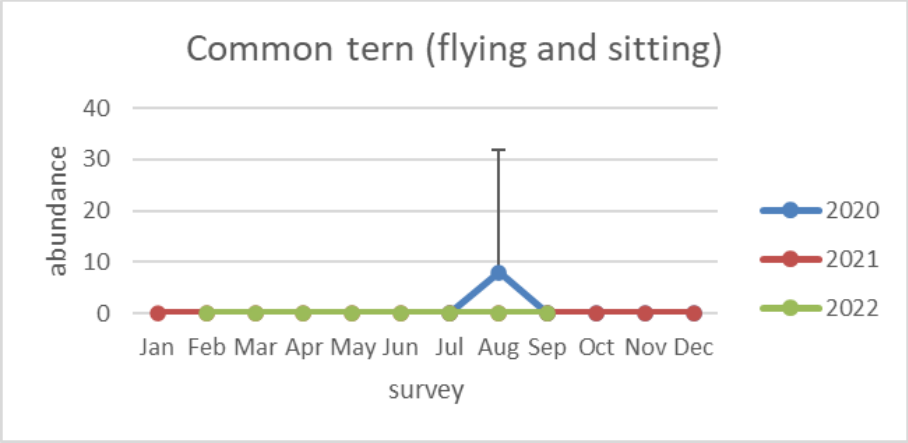

Figure 1-10 Estimated abundance and 95% confidence intervals of all common terns (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-6 Common tern abundance estimates, SDs and lower & upper C.I. values of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer. Large bold abundance estimates were used to calculate Mean Seasonal Peak (MSP) abundance for the breeding season (green), non-breeding season (blue), spring migration (yellow) and autumn migration (orange).

	Common tern Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer							
	Estimate (S.D.)	**95% c.i.**	**Estimate (S.D.)**	**95% c.i.**	**Estimate (S.D.)**	**95% c.i.**	**Estimate (S.D.)**	**95% c.i.**
Season	Breeding season (NatureScot)		Non-breeding season (NatureScot)		Spring migration (BDMPS)		Autumn migration (BDMPS)	
Jul-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Aug-2020	7.96 (6.55)	0-23.89	7.96 (6.55)	0-23.89	7.96 (6.55)	0-23.89	**7.96** (6.55)	0-23.89
Sep-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Oct-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Nov-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Dec-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jan-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Feb-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Mar-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Apr-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
May-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jun-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jul-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Aug-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Sep-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0

	Common tern Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer							
Oct-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Nov-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Dec-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Feb (18th)-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Feb (26th)-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Mar-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Apr-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
May-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jun-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jul-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Aug-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Sep-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
MSP Abundance	**0**		**0**		**0**		**3.98**	

1.6 Arctic skua

1.6.1 Ecology and status

48. In Britain, Arctic skua breeds only in northern and western Scotland on moorlands and coastal grasslands from sea level up to 300 m (Burnell et al. 2023). Scotland is at the southern edge of this species breeding range and Orkney, as well as Shetland and Lewis, hold the largest breeding colonies (Burnell et al. 2023). Arctic skua is a migratory species, in the non-breeding season, Scottish breeding birds winter predominantly off southern Africa, although some birds cross the south Atlantic to winter off South America (Wernham et al. 2002).

49. Arctic skua is a Red-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Endangered by the IUCN (IUCN, 2024). Seabirds Count (2015-2021) recorded 727 AOT in Scotland which represented a breeding population decline of 66% since Seabird 2000 (1998-2002) and a decline of 79% since the SCR Census (1985-1988). In Orkney, the Arctic skua population fell from 724 to 237 AOT between the Seabird 2000 count to the Seabirds Count (Burnell et al. 2023).

50. In a study of UK seabird colony counts following the 2021-22 outbreak of HPAI, Tremlett et al. (2024) considered Arctic skua to be a low priority target species as there were no known UK HPAI in 2021 or 2022 (no Arctic skuas had tested positive for HPAI in the UK, though there were some suspected, but un-tested, cases, and HPAI had been confirmed in the species globally; FAO, 2023). Within the Rousay SPA, which is designated for breeding Arctic skua, numbers fell from 11 AOT during the baseline pre-HPAI years (2016-2021) to 7 AOT in 2023, a decrease of 36%. Within other SPAs on Orkney designated for Arctic skua including Hoy SPA

and Papa Westray (North Hill and Holm) SPA, there were no changes to the colony sizes between the baseline pre-HPAI years (2016-2021) to 2023 (Tremlett et al. 2024). Elsewhere in Scotland, Arctic skua colony decreases were recorded in Shetland, Fair Isle and the Western Isles between the baseline pre-HPAI years (2016-2021) to 2023 (Tremlett et al. 2024).

51. Arctic skuas are primarily kleptoparasites (they deliberately steal food (usually small fish) from other seabirds, especially terns, small gulls and auks) but invertebrates, birds and eggs may be eaten at times when the availability of fish to steal is low. This species feeds very close to their breeding colonies and has a mean maximum foraging range of 2 ± 0.7 km (Woodward et al 2019). Poor breeding success of Arctic skuas has been linked to a lack of food and predation pressure, climate induced changes to the marine environment limiting the availability of sandeels also contributes to the decline (Burnell et al. 2023). Predation by great skua, which is known to kill Arctic skua chicks, juveniles and occasionally adults (Phillips et al. 1998; Jones et al. 2008) has been shown to adversely affect Arctic Skua populations (Perkins et al. 2018), therefore Arctic skuas potentially could benefit from any HPAI related reductions in the great skua population, if they do not succumb to the virus themselves.

1.6.2 Seasons

52. Arctic Skua seasons (breeding season, non-breeding season, BDMPS spring and autumn migration) are illustrated in **Table 1-7.**

Table 1-7 Arctic skua seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												
Spring migration												
Autumn migration												

1.6.3 Raw observations

53. Raw observations of Arctic skuas are presented for each survey in **Figure 1-11**. Arctic terns were recorded within the OAA plus 4 km buffer in 2 out of 27 surveys. In only one survey (July 2020) were Arctic skuas recorded outside the 4 km buffer. Very low numbers of Arctic skuas were recorded in June or July in 2020 and 2022. One bird was recorded in flight within the OAA in June 2022, flying birds were not recorded within the OAA in any other survey.

54. Arctic skuas displayed a weak spatial pattern across the survey area, observations were scattered across the survey area during June or July in 2020 and 2022.

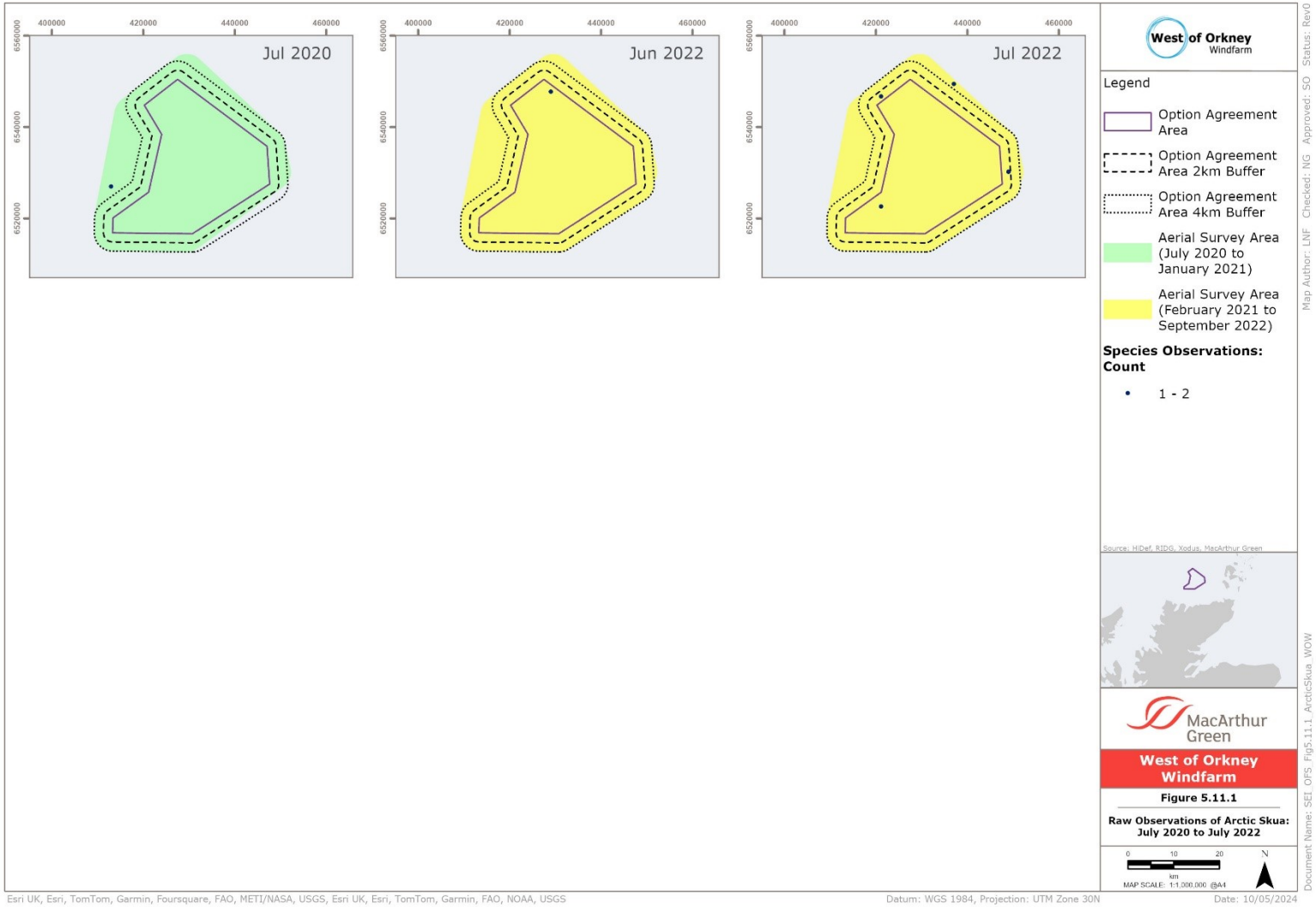

Figure 1-11 Raw observations of Arctic skua: July 2020 to July 2022.

1.6.4 Design-based density estimates

55. A density estimate (± S.D.) of 0.01 ± 0.01 Arctic skua in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**) for one breeding season month in June 2022. The bootstrap mean, upper & lower C.I. and CV value for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds**.

56. Given the very low density of Arctic skuas recorded in the OAA in all survey years, potential HPAI impacts on the density of birds recorded were not detected.

1.6.5 Design-based abundance estimates

57. Arctic skua design-based abundance estimates with S.D. and lower & upper C.I. values calculated using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**) for all birds (sitting and flying) in the OAA plus 2 km buffer in each survey are presented for each appropriate season in **Table 1-8.**

58. The bootstrap means and CV values for these abundance estimates are presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

59. The two abundance estimates with lower & upper C.I. values recorded for all Arctic skuas in the OAA plus 2 km buffer in June and July 2022 are illustrated in **Figure 1-12**. As abundance estimates were higher in 2022, these data do not indicate that Arctic skuas recorded in the OAA plus 2 km buffer were impacted by HPAI virus in 2022 (Tremlett et al. 2024).

60. Arctic skua was only recorded twice in one breeding season (June and July 2022), this species was not recorded during the non-breeding seasons. The MSP abundance of 15.86 birds for the breeding season (calculated as the mean of the peak DAS survey abundance estimate recorded in each complete breeding season) is presented at the bottom of **Table 1-8**.

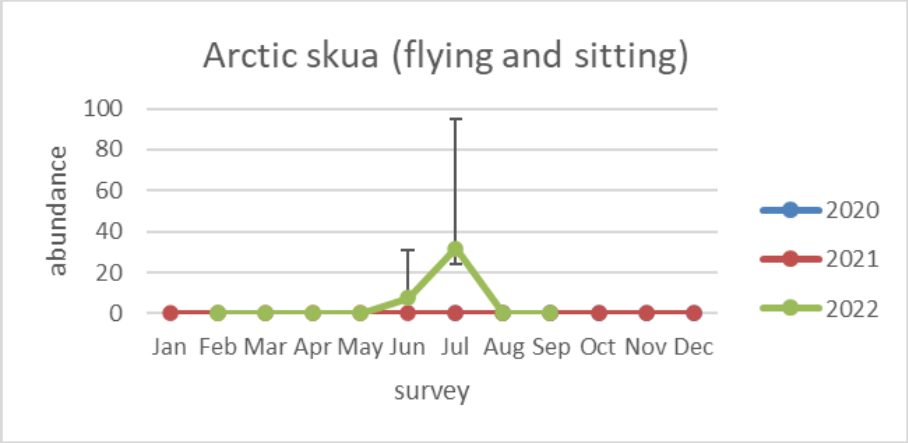

Figure 1-12 Estimated abundance and 95% confidence intervals of all Arctic skuas (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-8 Arctic skua abundance estimates, SDs and lower & upper C.I. values of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer. Large bold abundance estimates were used to calculate Mean Seasonal Peak (MSP) abundance for the breeding season (green), non-breeding season (blue), spring migration (yellow) and autumn migration (orange).

	Arctic skua Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer							
	Estimate (S.D.)	95% c.i.	Estimate (S.D.)	95% c.i.	Estimate (S.D.)	95% c.i.	Estimate (S.D.)	95% c.i.
Season	Breeding season (NatureScot)		Non-breeding season (NatureScot)		Spring migration (BDMPS)		Autumn migration (BDMPS)	
Jul-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Aug-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Sep-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Oct-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Nov-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Dec-2020	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jan-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Feb-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Mar-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Apr-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
May-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jun-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jul-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Aug-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Sep-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Oct-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Nov-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Dec-2021	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0

	Arctic skua Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer							
Feb (18th)-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Feb (26th)-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Mar-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Apr-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
May-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Jun-2022	7.74 (7.07)	0-23.23	7.74 (7.07)	0-23.23	7.74 (7.07)	0-23.23	7.74 (7.07)	0-23.23
Jul-2022	**31.73** (16.48)	7.93-63.45	31.73 (16.48)	7.93-63.45	31.73 (16.48)	7.93-63.45	31.73 (16.48)	7.93-63.45
Aug-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
Sep-2022	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0	0 (0)	0-0
MSP Abundance	**15.86**		**0**		**0**		**0**	

1.7 Long-tailed skua

1.7.1 Ecology and status

61. Long-tailed skua is not a breeding species in the UK, nor it is not present in significant numbers during the non-breeding season. Long-tailed skua is the scarcest of the palearctic *Stercorarius* skuas to occur in British and Irish coastal waters, yet it remains a regular passage visitor during both spring and autumn (Wernham et al. 2002).

62. Long-tailed skua is a Green-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024).

1.7.2 Raw observations

63. Out of 27 baseline aerial surveys, one long-tailed skua was recorded in flight during one survey in October 2021 outside of the 4 km buffer surrounding the OAA (**Figure 1-13**). Tables of abundance estimates within the OAA plus 2 km buffer and density estimates within the OAA are not presented for this species because no observations were recorded in these areas.

64. NatureScot 2023 Guidance Note 9 does not define breeding and non-breeding seasons for this species and BDMPS seasons are not provided in Furness, 2015.

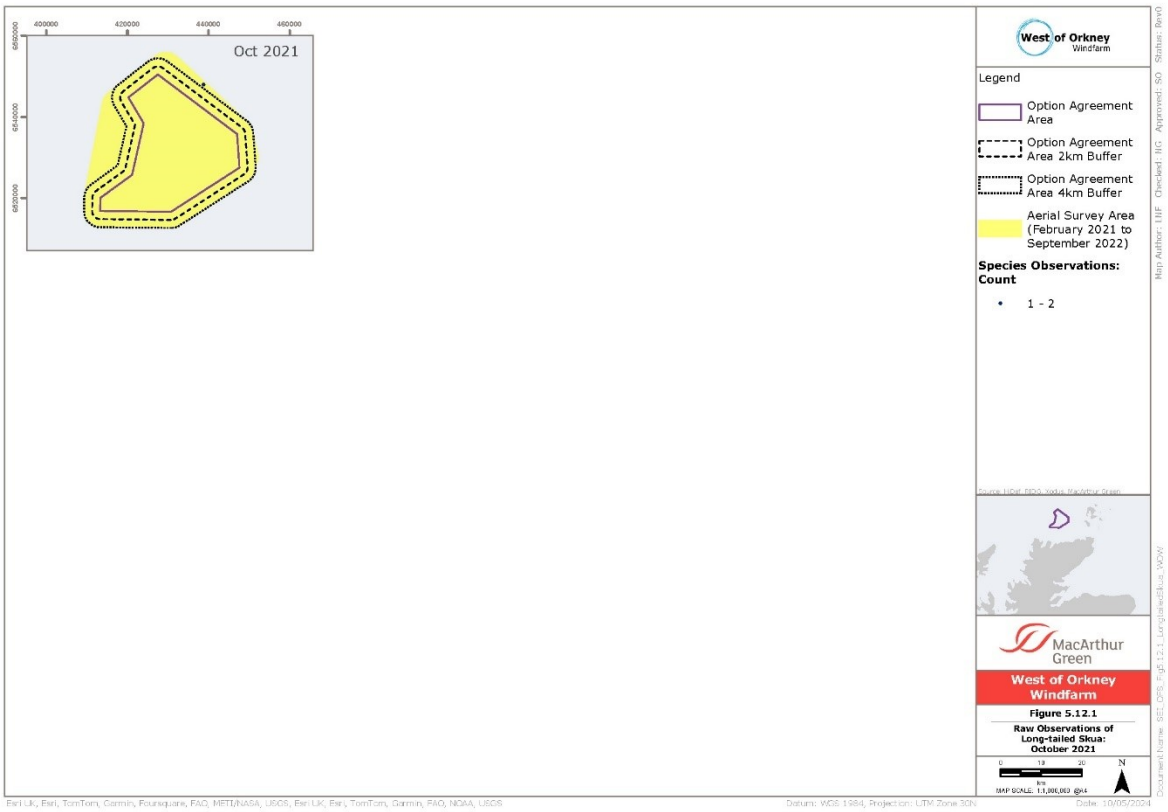

Figure 1-13 Raw observations of long-tailed skua: October 2021.

1.8 Little auk

1.8.1 Ecology and status

65. Little auk is not a breeding species in the UK, nor is it present in significant numbers during the non-breeding season. Little auks breed in large colonies between 68° and 82°N. About 90% of the world population breeds in Svalbard and in the Thule district off northwest Greenland (Wernham et al. 2002). Little auks winter pelagically to the south of the breeding colonies and are scarce winter visitors to the coasts of Britain and Ireland (Wernham et al. 2002).

66. Little auk is a Green-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024).

1.8.2 Seasons

67. NatureScot 2023 Guidance Note 9 does not define breeding and non-breeding seasons for this species and DBMPS seasons are not provided in Furness, 2015.

1.8.3 Raw observations

68. Raw observations of little auks are presented for each survey where this species was recorded in **Figure 1-11**. Little auks were recorded within the OAA plus 4 km buffer in 3 out of 27 surveys. Very low numbers of little auks were recorded during the winter months, observations were scattered across the survey area.

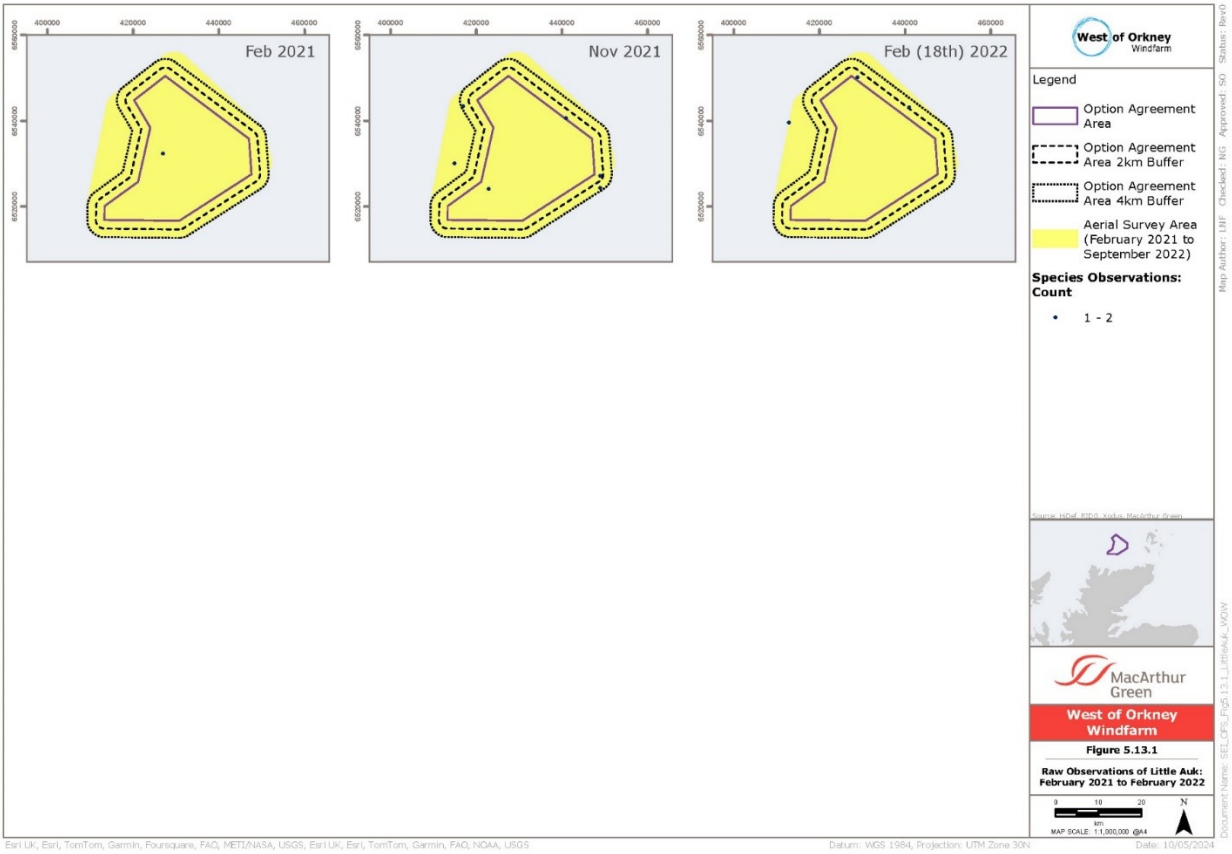

Figure 1-14 Raw observations of little auk: February 2021 to February 2022.

1.8.4 Design-based density estimates

69. Tables of density estimates within the OAA are not presented for little auk because no observations of birds in flight for this species were recorded in the OAA.

1.8.5 Design-based abundance estimates

70. Little auk abundance estimates, with S.D. and lower & upper C.I. values calculated using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**), for all birds (sitting and flying) in the OAA plus 2 km buffer in each survey are presented in

71. Table 1-9. The bootstrap mean, upper & lower C.I. and CV values for these abundance estimates are presented in Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying).

72. As defined seasons are not available for little auk in the UK, an MSP abundance was not calculated for this species.

73. The abundance estimates recorded for little auk in the OAA plus 2 km buffer in August and September 2021 are illustrated in **Figure 1-15**.

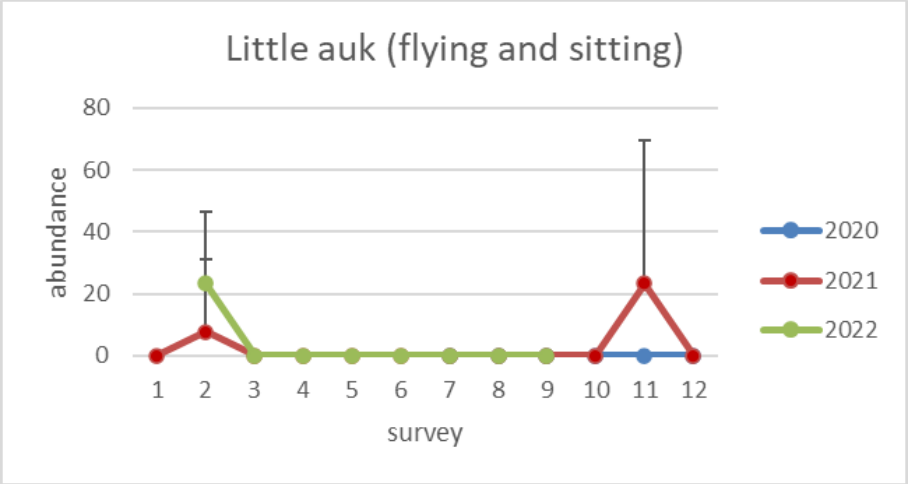

Figure 1-15 Estimated abundance and 95% confidence intervals of all little auks (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-9 Little auk abundance estimates and SDs of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer.

Survey	Little Auk Abundance Estimate in the OAA plus 2 km buffer
Jul-2020	0 (0)
Aug-2020	0 (0)
Sep-2020	0 (0)
Oct-2020	0 (0)
Nov-2020	0 (0)
Dec-2020	0 (0)

Survey	Little Auk Abundance Estimate in the OAA plus 2 km buffer
Jan-2021	0 (0)
Feb-2021	7.75 (7.1)
Mar-2021	0 (0)
Apr-2021	0 (0)
May-2021	0 (0)
Jun-2021	0 (0)
Jul-2021	0 (0)
Aug-2021	0 (0)
Sep-2021	0 (0)
Oct-2021	0 (0)
Nov-2021	23.22 (12.19)
Dec-2021	0 (0)
Feb-2022	7.75 (7.08)
Feb-2022	0 (0)
Mar-2022	0 (0)
Apr-2022	0 (0)
May-2022	0 (0)
Jun-2022	0 (0)
Jul-2022	0 (0)
Aug-2022	0 (0)
Sep-2022	0 (0)

1.9 Black guillemot

1.9.1 Ecology and status

74. Black guillemots are a coastal burrow or cavity nesting species with an almost circumpolar distribution. This species breeds all around the coastlines of the North Atlantic, the Arctic coast of Russia to northernmost Alaska. It is absent only from western arctic Canada (Wernham et al 2002). The British and Irish black guillemot breeding population lies at the southern limit of its global range. In the UK, black guillemot breeds around the northern isles, including Orkney, western Scotland and around most of Ireland (Burnell et al. 2023). Black guillemot is one of the most sedentary seabird species breeding in Britain and Ireland, breeding and non-breeding distributions are similar, although in winter additional records are scattered along the coasts of the North Sea and south-west and southern England, perhaps reflecting limited dispersal away from breeding areas (Balmer et al. 2013).

75. Black guillemot is an Amber-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). From Seabird 2000 (1998-2002) to the latest Seabirds Count (2015-2021) census, the population of black guillemots in Britain and Ireland has fallen overall by 9% from 43,535 to 39,523 individuals (Burnell et al. 2023). The

majority (86%, 33,986 individuals) of the British and Irish population breeds in Scotland and 20% of the population breeds on Orkney. While some populations in Shetland and western mainland Scotland decreased between Seabirds 2000 and Seabirds Count 2015-2021, the Orkney population increased by 33% from 5,820 to 7,754 individuals, and nearby Caithness increased by 35% from 1,184 to 1,602 individuals. On Orkney, the largest population is on North Ronaldsay which recorded 1,057 individuals during Seabirds Count (Burnell et al. 2023).

76. Black guillemots have a varied diet, with a diet including fish, zooplankton, crustaceans and molluscs (Byers et al. 2010). This species feeds very close to breeding sites and has a mean maximum foraging range of 4.9 km (Woodward et al 2019). As black guillemot is at the southernmost limit of its global range in Britain and Ireland it is potentially susceptible to changing environmental conditions and climate change. This species can be sensitive to extreme weather events causing nests to flood and mass mortality 'wreck' events (Burnell et al. 2023).

1.9.2 Seasons

77. Black guillemot seasons (breeding season and non-breeding season) are illustrated in **Table 1-10.**

Table 1-10 Black guillemot seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												

1.9.3 Raw observations

78. Out of 27 baseline aerial surveys, one black guillemot was recorded sat on the water in one survey in July 2021 and another one was recorded in flight in October 2021 (**Figure 1-16**). In March 2021, one observation of black guillemot was recorded just outside the 4 km buffer surrounding the OAA. In all other surveys, this species was not recorded.

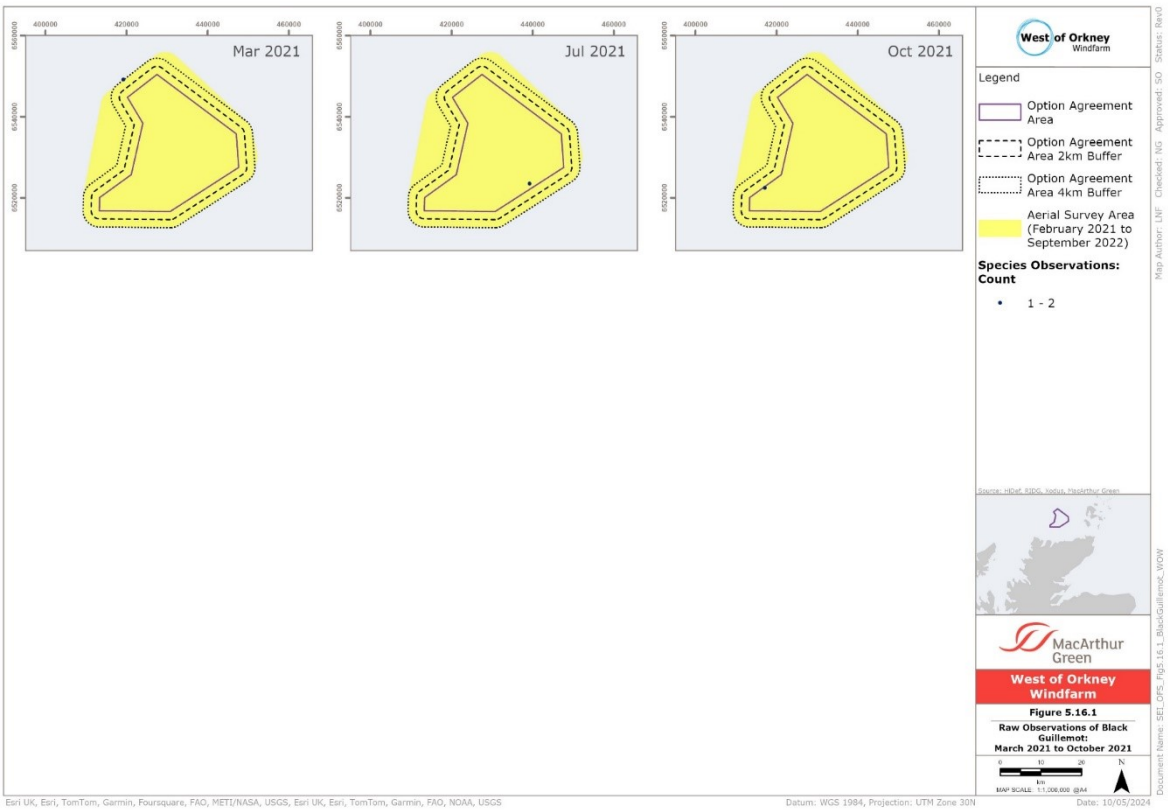

Figure 1-16 Raw observations of black guillemot: March 2021 to October 2021.

1.9.4 Design-based density estimates

79. A density estimate (± S.D.) of 0.01 ± 0.01 black guillemot in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**) for one non-breeding season month in October 2021. The bootstrap mean, upper & lower C.I. and CV values for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds**.

1.9.5 Design-based abundance estimates

80. Black guillemot design-based abundance estimates with S.D. and lower & upper C.I. values calculated using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**) for all birds (sitting and flying) in the OAA plus 2 km buffer in each survey are presented for each appropriate season in

81. Table 1-11. The bootstrap means, upper & lower C.I. and CV values for these abundance estimates are presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

82. Abundance estimates with lower & upper C.I. values recorded in the OAA plus 2 km buffer in July and October 2021 are illustrated in **Figure 1-17.**

83. Black guillemot MSP abundance calculations (calculated as the mean of the peak DAS survey abundance estimate recorded in each complete season) are presented at the bottom of

84. **Table 1-11.** The highest MSP abundance (3.88 birds) was recorded in both the breeding and non- breeding seasons.

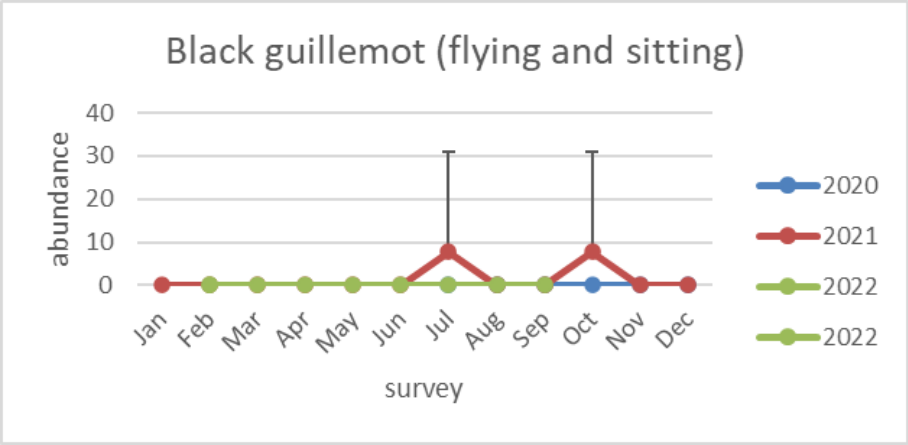

Figure 1-17 Estimated abundance and 95% confidence intervals of all black guillemots (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-11 Black guillemot abundance estimates, SDs and lower & upper C.I. values of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer. Large bold abundance estimates were used to calculate Mean Seasonal Peak (MSP) abundance for the breeding season (green) and non-breeding season (blue).

	Black guillemot Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer			
	Estimate (S.D.)	95% c.i.	Estimate (S.D.)	95% c.i.
Season	Breeding season (NatureScot)		Non-breeding season (NatureScot)	
Jul-2020	0 (0)	0-0	0 (0)	0-0
Aug-2020	0 (0)	0-0	0 (0)	0-0
Sep-2020	0 (0)	0-0	0 (0)	0-0
Oct-2020	0 (0)	0-0	0 (0)	0-0
Nov-2020	0 (0)	0-0	0 (0)	0-0
Dec-2020	0 (0)	0-0	0 (0)	0-0
Jan-2021	0 (0)	0-0	0 (0)	0-0
Feb-2021	0 (0)	0-0	0 (0)	0-0
Mar-2021	0 (0)	0-0	0 (0)	0-0
Apr-2021	0 (0)	0-0	0 (0)	0-0
May-2021	0 (0)	0-0	0 (0)	0-0
Jun-2021	0 (0)	0-0	0 (0)	0-0
Jul-2021	**7.75** (6.94)	0-23.26	7.75 (6.94)	0-23.26
Aug-2021	0 (0)	0-0	0 (0)	0-0
Sep-2021	0 (0)	0-0	0 (0)	0-0
Oct-2021	7.75 (7.08)	0-23.26	**7.75** (7.08)	0-23.26

	Black guillemot Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer			
Nov-2021	0 (0)	0-0	0 (0)	0-0
Dec-2021	0 (0)	0-0	0 (0)	0-0
Feb (18th)-2022	0 (0)	0-0	0 (0)	0-0
Feb (26th)-2022	0 (0)	0-0	0 (0)	0-0
Mar-2022	0 (0)	0-0	0 (0)	0-0
Apr-2022	0 (0)	0-0	0 (0)	0-0
May-2022	0 (0)	0-0	0 (0)	0-0
Jun-2022	0 (0)	0-0	0 (0)	0-0
Jul-2022	0 (0)	0-0	0 (0)	0-0
Aug-2022	0 (0)	0-0	0 (0)	0-0
Sep-2022	0 (0)	0-0	0 (0)	0-0
MSP Abundance	**3.88**		**3.88**	

1.10 Red-throated diver

1.10.1 Ecology and status

85. Red-throated diver is circumpolar in its distribution. Birds spend most of the year at sea, only coming onto freshwater lochans and pools to breed. The British and Irish population lies at the southern end of this species breeding range where it is largely restricted to the north and west of Scotland, with most pairs found in Orkney, Shetland, Caithness, the western fringe of the Highlands and the Outer Hebrides (Wernham et al., 2002; Balmer et al., 2013). In the non-breeding season, red-throated divers move south from their Scottish breeding grounds to overwinter in inshore marine waters along sheltered coasts, only rarely occurring inland on freshwater bodies (Snow and Perrins, 1998). In the UK this species overwinters all around the coast of Britain and Ireland, the highest concentrations are found along the North Sea coasts, in south-west Scotland and in south-west Ireland (Balmer et al., 2013).

86. Red-throated diver is a Green-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). Woodward et al. (2020) estimated a UK population of 1,250 pairs in 2006. In the Scottish population as a whole, there has been considerable regional variation in trends. Breeding numbers in Scotland increased by 38% between 1994 and 2006, and with an apparent increase in numbers away from the Northern Isles, some of the highest densities are found in Caithness (Balmer et al., 2013). Breeding range increased by 11% between 1968/72 – 2007/11, although a 9% range contraction was recorded between 1988/91 – 2007/11 (Balmer et al., 2013). Eaton et al. (2023) stated a weak increase in breeding birds by 38% over 12 years, thus, the national population is considered to be relatively stable, albeit with regional differences.

87. Red-throated divers feed principally on fish. Almost all birds at UK breeding sites commute from their freshwater nesting site to feed at sea in nearby shallow coastal areas. Foraging trips from breeding colonies have a mean maximum foraging range of 4.5 km (Woodward et al. 2019).

1.10.2 Seasons

88. Red-throated diver seasons (breeding season, non-breeding season, BDMPS spring and autumn migration) are illustrated in **Table 1-12**. September is defined as being split between the breeding and non-breeding seasons for red-throated diver (NatureScot Guidance Note 9, 2023).

Table 1-12 Red-throated diver seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep*	Oct	Nov	Dec
Breeding season												
Non -breeding												

*September is a split-month including both breeding and non-breeding seasons (NatureScot Guidance Note 9)

1.10.3 Raw observations

89. Raw observations of red-throated divers are presented for each survey where this species was recorded in **Figure 1-18.** Very low numbers of red-throated divers were recorded within the OAA plus 4 km buffer in 3 out of 27 surveys including October 2020, November 2021 and May 2022. One observation of red-throated diver was recorded outside the survey area in August 2020. Red-throated divers were not recorded in any other survey.

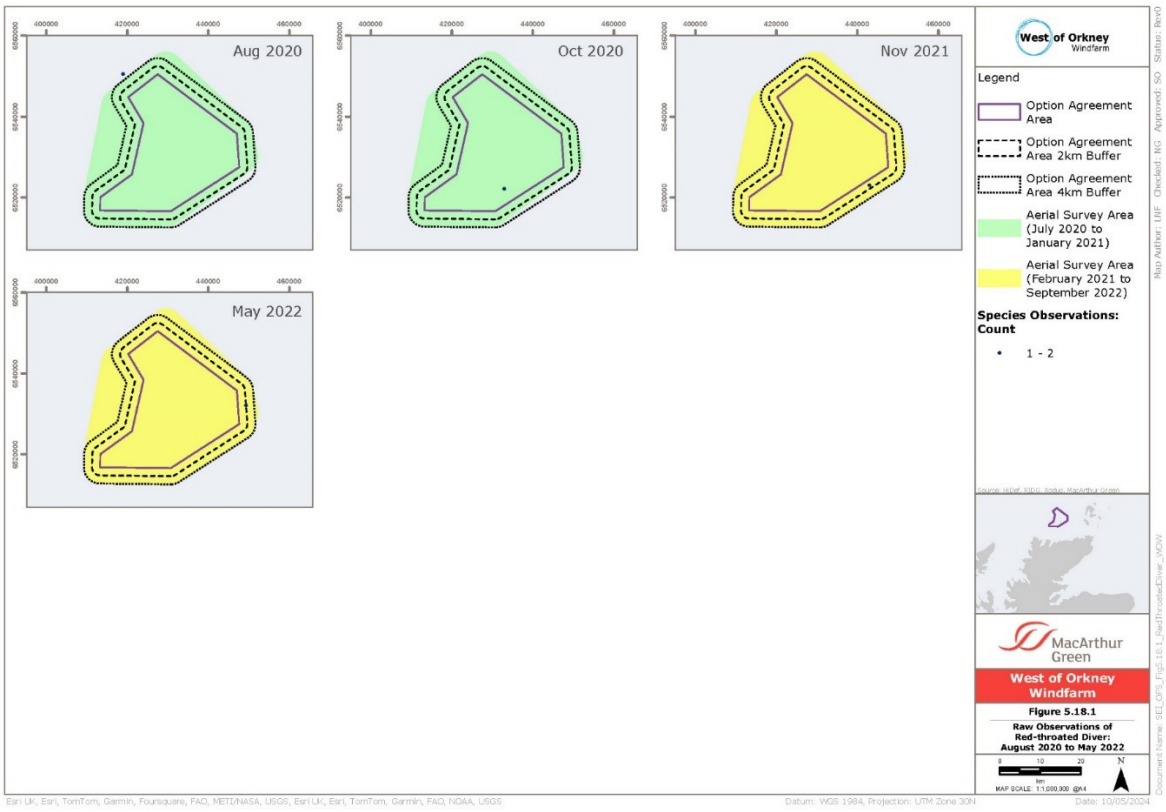

Figure 1-18 Raw observations of red-throated diver: August 2020 to May 2022

1.10.4 Design-based density estimates

90. Tables of density estimates within the OAA are not presented for red-throated diver because no observations of birds in flight for this species were recorded in the OAA in any of the 27 surveys.

1.10.5 Design-based abundance estimates

91. Red-throated diver design-based abundance estimates with S.D. and lower & upper C.I. values calculated using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report 3.3.1**) for all birds (sitting and flying) in the OAA plus 2 km buffer in each survey are presented for each appropriate season in **Table 1-13**

92. The bootstrap mean, upper & lower C.I. and CV values for these abundance estimates are presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying).**

93. Abundance estimates recorded in the OAA plus 2 km buffer in October 2020, November 2021 and May 2022 are illustrated in **Figure 1-19.** Abundance estimates were very low for this species in each survey month.

94. Red-throated diver MSP abundance calculations (calculated as the mean of the peak DAS survey abundance estimate recorded in each complete season) are presented at the bottom of **Table 1-13.**

95. The highest MSP abundance (7.75 birds) was recorded in the non-breeding season. The breeding season MSP abundance estimate was lower (3.88 birds).

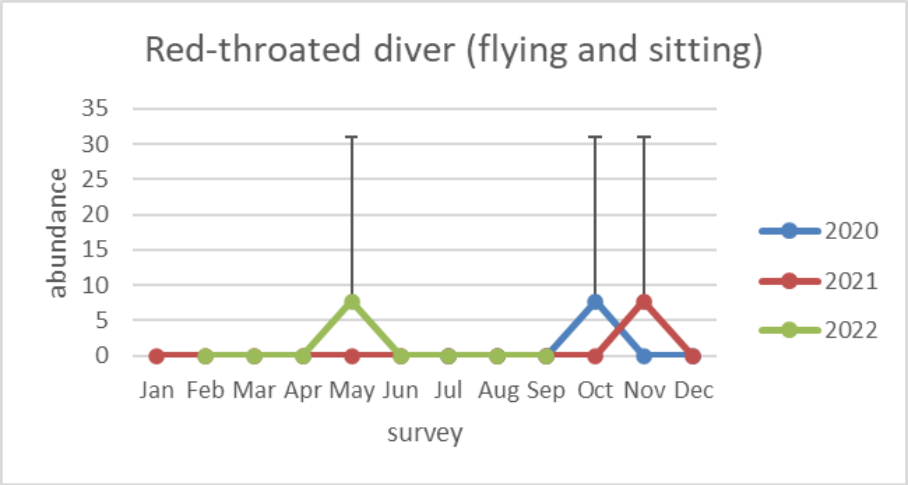

Figure 1-19 Estimated abundance and 95% confidence intervals of all red-throated divers (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-13 Red-throated diver abundance estimates, SDs and lower & upper C.I. values of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer. Large bold abundance estimates were used to calculate Mean Seasonal Peak (MSP) abundance for the breeding season (green) and non-breeding season (blue).

	Red-throated diver Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer			
	Estimate (S.D.)	**95% c.i.**	**Estimate (S.D.)**	**95% c.i.**
Season	Breeding season (NatureScot)		Non-breeding season (NatureScot)	
Jul-2020	0 (0)	0-0	0 (0)	0-0
Aug-2020	0 (0)	0-0	0 (0)	0-0
Sep-2020	0 (0)	0-0	0 (0)	0-0
Oct-2020	7.75 (7.19)	0-23.26	**7.75** (7.19)	0-23.26
Nov-2020	0 (0)	0-0	0 (0)	0-0
Dec-2020	0 (0)	0-0	0 (0)	0-0
Jan-2021	0 (0)	0-0	0 (0)	0-0
Feb-2021	0 (0)	0-0	0 (0)	0-0
Mar-2021	0 (0)	0-0	0 (0)	0-0
Apr-2021	0 (0)	0-0	0 (0)	0-0
May-2021	0 (0)	0-0	0 (0)	0-0
Jun-2021	0 (0)	0-0	0 (0)	0-0
Jul-2021	0 (0)	0-0	0 (0)	0-0
Aug-2021	0 (0)	0-0	0 (0)	0-0
Sep-2021	0 (0)	0-0	0 (0)	0-0

	Red-throated diver Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer			
Oct-2021	0 (0)	0-0	0 (0)	0-0
Nov-2021	7.74 (6.51)	0-23.22	**7.74** (6.51)	0-23.22
Dec-2021	0 (0)	0-0	0 (0)	0-0
Feb (18th)-2022	0 (0)	0-0	0 (0)	0-0
Feb (26th)-2022	0 (0)	0-0	0 (0)	0-0
Mar-2022	0 (0)	0-0	0 (0)	0-0
Apr-2022	0 (0)	0-0	0 (0)	0-0
May-2022	**7.76** (6.2)	0-23.29	7.76 (6.2)	0-23.29
Jun-2022	0 (0)	0-0	0 (0)	0-0
Jul-2022	0 (0)	0-0	0 (0)	0-0
Aug-2022	0 (0)	0-0	0 (0)	0-0
Sep-2022	0 (0)	0-0	0 (0)	0-0
MSP Abundance	**3.88**		**7.75**	

1.11 Great northern diver

1.11.1 Ecology and status

96. Great northern divers are generally winter visitors to the UK. This species migrates south in winter from Arctic breeding grounds. Great northern divers recorded in the UK during spring are likely to be those migrating north, although small numbers do remain to summer in coastal waters in the north and west (Balmer et al., 2013). The coastal waters around the UK hold an internationally important wintering population of great northern divers and this species is also occasionally recorded on inland wetland areas and some larger reservoirs (Balmer et al., 2013; Wernham et al., 2002). The largest concentrations of wintering great northern divers are found in the Northern Isles, Outer Hebrides, north-west Scotland south to Argyll as well as western and southern Ireland (Balmer et al., 2013). In England, this species is abundant off the Cornish coast (Balmer et al., 2013).

97. Great northern diver is an Amber-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). Great northern divers feed primarily on fish up to 28 cm, but the diet can also include crustaceans, molluscs, annelids, insects and amphibians, depending upon location and season (Snow & Perrins, 1998).

1.11.2 Seasons

98. Great northern diver seasons (breeding season and non-breeding season) are illustrated in **Table 1-14**. May is defined as being split between the breeding and non-breeding seasons for great northern diver (NatureScot Guidance Note 9, 2023).

Table 1-14 Great northern diver seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May*	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												

*May is a split-month including both breeding and non-breeding seasons (NatureScot Guidance Note 9)

1.11.3 Raw observations

281. Raw observations of great northern divers are presented for each survey where this species was recorded in **Figure 1-20**. Very low numbers of red-throated divers were recorded within the OAA plus 4 km buffer in 3 out of 27 surveys including one bird in flight in October 2020 and two birds sat on the water including one in May 2021 and the other in May 2022. Great northern divers were not recorded in any other survey.

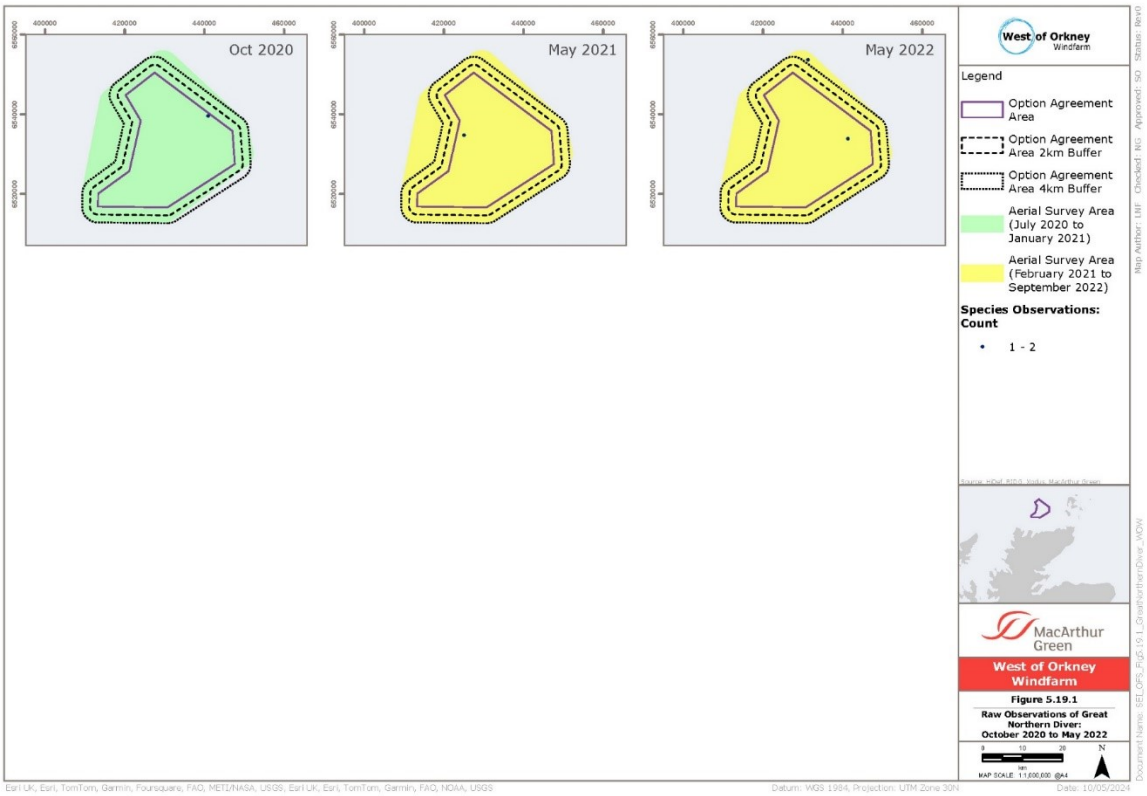

Figure 1-20 Raw observations of great northern diver: October 2020 to May 2022.

1.11.4 Design-based density estimates

99. A density estimate (± S.D.) of 0.01 ± 0.01 great northern diver in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report 3.3.1**) for one breeding season month in October 2020. The bootstrap mean, upper & lower C.I. and CV value for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds**.

1.11.5 Design-based abundance estimates

100. Great northern diver design-based abundance estimates with S.D. and lower & upper C.I. values calculated using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report section 3.3.1**) for all birds (sitting and flying) in the OAA plus 2 km buffer in each survey are presented for each appropriate season in **Table 1-15**.

101. The bootstrap mean, upper & lower C.I. and CV values for these abundance estimates are presented in Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying).

102. Abundance estimates recorded in the OAA plus 2 km buffer in October 2020, May 2021 and 2022 are illustrated in **Figure 1-21.** Abundance estimates were very low for this species in each survey month.

103. Great northern diver MSP abundance calculations (calculated as the mean of the peak DAS survey abundance estimate recorded in each complete season) are presented at the bottom of **Table 1-15**. The highest MSP abundance (7.75 birds) was recorded in the breeding and non-breeding season.

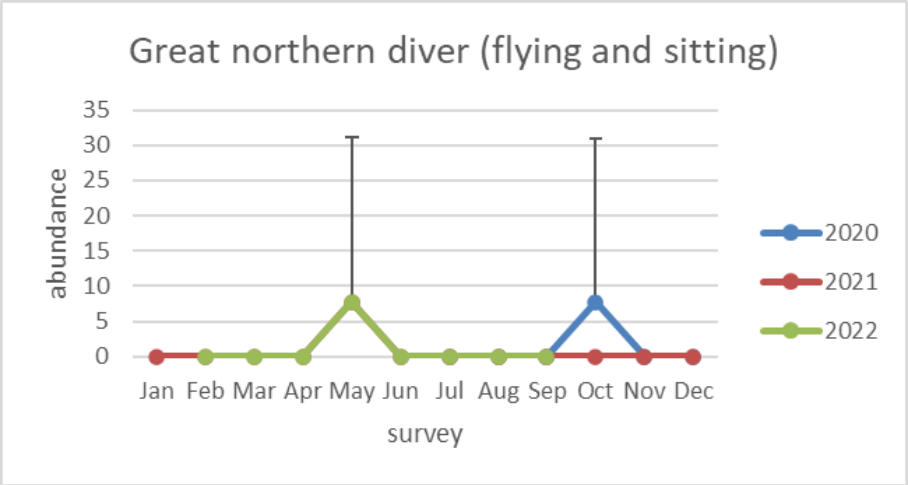

Figure 1-21 Estimated abundance and 95% confidence intervals of all great northern divers (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-15 Great northern diver abundance estimates, SDs and lower & upper C.I. values of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer. Large bold abundance estimates were used to calculate Mean Seasonal Peak (MSP) abundance for the breeding season (green) and non-breeding season (blue).

	Great northern diver Abundance Estimate (S.D.) with lower and upper C.I. values of ALL birds (Sitting and Flying) in the OAA plus 2 km buffer			
	Estimate (S.D.)	95% c.i.	Estimate (S.D.)	95% c.i.
Season	Breeding season (NatureScot)		Non-breeding season (NatureScot)	
Jul-2020	0 (0)	0-0	0 (0)	0-0
Aug-2020	0 (0)	0-0	0 (0)	0-0
Sep-2020	0 (0)	0-0	0 (0)	0-0
Oct-2020	7.75 (7.05)	0-23.26	**7.75** (7.05)	0-23.26
Nov-2020	0 (0)	0-0	0 (0)	0-0
Dec-2020	0 (0)	0-0	0 (0)	0-0
Jan-2021	0 (0)	0-0	0 (0)	0-0
Feb-2021	0 (0)	0-0	0 (0)	0-0
Mar-2021	0 (0)	0-0	0 (0)	0-0
Apr-2021	0 (0)	0-0	0 (0)	0-0
May-2021	**7.75** (6.98)	0-23.25	7.75 (6.98)	0-23.25
Jun-2021	0 (0)	0-0	0 (0)	0-0
Jul-2021	0 (0)	0-0	0 (0)	0-0
Aug-2021	0 (0)	0-0	0 (0)	0-0
Sep-2021	0 (0)	0-0	0 (0)	0-0
Oct-2021	0 (0)	0-0	0 (0)	0-0
Nov-2021	0 (0)	0-0	0 (0)	0-0
Dec-2021	0 (0)	0-0	0 (0)	0-0
Feb (18th)-2022	0 (0)	0-0	0 (0)	0-0
Feb (26th)-2022	0 (0)	0-0	0 (0)	0-0
Mar-2022	0 (0)	0-0	0 (0)	0-0
Apr-2022	0 (0)	0-0	0 (0)	0-0
May-2022	**7.76** (6.72)	0-23.29	**7.76** (6.72)	0-23.29
Jun-2022	0 (0)	0-0	0 (0)	0-0
Jul-2022	0 (0)	0-0	0 (0)	0-0
Aug-2022	0 (0)	0-0	0 (0)	0-0
Sep-2022	0 (0)	0-0	0 (0)	0-0
MSP Abundance	**7.75**		**7.75**	

1.12 Cory's shearwater

1.12.1 Ecology and status

104. Cory's shearwater is not a breeding species in the UK, nor it is not present in significant numbers during the non-breeding season. Cory's shearwaters breed in burrows and crevices at colonies throughout the Mediterranean and sub-tropical Atlantic islands. Late summer movements of this species within the North Atlantic result in varying numbers of sightings annually, usually from southwest Britain and Ireland (Wernham et al. 2002).

105. Cory's shearwater is classed as Least Concern by the IUCN (IUCN, 2024).

1.12.2 Raw observations

106. Out of 27 baseline aerial surveys, one Cory's shearwater was recorded in flight during one survey in August 2021 within the OAA (**Figure 1-22**).

107. NatureScot 2023 Guidance Note 9 does not define breeding and non-breeding seasons for this species and BDMPS seasons are not provided in Furness, 2015.

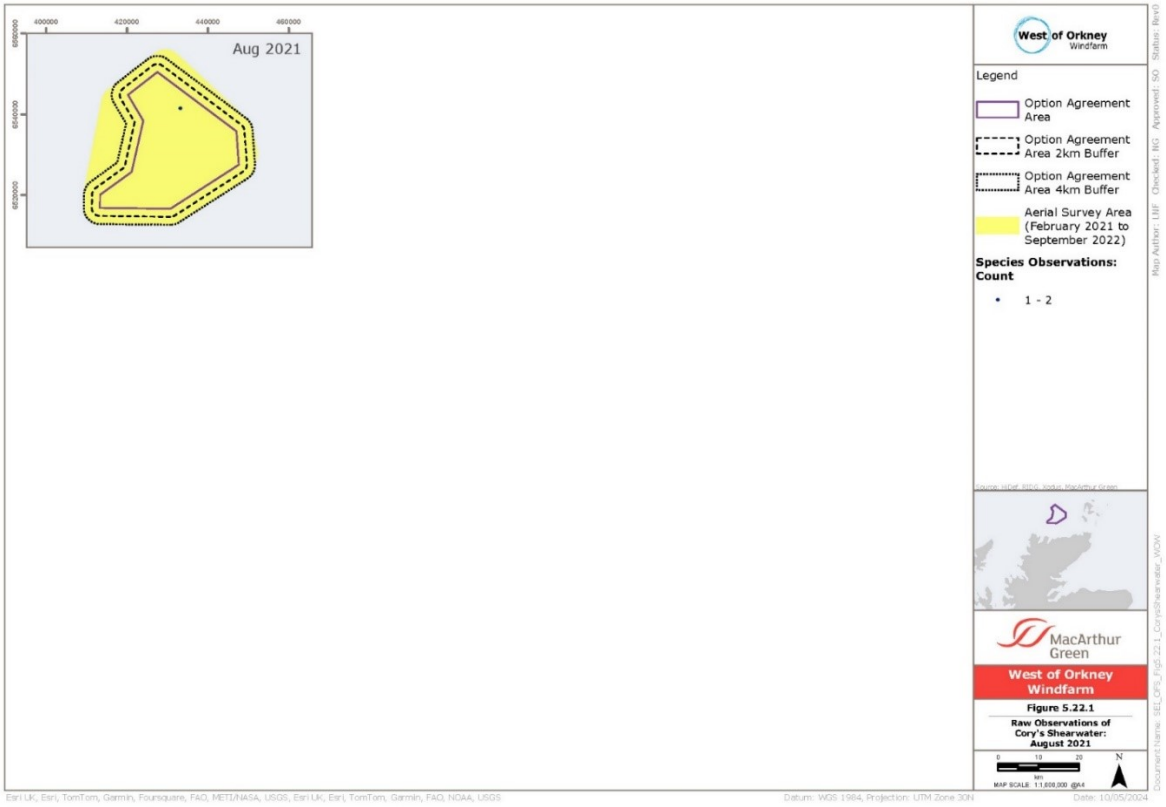

Figure 1-22 Raw observations of Cory's shearwater: August 2021.

1.12.3 Design-based density estimates

108. A density estimate (± S.D.) of 0.01 ± 0.01 Cory's shearwater in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report 3.3.1**) for one month in August 2021. The bootstrap mean,

upper & lower C.I. and CV values for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds**.

1.12.4 Design-based abundance estimates

109. An abundance estimate (± S.D.) of 7.74 ± 7.13 Cory's shearwaters were estimated in the OAA plus 2 km buffer for one month in August 2021. The bootstrap mean, upper & lower C.I. and CV value for this abundance estimate is presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

110. As defined seasons are not available for Cory's shearwater in the UK, an MSP abundance was not calculated for this species.

111. The single abundance estimate recorded for Cory's shearwater with lower & upper C.I. values in the OAA plus 2 km buffer in August 2021 is illustrated in **Figure 1-23**.

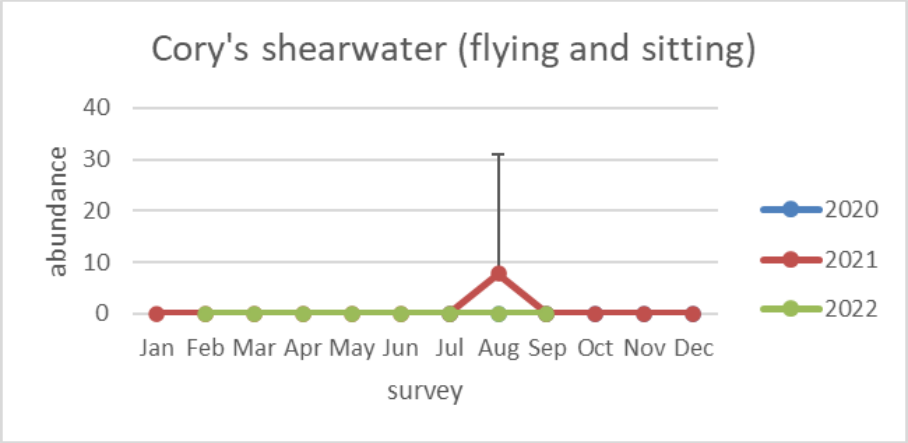

Figure 1-23 Estimated abundance and 95% confidence intervals of all Cory's shearwaters (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

1.13 Sooty shearwater

1.13.1 Ecology and status

112. Sooty shearwater is not a breeding species in the UK, nor it is not present in significant numbers during the non-breeding season. Sooty shearwaters breed in the southern hemisphere, but migration routes into the northern hemisphere brings relatively small numbers of birds into coastal waters off Britain and Ireland in late summer (Wernham et al. 2002).

113. Sooty shearwater is classed as Near Threatened by the IUCN (IUCN, 2024).

1.13.2 Raw observations

114. Out of 27 baseline aerial surveys, two individual sooty shearwaters were recorded during one survey in August 2021 (one bird flying within the OAA, one bird flying within the 2 km buffer surrounding the OAA) within the OAA plus 2 km buffer and another individual was recorded in September 2021 within the OAA plus 2 km buffer (**Figure 1-24**).

115. NatureScot 2023 Guidance Note 9 does not define breeding and non-breeding seasons for this species and BDMPS seasons are not provided in Furness, 2015.

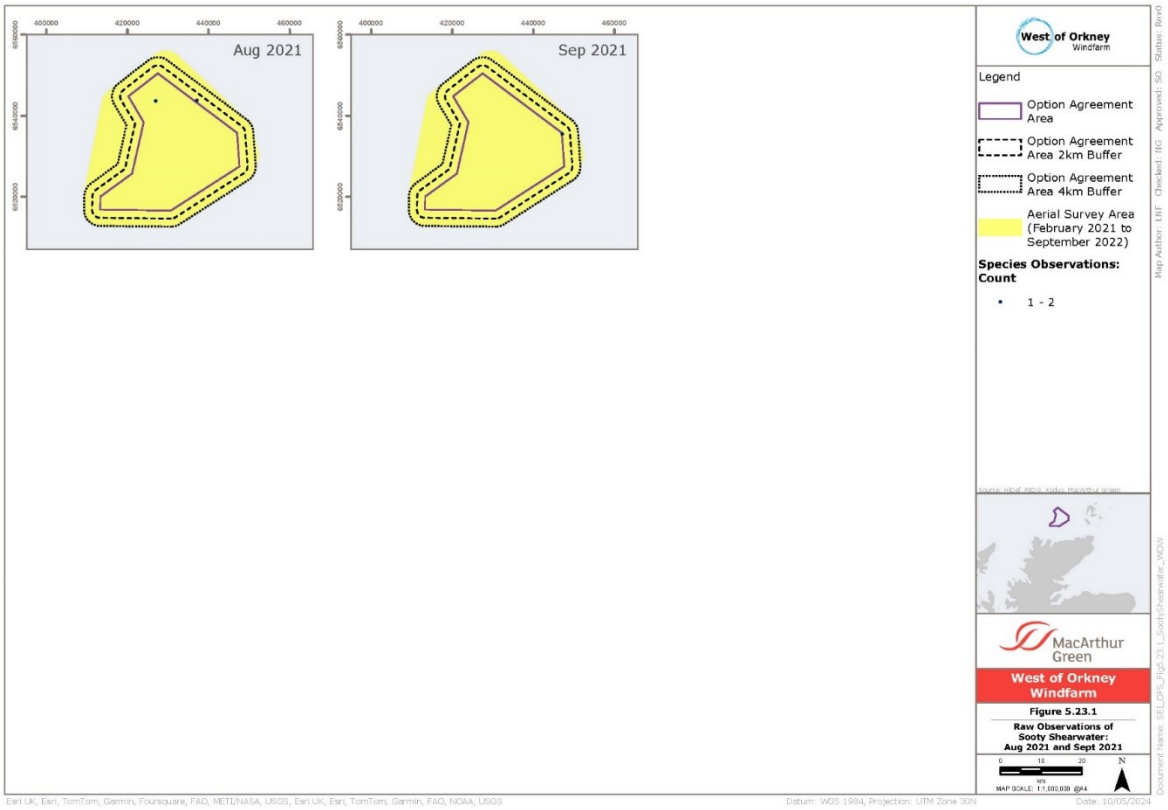

Figure 1-24 Raw observations of Sooty shearwater: August 2021 and September 2021.

1.13.3 Design-based density estimates

116. A density estimate (± S.D.) of 0.01 ± 0.01 sooty shearwater in flight was estimated in the OAA using the design-based analysis method (see **Appendix 1: ornithology baseline technical report section 3.3.1**) in August 2021. The bootstrap mean, upper & lower C.I. and CV values for this density estimate is presented in **Annex 1F: Design-based analysis density estimates per survey recorded for flying birds**.

1.13.4 Design-based abundance estimates

117. Sooty shearwater design-based abundance estimates with S.D. and lower & upper C.I. values calculated using the design-based analysis method (see **Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report 3.3.1**) for all birds (sitting and flying) in the OAA plus 2 km buffer in each survey are presented for each appropriate season in **Table 1-16**. The bootstrap mean, upper & lower C.I. and CV values for these abundance estimates are presented in **Annex 1B: Design-based analysis abundance estimates per survey recorded for all birds (sitting and flying)**.

118. As defined seasons are not available for Sooty shearwater in the UK, an MSP abundance was not calculated for this species.

119. The abundance estimates with lower & upper C.I. values recorded for sooty shearwater in the OAA plus 2 km buffer in August and September 2021 are illustrated in **Figure 1-25**.

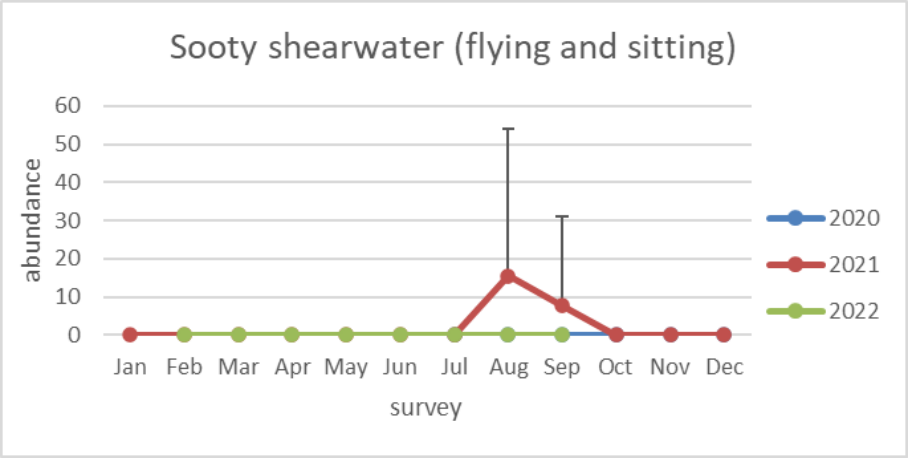

Figure 1-25 Estimated abundance and 95% confidence intervals of all sooty shearwaters (flying and sitting) in the OAA plus 2 km in each survey using design-based analysis.

Table 1-16 Sooty shearwaters abundance estimates and SDs of all birds recorded in flight and on the sea in each survey in the OAA plus 2 km buffer.

Survey	Sooty shearwaters Abundance Estimate in the OAA plus 2 km buffer
Jul-2020	0 (0)
Aug-2020	0 (0)
Sep-2020	0 (0)
Oct-2020	0 (0)
Nov-2020	0 (0)
Dec-2020	0 (0)
Jan-2021	0 (0)
Feb-2021	0 (0)
Mar-2021	0 (0)
Apr-2021	0 (0)
May-2021	0 (0)
Jun-2021	0 (0)
Jul-2021	0 (0)
Aug-2021	15.49 (9.94)
Sep-2021	7.75 (6.71)
Oct-2021	0 (0)
Nov-2021	0 (0)
Dec-2021	0 (0)
Feb-2022	0 (0)

Survey	Sooty shearwaters Abundance Estimate in the OAA plus 2 km buffer
Feb-2022	0 (0)
Mar-2022	0 (0)
Apr-2022	0 (0)
May-2022	0 (0)
Jun-2022	0 (0)
Jul-2022	0 (0)
Aug-2022	0 (0)
Sep-2022	0 (0)

1.14 Great shearwater

1.14.1 Ecology and status

120. Great shearwater is not a breeding species in the UK, nor it is not present in significant numbers during the non-breeding season. Great shearwaters breed on a small number of islands in the South Atlantic Ocean. Annual migration takes a clockwise loop around the Atlantic Ocean and during late summer this species occurs in varying numbers off the western coast of Britain and Ireland (Wernham et al. 2002)

121. Great shearwater is classed as Least Concern by the IUCN (IUCN, 2024).

1.14.2 Raw observations

122. Out of 27 baseline aerial surveys, one great shearwater was recorded during one survey in September 2022 within the 4 km buffer surrounding the OAA (**Figure 1-26**). Tables of abundance estimates within the OAA plus 2 km buffer and density estimates within the OAA are not presented for this species because no observations were recorded in these areas.

123. NatureScot 2023 Guidance Note 9 does not define breeding and non-breeding seasons for this species and DBMPS seasons are not provided in Furness, 2015.

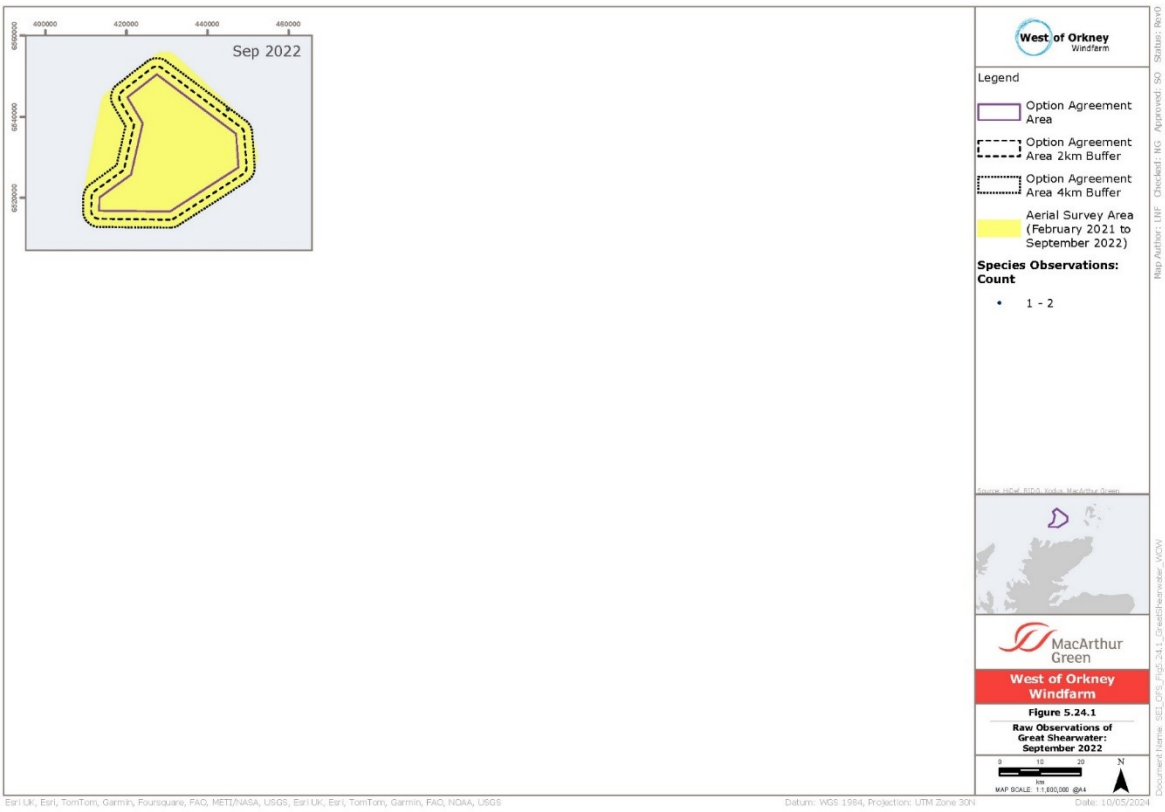

Figure 1-26 Raw observations of great shearwater: September 2022

1.15 Shag

1.15.1 Ecology and status

124. Shags breed on rocky shorelines and islands around much of the British and Irish coastline. This species is absent from south-west England (Burnell et al. 2023). Scotland is a stronghold for this species with a number of colonies present around Orkney and the north coast of Scotland. Adult birds are fairly sedentary, staying relatively close to breeding colonies during the non-breeding season (Balmer et al. 2013).

125. Shag is a Red-listed Bird of Conservation Concern in the UK (Stanbury et al., 2021) and classed as Least Concern by the IUCN (IUCN, 2024). The last seabird census, Seabirds Count (2015-2021), estimated Britain, Ireland, the Channel Islands and the Isle of Man's shag breeding population to be 25,961 AON, which represented a 20% decline since Seabird 2000 (1998-2002). Scotland holds 65% of the shag population (16,788 AON recorded by Seabirds Count), but numbers have declined in Scotland by 22% since Seabird 2000.

126. In Britain, shags forage for sandeel primarily, although other small fish are taken. The mean maximum foraging range is 9.2 ± 4.9 km (Woodward et al 2019). There are many reasons that could be influencing Britain's breeding shag population decline including climate induced changes in sandeel availability, mammalian predation pressures pollution exposure, disease and incidental bycatch in fisheries (Burnell et al. 2023).

1.15.2 Seasons

127. Seasonal definitions for shag (breeding season and non-breeding) are illustrated in **Table 1-17.**

Table 1-17 Shag seasons taken from NatureScot 2023 (Guidance Note 9)

Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Breeding season												
Non -breeding												

1.15.3 Raw observations

128. Raw observations of shags are presented for each survey where this species was recorded in 3.3.1. Very low numbers of shags were recorded within the OAA plus 4 km buffer in 2 out of 27 surveys including April 2021 and 18 February 2022. One observation of shag was recorded outside the survey area in August 2020, March 2021 and May 2021. Shag was absent within the survey area at all other times of the year.

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