

A census of the Northern Gannet population on Grassholm 2025

Report no: 1022

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Crynodeb gweithredol

Yn hanesyddol mae poblogaeth huganod ar Gwales wedi bod yn un o'r rhai mwyaf yn y byd. Amcangyfrifwyd y boblogaeth gyntaf yn 1872 pan gofnodwyd 12 pâr. Digwyddodd amcangyfrifion poblogaeth yn rheolaidd ar ôl hynnu ac ers 1986 mae wedi'i gyfrif bob pum mlynedd. Yn 2015 amcangyfrifwyd bod y boblogaeth yn 36,011 o "Apparently Occupied Sites (AOS)" – cynhaliwyd hyn gan ddefnyddio awyren adain sefydlog i gipio delweddau, ac yna cyfrif â llaw. Roedd y ffigwr hwn yn cyfrif am ychydig o dan 10% o boblogaeth y byd.

Yn 2022 newidiwyd y fethodoleg i ddefnyddio drôn i dal delweddau. Roedd y cyfrif yn dal i gael ei wneud â llaw, bellach yn defnyddio'r "count function" ar Adobe Photoshop.

Cynhaliwyd cyfrifiad 2022 fis cyn achos o fflw adar pathogenig iawn (HPAI) ac arweiniodd at amcangyfrif poblogaeth o 34,491 AOS. Ni ddylai hyn gael ei ystyried yn ddirywiad gwirioneddol o gyfrifad 2015 gan y teimlwyd bod yr ongl uwchben a ganiateir gan y drôn yn cynnig darlun mwy cywir o'r nythfa. Yn ogystal, roedd y cyfrifwyr yn gyfarwydd â'r ardaloedd lle mae'r adar sydd ddim yn bridio yn ymgasglu ac roedd niferoedd isel o rhain ar y safle yn 2022 (factor a allai fod wedi ystumio rhai o'r cyfrifion blaenorol a waned gan contractwyr anghyfarwydd â'r safle).

Yn dilyn yr achosion o HPAI yn 2022, mae CNC wedi rhoi cyllid i gynnal arolwg drôn ym mhob blwyddyn ddilynol. Defnyddiwyd yr un fethodoleg ym mhob blwyddyn gyda dau o'r staff yn cyfri'n gyson bob blywddyn (gyda trydydd person yn cyfri yn 2023 a 2025). Amcangyfrif poblogaeth 2023 oedd 16,482 AOS. Roedd hyn yn ostyngiad o 52% ers 2022 a'r nifer isaf ar Gwales ers 1969. Ni chofnodwyd unrhyw HPAI yn 2024 a chynyddodd amcangyfrif y boblogaeth 16.4% i 19,199 AOS.

Ni chofnodwyd unrhyw fflw adar eto yn 2025 ond gostyngodd amcangyfrif y boblogaeth 11.2% i **17,045 AOS** (gweler Ffigur 1).

Executive summary

The Northern Gannet population on Grassholm has historically been one of the largest in the world for this species. The population was first estimated in 1872 when 12 pairs were recorded. Population estimates occurred regularly after that and since 1986 has been censused every five years. In 2015 the population was estimated at 36,011 Apparently Occupied Sites (AOS) – this was conducted using a fixed wing aeroplane to capture images, followed by manual counting. This figure accounted for just under 10% of the world population.

In 2022 methodology was changed to use a drone to capture imagery. Counting was still carried out manually, now utilising the 'count function' on Adobe Photoshop.

The 2022 census was carried out a month before an outbreak of Highly Pathogenic Avian Influenza (HPAI) and resulted in a population estimate of 34,491 AOS. This should not necessarily be seen as a real decline from the 2015 census as it was felt the overhead angle the drone allowed offered a more accurate picture of the colony. In addition, the counters were familiar with the areas where non breeders congregate and there were low numbers of non-breeders on site in 2022 (a factor which may have skewed some of the previous counts carried out by contractors unfamiliar with the site).

Following the HPAI outbreak in 2022, funding has been granted by NRW to carry out a repeat drone survey in all subsequent years. The same methodology has been used in all years with two of the counters being consistent throughout (with a third counter in 2023 and 2025).

The 2023 population estimate was 16,482 AOS. This represented a 52% decline from 2022 and the lowest the population has been since 1969. No HPAI was recorded in 2024 and the population estimate increased by 16.4% to 19,199 AOS.

No bird flu was recorded again in 2025, but the population estimate decreased by 11.2 % to **17,045 AOS** (see Figure 1).

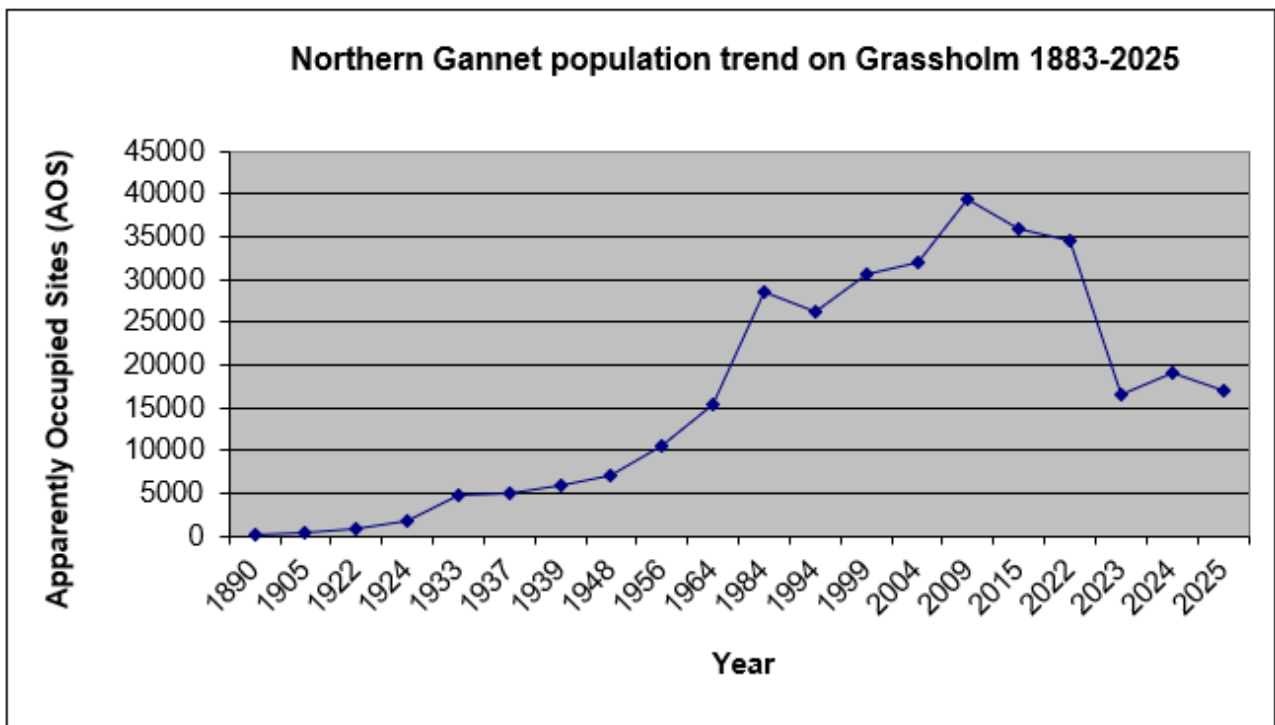


Figure 1: Northern Gannet population trend on Grassholm 1883-2025

Methodology

Bad weather delayed the boat to Grassholm slightly in 2025. On 29th June (20th in 2023 and 2024) RSPB staff travelled to Grassholm on the Blue Shark, a vessel in the Thousand Islands Expeditions fleet. Due to swell it was not possible to land for this survey in 2025, so the drone was flown and recovered from the boat. There was no sign of HPAI during this drone flight, and none was recorded on any visit in 2025 (as was the case in 2024).

As in previous years, the drone operator, Richard Humpidge (RSPB Site Manger Grampian) was using a DJI Mavic 2 Pro and flew over the colony at a height of 60m (91m above sea level). The drone flew a series of parallel transects (see Figure 2) with 75% overlap between photos along each transect and between transects.

DJI GS Pro software was used for flight management ('Maps made easy' in previous years) and 'drone2map' was again used to produce the final image used for counting.

This image was then shared with the authors who conducted a manual count using the 'count function' in Adobe Photoshop. The count unit used was Apparently Occupied Sites (AOS).

Only birds sitting in an 'apparently incubating' position and showing no signs of non-breeding plumage were included in the count. Any birds standing loosely in the colony were discounted, along with any obvious non breeders occupying sites, plus all known non-breeding club sites. If two birds, of apparent breeding age, were present on one nest site (an obvious pair), this was counted as a single site. This count methodology has been used in all previous surveys.

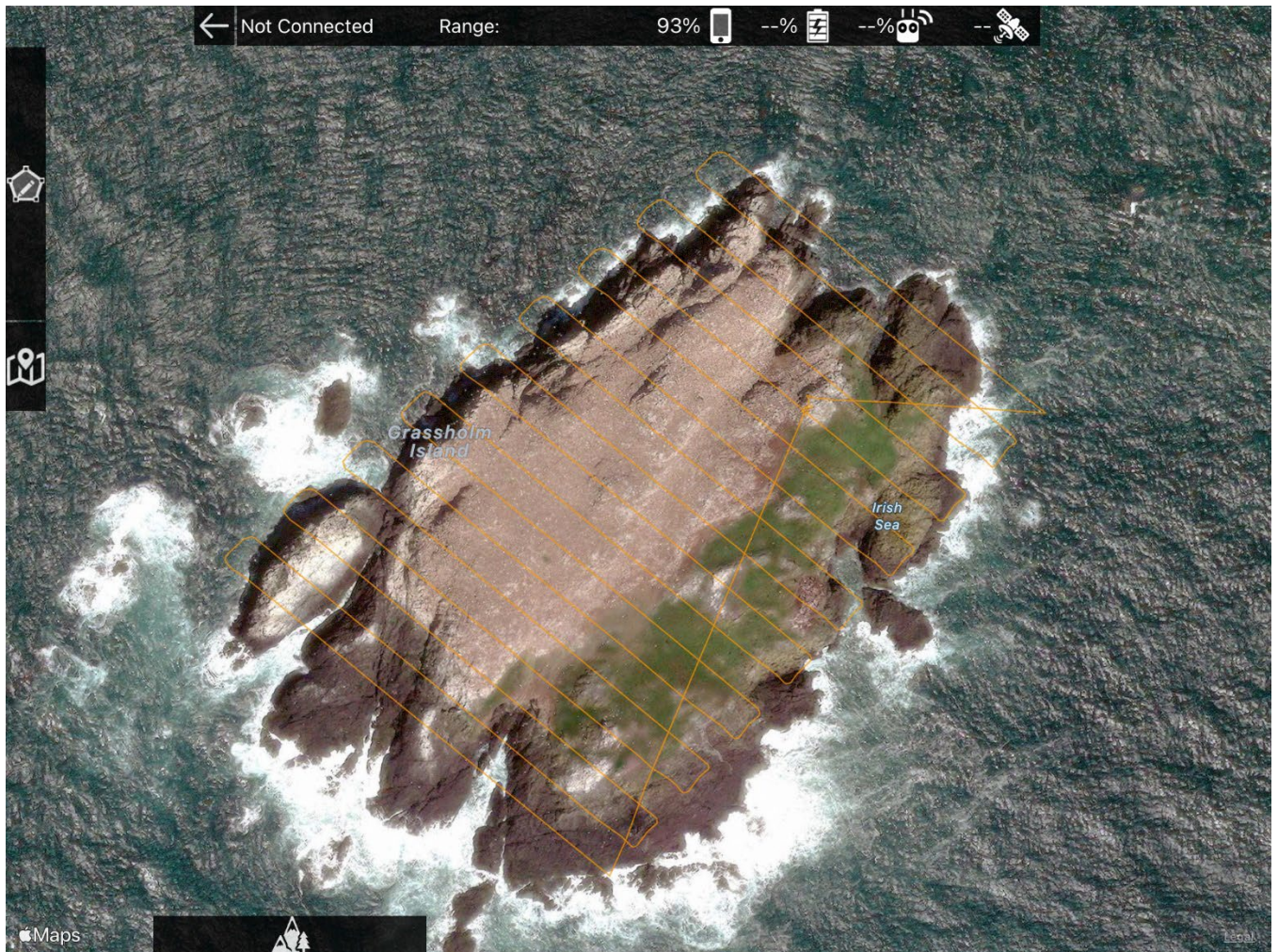


Figure 2: Drone transect flight lines © RSPB Cymru

Results

The individual counts were:

GM – 16,829 AOS

NS – 17,177 AOS

AP – 17,129 AOS

Average – 17,045 AOS

Summary of key results

17,045 AOS is a 11.2% decrease on the 19,199 AOS recorded in 2024 which itself was a 16.4% increase on the 16,482 figure from 2023, which in turn was a 52% decrease on the 34,491 recorded in 2022.

The significant population decline between 2022 and 2023 was as a direct result of the HPAI outbreak of late summer 2022.

The slight fluctuation between years since the outbreak with the 2025 figure similar to the 2023 figure indicates that, overall, there has been little change in the post HPAI outbreak population and the colony is showing no sign of recovery in the short term.

Conclusions and recommendations

Grassholm supported one of the largest populations of Northern Gannet in the world prior to 2022, holding internationally important numbers. In a single year HPAI reduced the population by over 50%. Most Gannet colonies around the UK also saw similar declines with Bass Rock, previously the largest colony in the world, reduced by around 40% and Hermaness by 37%.

In 2023 HPAI was again recorded on Grassholm but at apparently lower levels and the discovery of dead/dying birds in July of that year failed to materialise into the significant outbreak witnessed in 2022. There were fewer cases at other UK gannet colonies in 2023 too.

In 2024 there was no sign of the disease in Gannets on Grassholm and this mirrored seabird colonies around the UK. It wasn't until late in the season that a small spike in cases was

announced, primarily from Scotland and northern England and mainly in gulls, Fulmars and Great Skuas.

The population increase seen in 2024 was a welcome but perhaps not unexpected result. It is possible a percentage of the population 'missed a year' in 2023. Colony avoidance when breeding conditions are below a certain threshold has been demonstrated in the closely related Red-footed Booby (*Cubaynes et al 2010*).

The apparent decline in the 2025 figure is more likely a reflection of the unstable nature of the population at present. Younger birds that are nearing breeding age may take up position in the colony one year but not establish, hence giving higher than actual apparent count figures in some years. The most likely conclusion is the population is stable but showing little sign of recovery in the three years since the initial outbreak. The difference between the 2023 and 2025 figure being just +3.4%.

The number of obvious non-breeding birds (2nd or 3rd year birds by plumage) that could be readily identified as occupying an apparent 'breeding plot' in the colony were counted in 2025. For the first time this count produced a figure that was worth recording with 118 AOS counted. These AOS were not included in the final figure but are further evidence that non-breeding birds are perhaps occupying sites earlier than normal due to the added space. The plumage of 4th year birds cannot be distinguished from full breeding adults, and it is possible some of the AOS's included in the total count are made up of these non-breeding birds, as will have been the case in all counts previously undertaken.

A count was made of freshly dead adults in the colony. 12 birds were recorded. This is not unusual for a large seabird colony.

Productivity remained below target once again but saw a significant increase from the record low of 2024 (0.26) to 0.50 in 2025. This is the highest since the initial HPAI outbreak and only marginally below what would be described as a poor year pre outbreak.

Gull predation was once again a factor with the same large caches of eggs present as in 2024. With continued large gaps in the colony, gulls are able to easily access isolated sub populations. In a normal year they are limited to predating vulnerable nests at the colony edge. Piles of predated egg shells were once again a feature of 2025 on Grassholm (see Figure 3).

As in 2024, the possible increase in newly established, inexperienced pairs may also have contributed. It is not known how many of the AOS contained fertile eggs.



Figure 3: Gannet eggs predated by gulls on Grassholm in 2024 and again in 2025. This scene was repeated at several points around the island (© S Votier)

Productivity analysis on Grassholm has always been via an imperfect method. The Seabird Monitoring Handbook recommends an initial visit in May to map nests containing eggs, with a follow up visit in August to monitor the outcome of those nests. However, due to the island's topography and, previously, dense nature of the colony, a visit in May was deemed to cause unacceptable levels of disturbance which saw high levels of egg predation as a result of human presence.

The alternative method, used since the 1990's, is described as a '% of nests that produced young'. A single visit is made in July to sample 500-800 nests and the % of nests that hold large young likely to fledge is recorded. This is not productivity in the true sense. It probably underestimates the actual figure as there is no way of knowing how many of those empty nests initially contained an egg.

Alternative methods are being investigated including fixed point cameras and an MRes study looking at the use of drones to monitor productivity. The MRes student studying this is one of the authors (Alys Perry) and her findings will be published at the conclusion of the project.

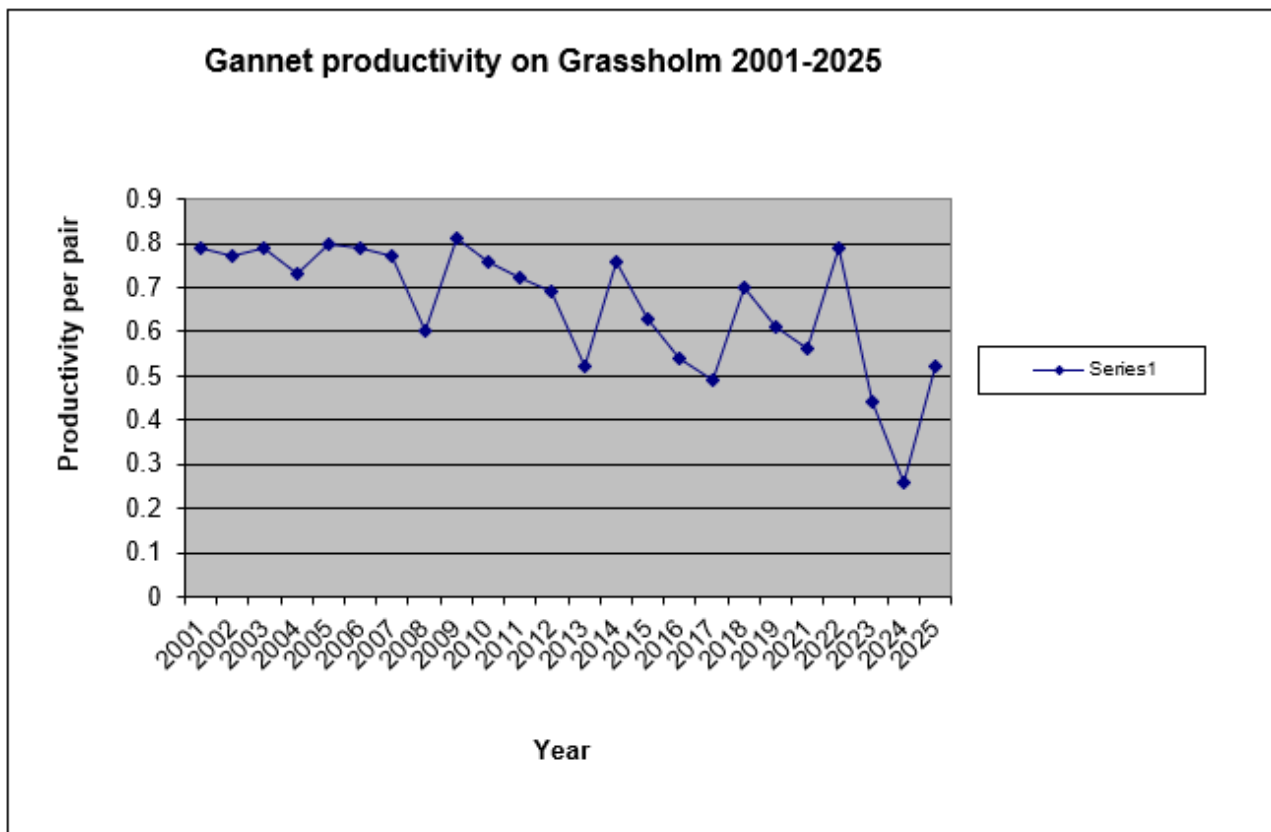


Figure 4: Northern Gannet productivity trend on Grassholm 2001-2025

Despite an upward trend in 2024, the population count in 2025 demonstrates the population is still in flux and shows minimal recovery in the three years since the HPAI outbreak. Such an overall significant decline in the population at Grassholm puts the colony at enhanced risk from other potential threats and pressures e.g. climate change, offshore wind, pollution and fisheries. The future of the colony is still at a crucial junction, and it is recommended this census continues to be conducted annually for a number of years to better understand the longer-term impact of the recent mass mortality event, as well as future outbreaks of HPAI.

The RSPB would like to thank NRW for its financial support towards the 2025 census and commitment to future monitoring.

Figures

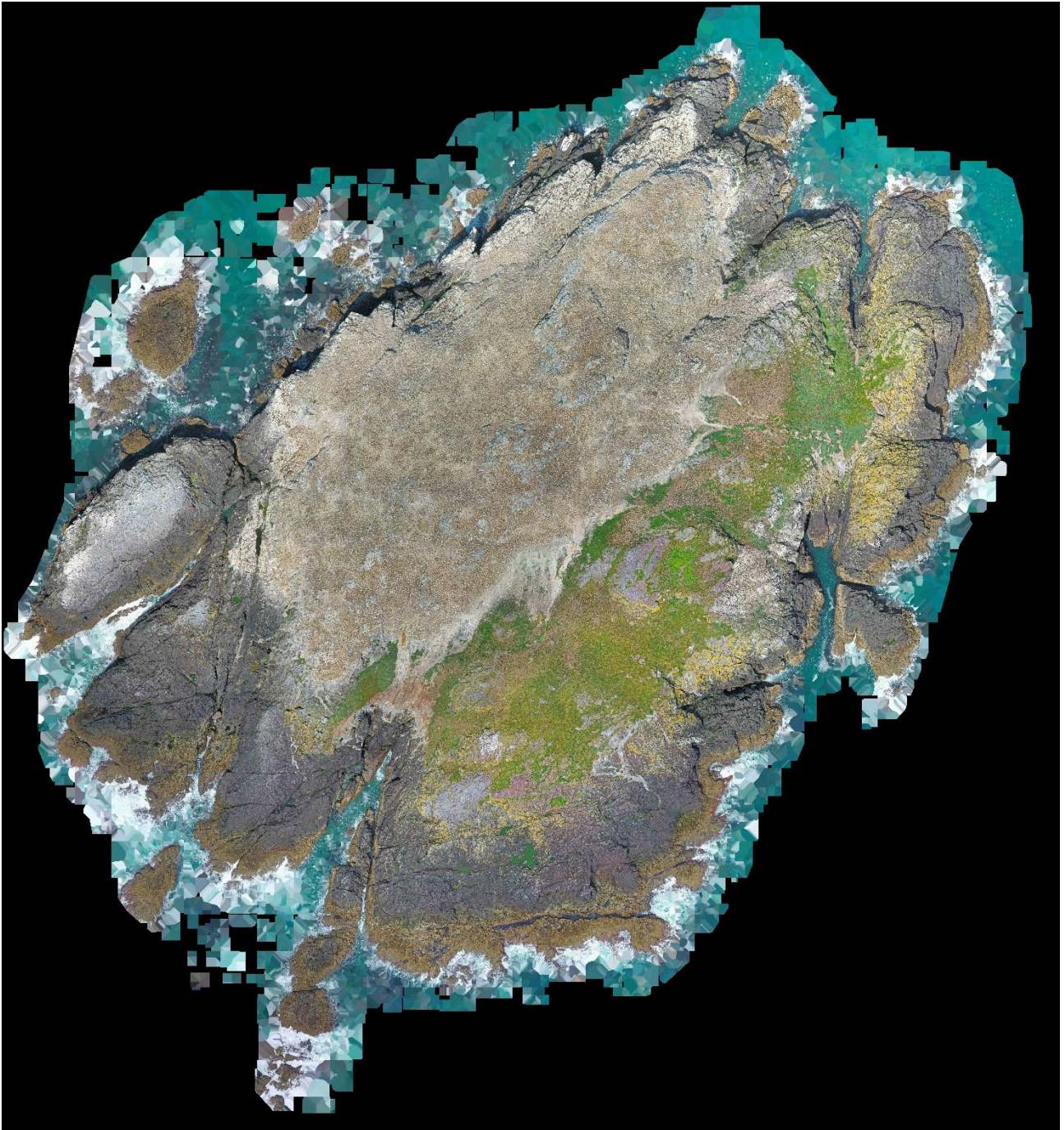
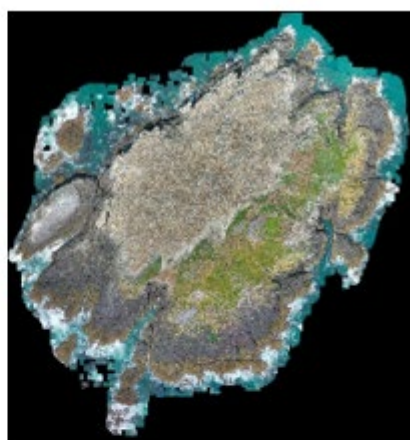


Figure 5: Whole island aerial of Grassholm 2025 (17,045 AOS) – with seemingly little overall recovery since the outbreak in 2022, large gaps remain in the colony (use zoom function to view more clearly) © RSPB Cymru



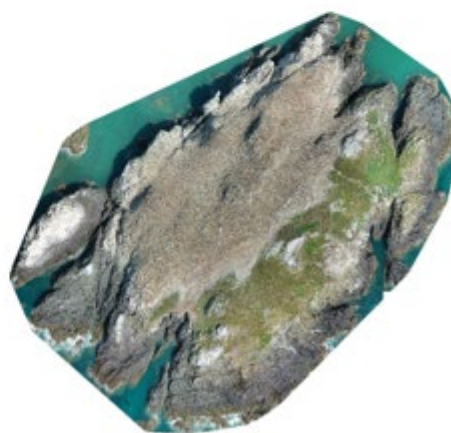
2025 17,045 AOS



2024 19,199 AOS



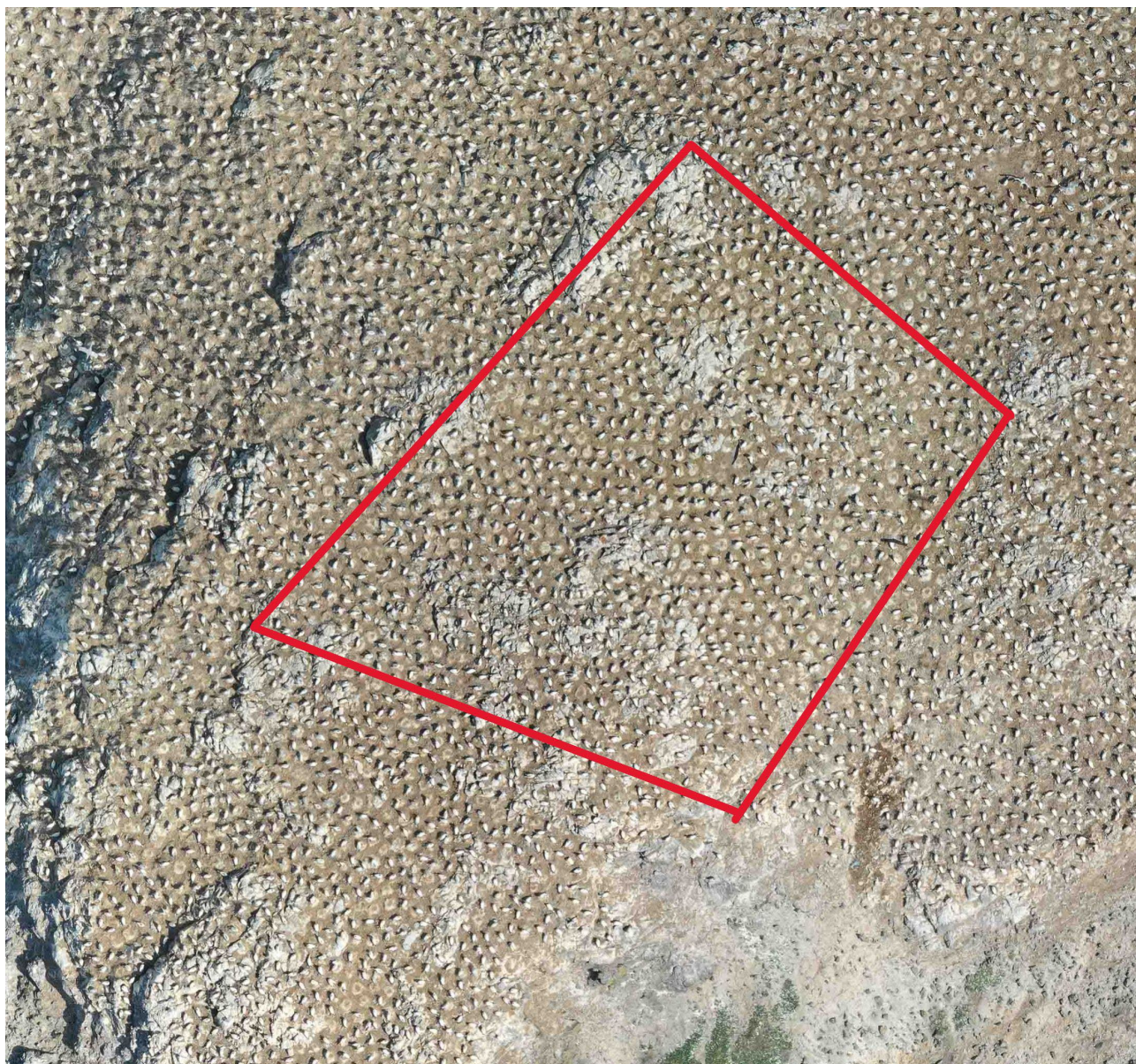
2023 16,482 AOS



2022 Pre HPAI 34,491 AOS

Figure 6: Comparison aerial shots of Grassholm pre (2022) and since (2023-2025) the HPAI outbreak (use zoom function to view more clearly) © RSPB Cymru

Figure 7: A comparison of part of the southern section between 2022-2025 – 2022 shows the density pre the HPAI outbreak. 2023-2025 are the post outbreak years which show little in the way of recovery across this time period. © RSPB Cymru



2022 southern section monitoring plot (pre HPAI Outbreak)



2023 southern section monitoring plot (1 year after major outbreak)



2024 – southern section monitoring plot (2 years after major outbreak)



2025 – southern section monitoring plot (3 years after major outbreak)

Tables

Table 1: Northern Gannet population trend on Grassholm 1872-2025

Year	AOS	Source
1872	12	Davis 1890
1883	20	Fisher & Ververs 1943
1886	250	Fisher & Ververs 1943
1890	200	Fisher & Ververs 1943
1889	225	Fisher & Ververs 1943
1893	240	Fisher & Ververs 1943
1905	300	Fisher & Ververs 1943
1922	900	Fisher & Ververs 1943
1924	1800	Fisher & Ververs 1943
1933	4750	Fisher & Ververs 1943
1937	5000	Unknown
1939	6000	Unknown
1946	6000	Buxton & Lockley 1946
1948	7000	Pitt 1947
1949	9200	Fisher & Lockley 1954
1956	10550	Lockley 1956
1964	15500	JNCC
1969	16128	JNCC

Year	AOS	Source
1977	20000	Watson 1977
1984	28545	JNCC
1986	30000	JNCC
1991	26000	JNCC
1994	26277	JNCC
1999	30688	JNCC
2001	31000	Field 2001
2004	32094	JNCC
2009	39292	Murray 2009
2015	36011	Murray 2015
2022	34491	Morgan & Humpidge 2022
2023	16482	Morgan, Stephens & Humpidge 2023
2024	19199	Morgan & Stephens 2024
2025	17045	Morgan, Stephens & Perry 2025

References

Cubaynes et al (2010) To breed or not to breed: a seabird's response to extreme climatic events (Biol. Lett. (2011) 7, 303–306)

Data Archive Appendix

No data outputs were produced as part of this project.

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