A Census Of The Northern Gannet Population On Grassholm 2024

Report No: 927

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Crynodeb gweithredol

Cefndir

Yn hanesyddol mae poblogaeth huganod ar Gwales wedi bod yn un o'r pologaethau mwyaf yn y byd. Amcangyfrifwyd y boblogaeth gyntaf yn 1872 pan gofnodwyd 12 pâr. Digwyddodd amcangyfrifon poblogaeth yn rheolaidd ar ôl hynnu ac ers 1986 mae poblogaeth huganod ar Gwales wedi'i gyfrif bob pum mlynedd. Yn 2015 amcangyfrifwyd bod 36,011 o safleodd mae'n debyg sy'n cael eu meiddiannu (AOS) – cynhaliwyd hyn gan ddefnyddio awyren adain sefydlog i dynnu lluniau, ac yna cyfrif a llaw. Roedd y ffigur hwn yn gwneud i fyny dros 10% o boblogaeth y byd.

Yn 2022 newidiwyd y fethodoleg i ddefnyddio drôn i dynnu lluniau. Roedd y cyfri yn dal i gael ei wneud a llaw, bellach yn defnyddio "count function" Adobe Photoshop. Cynhaliwyd cyfrifiad 2022 fis cyn achos o Ffliw Adar (HPAI) ac arweiniodd at amcangyfrif poblogaeth o 34,491 AOS. Ni ddylai hyn cael ei ystyried fel gostyngiad gwirioneddol yn boblogaeth ers 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 a'r ardaloedd lle mae adar nad ydynt yn bridio yn ymgasglu.

Yn dilyn yr achos o HPAI yn 2022, rhoddwyd cyllid gan CNC y gynnal arolwg drôn arall yn 2023, ac eto yn 2024. Defnyddiwyd yr un fethodoleg a'r un ddau berson a gyfrifodd yr AOS' yn 2022, 2023 a 2024 (yr awduron).

Amcangyfrif poblogaeth 2023 oedd 16,482 AOS. Roedd hyn yn ostyngiad o 52% ers 2022 a'r isaf ers 1969.

Ni chofnodwyd unrhyw achos o ffliw adar yn 2024 a chynyddodd amcangyfrif y boblogaeth 16.4% i **19,199 AOS**.

Executive summary

Background

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 was granted by NRW to carry out a repeat drone survey in 2023, and again in 2024. The same methodology was used with the two counters in 2024 (the authors) also involved in 2022 and 2023.

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**

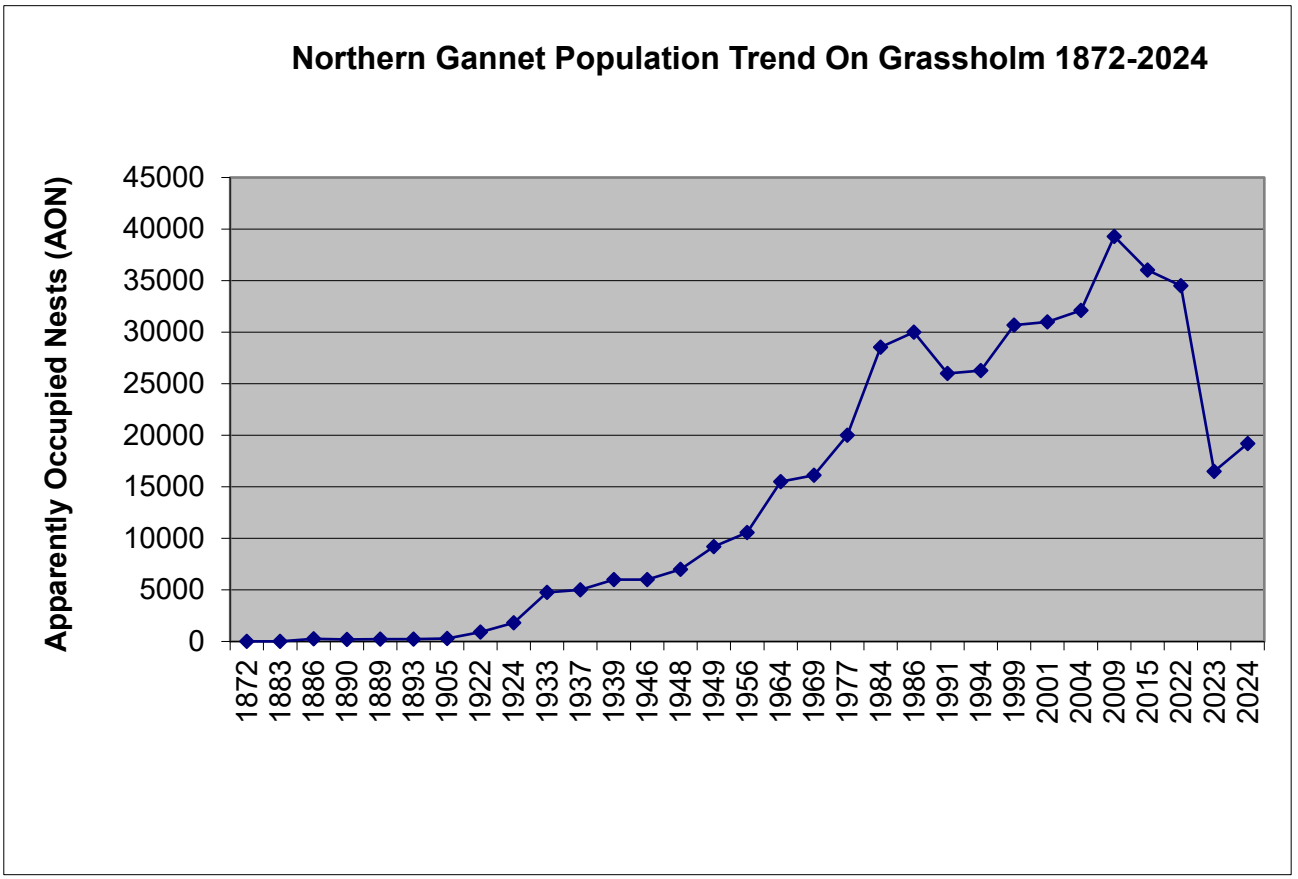


Figure 1: Northern Gannet population trend on Grassholm 1872-2024

Methodology

On 20th June 2024 (same date as 2023) RSPB staff travelled to Grassholm on the Blue Shark, a vessel in the Thousands Islands Expeditions fleet and landed via small RIB transfer. There was no sign of HPAI at the time of landing and none was recorded on any visit in 2024. This was in keeping with the rest of the UK which saw minimal cases in seabirds until a small increase in Scotland post breeding season.

As in 2022 and 2023, 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.

'Maps made easy' software was used for flight management and 'drone2map' to produce the final image used for counting.

This image was then shared with RSPB Ramsey and Grassholm staff, Greg Morgan (RSPB Site Manager) and Nia Stephens (Warden) 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 were included in the count. Any birds standing around 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.

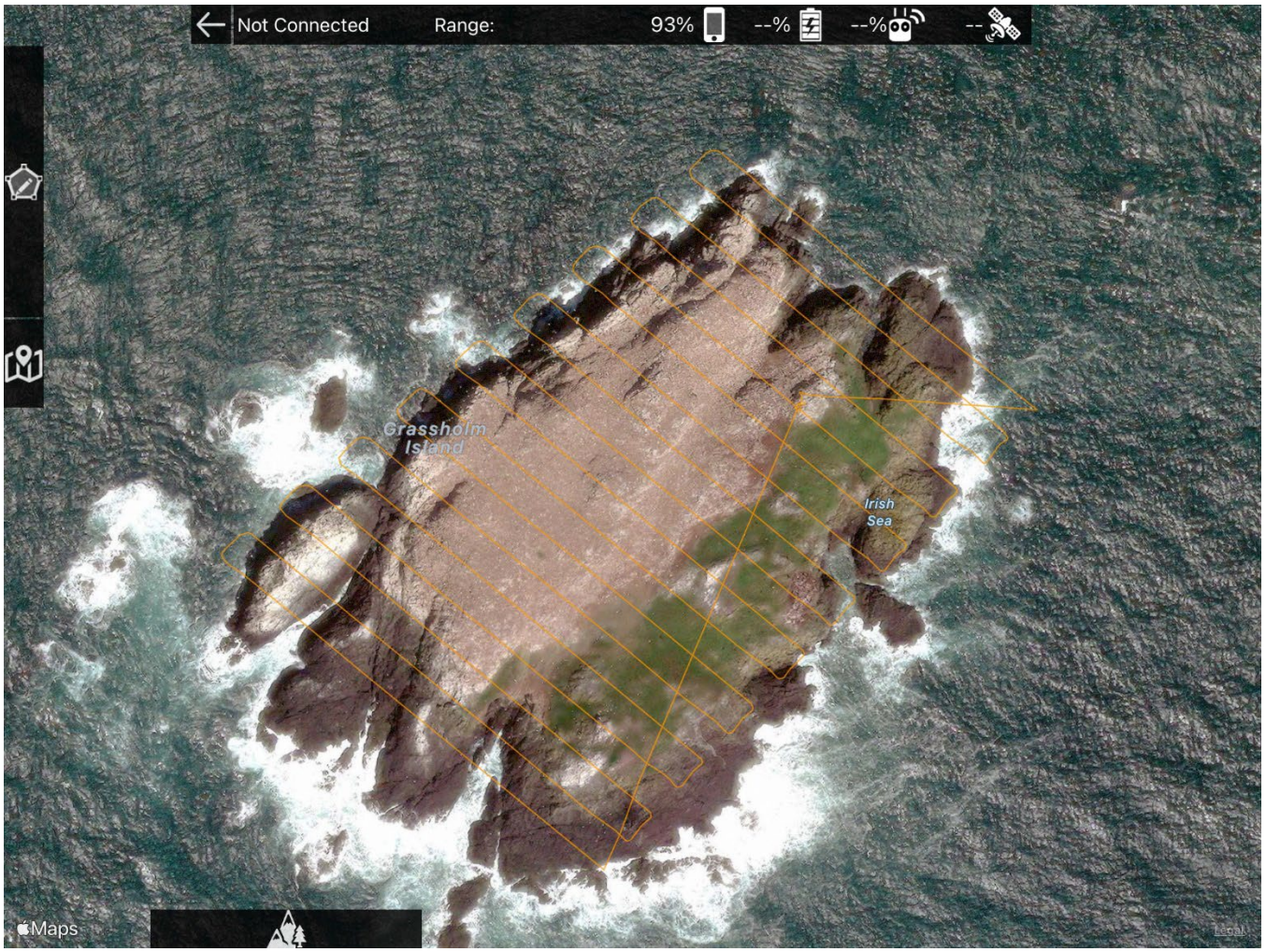


Figure 2: Drone transect flight lines © RSPB Cymru

Results

The individual counts were:

GM – 19,214 AOS
NS – 19,183 AOS

Average – 19,199 AOS

Summary Of Key Results

19,199 AOS is a 16.4% increase on the 16,482 AOS recorded in 2023 which itself 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. In 2023 there was a much smaller outbreak and the disease wasn't recorded at all in 2024.

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 decines 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 gannet colonies 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 slight 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)*.

An increase in younger birds taking up territories may have been a factor too. There were notably more 2nd and 3rd year non breeding birds taking up residence in the breeding population in 2024 (these sites were not included in the count), so it is possible that some 4th year birds took advantage of gaps in the colony and paired up with established breeders that had lost partners.

Productivity remained poor and 2024 saw a record low of 0.26 recorded (only 26% of nests monitored produced young). A significant increase in gull predation was probably one factor. With large gaps in the colony, gulls were 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 a feature of 2024 on Grassholm (see Fig 3).

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

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

Productivity analysis on Grasshom 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 influence.

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.

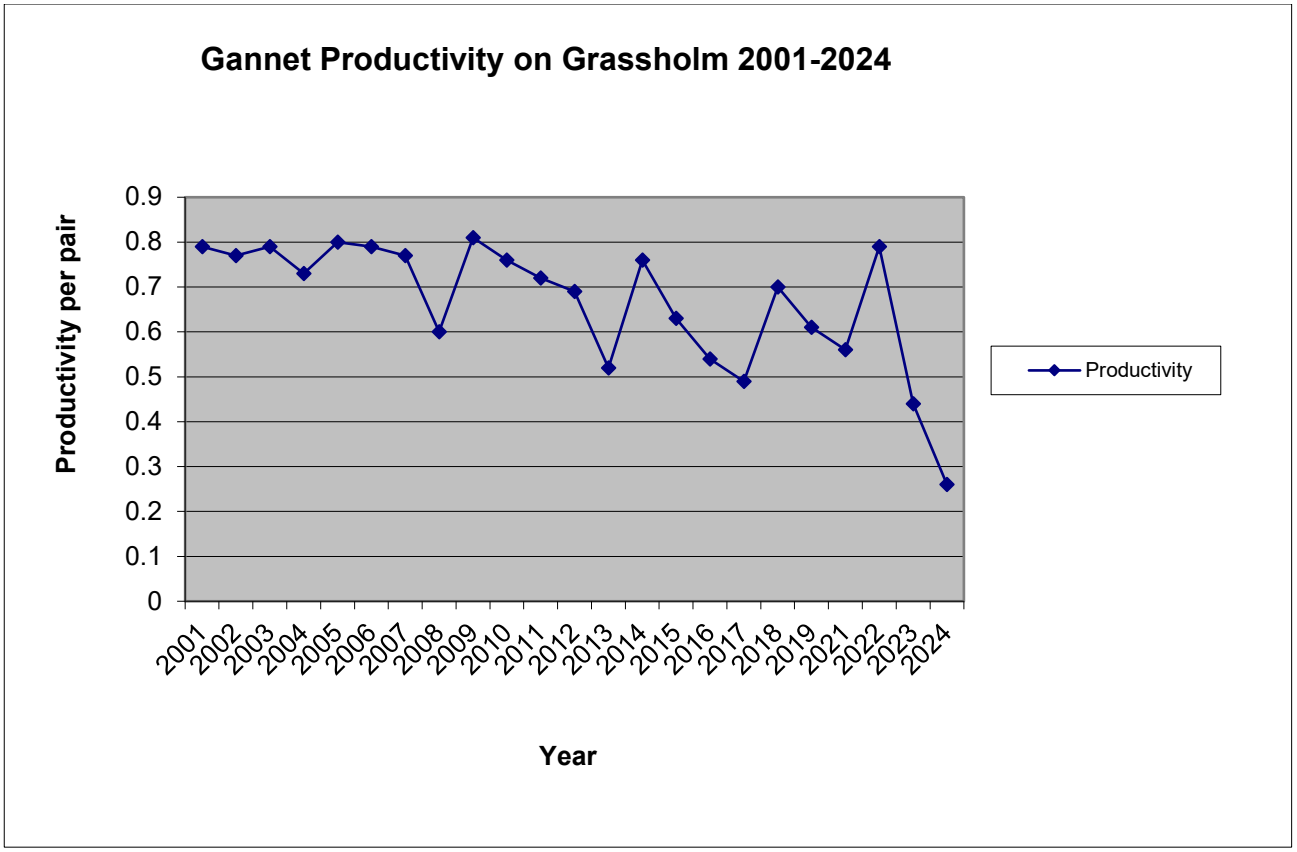


Figure 4: Northern Gannet productivity trend on Grassholm 2001-2024

Despite an upward trend in 2024, 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, windfarms 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 mortaility event, as well as future outbreaks of HPAI.

The RSPB would like to thank NRW for its financial support towards the 2024 census and commitment to future monitoring.

FIGURES

Figure 5a: Whole Island aerial of Grassholm 2024 (19,199 AOS) – despite the increase on 2023, large gaps and reduced density in comparison to pre HPAI are still clear (use zoom function to view more clearly) © RSPB Cymru

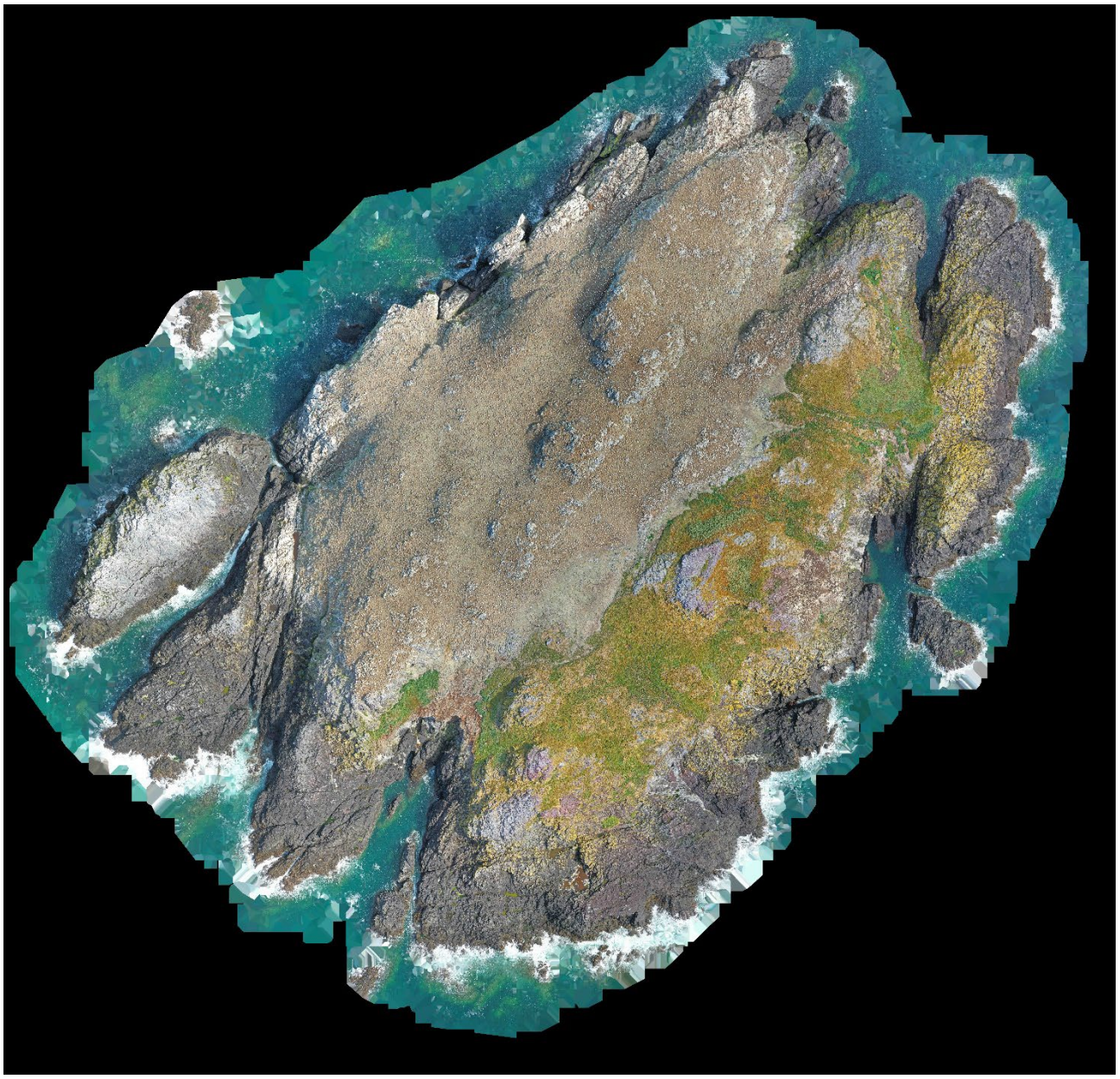


Figure 5b: Whole Island aerial of Grassholm 2023 (16,482 AOS) for comparison with Figs 5a & 5c (use zoom functions to view more clearly)

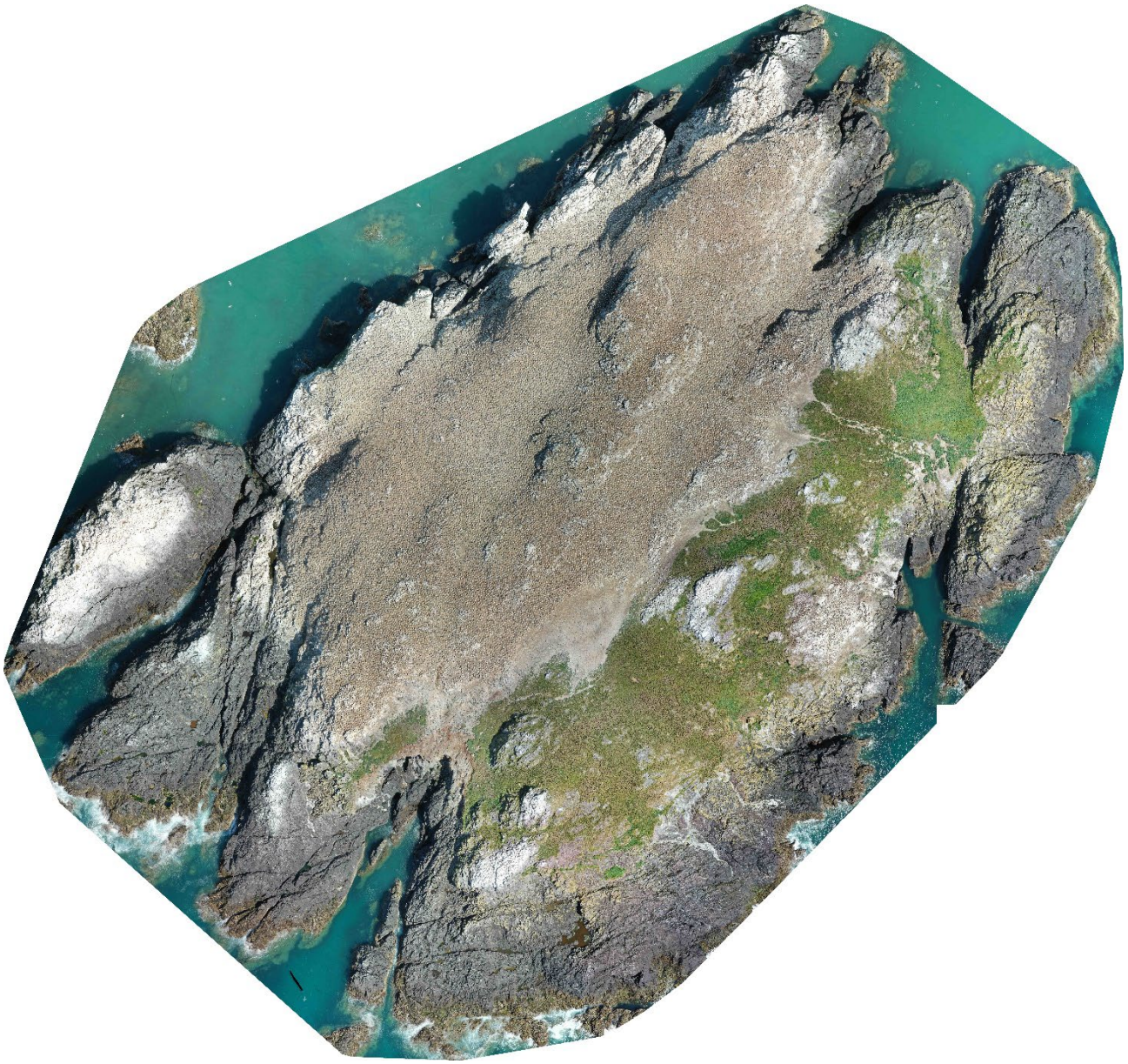
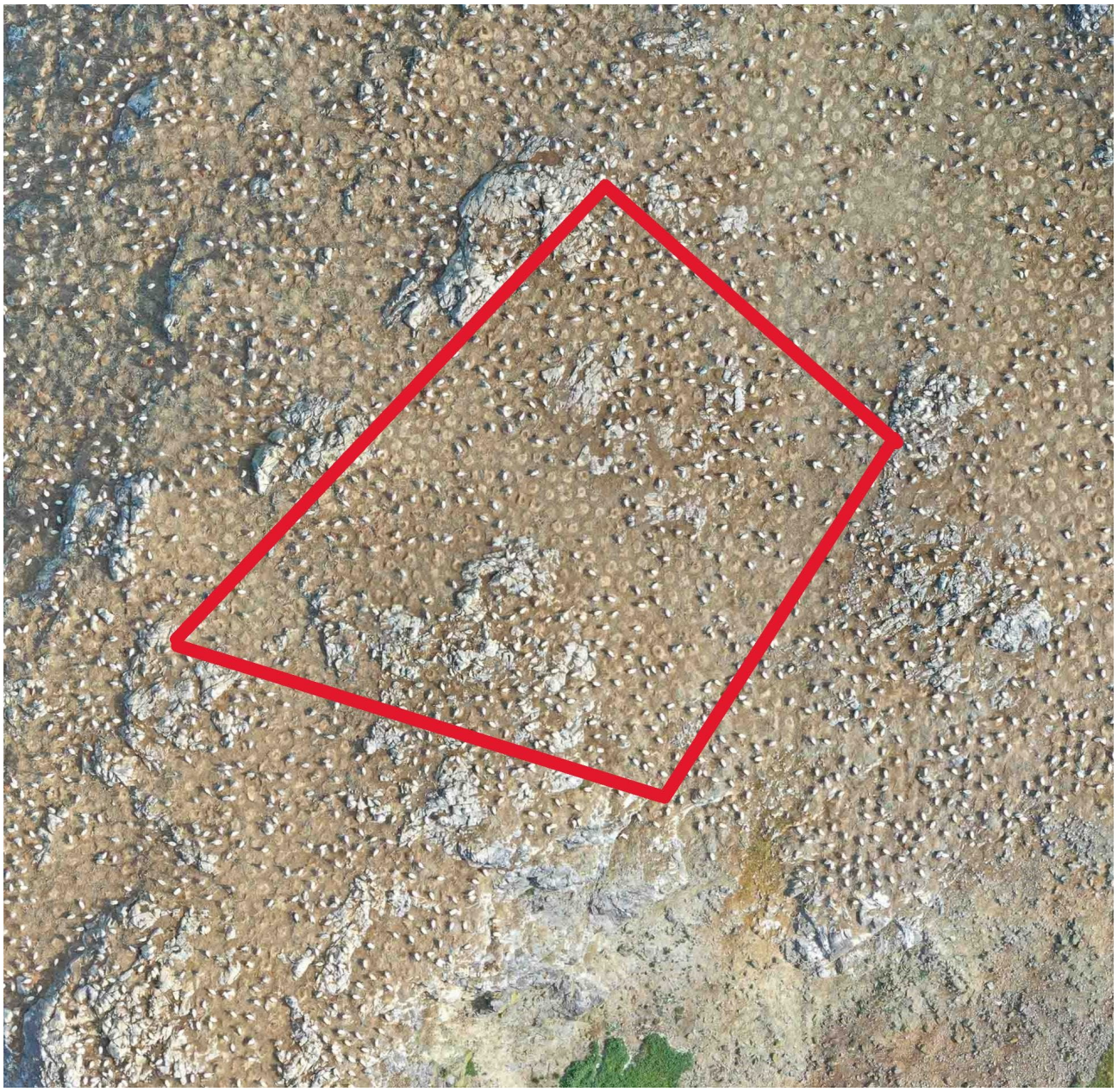


Figure 5c: Whole Island aerial of Grassholm 2022 (34,491 AOS) for comparison with Fig 5a (use zoom functions to view more clearly)

Figures 6 below are close up views of the southern section of the colony, allowing a more detailed comparison of nest density pre and post HPAI.

2022 (pre HPAI Outbreak)



2023 (1 year after major outbreak)

2024 – southern section (2 years after major outbreak)

Figure 6: A comparison of part of the southern section between 2022-2024 – 2022 shows the density pre the HPAI outbreak. 2023 is the year after the outbreak. 2024 is following slight recovery. There are still large gaps but density has increased slightly within the red square © RSPB Cymru

TABLES

YEAR	AOS	Source
1872	12	Davis 1890
1883	20	Fisher & Vevers 1943
1886	250	Fisher & Vevers 1943
1890	200	Fisher & Vevers 1943
1889	225	Fisher & Vevers 1943
1893	240	Fisher & Vevers 1943
1905	300	Fisher & Vevers 1943
1922	900	Fisher & Vevers 1943
1924	1800	Fisher & Vevers 1943
1933	4750	Fisher & Vevers 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
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

Table 1: Northern Gannet population trend on Grassholm 1872-2024

References

Reference Type	**Correct Format**
Journal	Lane et al. (2023) High pathogenicity avian influenza (H5N1) in Northern Gannets: Global spread, clinical signs, and demographic consequences (in press IBIS) Cubaynes et al (2010) To breed or not to breed: a seabird's response to extreme climatic events (Biol. Lett. (2011) 7, 303–306)
Web pages/sites and e-books	Avian influenza overview December 2022 – March 2023 (wiley.com) Investigating the genetic diversity of H5 avian influenza in the UK 2020-2022 | bioRxiv

Appendices

Data Archive Appendix

Data outputs associated with this project are archived in [NRW to enter relevant corporate store and / or reference numbers] on server–based storage at Natural Resources Wales.

Or

No data outputs were produced as part of this project.

The data archive contains: [Delete and / or add to A-E as appropriate. A full list of data layers can be documented if required]

[A] The final report in Microsoft Word and Adobe PDF formats.

[B] A full set of maps produced in JPEG format.

[C] A series of GIS layers on which the maps in the report are based with a series of word documents detailing the data processing and structure of the GIS layers

[D] A set of raster files in ESRI and ASCII grid formats.

[E] A database named [name] in Microsoft Access 2000 format with metadata described in a Microsoft Word document [name.doc].

[F] A full set of images produced in [jpg/tiff] format.

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