

## **“North Mainland Shetland revisited – Emergency HPAI SMP”**

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### **Expedition SIMMER DIM 23 – Royal Air Force Ornithological Society (RAFOS) expedition to north Mainland Shetland, June 2023**

Following the devastating outbreaks of Highly Pathogenic Avian Influenza (HPAI) in the 2021-22 breeding seasons, understanding how seabird populations were affected was deemed essential. Accordingly, a one-off coordinated programme of targeted seabird counts across the UK was planned by an *ad-hoc* Seabird Monitoring Programme (SMP) HPAI Task and Finish Group, to help understand how HPAI was affecting the numbers of birds returning to breed in 2023. This would also supplement the routine counts normally undertaken as part of the SMP. The targeted re-surveys were directed towards key species and sites most affected by high mortality in 2022, but also included some coverage of those less affected for comparison. RAFOS had previously mounted expeditions in support of the 4th SMP Periodic Census, ‘Seabirds Count’ (SC), on the north-western and western peninsulas of Mainland Shetland (2019 & 21). The Society was thus suitably qualified and uniquely experienced to carry out targeted re-surveys of some of those Grid Squares visited in 2019 & 21.



**Bonxie<sup>1</sup> on territory – Keith Cowieson**

Expedition SIMMER DIM (SD) 2023 took place in northern Mainland Shetland with re-surveying taking place from 13-23 Jun 23 inclusive and comprised personnel from RAFOS, Royal Naval Bird Watching Society (RNBWS) and the Army Ornithological Society (AOS). The mission was to re-survey all breeding seabirds - with particular emphasis on skua and gull species - in targeted SMP grid squares surveyed during the SC 2019 & 21 SD expeditions in the parishes of Delting, Lunnasting, Nesting & Northmavine of Mainland Shetland - insofar as timing and available resources permitted.

The re-survey's aim was to collect full colony counts, conducted at the appropriate time periods and using appropriate methods for the target skua and gull species. Dr Connie Tremlett, the overall Emergency HPAI SMP coordinator, identified potential sites and species deemed as the highest

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<sup>1</sup> The local Northern Isles' name for great skua.

priority, and RAFOS coordinated with Connie and other surveyors to minimise the chances of double-counting in north Mainland Shetland. Additionally, given the emerging and alarming news of HPAI outbreaks amongst tern colonies on the UK mainland east coast<sup>2</sup>, it was decided, internally, to re-survey as many of the local tern colonies as possible.

This year we deployed an 8-strong joint RAFOS, RNBWS and AOS team to carry out the re-survey, arriving in Lerwick from Aberdeen in mid-June. All team members were already familiar with survey methodology, predominant topography and habitat from 2019 & 21, so we were able to hit the ground running and conduct any necessary refresher training/mentoring, on-the-job, whilst remaining mindful of the precautions required to ensure the expedition complied in all respects with prevailing national HPAI guidance.

**Emergency HPAI SMP Priorities.** The priority for our re-survey work on north Mainland Shetland remained squarely focussed on skua and inland gull colonies, as not only are some of these species those giving rise to great conservation concern, but also in the case of the great skua, one of species worst hit by HPAI during the 2021 & 22 breeding seasons, and whose Scottish population was previously estimated to represent ~60% of the global total (Burnell *et al*, 2023). We approached our task with mixed feelings, keen yet worried to discover the level of the adverse impact wrought by HPAI between our recent SC observations and those of the Emergency HPAI SMP re-survey.

**Observations.** So, what did we discover during our survey and what Lessons were we able to identify for future breeding seabird surveyors? The task was simple, re-survey a targeted selection of grid squares containing both denser concentrations of breeding great skua and those with more widely spaced individual pairs typically found on the drier, higher ridges between voes<sup>3</sup>, through a snap-shot, single visit. Our aggregated 2019 & 21 SC observations are tabulated below, alongside Emergency HPAI SMP re-survey results:

**Changes in breeding seabird populations on north Mainland Shetland  
(from 131 targeted Grid Squares re-surveyed), 2019 & 2021 v 2023<sup>4</sup>**

Species	Seabirds Count (2019 & 2021)	Emergency HPAI SMP (2023)	% Change
Arctic Skua	15 AOT	25 AOT	+67
Great Skua	132 AOT	60 AOT	-55
Great Black-backed Gull	17 AOT	32 AON/AOT	+88
Lesser Black-backed Gull	0	3 AOT	N/A
Herring Gull	1 AOT	4 AOT	N/A
Common Gull	58 AOT	69 AON/AOT	+17
Black-headed Gull	16 AOT	22 AON/AOT	+38
Arctic Tern	28	220 AON/AOT	+686

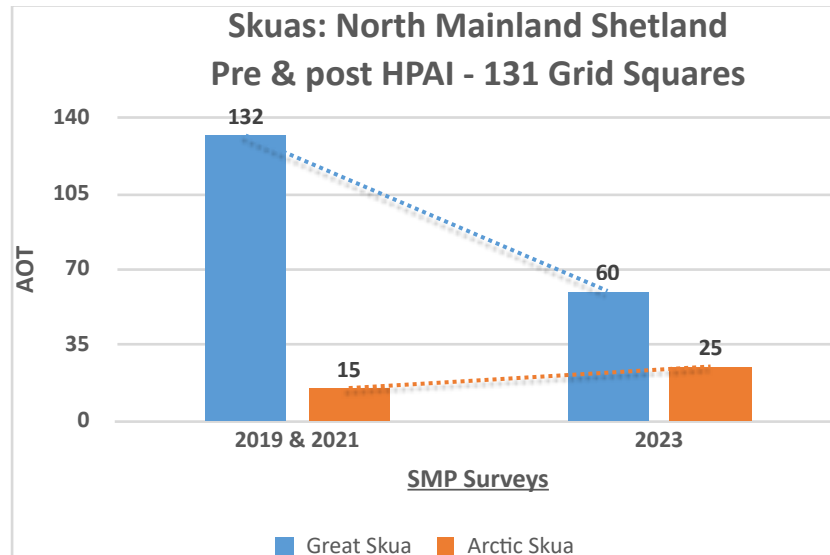
Source: Seabird Monitoring Programme On-line Database <https://app.bto.org/seabirds/public/index.jsp>

<sup>2</sup> <https://isleofmaynnr.wordpress.com/2023/05/31/a-tern-for-the-worse/>

<sup>3</sup> Voe is the local name for an inlet or sea loch in Shetland.

<sup>4</sup> Health warning – 2023 figures not yet checked by SMP coordinator.

**Skua colony observations.** Our skua observations from the 131 targeted grid squares re-surveyed revealed what all informed commentators and observers had predicted, that great skua numbers would suffer a significant decline following the scourge of HPAI in the 2021 & 22 breeding seasons – in our case by **-55%** from 132 to 60 Apparently Occupied Territories (AOT). This was at the lower end of, but in keeping with, declines recorded during other Emergency HPAI targeted re-surveys elsewhere, e.g. of -60% at Canna; -69% at the Shiant Isles; -71% at Fair Isle; -78% at Hermaness and -85% at Noss (Seabird Group, 2023).



**Changes in skua populations on north Mainland Shetland, 2019 & 21 v 2023**

Interestingly, although there were several indications of the previous seasons’ high mortality among Bonxie populations - skeletal remains and unoccupied territorial ‘look-out mounds’ with associated old nest cups in territories that were occupied in the 2019 & 23 seasons - we encountered no indications of HPAI infection among the remnant great skua population.



**Bonxie skeletal remains – Keith Cowieson**



**Surveyor on unoccupied Bonxie ‘look-out’ mound/territory – Keith Cowieson**

On great skuas, the Chair of the Seabird Group had requested that we re-survey samples of both the larger denser colonies and smaller groupings where breeding territories were more widely spaced, on isolated and narrow peatland ridges. As expected, the denser the colony previously, the greater the apparent mortality, in the worst case an 81% decline was recorded. By contrast, on a less densely populated peatland site, the decline was 13%. Meanwhile on one particularly narrow ridge, where 8 pairs of great skua had been spaced every 500-900m, only 3 of the original 8 pairs were missing and on another particular western morainic flat in more glaciated terrain, the small colony of 5 pairs of bonxies found within a 300m<sup>2</sup> area in 2021 had declined by 1 pair.

Great Skua colonies	Seabirds Count (2019 & 21)	Emergency HPAI SMP	% Change	Remarks
Colony A	67 AOT	13 AOT	-81	Dense peatland colony
Colony B	30	26	-13	Less dense peatland colony
Colony C	10	8	-25	Isolated peat ridge
Colony D	7	2	-71	Isolated peat headland
Colony E	8	5	-38	Isolated peat ridge
Colony F	8	5	-38	Narrow peat ridge above Voe

Meanwhile, our sample of Arctic skua numbers had increased by a surprising 67%, from 15 to 25 AOT, albeit in our admittedly small sample of 131 targeted grid squares re-surveyed. This significant increase perhaps reflecting an element of release from the ‘top down’ pressure of the burgeoning, pre-HPAI population of competing/predatory great skua, postulated to have helped contribute to the catastrophic historical Arctic skua decline in Scotland (Perkins *et al*, 2018).



**Pale morph Scooty Allan<sup>5</sup> - Keith Cowieson**

**Inland gull observations.** Inland breeding gulls on the targeted grid squares of north Mainland Shetland were still doing well, numbers seemingly unaffected by HPAI. Notwithstanding their previous relative paucity on the peatlands, on the higher, drier ridges between, great black-backed gull (*Larus marinus*) numbers had increased by 88%, albeit from a low base, perhaps through release from Bonxie competition and predation on shared habitat? Similarly, common gull (*Larus canus*) numbers had also increased, bolstering, further the local increase we had recorded since Seabird 2000 (Cowieson, 2021). Finally, it was gratifying to note that the isolated small black-headed gull (*Larus ridibundus*) colony in our survey area had escaped the HPAI ravages suffered by many colonies further south.

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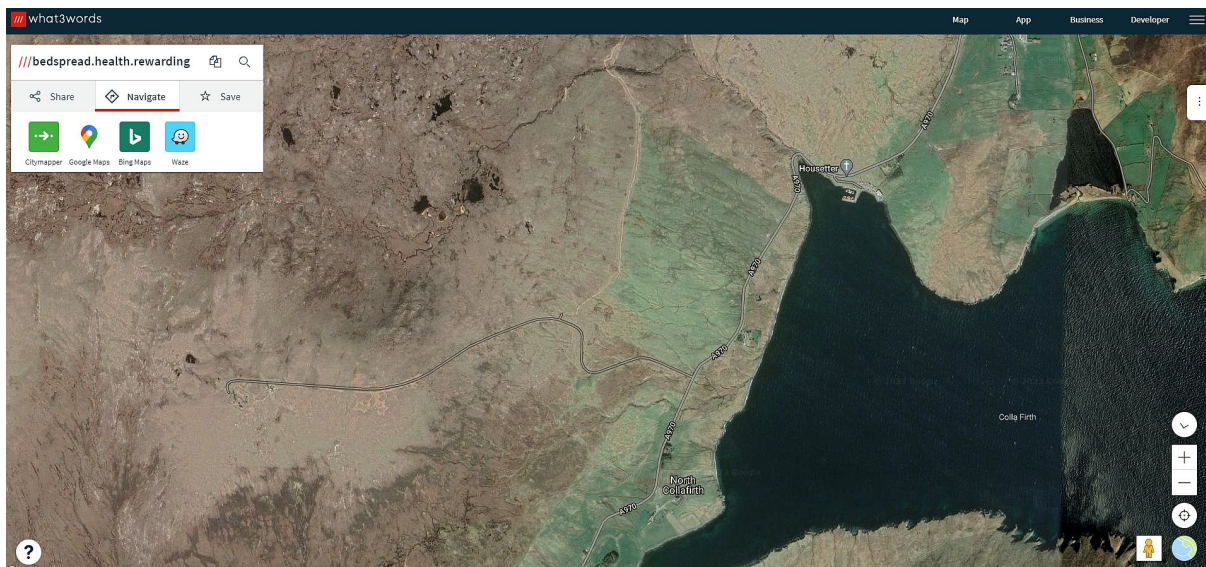
<sup>5</sup> The local Northern Isles’ names for the Arctic skua.



**Great black-backed gull nest, egg & chicks – Keith Cowieson**

**Lessons Identified & Top Tips for Surveyors**

**Planning.** During survey planning, it is useful to scrutinise the grid squares to be surveyed using Google Maps' satellite picture or similar, to see if they appear to have been improved by Crofters (into grassland) for stock grazing or remain unimproved moor or peatland. We found no nesting great skuas on improved grassland, but surveyed it nonetheless for other species / Seabirds Count purposes. The attached 'what3words' imagery of the Ronas Hill approach road shows clearly the green 'improved' areas of grassland to the east (right of the satellite picture) and unimproved (brownish) moor or peatland to the west, left, with the straight dividing lines between both representing stock fences or drystone-type dykes/ditches etc.



**Satellite imagery with clearly visible (green) improved grassland to right of centre and (brown) unimproved moor/peatland to left – Source 'what3words'**

**Skua Surveying Techniques.** Four years of breeding seabird surveying, concentrating on priority breeding skuas, inland nesting gulls and terns, have reinforced lessons identified in previous years, namely that in order to most comprehensively and best survey such species, transect walking and flush counting, respectively, are the two most accurate and effective methods - as set out in the 'Seabird monitoring handbook for Britain and Ireland' (Walsh *et al*, 1995) and 'Bird Census Techniques, 2<sup>nd</sup> Edition' (Bibby *et al*, 1992).

In our survey area, Arctic skua territories were sparse and, as witnessed during SC in 2019 & 21, often easily overlooked, as the birds were relatively undemonstrative, unless surveyors were heading directly towards nest, eggs or chicks. This reinforces our impression that Arctic skua numbers in such habitat are likely to be under-recorded. Breeding Arctic skua pairs often only became obvious when surveyors were bearing down on them, often within 30 metres or so, despite having scoped or glassed the area at regular intervals on the approach.

In stark contrast, the behaviour of their larger great skua cousins was much more obvious with off-the-nest birds flying out to inspect approaching surveyors at ranges of 2-300 metres, often revealing previously unnoticed birds and territories. In this respect our findings mirror those of previous years - transect walking is the only sure way of surveying the bulk of breeding skua territories in rolling peatland landscapes, and even then a proportion of Arctic skua pairs will likely be overlooked. In north Mainland Shetland, the peat hag-dominated landscape essentially rendered most attempts at surveying skuas, accurately, from vantage points redundant, due to the significant areas of 'dead ground'<sup>6</sup> hidden by folds and dips in the undulating landscape.



**Typical north Mainland Shetland peatland habitat – Keith Cowieson**

**Skua Breeding Site Fidelity.** Another previous skua observation that was reinforced during the expedition was that of skua site fidelity and thus probable breeding-site philopatry<sup>7</sup>, exhibited by both great & Arctic skua. This was touched upon in previous SD Grant reports where it was noted that active Bonxie nests were often side-by-side with previous seasons' nest cups. What really highlighted skua site fidelity this year was that on revisiting previous, isolated, Arctic skua breeding sites from the 2019 & 21 SC surveys, all bar one was occupied, with nests and young being

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<sup>6</sup> An area of ground hidden from an observer due to undulations in the land.

<sup>7</sup> [https://en.wikipedia.org/wiki/Philopatry#Breeding-site\\_philopatry](https://en.wikipedia.org/wiki/Philopatry#Breeding-site_philopatry) The tendency of an animal to remain in or return to the area of its birth e.g. more than 99% of Laysan albatross (*Phoebastria immutabilis*) in a study returned to exactly the same nest in consecutive years.

discovered in virtually the same spots as before. Both species therefore display very strong site fidelity. Using historical GPS-derived coordinates, future surveyors should be able to proceed directly to previous territories and nest sites and quickly establish whether or not the traditional territory is occupied, without having to undertake the time-consuming searches of past years.



**Bonxie nest-site fidelity – current nest back right with egg & old nest cup, centre right foreground - Keith Cowieson**







**Sooty Allan nest-site fidelity – 2023 top, 2019 bottom (within 3 metres) – Keith Cowieson**

**Seabird Mobbing.** Aggressive nest defence by mobbing skuas, gulls and terns is intimidating for experienced and novice breeding seabird surveyors alike. Although unusual to be physically struck, it is nevertheless an unnerving experience for many, and some recommend not only wearing stout headgear but also holding a walking pole or suchlike above head-height, as birds invariably attack the highest point of the intruder. Over the years I have found that facing attacking birds, and looking them directly in the eye will invariably cause them to veer away or pull up short of the observer. Conversely, turning one's back on the birds can lead to being hit, occasionally – and I have had the odd 'bump' to prove it.



**Looking a Bonxie in the eye – Keith Cowieson**

Another observation is that the ferocity of the mobbing attack, and the closeness of the pass, is often another cue to proximity of nest or chicks. The closer and more frequent the attacks from Bonxie, the 'hotter' the surveyor is. With Arctic skua, the risk of being hit is less, but a good giveaway to proximity to nest or chicks is the extent to which the 'Sooty Allan' flutter closer and closer around

one's head, or perform a 'dying duck' distraction display around one's feet. Again, the closer and more frequent, the 'hotter' the surveyor is. My recommendations to fellow breeding seabird surveyors then is to face attacking seabirds directly, if possible, and look them straight in the eye as you make your way gingerly through ternery, gullery and skua colonies. The more demonstrative they become, the closer to nest and/or chicks you are. That said, clearly one should not linger in the vicinity when the birds are agitated, only remaining long enough to record the nest or ring the young, particularly if the weather is cold, windy or wet.



**Dark morph Arctic skua distraction display, indicative of nearby nest, eggs or young – Keith Cowieson**

Finally, vivid patches of well-manured, green plots in otherwise uniform brown peat and heathland-dominated landscapes are another good giveaway for locating great skua (and great black-backed gull) territories and nest sites. These invariably indicate historical breeding sites and lookout posts, well-fertilised by guano and the decomposing corpses of prey over the years.

**Seabird Nest Incorporation of Debris.** Dr Nina O'Hanlon's fine initiative in requesting surveyors to note any seabird nest incorporation of plastic and/or other debris during their work, in order that the proportion of nests affected could be ascertained, is now a very successful and well established procedure. The resultant Birds and Debris website catalogues the incorporation of plastic and other debris in all bird species' nests, worldwide (Birds & Debris, 2023). On Mainland Shetland, we found that many shorelines contained varying amounts of plastic and other litter - noticeably worse by fish & shellfish farms - and several Arctic tern nests were again discovered this year in wrack & flotsam-littered shingle beaches, containing thread-like plastic, plastic rope, metal wire and other debris. The terns' nests were part of a small colony of 18 pairs, sadly surrounded by, and interspersed with, the detritus of fish farm and other activity.



**Arctic tern nests containing and amidst plastic debris – Keith Cowieson**

**Non-target bird species and other wildlife.** Shetland's appeal is not limited to seabirds either, there were good numbers of breeding wetland birds and waterfowl in the survey area, such as eider, red-breasted merganser, tufted duck, teal, wild greylag goose, wigeon, locally common red-throated diver and 2 pairs of whooper swan.



**Newly-hatched greylag goslings – Keith Cowieson**

Breeding waders abound, including curlew, dunlin, golden plover, lapwing, oystercatcher, redshank, ringed plover, snipe and numerous whimbrel. We were also fortunate enough to come across territorial ruff, black-tailed godwit and breeding greenshank too.



**Black-tailed godwit on territory – Brian Lyon**

Passerines and doves included blackbird, collared dove, dunnock, hooded crow, house sparrow, skylark, meadow & rock pipit, raven, rock dove, skylark, starling, swallow, twite, woodpigeon and Shetland wren, as well as several pairs of red grouse. Notwithstanding recent reported declines in some populations of breeding birds in Shetland (Hughes *et al*, 2021), for those accustomed to depauperate mainland UK populations, Shetland offers an impressive and diverse assemblage of birds with numbers of waders being especially abundant, perhaps reflecting the reduced suite of native mammalian predators on the islands. Added wildlife bonuses include seals, otter and good numbers of mountain hare.

**Conclusion.** In sum, 131 previously-surveyed SC grid square and other sites were re-surveyed in the parishes of Delting, Lunnasting, Nesting, & Northmavine of Mainland Shetland by RAFOS, RNBWS & AOS personnel in 2023. The sites ranged in character from Arctic-alpine fjell-field, tundra-like

heather moorland and peat hags & bog, to stretches of sandy and shingle beaches. Personnel covered many miles on foot, daily, often over demanding and unforgiving terrain and in all weathers. In addition, the teams completed 47 x BTO BirdTrack species lists from 12 separate 10 Km squares with a total of 664 BirdTrack entries from 67 species recorded in the survey area. Additionally, several nest record cards covering a variety of species were also generated for the BTO Nest Record Scheme; 2 x Nest Incorporation of Debris records were posted on the Birds & Debris website (both Arctic tern); 9 x Pollinator Monitoring Scheme, Flower Insect Timed (FIT) count records were submitted to the Centre for Ecology and Hydrology FIT database, and 34 moth species records forwarded to the Shetland Moth Recorder.

Finally, the RAFOS Chairman and Committee would like to express their sincere gratitude to both The Seabird Group and NorthLink Ferries for their generous grant and sponsorships towards the costs of our 2023 and previous expeditions. All participants have found the experience of tremendous value and benefit, learnt significant new skills in the process and are grateful for being given the opportunity to assist in this vital strand of work. We all now look forward, rather wistfully and longingly, to the 5th National Periodic Census of Breeding Seabirds in the UK and Ireland - in 2030 or so? - and to digesting the results of Seabirds Count findings in the recently published, magisterial, eponymous tome (Burnell *et al*, 2023).

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