



Plate 93. The derelict roofless outbuilding at Cuppin, Papa Westray, Orkney, May 2016; the Fulmars were trapped behind the main wall shown. © Tim Dodman

Fulmar deaths in a building on Papa Westray, Orkney

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A large number of Fulmar *Fulmarus glacialis* corpses and a number of live Fulmars were found in Cuppin, an abandoned croft on Papa Westray, Orkney, in May 2016 (Plate 93). Attempts to renovate this croft had been abandoned about three years earlier. The birds were in a room approximately 5 m by 4 m, which had no roof, with walls to just over 2 m high, a closed door and one window which was still glassed (Plate 94). After the discovery of the birds, the door was left open and the window removed so that the surviving birds and any future birds entering the room could escape.

A week later, we sifted through the corpses, counting 469, of which 15 (3%) were ringed. The state of decomposition of some birds was such that the overall count must be viewed as a minimum. It is also possible that some rings were missing, as it was not easy to find legs on all the birds. The number of live birds and the number of apparently fresh corpses suggested that many of the birds had become trapped during 2016, but the levels of decay in some corpses suggested that some had died in an earlier year.

A return visit was made two days later to collect 170 of the fresher corpses for autopsy and analysis of stomach contents as part of an ongoing investigation into levels of ingested plastic in Fulmars over the North Sea area (Van Franeker *et al.* 2011). Most of these were in good enough condition to attempt internal assessment, which supports the suggestion that a large number of the birds were trapped within months of their discovery; 117 stomachs were collected and 84 birds could be sexed and aged.

The ringing returns were all of birds ringed in Orkney, on Papa Westray, North Ronaldsay, Eynhallow and Swona, with the exception of a single bird ringed in Caithness. Only three of the birds had been ringed as full-grown birds while the other 12 were ringed as nestlings; one bird having been ringed in 2008, two in 2009 and nine in 2010. This suggests that a large proportion of the birds were five to six years old when they were trapped in the building at Cuppin. Of the three birds ringed when full-grown, the Caithness bird was caught on 19 May 2014. The other two had been ringed when found grounded in North Ronaldsay, one on 8 September 2013 and one on 7 September 2015. These dates suggest they might have been fledglings from nearby nests, not yet able to fly properly. This mass mortality appears to have largely involved sub-adult birds. Fulmars start breeding between 6–12 years of age (Ollason & Dunnet 1978). From general prospecting of potential breeding areas in their youngest years, they gradually become involved in specific site and partner selection as sub-adults. The developmental stage of the female oviducts suggested that almost all of the birds that died in the building were sub-adults; judging from sexual organs, no first- or second-year birds were involved, although the single recovery of a bird ringed in 2015 suggest that this may have happened. Among the 84 corpses that could be sexed and aged, all 48 females were immatures and, among 36 males, 24 were certain immatures, others uncertain, but certainly not of adult breeding age. The absence of rings pre-dating 2008 also indicates that younger birds were largely involved.

We suggest that this mortality started with one or two birds entering the ruin, possibly prospecting for nest sites, to find that they were unable to get out given the height of the walls and the confined dimensions. We believe that the sight and sound of these birds then attracted others. There was one other unroofed and otherwise closed room on the property with no evidence of any Fulmars having entered it. However, this room was larger, with some roof timbers and debris hanging down from



Plate 94. Fulmar corpses litter the floor of the open-roofed enclosure, Cuppin, Papa Westray, Orkney, May 2016; note the window was previously intact. © *Tim Dodman*

the walls, both factors that could have enabled birds to escape. Occasional Fulmars have been found trapped before on Papa Westray, though never in such numbers, whilst Fulmars have also been reported trapped elsewhere. Anderson (1982) recorded 119 Fulmars caught over three years in a burnt-out building at Newburgh, Ythan estuary, Grampian measuring 8m by 15m with walls about 10 m high. The Fulmars used the walls of this building for display, and Anderson (1982) considered the main danger presented by the building was to prospecting birds. He also reported on 274 Fulmars trapped in planti-cruives (dry-stone enclosures) on North Ronaldsay between 1978 and 1980, with most entrapments occurring between January and May and in September; older corpse remains were also found in the enclosures. Macdonald (1982) reported 24 Fulmars trapped in a narrow pathway on Dornoch Cathedral, with the expectation that a single bird had become trapped, thereafter attracting the others.

We have no precise information on how long individuals survived in the building before dying of starvation or dehydration. In extreme cases, incubation shifts in tube-nosed birds of this size may be in excess of two weeks. However, even if initially trapped in excellent body condition, it seems unlikely that individual Fulmars in the building could have survived for much more than about three weeks.

Some of the corpses were autopsied to investigate the stomach contents (e.g. Plate 95). Data from autopsied birds have provided sex-specific size details that will assist in sexing birds handled alive, e.g. during ringing. Preliminary data from analyses of stomach contents suggest that about 90% of them contained plastic when they died. The average mass of plastic per individual (0.09 g; unpublished) appeared considerably less than is usually found in Fulmars beached or accidentally killed around the Scottish Islands (0.32 g; OSPAR 2017). Like house-trapped birds, most beached birds are emaciated, but where beached birds may have had the opportunity to ingest plastics from their surroundings until their final stages, this was not possible for the



Plate 95. Although the average plastic mass in the stomachs of these Fulmars was lower than in beached birds from around Orkney, some still showed an impressive level of plastic pollution. Fulmar number ORK-2016-089, an immature female, contained 1.186 g of plastics, a mix of industrial granules (lower left) and a variety of user plastics (sheet-like, threads, foamed and fragments). © *Jan van Franeker, WMR lab, Den Helder*

Fulmars trapped in the building. Through grinding and fragmentation in the muscular gizzard, it is thought that Fulmars can reduce plastics in the stomach by an estimated 75% per month (Van Franeker & Law 2015), which might explain the lowered plastic mass in the trapped birds.

We recommend that derelict properties should be checked for trapped Fulmars whenever possible. Closed roofless rooms should be opened by opening doors, removing windows or taking down sections of wall. Clearly, permissions may need to be sought. Given the apparent rapidity with which numbers can build up once some birds are trapped, checks should be carried out regularly.

The monitoring of plastics in stomachs of Fulmars, beached or otherwise found dead, is an ongoing programme over the UK. For Orkney, the local co-ordinator is Jenni Kakkonen (jenni.kakkonen@orkney.gov.uk; 07545 436 369). For addresses of other co-ordinators please contact jan.vanfraneker@wur.nl or suse.kuehn@wur.nl.

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References

- Anderson, A. 1982. The establishment and growth of a new Fulmar colony on sand dunes. *Bird Study* 29(3): 189–194.
- Macdonald, D. 1982. Fulmars trapped on building. *Scottish Birds* 12(1): 22.
- Ollason, J.C. & Dunnet, G.M. 1978. Age, experience and other factors affecting the breeding success of the Fulmar, *Fulmarus glacialis*, in Orkney. *Journal of Animal Ecology* 47: 961–976.
- Van Franeker, J.A., Blaize, C., Danielsen, J., Fairclough, K., Gollan, J., Guse, N., Hansen, P.L., Heubeck, M., Jensen, J.-K., Le Guillou, G., Olsen, B., Olsen, K.O., Pedersen, J., Stienen, E.W.M. & Turner, D.M. 2011. Monitoring plastic ingestion by the northern fulmar *Fulmarus glacialis* in the North Sea. *Environmental Pollution* 159: 2609–2615.
- Van Franeker, J.A. & Law, K.L. 2015. Seabirds, gyres and global trends in plastic pollution. *Environmental Pollution* 203: 89–96.
- OSPAR. 2017. OSPAR Intermediate Assessment 2017. Plastic Particles in Fulmar Stomachs in the North Sea. OSPAR Assessment Portal OAP online document: <https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/pressures-human-activities/marine-litter/plastic-particles-fulmar-stomachs-north-sea/>

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