

# LUNDY'S WHEATEAR POPULATION IN 2013

by

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## INTRODUCTION

The British Trust for Ornithology (BTO), which runs the national ringing scheme, collects data on aspects of bird populations such as clutch size, breeding success, survival rates of fledged young, and adult survival from one year to the next. These variables combine to determine whether a population is stable, increasing or decreasing. So, in species of conservation concern, understanding them provides evidence as to which aspects of their life cycle are causing their decline. This in turn indicates the areas where conservation measures will be most effective in reversing any decline.

Northern Wheatears *Oenanthe oenanthe* are currently listed as Birds of Conservation Concern. As long-distance migrants that winter in Africa, they are particularly vulnerable to climate and habitat changes in their wintering areas. So they are high-priority targets for the BTO's Recapturing Adults for Survival (RAS) scheme, which encourages ringers to carry out long-term studies monitoring the proportion of adults that return to breed in successive years. Since Wheatears breed at low densities over most of their British range, there are very limited opportunities for monitoring large enough populations to accumulate reliable data.

During a visit to Lundy at the end of May 2012, 34 Wheatears were caught and ringed in five days, using traps baited with mealworms. In view of this success, it was decided that Lundy would make a good RAS study site: it has a comparatively large, dense population of Wheatears and is a well-defined area in which individuals should be easy to relocate, even if they change their precise breeding sites between years. (Studies elsewhere suggest that first-time breeders sometimes set up territories away from their natal area, but that established breeders very rarely move significant distances.)

## METHODS

Since most Wheatears quickly learn to avoid traps, and retain that knowledge in subsequent years, a licence was obtained to colour-ring birds in 2013. Colour-rings enable individuals to be identified by observing them through binoculars or a telescope, so avoiding the need for retrapping. During the first week of June 2013, birds were trapped and given a unique combination of a standard BTO metal ring and one colour-ring on one leg, and two colour-rings on the other (see colour plate 3). The work was started at the Castle and progressed west, then north along the sidelands and nearby areas of grazing on the plateau.

Each bird was examined, weighed and measured. Their sex, age, wing length, weight and the stage of development of any brood-patch were recorded. Their precise location and any association with a nest hole or a ringed partner were also noted.

Four of the captured individuals were not colour-ringed because they were significantly larger and heavier than the local population. Their size indicated that they were of the Greenland race

*O. o. leucorroha*. Local birds were already incubating eggs or feeding young, but Greenland birds migrate and breed much later.

During the last week of May and the first week of June 2013, a team of ornithologists was on Lundy carrying out census work on the island's seabird populations. In the course of this work, which covered the entire coastline of Lundy, any incidental sightings of Wheatears were noted on the recording maps. By combining this information with the more detailed data from the ringing study, an estimate of the Wheatear population for the whole island was calculated.

## RESULTS

Since breeding Wheatears were more numerous than anticipated, it took a week to progress from the Castle to the Battery, ringing as many of the breeding birds as possible. In the area covered, 27 males and 21 females were colour-ringed; in addition there were two females and one male that had metal rings from previous years that were too wary of traps to be recaptured (Table 1). Altogether, these 51 birds are likely to represent at least 28 breeding pairs, with more males than females ringed because some females were probably spending most of their time incubating eggs or brooding small young during the study.

Looking more closely at the figures, there were 19 male and 11 female ringed birds south of Old Light, but the ratio was 9:12 from Old Light to Battery. With no movement of birds seen between the two areas, these figures suggest there could be 19 pairs to the south and 12 to the north of Old Light, giving a total of 31 pairs. The different sex ratios could be explained by timing: work in the southern area was on average three days earlier than in the north and, as time progressed and chicks grew, females were perhaps doing more feeding and less brooding.

During the seabird survey work, 46 Wheatears (29 males and 17 females) were recorded around the whole of the coast. Of these, 18 were in the area of the colour-ringing study, so it can be estimated that the colour-ringed population represents  $18/46 = 0.391$  of the total. This gives a whole island population of  $28/0.391 = 72$  pairs using the lower estimate for the study area, or  $31/0.391 = 79$  pairs using the higher figure.

## OTHER OBSERVATIONS

During the colour-ringing work, all of the nest sites that were found, or located approximately through observing the birds' behaviour, were in burrows or rock crevices down the sidelands.

	Ringed birds		Recorded during Seabird Survey	
	Males	Females	Males	Females
Castle–Old Light	19	11	8	4
Old Light–Battery	9	12	3	3
Total males & females	28	23	11	7
Total birds	51		18	

This was unexpected, because birds were frequently seen feeding on the island plateau, and indeed this was where most birds were trapped. So it had been anticipated that some nests would be in drystone walls or in burrows inland from the slopes. However, it became clear that birds were repeatedly flying from their nests up onto the plateau to gather food on the grazed areas. In some cases this involved flights of 100 m or more, for example going to the east side of South West Field from the west coast or from below Benjamin's Chair.

Most birds fed by searching for insects or other invertebrates on heavily grazed areas of short turf, particularly on broad paths, where birds could move about freely by hopping rather than flying. At times they used nearby rocks, posts and other prominent features as temporary perches from which they could scan surrounding areas for prey; at other times they also hovered over longer grass in South West Field and dived down onto prey. Occasionally, hopping birds extracted large grubs from deep within tussocks of longer vegetation. This was seen on the west side of Ackland's Moor and may have been a strategy favoured at that particular time because cool, windy conditions were reducing the activity of insects.

At their closest, nests were only about 50 m apart, and pairs were only seen behaving territorially in the immediate vicinity of their nest. There was no evidence of territoriality in the main feeding areas: individuals appeared to come and go freely, without interference.

## DISCUSSION

### Reliability of the population estimate

Four potential sources of error (factors) are:

1. Underestimation of the breeding population in the ringing study area, if pairs were missed.
2. Overestimation of the breeding population in the ringing study area, if some ringed birds were non-breeders.
3. Unevenness in the recording of Wheatears during the seabird survey work. It is possible that factors such as weather conditions, local topography, time of day and length of time spent by observers in different areas might have influenced the visibility of Wheatears. If any such factors led to a difference in visibility in the ringing area compared with the rest of the island, the ratio used in the calculations would be inaccurate.
4. Uneven distribution of non-breeders (summering birds or late migrants) on the island.

Judging from experience during the week, factors 1 and 2 seem unlikely to have produced errors of more than two pairs beyond the 28-31 range suggested above. Since the two factors will tend to cancel each other out rather than add up, a maximum error of two appears reasonable. Applying this level of potential error to the whole-island estimate would give a population of between 66 and 84 pairs.

The possible effects of factor 3 are more difficult to assess, but the distribution of the seabird survey team's records round the island matches expectations, based on previous general observations: highest densities on the West Side, in the areas where there are large areas of good feeding habitat, and fewer on the East Side, where taller vegetation, particularly Bracken *Pteridium aquilinum*, is prevalent.

There were interesting differences between the two areas, Castle to Old Light, and Old Light to Battery. The seabird survey team recorded 12 birds in the former, six in the latter. If these figures are used separately to produce whole-island estimates, they give a range of  $46 \times 19 / 12 = 79$ , to  $46 \times 12 / 6 = 92$  pairs. However, considering the whole island, Wheatears are probably more visible in the area south of Old Light than anywhere else because of the extent of close-cropped vegetation and open slopes. The Old Light to Battery area has longer vegetation and a more broken landscape, making it more likely that birds would be missed during a comparatively brief visit. The 'average' landscape of the island is perhaps between these two extremes, suggesting a population of around 80 pairs.

Regarding factor 4, it seems unlikely that the distribution of non-breeding local birds would be significantly different from that of breeders, and since they are likely to be a small proportion of the population, any effect on the estimate would also be small.

While it is possible that late spring migrant birds might be unevenly distributed, for instance if they tended to gather at the North End prior to leaving, the presence of Greenland birds in the south suggests that was not the case.

Though it is not possible to put a statistical value on the level of error involved, it is very unlikely that the issues discussed above (with factors 1 and 2 combined, as opposites) would introduce errors cumulatively, in the same direction as each other. So, taking all these factors into account, there would seem to be a high probability that the 2013 breeding population was within the range 70-85 pairs.

## COMPARISONS WITH OTHER SURVEYS

### On Lundy

From 1952 to 1996, there were four years in which Lundy's Wheatear population was reported as ten pairs; most other estimates for this period were between three and six pairs. In 2000 and 2004, 20 territories were found (Davis and Jones, 2007). So the 2013 results suggest a major increase. One possible change leading to the increase could have been the eradication of rats, since Wheatear nests, which are usually down burrows or in rock crevices, are very vulnerable to predation by rats. However, the 2000 Wheatear census was carried out before the rat eradication programme, so this cannot be the only factor involved. Clearly, other factors such as weather will also influence breeding success, as well as the birds' survival throughout the year.

Our ringing work in 2012 and 2013 showed that there was a higher population in the study area than we would have estimated from observation alone, so some previous surveys may have resulted in similar underestimates.

### Other sites

On Ramsey, Pembrokeshire, the mean breeding population for 2009-2013 was 109 pairs (range: 106-115) (data from *Pembrokeshire Bird Reports 2009-2012*; the Wildlife Trust South and West Wales Welsh Wildlife Centre, Cilgerran, Cardigan; and <http://www.rspb.org.uk/community/places-to-visit/ramseyisland/b/ramseyisland-blog/archive/2014/02/16/a-look-back-at-2013-part-2-april-to-june.aspx>). Since Ramsey is an island of 230 ha (compared with 445 ha for Lundy), its 2013 population density (0.47 pairs/ha) was more than double Lundy's (0.18 pairs/ha). This probably reflects differences in habitat: as an RSPB reserve, Ramsey is managed primarily for the benefit of its breeding birds, and these include Choughs (*Pyrrhocorax pyrrhocorax*), which, like Wheatears, are ground feeders, so it is extensively grazed to produce large areas of short-cropped grass.

In contrast, Skomer, Pembrokeshire, is an island of 292 ha but has only had an average of 14 pairs of Wheatears (range: 5-22) in the years 2010-2013 (0.08 pairs/ha in 2013) (data from [www.welshwildlife.org/wildlife-of-skomer](http://www.welshwildlife.org/wildlife-of-skomer)). Apart from a narrow coastal strip, most of Skomer is dominated by tall vegetation such as Bracken.

In upland areas of mainland Britain, Wheatear population densities are low, estimated at 1-10 pairs per sq km (Cramp *et al.*, 1988, p. 780).

## CONCLUSIONS

Lundy's 2013 Wheatear breeding population, estimated at approximately 80 pairs, was significantly higher than any previous survey of the island has found. Rats were probably the main limiting factor before their eradication in 2003/04. Numbers are now likely to be limited by availability of the birds' preferred feeding habitats, with very short vegetation.

Comparisons with other Wheatear breeding sites suggest that islands such as Lundy, which are grazed and free of nest predators, may play an important role in the conservation of the UK population.

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## REFERENCES

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### Recording colour-ringed Wheatears

About 50 Wheatears were colour-ringed on Lundy in 2013, contributing towards the BTO's Recapturing Adults for Survival scheme, which monitors the winter survival rates of adult birds. To achieve results, we need to record which of these birds return to Lundy in subsequent summers. If you see Wheatears with colour-rings, please enter a note of the colour combination in the LFS logbook. A notice in the Tavern has further information.

The bird pictured on colour plate 3 would be recorded as "left: white over yellow; right: pale green banded over metal".

***Thank you for your help***