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Recovery of Wren *Troglodytes troglodytes* populations after the severe winter of 2010/11

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Wrens *Troglodytes troglodytes* are amongst the most common resident breeding birds in Ireland occupying a wide range of habitats, including offshore islands (Hutchinson 1989). Population fluctuations are not unusual, although major declines have occurred during severely cold winters (Marchant *et al.* 1990, Robinson *et al.* 2015). At North Bull Island (53.3705° N, 6.1440° W) in Dublin Bay, Wrens were winter visitors up to the 1950s (Kennedy 1953), but a small resident population had become established by the early 1980s. In May 1998 an informal survey of the breeding population on the island was carried out by the author in conjunction with a birdwatching event (Stubbs 1998), and this produced a minimum of 17-20 territories (five on the northern end and 12-15 on the southern end). During the cold winter of 2010/11 when heavy snowfall and record low temperatures were recorded in Ireland (Met Éireann 2011), Wrens were absent from many areas on North Bull Island, and it became obvious that the population had declined severely. To monitor their recovery all breeding territories recorded from March to early July 2011-2014 were mapped using satellite

imagery (scale 1: 5000) and GPS (Garmin GPS 72H). In 2015 only the north end of the island was surveyed. A map of their breeding distribution during 2011-2015, plotted by hectare, was produced using QGIS (v.1.8 and v.2.16). The extent of the wintering range was established by recording hectares with Wrens during regular but casual visits to all areas of the island in the winter of 2013/14. Mapping of breeding and wintering distributions were part of a study of passerine populations on the island (Cooney 2013a, b).

The results confirmed that a severe decline had taken place with only eight territories located in 2011. In 2012 the number of territories doubled to 17 (+115%), but the rate of increase was lower in subsequent years with 24 (+41%) in 2013 and 29 (+21%) in 2014. In 2011 the entire breeding range had contracted to the southern end of the island where patches of dense scrub presumably provided prime habitats for nesting. Recolonisation based on the most northerly occupied hectare annually, was from south to north (Figure 1). It was not until 2015 that nesting recommenced at the most northerly breeding site used in 1998. This direction of recolonisation suggests the recovery was mainly, though possibly not exclusively, by the island's resident population.

Declines in bird populations are not unusual during severely cold winters and the impact of the 2010/11 winter on a number of Irish passerines, including Wrens, has already been documented (Lovatt & Madden 2012). Although the population at North Bull Island was severely reduced by the winter of 2010/11, it recovered within a year or two. A primary driver of Wren populations are overwintering survival rates (Robinson *et al.* 2015) and it seems likely that the mild winter of 2011/12, with above average air temperatures in the Dublin

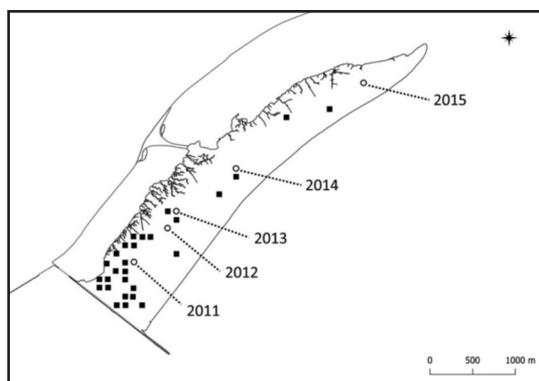


Figure 1. Breeding distribution of Wrens (plotted by hectare) at North Bull Island in 2011 to 2015. Open circles and dated dashed lines indicate the most northerly occupied hectares annually.



Figure 2. Breeding distribution of Wrens at North Bull Island in 2013 (shaded area) and winter distribution (plotted by hectare) November 2013 to February 2014.

region (Met Éireann 2012) contributed to their rapid recovery at North Bull Island. Another factor which may have influenced their recovery is the ability of Wrens to exploit a wide range of habitats in winter not usually associated with this species. During the survey of their wintering range Wrens were regularly encountered foraging in Marram *Ammophila arenaria* grasslands, Mediterranean salt meadows *Juncetalia maritimi*, Atlantic salt meadows *Glauco-Puccinellietalia maritimae*, in beach debris and amongst seaweed covered rocks.

Information of local movements and site fidelity of Wrens are based mainly on British ringing recoveries, and Conway (2002) states that 'we know almost nothing about local movements' in Ireland. In this context it is interesting to note that seasonal movements were also detected at North Bull

Island. Each winter, Wrens were found in all areas on the island up to the most northerly point. The distance between the breeding range in 2011 and the most northerly wintering record in 2011/12 was approximately 4.5 km. Even if some of the wintering birds on the north of the island had originated from the mainland, this would still have involved a migration of 3.5 km. This pattern of nesting on the southern end of the island and expanding to all areas in winter was repeated annually (Figure 2). The distance between the northern limits of the summering and wintering ranges reduced as the resident breeding population expanded northwards.

In conclusion, the resident Wren populations at North Bull Island declined during the winter of 2010/11 but the number of breeding territories appears to have recovered within two years. Recolonisation of the former breeding range took four years to complete. A seasonal population movement between summer and winter was detected. Although the results of this study were site specific, it seems unlikely that these events occurred in isolation and that similar population and range retractions and expansions occurred at other coastal dune systems in Ireland.

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