An Roinn Cultúir,
Oidhreachta agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

The Corncrake Conservation Project

Annual Report

2018

November 2018

Marie Duffy

Table of Contents

SUMMARY

This report describes the measures carried out under the Corncrake Conservation Project in 2018. It presents the results of the 2018 census, together with information on the uptake of conservation measures, results of predator control operations, research activities and ongoing habitat creation and management works.

151 calling males were confirmed in Ireland during the 2018 breeding season and this is the first recorded increase since 2014. This figure represents an 8% increase on the 140 individuals confirmed in 2017. Donegal remains the national stronghold, with 90 confirmed calling males (60% of the national total). West Connacht, which comprises the western seaboards of counties Mayo and Galway, held 59 males (39% of the total). Two calling males were recorded in Templeboy, Co. Sligo. For the fourth consecutive year no Corncrakes were recorded in the Shannon Callows.

Offshore islands held 53% of the national population. At a regional scale, islands accounted for 66% of the population in Donegal population and 33% of that in West Connacht. The Corncrake Special Protection Area (SPA) network held 48% of the national population, accounting for 66% and 22% of numbers in Donegal and West Connacht respectively. Compared to 2017, there was an overall 14% increase in numbers recorded within the network. All SPAs, except for the Mullet SPA, saw an increase in numbers.

Conservation measures in 2018 again included habitat management and the administration of grant schemes. Over 640 ha of land were entered in one of four NPWS and DAFM schemes in 2018. 125 participants entered the Corncrake Grant Scheme (CGS), covering an area 352.78 ha nationally at a cost of over €118,000. 10 NPWS Corncrake Farm Plans had a combined plan area of 63.52 hectares, 64 GLAS plans covered 209 ha in the country and land management agreements extended over 15.47 ha. Looking at the total land area eligible for the CGS within 250m of all Corncrakes nationally, 69% of this was entered in the CGS, the Farm Plan Scheme or the Corncrake measure in GLAS. No conservation measures were implemented on the remaining 31% of eligible land area; the vast majority of this area was outside of SPAs.

Habitat creation and management works were initiated last year and will continue to take place on offshore Donegal islands, with works also planned on Inishark in Co. Galway this year. Works include fencing works where necessary, removal of rank vegetation and establishment of Early and Late Cover (ELC), grassland and crops.

A small-scale bioacoustic study was initiated during the 2018 breeding season. The calls of the majority of males encountered during the census period in Co. Donegal were recorded by fieldworkers using handheld recording equipment. Data obtained will be analysed by GMIT in 2019. The aim of this trial study is to identify individuals using vocal characteristics and thus obtain a more accurate estimate of Corncrake numbers in Donegal, with a view to repeating the project nationwide in 2019, if possible.

The Predator control programme was carried out again in Donegal, West Connacht and the Shannon Callows this year.

1. INTRODUCTION

1.1 Corncrake ecology, legal status and population trends

Corncrakes (*Crex crex*) are members of the Rallidae family, associated with a variety of marshy and dry grassland habitats (Cramp & Simmons 1980, Schaffer 1997, Green et al. 1997). They breed in Eurasia, from Ireland eastwards across central and northern Europe and Russia, as far east as China. The global population is estimated to be between 1.8 and 3.2million singing males (BirdLife International 2016) with at least 1.5 million of these in Russia. At least 300,000 are thought to breed in the Eastern European strongholds of the Baltic States, Georgia, Ukraine, Poland and Romania (Koffijberg & Schaffer 2004). Western European populations are much smaller, with populations of more than 1000 being found only in Germany (Schaffer & Green 2001) and Scotland (Wotton et al. 2015).

Figure 1: European distribution of Corncrakes during the breeding season (Source: Birdlife International, 2016)

Corncrakes are migratory, wintering in sub-Saharan Africa, mostly in south-eastern countries (South Africa, Zimbabwe, Zambia and Tanzania), where grassland habitats are favoured (Walther et al. 2012, Barry 2000). Eastern breeding populations appear to reach their wintering grounds through a migration route along the eastern Mediterranean, down to Kenya and then

further south; evidence indicates that Western populations follow a route through north-west Africa before making a south-eastern crossing of the Sahara (Walther et al. 2012).

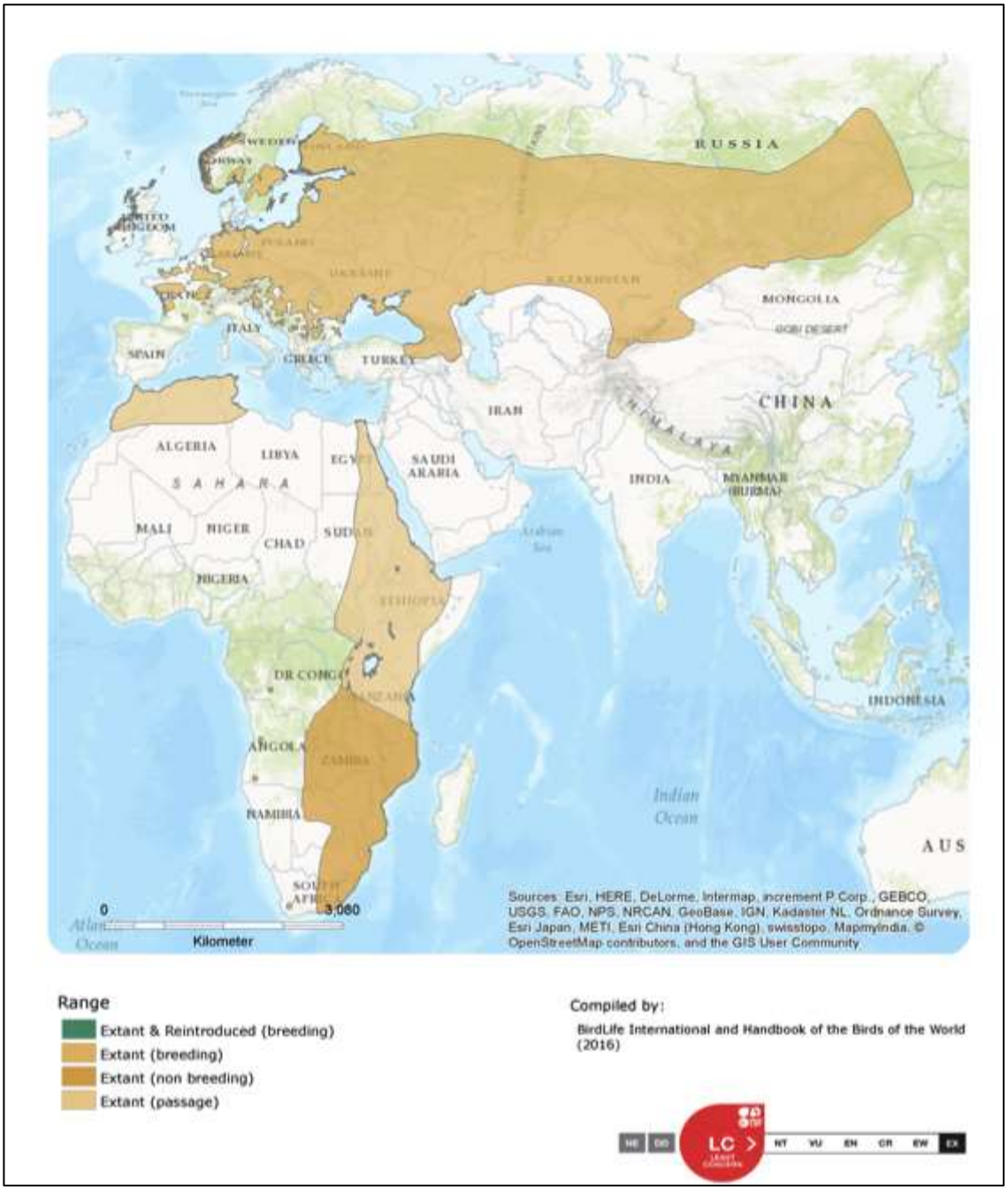


Figure 2: Global distribution of Corncrakes (Birdlife International 2016)

Corncrakes begin arriving back on their breeding grounds in April and May (Hudson et al. 1990). Like most rails, they are secretive and are rarely seen in the open. Throughout the breeding cycle, they require continuous cover of tall vegetation, at least 20cm in height, which retains an open structure - vegetation which becomes too dense as the season progresses tends to be avoided (Tyler 1996). They are found most frequently in annually harvested meadows, but unfertilised, damp and abandoned grasslands which have not become too rank are also used

(Green et al. 1997a). In the early stages of the breeding season, birds favour stands of tall herbaceous vegetation such as nettles (*Urtica dioica*) and marsh vegetation, including yellow flag iris (*Iris pseudacorus*) and reeds (*Phragmites australis*) (Green 1996, Cadbury 1980), as these provide cover when the surrounding grass is short. By June, once vegetation height in utilised grasslands exceeds 20cm, birds will usually move into these areas (Green et al. 2009).

Males attract mates with their loud rasping song, calling most consistently for several hours from midnight onwards, from shortly after arrival until mid-July, when calling activity declines (Hudson et al. 1990, Cramp & Simmons 1980). They form a pair-bond with females during egg laying, at which time they sing less frequently at night (Tyler & Green, 1996). Following clutch completion, males can move hundreds of metres away and resume singing. The female is the sole carer, incubating the clutch of usually 8-12 eggs in a shallow nest on the ground concealed in tall vegetation. First brood chicks are accompanied by the female for about 12 days, with the female then abandoning the chicks to lay a second clutch (Tyler 1996). Peak hatching dates of first and second clutches are mid-June and late July/early August, respectively; as chicks are not fully fledged until they are about 35 days old, (Cramp & Simmons 1980) flightless chicks from second broods are still present on breeding grounds into September (Donaghy et al. 2011, Green 2010).

Population decline and range contractions were observed during the late 19th and 20th centuries in many range states (Tucker & Heath 1994, BirdLife International 2004). This led to the classification of the Corncrake as a globally threatened species (Collar & Andrew 1988). In Ireland, a long-term decline is thought to have started in the early 20th century (O'Meara 1979). The population in the late 1960s/early 1970s was estimated at 4,000 individuals (Cadbury 1980). A national survey carried out in 1988 recorded 903-930 singing males (Mayes & Stowe 1989) and identified three core breeding areas: North Donegal, the Moy Valley and West Mayo/Galway, and the Shannon Callows. By 1993, during the third national Corncrake census, only 189 singing males were recorded and the population was almost entirely confined to the core areas (Casey 1998), though by 1999, the Moy Valley population had been lost (NPWS 2015).

Mechanisation of mowing was regarded as the principle cause of the decline in most European range states (Green et al. 1997a), allied with earlier mowing and loss of hay meadows. Mowing of hay and silage fields during the breeding seasons destroys nests; in many areas of Ireland harvesting takes place from June onwards and thus overlaps with the nesting period (Green et al. 1997b); second nests are particularly vulnerable. Machine mowing from the edges of the field to the centre results in the death of unfledged chicks, which are reluctant to escape across open ground to field margins (Broyer 1996, Tyler et al. 1998, Green et al. 1997b); moulting females may also be at risk (Green 2010). Recruitment of young adults to the breeding population was shown to be markedly reduced during periods of rapid decline, probably as a result of low breeding success caused by machine mowing (Green 2008).

The development of conservation measures focused on delaying mowing until after the peak of hatching of second clutches, together with mowing fields from the centre outwards, to allow chicks to escape (Green et al. 1997b, Green et al. 1998). In the absence of mowing, survival estimates for first and second brood chicks are similar; however, as second brood chicks normally suffer higher mortality due to greater exposure to mowing (Donaghy et al. 2011), management measures which facilitated hatching of second nests and Corncrake Friendly Mowing (CFM), i.e., mowing from the centre towards the edges of the field (Tyler et al. 2008)

were predicted to improve productivity sufficiently to halt long term declines if implemented widely enough. (Green et al. 1997b). In the UK, the population increased from 480 calling males in 1993 to 1,245 calling males in 2014, mainly, it is believed, in response to the implementation of these conservation measures (O'Brien et al. 2006, Wotton et al. 2015), though the population there has also decreased somewhat since 2014 (England, 2016). Provision of sufficient cover early in the season has also been shown to be an important factor in retaining populations (Green 1996) and therefore effort was also focused also on the maintenance and creation of early cover and this is also likely to have contributed to the recovery.

Such reversal of population declines across the range has been limited; however, due to the recent discovery of large Eastern populations and the fact that population declines predicted in 2004 have not occurred, the Corncrake was reclassified in the IUCN Red List from 'Vulnerable' to 'Near Threatened' and finally to 'Least Concern' in 2010 (Schaffer & Barov 2011, Birdlife International 2014). It should be noted however that this was on the basis of improved knowledge of the species' global population and its reduced extinction risk, rather than on a genuine recovery to favourable conservation status across its range. The species remains a high conservation priority; at a European level it is included in Appendix II of the Bern Convention, Annex I of the Birds Directive (2009/147/EC), and is listed on the Red List of Conservation Concern of most European countries. The International Single Species Action Plan (ISSAP), to which many range states are signatories as part of the African Eurasian Waterbird Agreement (AEWA), was updated in 2006 (Schaffer & Barov 2011).

In Ireland, Corncrake is on the Red List of Birds of Conservation Concern in Ireland due to historical declines (Colhoun & Cummins, 2014). Targets for recovery have been outlined at both the All-Ireland and Republic of Ireland level (NPWS & EHS 2005, NPWS 2015). A programme of conservation measures in the core areas has been adopted by NPWS since the 1990s (see Section 1.2); between 1993 and 2017, the national population decreased from 189 to 140. The functional extinction of the population on the Shannon Callows, where summer flooding had a severe impact, particularly in the early 2000s, has contributed to this decrease (Donaghy 2007). The population in West Connacht has increased by over 50% since the project was established, from 30 calling males in 1993 to 47 in 2017. The population in Donegal doubled during the same period, from 46 to 92 calling males. Conservation measures are likely to have contributed to the recovery in these areas, although a significant part of the population occurs on offshore islands of Donegal, where land abandonment is a core issue and conservation measures are minimal. The proportion of calling males on offshore Donegal islands relative to the national population has increased significantly since 2000. An average of 37% of the national population was on islands from 2000-2008 and this increased to 55% from 2009-2017. The reasons for the increase on these islands is not clear, but is likely to include good productivity as a result of little (if any) mowing during the breeding season and reduced disturbance.

The national population was identical in 2000 and 2017 (140 individuals), yet there have been considerable fluctuations in numbers over the years. Declines of at least 10% on the previous year occurred in 2002 (-10.4%), 2009 (-14.2%) and 2015 (-20.1%). Significant increases on the previous year occurred in 2005 (+11.7%), 2013 (+43.5%) and 2014 (+21.8%). Population fluctuations have also been recorded in the UK, where for example the population dropped by 24% between 2012 and 2013, with numbers recovering markedly in 2014 (Wotton *et al.* 2015). The UK population increased more or less steadily between 1994 and 2014, so the sharp decline

in 2013 was unusual and was attributed to a particularly cold spring in 2013 that inhibited growth of vegetation cover.

The Irish population declined by 39%, from 230 to 140 calling males, between 2014 and 2017. The 230 calling males recorded in 2014 was the highest on record since the conservation programme began in 1993.

1.2 The Corncrake Conservation Project

1.2.1 Project Background

The Corncrake Conservation Project began in 1993 as a response to the population decline in Ireland (see Section 1.1). Initially funded by the Royal Society for the Protection of Birds (RSPB) and implemented by BirdWatch Ireland, the project monitored populations annually and took measures to protect nesting habitat. National Parks and Wildlife Service (NPWS) began funding the whole programme of measures in the late 1990s and in 2009 the project was taken into their direct administration. A predator control programme was introduced, as well as a Short Term Lease (conacre) scheme, which allowed for habitat management for Corncrakes throughout the year. While NPWS had a Farm Flan Scheme for Corncrakes in the Shannon Callows since 2007, the Corncrake Farm Plan Scheme (CFPS) was tailored in 2012 for Special Protection Areas (SPAs) in Counties Mayo and Donegal. The CFPS includes measures for the creation and maintenance of Early and Late Cover (ELC) as well as for mowing options to benefit Corncrakes. The Scheme for the Shannon Callows was discontinued following the extinction of this population.

In 2011, the legislative framework of measures provided by the Birds Directive to ensure endangered bird species conservation was enacted in Ireland with the designation of a network of Corncrake SPAs. This network covers almost 10,000ha across Donegal, Mayo, Connemara and the Shannon Callows. A list of Activities Requiring Consent (ARCs) was been drawn up for each SPA. In Corncrake SPAs, one of the ARCs listed is mowing prior to specified dates, provided landowners have been notified that it is likely to interfere with the breeding of Corncrakes. Corncrake SPA boundaries in Ireland were determined using historical Corncrake distribution data from 1994-2007 inclusive (NPWS 2014a). Nine sites were proposed, and as the appeals process for these sites is still ongoing, their exact boundaries remain subject to change. The SPA sites are listed below and are illustrated in Figure 3:

- Tory Island SPA (Co. Donegal, Site Code 4073)
- Inishbofin, Inishdooey and Inishbeg SPA (Co. Donegal, Site Code 4083)
- Malin Head SPA (Co. Donegal, Site Code 4146)
- Fanad Head SPA (Co. Donegal, Site Code 4148)
- Falcarragh to Meenlaragh SPA (Co. Donegal, Site Code 4149)
- Mullet Peninsula SPA (including Termoncarrgah SPA) (Co. Mayo, Site Code 4227)
- West Donegal Islands SPA (Inishirrer, Inismeane and Gola) (Co. Donegal, Site Code 4230)
- Inishbofin, Omey Island and Turbot Island SPA (Co. Galway, Site Code 4231)
- Middle Shannon Callows SPA (Co. Offaly, Site Code 4096)

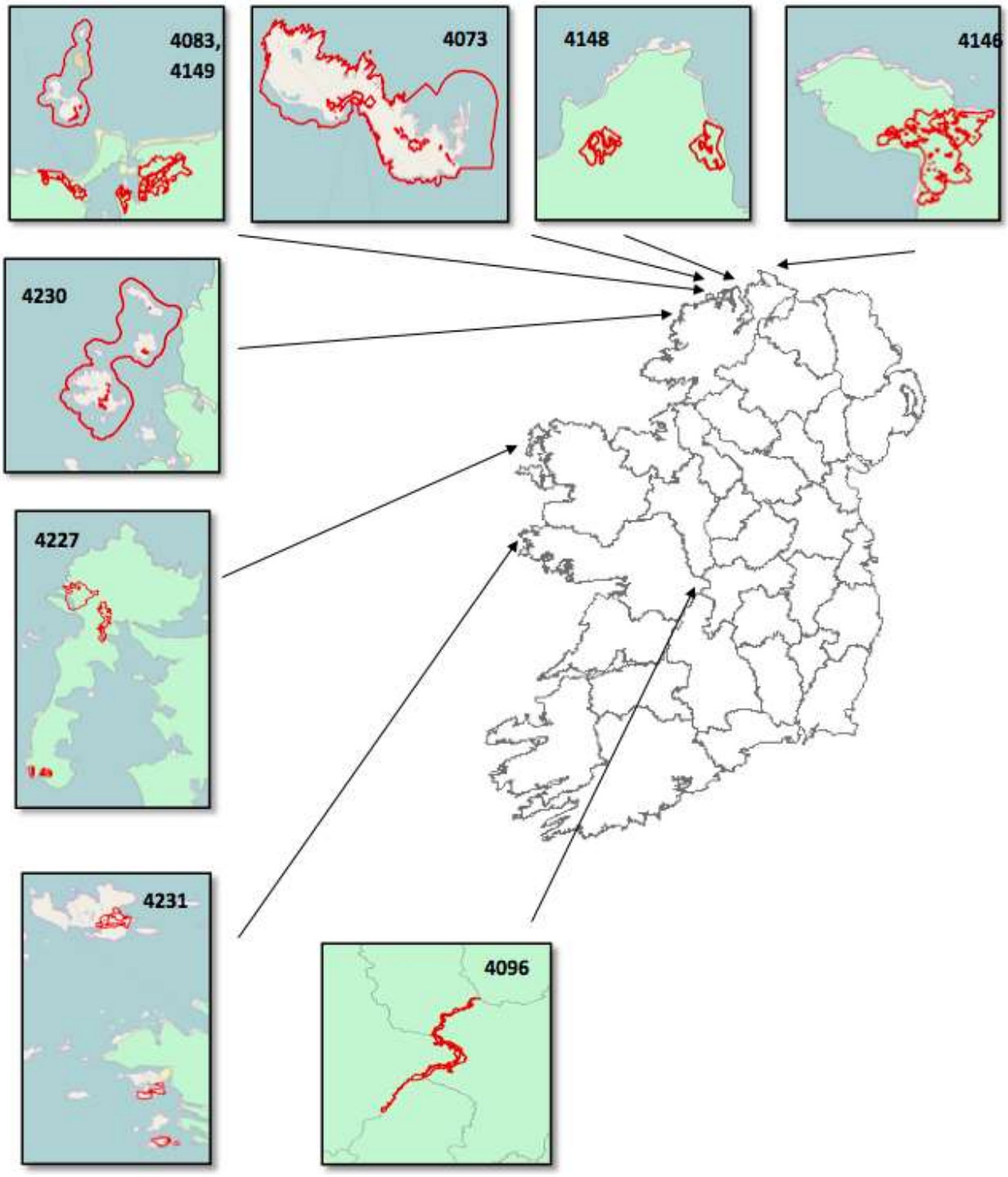


Figure 3: Distribution of Corncrake SPAs in Ireland

In 2005, an All-Ireland Species Action Plan setting national targets for habitat creation and population re-establishment and growth was created for the Corncrake. In order to achieve them, in 2012 site based targets were also set for habitat creation and Corncrake numbers in and associating with individual SPAs within the Corncrake SPA network. Figures were based on the estimated carrying capacity for each site and a ten-year time span (to 2022) was chosen to frame them. In April 2014, the NPWS drafted 'A Framework for Corncrake Conservation to 2022 (NPWS 2014); this document reviews Corncrake conservation measures to date, current population levels and distribution, and provides a Framework Corncrake Conservation Scheme which will guide the implementation of future conservation measures.

1.2.2. Project implementation

The fieldwork components of the Corncrake Conservation Project are delivered by seasonal contract fieldworkers and local NPWS staff. A project supervisor carries out fieldwork during the breeding season and delivers continuity of project activities during the remainder of year. Senior NPWS staff manage these teams. The NPWS Scientific Unit provides scientific oversight and oversees the NPWS Corncrake Farm Plan Scheme.

Conservation measures were carried out in three areas in 2018; Co. Donegal, West Connacht and the Shannon Callows. Corncrake related conservation efforts have been reduced to a minimum in the Shannon Callows since the local extinction of the species in the area in 2015.

Work carried out by Corncrake fieldworkers comprises the following key elements:

- Publicising the project and raising awareness of Corncrake conservation through dialogue with local communities and landowners, talks and presentations, and media communications
- Establishing, enhancing and maintaining areas of suitable Early and Late Cover (ELC) for breeding birds
- Monitoring of calling male Corncrakes throughout the census period and, in Donegal, recording Corncrake calls
- Administering Corncrake conservation schemes to eligible landowners and monitoring compliance
- Enrolling landowners to voluntarily manage their land in a Corncrake friendly manner
- Monitoring mowing activities in fields likely to shelter breeding birds and chicks

The NPWS Predator Control Programme is now in its 9th year and is implemented by predator control operatives prior to and during the Corncrake breeding season. This programme aims to protect the following ground nesting bird species: Corncrake, Red-throated Diver, Tern species, breeding waders (Golden Plover, Curlew, Dunlin, Snipe, Redshank and Lapwing), Red Grouse, Common Scoter, Common Gull, Black-headed Gull and Red-necked Phalarope. In relation to Corncrakes, the programme's objective is the removal of resident and transient predators from traditional breeding areas and the immediate vicinity of nesting females.

1.3. Corncrake Schemes

The schemes available to landowners for Corncrake conservation in 2018 are briefly described below (see Appendix 1 for full details):

1) **NPWS Corncrake Grant Scheme (CGS)**: This is a voluntary, short-term management agreement with the landowner designed to protect Corncrakes by delayed mowing, grazing and Corncrake Friendly Mowing (CFM), separately or in combination. Eligible habitat consists of any suitable habitat situated wholly or partially within a 250 metre radius of a calling male. A basic rate of €250 per hectare is offered for delaying activities until 05 August, €325/ha until 20 August and €375/ha until 01 September, with a further €45/ha for CFM. Where two cuts of silage are taken, a top-up of €150/ha is available.

   CGS applicants participating in certain GLAS measures were offered reduced CGS rates commencing in 2018, due to an overlap between both measures. For example, those in the Twite measure in GLAS are requested to delay activities until August 15th. Thus a maximum top-up payment of €150/ha is offered to further delay until September 1st under the CGS.

   In 2018, a 'margin' option was incorporated to the CGS. Where no suitable tall vegetation adjoins field boundaries, the provision of a refuge area is achieved by leaving an unmown 2.5m strip of meadow along the field boundary. The rate of payment is €100/100m with a maximum payment of €500 per applicant and margins must be left in place until 15th of September.

   In the Shannon Callows, the grant is still available should a Corncrake be detected and CGS participants must delay mowing until 15 September and leave 2.4m margins on either side of the field.

2) **Corncrake Farm Plan Scheme (CFPS)**: This offers farmers within SPAs a five year plan of Early and Late Cover (ELC) creation and maintenance, in combination with delayed mowing of adjacent meadows and CFM. The area of ELC must be at least 5% of the total land area entered into the scheme, with a minimum of 0.1ha. Also key to this scheme is stock exclusion and the absence of mowing activities from 15 March - 15 July on nominated plots. If a calling male is recorded in or within 250m of these plots (i.e. the site is considered active), mowing is delayed further until 5 August, 20 August or 01 September, as advised by the fieldworker.

   CFPS terms and conditions were updated in 2018 to allow for greater flexibility and earlier removal of stock where required, for example where vegetation growth is poor. In addition, where sites are active, participants will now receive a 'bonus' payment. This consists of an adiditonal 20% of the meadow payment rate, and it is hoped that this will attract more CFPS participants and foster a positive community perspective of the Corncrake.

3) **Land Management License Agreements:** This scheme, introduced in 2017, is a 5-year agreement with landowners designed to promote habitat creation and management in these areas. The scheme is predominantly offered on offshore islands. A rate of 100€/acre is offered to those landowners who are in

agreement for NPWS to erect fencing and manage habitat exclusively for Corncrake. In the majority of cases this entails the removal of rank vegetation, establishment of new ELC, maintenance of existing ELC, and sowing crops and grass species suitable for Corncrake. Crops are cut and grassland cut or grazed annually during the months of October – March.

4) **DAFM Agri-environmental schemes**: The Agri-Environmental Options Scheme (AEOS) and the Green Low-carbon Agri-environment Scheme (GLAS) are administered by the Department of Agriculture, Food & the Marine and include Corncrake measures such as delayed mowing and CFM. Landowners in Corncrake SPAs benefited from priority entry but farmers outside SPAs are currently not eligible. These schemes are currently closed to new applicants.

1.4. Bioacoustics

The Corncrake presents obvious monitoring issues due to its shy, secretive behaviour. In Ireland, the census technique used is based on the results of studies of radio–tagged individuals (Stowe & Hudson, 1988, 1991) which suggest that males rarely move more than 250m between calling sites and that males call on 75-80% of nights. Calling males are mapped in core breeding areas over a minimum of two visits during the census period and results are then combined at the end of the season to determine the overall number of calling males present. Based on Stowe & Hudson's results, 250m is used as a rule of thumb for the maximum distance which a male moves between calling sites. Thus birds recorded calling >500m away from current or previous calling male locations are automatically considered new individuals (see Appendix 3 for full details of the census technique).

There are two main possible sources of error when performing counts in this way:

1. The possibility of missing individuals, which can occur where surveys are carried out infrequently (e.g. on islands), where males call irregularly or have a weak call, and where newly arriving males use almost identical sites as males already or recently present (observed in a study by Schäffer & Koffijberg 2006).

2. The possibility of counting the same indidual two or more times when males move >500m between breeding attempts. Recent studies across Europe show that it is not unusual for birds to travel over 10km between breeding attempts, and several movements of over 100km have even been recorded (Hoffman 1999, Pinechot 2017, Mikkelsen 2010).

In this context, the identification of individuals would improve the accuracy of population estimates. Acoustic analysis of Corncrake song have shown this to be an effective tool in differentiating and identifying individuals, with certain limitations. The most often used variable in identifying Corncrake calls is the Pulse-to-Pulse Duration (PPD). Each Corncrake call consists of two syllables and two intervals and each syllable consists of a number of pulses of sound separated by smaller intervals. The time from the start of one pulse to the start of the next pulse has been defined as the PPD.

Acoustic analysis studies carried out to evaluate census accuracy have yielded different results in different countries. Peake & McGregor (2001) showed that traditional census

techniques in North Uist, Scotland, underestimated true numbers by 20-30%. The census technique used is similar to that in Ireland, with the exception that areas were surveyed a maximum, rather than a minimum, of two nights per season. The main source of error identified in this study was a lower than expected incidence of calling. Corncrakes called on 41.5 % of nights, lowering the incidence of males detected when using a census technique based on the assumption that males call on 75-80 % of nights. In Norway true numbers were shown to be overestimated by 67% (Mikklesen 2010). In this study the main source of error was the high rate of long-distance movements observed and the fact that many new Corncrake observations were made after 15 June, whereas these were in fact thought to be disturbed birds. In France studies over 5 breeding sites highlighted a slight underestimate of calling males; 15 using bioacoustics and 8-13 using traditional methods (Pinechot 2017).

Bioacoustic research has certain limitations in its applications. It is important to distinguish between discrimination and identification. Discrimination is limited to census-type tasks and allows researchers to distinguish among individuals at a given point in time. In contrast, identification of individuals allows those birds to be monitored over space and time. Budka et al (2015) compared PPD similarity within and between individuals and showed that birds can be correctly discriminated, even in populations exceeding 100 individuals. However PPD similarity between males can be as high as within males, meaning that when looking at the movements of birds identified by their song characteristics, some movements may be false, whereas some true movements may not be detected (Mikkelsen 2010). This rate of error, which can be estimated using statistical analysis, increases as population size increases. Despite this, acoustic analysis is still useful in detecting general behavioural patterns (e.g., dispersal) within populations. It is also important to state that while ringing and telemetry provide 100% accuracy in individual identification, these methods are expensive, time-consuming, and may also have sources of bias. Firstly, it is possible that they may only capture more strongly territorial and vocally active birds, given that males are usually captured using lures to stimulate approach. It is also possible that radio-tags themselves may cause behavioural changes in tagged birds (Peake & McGregor 2001).

Following a literature review and a number of discussions among the project team, recording equipment was acquired and active recordings were taken in Co. Donegal during the 2018 breeding census. Recordings will be analysed in GMIT during the 2018/19 academic year, with a view to obtaining population estimates using call characteristics and to determine the feasibility of additional future studies in this domain.

2. METHODOLOGY

2.1 Survey methods

2.1.1. Survey team and areas

Contracted fieldworkers undertook the majority of census survey efforts in 2018, assisted by NPWS staff on coordinated surveys and offshore islands. Fieldwork was carried out by Mark Craven in the Shannon Callows, Ciaran Reaney in South Mayo, Connemara and Sligo and Liam Loftus in North Mayo. A local volunteer carried out additional surveys on the Mullet peninsula (Co. Mayo) two nights per week. In Co. Donegal, fieldwork was undertaken by Marie Duffy in West Donegal and on offshore Islands, and Andy Ellard in East Donegal.

All 10km national grid squares in Co. Donegal, Co. Mayo and Connemara in which Corncrakes were recorded in recent years were surveyed for calling males, as were the Shannon Callows. Core areas in Donegal and West Connacht were visited at least twice during the census period. Within these squares, survey efforts were focused on traditional breeding locations and nearby areas of suitable habitat. Habitat considered suitable included grassland with a height exceeding 20cm (from which vegetation is periodically removed) and herbaceous vegetation such as nettles, iris, reed canary grass, common reed and dock leaf. Reports received from the public and organisations such as BirdWatch Ireland were followed up on a case-by-case basis, either by a fieldworker or a NPWS Conservation Ranger.

2.1.2. Census conditions

Weather can impact census estimates as in cold, wet or windy conditions birds can call less frequently and are also harder to detect. Previously meteorological conditions for the census period were obtained on www.met.ie, using a singular location to represent weather at a regional level. This year a 'Census Data Survey' was created as part of the Corncrake Survey App, allowing more detailed and accurate data to be collected (see Section 2.5.2 for more details).

Figure 6 illustrates the number of nights in each wind force category (F=0–F=6) throughout the survey season, as evaluated by fieldworkers in West Connacht and Donegal. This accounts for all nights from 20 May –10 July, whether surveyed or not, and any additional nights surveyed outside of the census season.

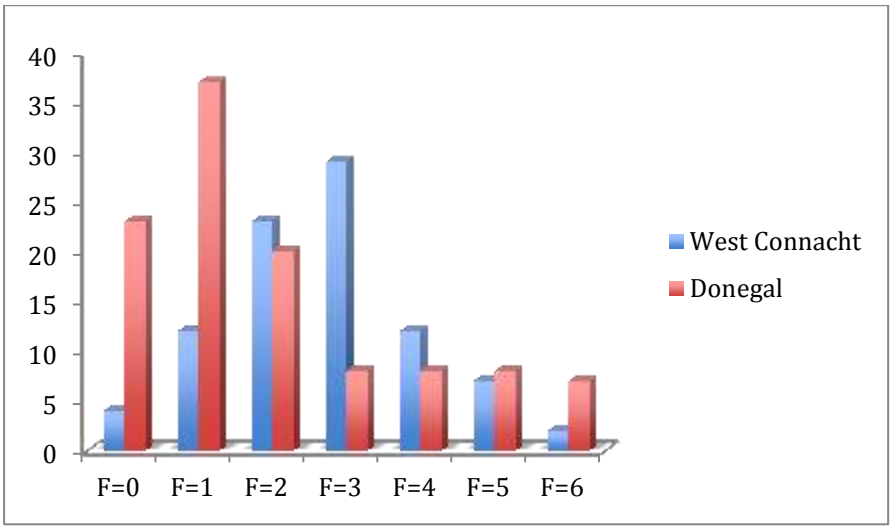


Figure 6: No. of nights in each wind force category throughout the census season.

Figure 7 shows the levels of precipitation recorded by fieldworkers throughout the season in each region. Precipitation was classified according to the 4 categories shown in the bar chart.

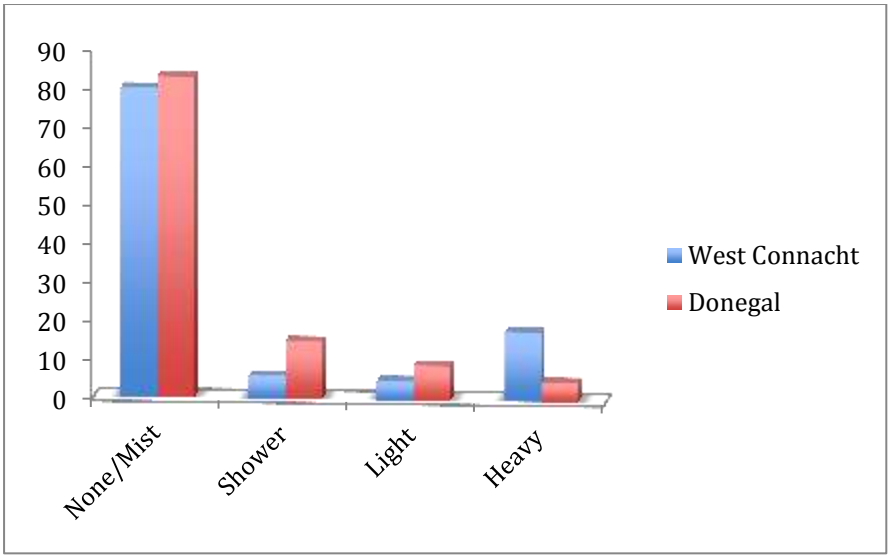


Figure 7: No. of nights per rainfall category throughout the census.

Figure 8 summarises the census accuracy as estimated by fieldworkers on nights surveyed in West Connacht and Donegal, based on overall weather conditions and amount of time spent in the field.

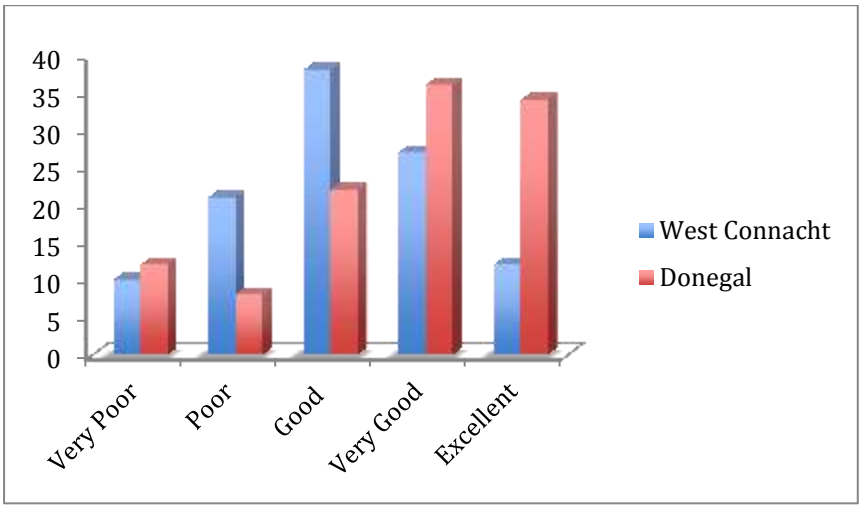


Figure 8: Number of nights for each category of census accuracy, as estimated by fieldworkers during survey nights.

Weather conditions were overall favourable for Corncrake throughout the 2018 breeding season, representing a major improvement on 2017 conditions. A particularly cold and wet spring severely hampered vegetation growth in the early stages of the season, yet warmer temperatures later in the season stimulated growth, albeit later than usual. An unprecedented drought experienced in both regions in July may have impacted breeding success and chick survival.

In Donegal, temperatures ranged from 7-20° C throughout the season and averaged 13° C. Temperatures were similar in West Connacht, averaging 12° and ranging from 8-17°.

The vast majority of survey nights were dry. Showers or rainfall occurred only on 17% and 16% of nights in Donegal and West Connacht respectively. In contrast, in 2017, 81% of nights were wet both in Donegal and West Connacht.

76% of census nights were calm in West Connacht, and 79% in Donegal. This is again more favourable than in 2017 when only 50% and 46% of days were calm in West Connacht and Donegal respectively. Conditions are considered calm when F≤3.

Census accuracy, described as the likelihood of hearing all calling birds present in an area on a given night based on weather conditions and time spent in the field, was estimated by fieldworkers each time a survey was carried out. Census accuracy was estimated as being good, very good or excellent on 71% of survey nights in West Connacht and on 82% of nights in Donegal. While these figures are subjective, they serve a useful guide in determining the reliability of census results in 2018 and can be examined alongside Corncrake numbers and population trends in future.

2.1.3. Survey hours

Survey hours were generally recorded by fieldworkers. Where actual hours were not recorded an estimate was calculated by allocating three hours of survey time per individual/team per night surveyed. i.e. a team of two people surveying an area for one night corresponds to three hours of survey time.

Table 1 shows survey hours provided by fieldworkers, volunteers, and additional hours carried out during co-ordinated surveys in each region.

Table 1: Total survey hours carried out during the census period in each region.

Region	Field-workers	Volunteers	Co-ordinated surveys	Total
Co. Donegal	136	0	27	**163**
West Connacht	120	48	12	**132**
Shannon Callows	24	N/A	N/A	**24**
National Total	**280**	**48**	**39**	**319**

Mainland sites were regularly surveyed by fieldworkers. Island counts were either carried out by fieldworkers alone where it was deemed safe to do so, or in teams with predator control operators or local rangers as coordinated counts. Table 2 shows the team members present and the dates of island counts at a national scale.

Table 2: Census survey dates for Donegal Islands and West Connacht core areas in 2018.

Area	May	June	July	Surveyors
DONEGAL ISLANDS				
Gola, Inismeane, Inishirrer	May 25	June 21		1 Team
Inishkerragh, Inishfree Upper, Rutland, Owey	May 29	June 13	July 11*	1 Team
Inishbofin	May 24	June 12, 28		1 Team
Inishdooey	May 24	June 28		1 Team
Aranmore	May 30			TG
Tory		June 3, 26		MD
Inishkeel	May 22	June 17		MD

* ***Inishkerragh only***

Area	May	June	July	Surveyors
WEST CONNACHT				
Omey Island		June 4	July 11	1 team
Inisturbot			July 7	1 team
Inishbofin		June 12	July 3	1 team
Inishark			July 4	CR
Clare Island		June 23		1 team
Inishturk	May 29			CR
Mullet Peninsula		June 6, 25	July 5	1 Team

Table 3 shows the dates on which core mainland sites were surveyed. These were all surveyed by lone fieldworkers and volunteers.

Table 3: Census survey dates for mainland core areas in 2018.

Area	May	June	July
DONEGAL MAINLAND			
Malin Head	May 20	June 9, 6, 29, 30	Jul 10
Ballyliffin / Doagh Isle	May 24, 31		July 5
Fanad Head	June 3	June 28	
Dunfanaghy	May 25, 26, 28	June 5, 6, 7	
Marble Hill	May 22, 30	June 13, 29	July 3
Ramelton	May 26	June 2	July 7
Rosguill	May 22	May 30	June 5
Cruit	May 28	June 24	
Magheroarty	May 20	June 2, 23	July 6
Falcarragh to Gortahork	May 20	June 5, 23	July 6, 24
Gweedore	May 18	June 27	
Lettermacaward	June 6	June 17	
Dooey/Marameelan	May 21	June 6	
Glencolmcille	May 23	June 30	
Carrickfinn	May 28	June 19, 27	July 18, 24
Portnoo	May 23	June 6, 17	
Maghery	June 6	June 10, 17, 22	

Area	May	June	July
WEST CONNACHT MAINLAND			
The Mullet Peninsula	8 visits	8 visits	6 visits
Inver			July 10, 12
Kilcummin			July 9, 29
Shraigh	May 4		
Louisbourgh & surrounds	May 30	June 22, 29	
Clifden	May 16	June 15	
Sligo:Templeboy / Mullaghmore	May 22, 26	June 11	June 27

2.1.4. Census technique

Due to its shy, elusive nature, the Corncrake is rarely seen and consequently it is the male's loud and distinctive mating call which is used to locate individuals. The Corncrake census in Ireland uses standard methodology described by Stowe & Hudson (1988, 1991). Surveys are carried out from May 20th to July 10th, between the hours of 00:00 and 03:00, on calm nights. When reports were received from the public either side of the official survey dates, these were followed up by the local fieldworker. Full details of the methods are given in Appendix 3.

2.1.5. Bioacoustics

Two complementary approaches were used to record calling males in Co. Donegal:

1) **Active recording:** Male Corncrakes encountered during regular census activities were recorded calling for 2-10 minutes from a distance of approximately 5-20m. Where possible, Corncrakes calling at the same location were recorded multiple times during the census period in order to 'recapture' the call. Recordings were made at 44.1 kHz and equipment used consisted of a Marantz PMD 561 recorder, a Sennheiser K6 powering module, a Sennheiser ME67 long gun capsule and a Rycote softie windscreen.

2) **Passive recording:** Two Song Meter SM4 (Wildlife Acoustics) recorders were used. These have two omnidirectional microphones. One Song Meter was placed in traditional breeding areas in Donegal, set to automatically record every night from 12:00 – 4:30 am. Recordings were set at a lower quality (22 kHz). This second approach can increase the spatial (covering areas over a longer period of time) and temporal (obtaining continuous recordings over a selected period of time) extent of recordings. However the analysis of recordings obtained in this

way are very time-consuming. The second recorder was set-up in Fota Wildlife Park. A Corncrake pair was placed in a separate pen and continuously filmed and recorded throughout the breeding season. The aim was to obtain a detailed visual and acoustic analysis of behaviour and activity throughout the breeding process.

2.2 Mowing watches

As a condition of the Corncrake Grant Scheme (CGS) and the Corncrake Farm Plan Scheme (CFPS), landowners are required to give the fieldworker 24hrs notice before mowing. Fieldworker attendance at mowings allows for compliance verification, provision of guidance on CFM, inspection of fields for breeding evidence during and after mowing, and guidance on the correct course of action where Corncrakes are observed.

The aim of CFM is to prevent the creation of an island of uncut hay or silage. In most cases this is achieved by cutting a few swards at either end of the field, then along the middle and finally along the length of the field from the centre towards the outer edges (Figure 4).

Figure 4: Illustration of CFM methods in a regularly shaped field.

In irregularly shaped fields, variations of this mowing pattern are carried out depending on the shape of the field and the width of the mower as advised by the fieldworker. Mowing speed and distance to the nearest cover are critical to the survival of Corncrake chicks. Farmers and contractors are encouraged to maintain a slow speed, particularly

in the first and last swards where most casualties occur (Tyler *et al.* 1998). As many mowing operations as possible are attended by the fieldworkers. However, attendance is limited by the dispersed distribution of Corncrakes and intensive mowing activity during spells of good weather.

2.3 Predator Control Programme

Chick mortality due to mechanized mowing and consequent increased predation is considered to be the primary threat to Corncrakes in Europe (Koffijberg & Schaffer 2006). Species that are known to prey on Corncrake nests include introduced mammals such as domestic cats and the American mink (Birdlife International 2016), as well as native species such as foxes and corvids in Ireland. In 2010, the NPWS predator control programme was put in place in core Corncrake breeding areas to address this threat. Predator control operatives have since carried out predator control licenced under the Wildlife Act on an annual basis in these areas.

In 2018, control measures were carried out in Co. Donegal, West Connacht and the Shannon Callows (see Appendix 4 for a full list of sites in 2018) prior to and during the nesting season from 01 March to 31 July. Additional trapping was carried out in certain areas during the months of September - December.

Predator control measures were carried out by Tommy Gallagher in Co. Donegal, Mark Craven in the Shannon Callows, Padraig Farrell in Co. Mayo and Ciaran Coyne in Connemara. Target areas in which gun clubs are active were not covered by predator control operators, however gun clubs do not provide NPWS with any data for these areas. There has been good collaboration between gun club members and the NPWS since the establishment of the Predator Control Programme and gun clubs have regularly been provided with traps in order to trap specified sites. Predator control is carried out in this manner by eleven gun clubs in the Shannon Callows.

Control efforts were concentrated on traditional breeding sites and areas around known nesting birds. Target predator species were American mink, fox, grey crow, magpie and jackdaw. These are all known predators of ground nesting birds. By-catch of rats and feral cats were humanely destroyed. All by-catch of protected species such as pine marten and hedgehog were released or translocated unharmed.

Mink were live trapped using cage traps. In Corncrake areas, the aim was to create a ‘mink free zone’ during the Corncrake breeding period. In each control area an original intensive trapping effort of 5-10 days was carried out, preceded by a short pre-baiting period using fresh fish, scent bait, or offal. Following the first trapping effort areas were re-trapped for two days every two weeks in order to limit recolonisation. Cage traps were set concentrically around the target area, approximately every 300m and for about 1000m on any shoreline, river or drain leading to the target area. Where small islands were trapped, traps were set only to the extent that this was possible without disturbing breeding birds. Traps were checked daily; individuals caught were humanely killed using a pistol or rifle and the carcasses removed.

Corvids were trapped using Larsen live traps, ladder traps, and multicage traps (hexagonal and octagonal) which involve the use of a decoy. Pre-baiting was carried out for at least a week followed by a first trapping period of at least five days. Maintenance trapping was then carried out for a minimum of two days every three weeks with traps remaining pre-baited during trapping intervals.

Fox control was carried out nocturnally using lamping. This involves the use of lamps and appropriate calibre rifles. A circular area around each control site was lamped at least once a month, subject to landowner permission and safety regulations. Where foxes were spotted at a large distance a FOXPRO lure was used to attract them closer.

2.4 Habitat management on offshore islands

Over time, offshore islands have become increasingly important strongholds for the national population (see Section 4.2.2). In winter 2017/spring 2018, works were carried out on over an area of 11.84 ha on three offshore islands within Corncrake SPA's in Co. Donegal; Gola, Tory and Inishbofin (see Section 4.5 for more details). Habitat maintenance works will be required on Tory and Gola Island in spring 2019.

Over the coming winter/spring, removal of rank vegetation is due to be undertaken on 3.2 ha on Inishkerragh in Co. Donegal and on one additional plot (0.5 ha) on Gola Island.

Fencing is also due to take place in Spring 2019 on Inishark, which is adjacent to Inishbofin (part of Inishbofin, Omey Island and Turbot SPA) in Co. Galway.

2.5 Data recording and interpretation

2.5.1. Corncrake survey collector application

A Corncrake survey collector application was created in 2017 to record data via mobile phones in the field. A Corncrake Survey Online Desktop Viewer, also available on mobile phones, was developed in conjunction with the application. Both of these have proved relatively easy to use and have simplified data collection, management and interpretation, particularly during the census period. Three layers were added to the Survey Collector App in 2018; Habitat Management, Census Survey Data and Land Use (see Section 2.5.2 for more details).

A second Corncrake online viewer containing fewer layers also allows any other registered users, namely NPWS staff associated with the project, to view all Corncrake data collected nationally in real time from their desktops. This was also updated in 2018 to include all Corncrake point locations recorded since 2006. This historical data should assist NPWS staff in evaluating development applications, in particular within SPAs. Data collected by the project from 1993-2006, once obtained, will also be added.

All data and files pertaining to the Corncrake Project were also recorded separately in a 'Corncrake Conservation Project 2018' Google Drive folder, which facilitated exchange of information between fieldworkers and stored all files in one central location. It is intended to minimise the data recorded on Google Drive from 2019 onwards and switch to the Survey Collector App as the main medium for data storage, given its efficiency and reliability.

2.5.2. Data recorded

Corncrake Census and Associated Data

Information for each component was recorded as follows:

- **Corncrake census**: Each calling Corncrake heard was recorded, along with the following information: name of recorder(s), date(s) the bird was heard calling, townland location and ITM grid co-ordinates and chosen habitat. When confirmed breeding, Corncrakes were assigned individual codes, composed of the following elements: national grid letter and 10km grid square/last two digits of the calendar year/order of occurrence within the 10km square. E.g. the first Corncrake confirmed in the B72 square in 2018 would be assigned the code B72/18/01.
- **Corncrake Grant Scheme**: A list of all CGS participants was recorded along with the date of delayed activity, type of activity (mowing or grazing), name and contact details of landowner/tenant, townland location, code and location of associated Corncrake(s) and payment amount. CGS applicants were requested to provide their herd number, agricultural planner and the Land Parcel Identification System (LPIS) number for each of the plots entered in the CGS, if applicable. They were also requested to declare their participation in GLAS and, where applicable, the measures for which they were signed up. All personal data collected are processed in compliance with General Data Protection Regulations. The Department is committed to protecting and respecting landowner privacy and employs appropriate technical and organisational measures to protect their information from unauthorised access. The Department does not process personal data for any purpose other than that for which they were collected.
- **Habitat management**: Where fieldworkers fertilised habitat prior to the breeding season, details of landowner name and contact details, townland, coordinates of the centre of the field, management type, materials used and date on which works were carried out were recorded. Where the project created and managed habitat in the context of Land Management Agreements, the areas in question were digitised and nature and date of works as well as habitat type created were recorded.
- **Land use**: In 2018, all land parcels within the 250m radius of breeding males were digitised and classified into 5 categories: Land entered in a Corncrake Scheme (including NPWS Corncrake Schemes and DAFM GLAS Corncrake measure), Eligible for but not entered in CGS, suitable habitat type but not eligible for CGS, Unsuitable habitat condition (e.g. already cut or grazed),

Unsuitable habitat type. This data was collected for birds in actively farmed areas, i.e., on the mainland and on Inishbofin in Co. Galway.

- **Weather**: Fieldworkers collected weather data while in the field during surveys, and from their home during inclement weather and on nights off. Parameters included wind speed and direction, precipitation levels and temperature. Fieldworkers also noted their estimate of overall census accuracy based on weather conditions and time spent in the field for each survey.
- **Mowing watches**: A list of all mowing watches attended was recorded, along with mowing date, location of field, name of person operating the mower and number of hectares mowed. Any evidence of breeding or birds seen was also noted. Where mowing operations were not attended, the date of mowing was recorded.

Farm Plan Scheme

ELC Assessment: ELC created by landowners in the context of Farm Plans was evaluated by fieldworkers in late April/early May. An Early Cover Assessment form created by the RSPB in 2011 was used for assessments (See Appendix 5). Where farm plans contained multiple areas of ELC, each ELC patch was evaluated individually. The assessment is based on the evaluation of eight atrributes including sward height and composition, presence of ELC species, size of ELC area and time since last used by a calling male. Agri-Ecology Unit of NPWS have developed a specific Corncrake habitat scorecard for Ireland, to include both ELC and meadow quality.

Bioacoustics

For active recordings, the following parameters were recorded: date, recorder name, assigned bird ID code (as per normal survey protocol), ITM grid co-ordinates and distance from the calling bird, as well as any additional comments that could assist in individual identification. For passive recordings, the dates, townland and ITM co-ordinates of the SM4 recorder were noted for each new location.

Predator Control

Information recorded for each trapping effort included species type, site location and number, trap type and number, number of individuals, and method of disposal. Mink and foxes were also sexed and aged.

Mapping

Maps included in this report were produced using the ArcView 3.2 and ArcGis 10.2 programmes (ESRI). Tables and graphs were produced using Microsoft Excel.

3. Publicity and community engagement

Prior to the breeding season fieldworkers raised local awareness of the project to encourage the public to report calling birds throughout the census period. Flyers advertising the Corncrake project and fieldworkers contact details were widely distributed in businesses within traditional core areas.

Regional press releases were prepared for Donegal and West Connacht and issued to newspapers by the Department of Culture, Heritage and Gaeltacht (DCHG) Press Office prior to and following the end of the census. Radio interviews with Highland Radio and Mid-West Radio were given by the project supervisor in May, and Donegal fieldworkers participated in the 2018 Dawn Chorus programme on RTE Radio 1. The Corncrake was the opening piece on the program and, similar to 2017, extensive positive feedback was received by program organisers. Following the Dawn Chorus, RTÉ Raidió na Gaeltachta in Donegal also presented a piece on the Corncrake.

The project worked with a Gaeltacht based company (LAN Ctr.) in Killult, within the Falcarragh-Meenlaragh SPA in Donegal, to promote and offer a series of Corncrakes Talks and Tours (Turais na dTraonach). This is the first Corncrake related community-based initiative of its kind in Donegal. LAN Ctr. offered three tours in June and July to a total of 54 members of the public from the Republic and Northern Ireland. LAN Ctr. sees Turais na dTraonach as a way of developing the company as a community information point, educational and visitor resource and intends to expand these activities in 2019. This inititative has also generated revenue for several hospitality businesses in the locality and it is hoped the tours will contribute to improving the local community's perception of the species.

In July, Ballycroy NP and Belmullet Tidy Towns organised a nocturnal tour on the Mullet peninsula in Mayo for the 4th consecutive year. There were 25 attendees and with demand exceeding capacity, more tours may be offered next year.

Talks were also given in primary schools in Tory, Inishbofin (Co. Galway) and the Mullet Peninsula. A community involvement project was carried out with both primary and secondary schoolchildren on Tory Island; the presentation was followed by seaweed harvesting and potato planting activities to create Corncrake habitat. Corncrakes were seen foraging there over the summer and potatoes were harvested in October and used in Home Economics classes in the secondary school. A Geoform was also created by NPWS GIS staff to allow children to report Corncrakes online throughout the summer. This was highly successful with Tory schoolchildren reporting 15 of the 16 birds present over the summer. However fieldworker induction and habitat management activities are time-consuming priorities in the run-up to the breeding season, thereby restricting the number of schools with which the project can engage in this way.

Two agricultural shows were attended in Co. Donegal this summer; Ardara agricultural show on August 10th and Glencolmcille on August 5th. The National Ploughing Championships were also attended from September 18-20th. It is intended to increase the project's presence at agricultural shows in both regions in 2019.

A tri-fold flyer was created and disseminated to farm planners and community groups within the Falcarragh-Meenlaragh SPA. The aim is to provide accurate information about project activites, Corncrake Schemes and Activities Requiring Consent (ARCs)

within the SPA. Another flyer for the overall Corncrake Project will be created in winter 2018.

Signs were created and will be installed in communities demonstrating a high level of co-operation with the Corncrake project, to publicise the project and to bolster engagement and a sense of pride in these communities. Permission was obtained to put up signs in 5 communities in Donegal and 3 communities in West Connacht. Signs were also erected on Omey island, encouraging walkers to be mindful and keep their dogs on leashes to minimise their impact of breeding bird populations.

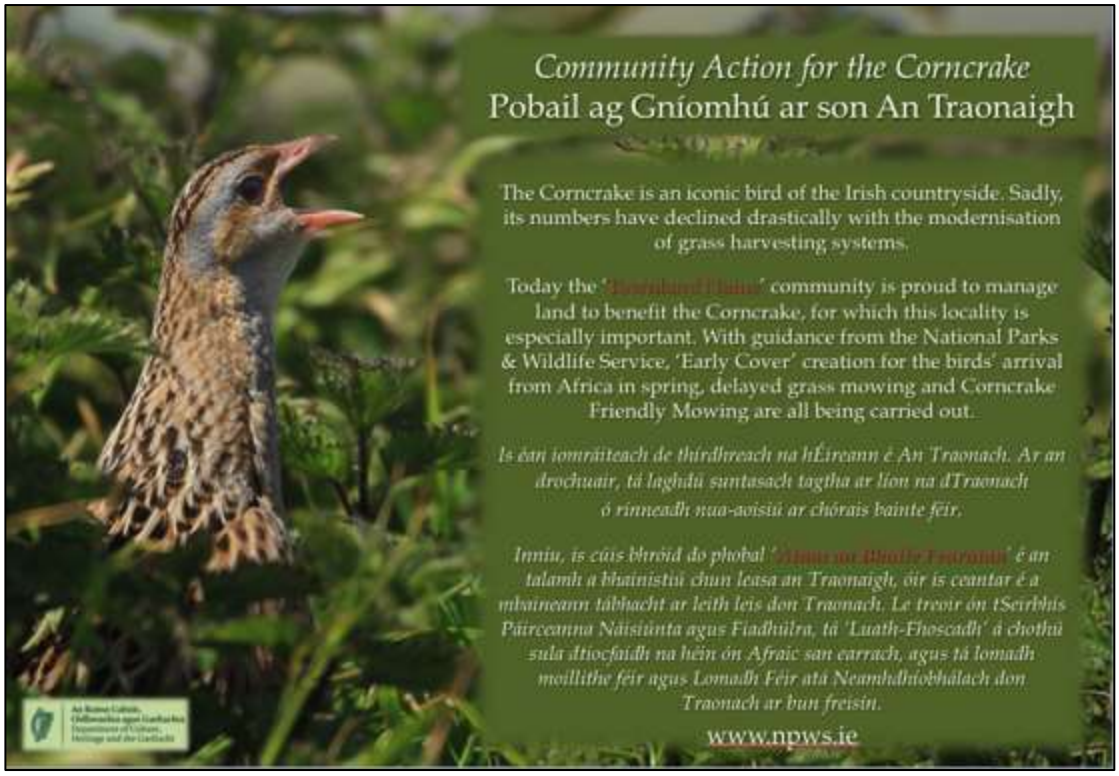


Figure 5: Sign erected in communities demonstrating strong engagement in Corncrake conservation activities.

4. RESULTS

4.1 Census results

4.1.1 Corncrake numbers – national overview

151 calling males were confirmed in Ireland during the 2018 breeding census period. This is an increase of 8% relative to 2017 and a decrease of 37% relative to 2014, when the population was at an all-time high since the initiation of the project. This increase of 11 males, albeit modest, is positive as it follows three consecutive years of population drops. It should however be noted that optimal survey conditions throughout the census period may have contributed to the higher numbers of calling males heard this year.

Figure 9 shows the annual variation in each of the core areas and in the overall national population in the 25 years since the project began.

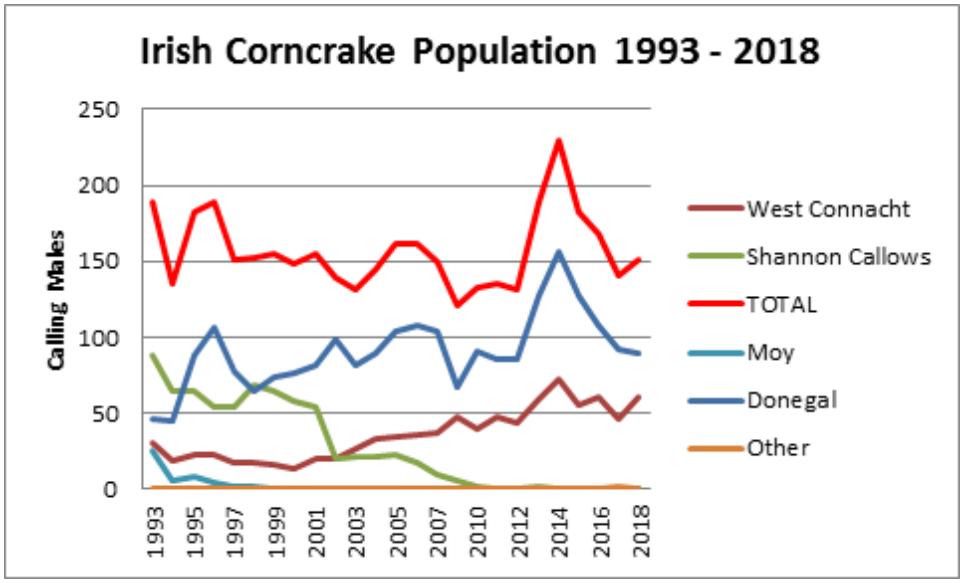


Figure 9: Corncrake population trend in core areas of Ireland, 1993 to 2018.

The national population has decreased by 20% since the start of the Corncrake Conservation Project, from 189 calling males in 1993 to 151 in 2018. This overall decrease masks more variable trends at the regional level, however. In 1993, there were four strongholds in Ireland – the Shannon Callows, Co. Donegal, West Connacht and the Moy Valley. Today, the species is extinct in the Moy Valley and the Shannon Callows, however there has been a population increase in the other 2 areas. The population in West Connacht doubled from 30 birds in 1993 to 61 in 2018, and a similar rate of increase occurred in Donegal in the same period, from 46 to 90 birds. This increase may, however, partially reflect an increased survey effort over time.

Donegal has been the species' main stronghold since 1999. This year it held 90 birds (64% of the national population), a decrease of 2 birds since last year. It should be noted that similarly to last year, numbers may have been slightly underestimated on some

islands. Reliable reports suggest a greater number of birds present than recorded on at least 3 islands (Gola, Owey, Inishekerragh), and recorders noted birds calling intermittently and for short periods of time on Inishbofin. West Connacht held 61 birds in 2018, or 36% of the population. This represents a 30% increase on the 46 birds recorded in 2017 and corresponds to a recovery of population levels in 2016 (60 birds). No birds were recorded in the Shannon Callows for the fourth consecutive year. A female Corncrake was recorded in Mullaghmore in Co. Sligo and another in Inishirrer in Co. Donegal; these are not included in census results.

The species' range expanded slightly in 2018. Birds were recorded in 26 10km national grid squares across four counties (see Appendix 6). This represents one additional square relative to 2017. There was a loss of bird from seven squares and a presence in eight new squares. Similarly to previous years, the highest densities of birds were recorded in offshore islands in Co. Donegal. Five 10km squares held over ten birds; three in Donegal (Tory Island, Inishbofin and Carrickfinn areas), one in Mayo (Mullet peninsula) and one in Connemara (Inishbofin).

Population changes by region

Table 4 shows Corncrake populations in each region in 2018 and the difference relative to 2017. For more detailed, site-specific information on Corncrake numbers in 2018/2017, see Appendix 7.

Table 4: Corncrake numbers confirmed per geographical area in 2018 and 2017.

Region	Area	No. 2018	No. 2017	Change
DONEGAL MAINLAND	Inishowen	6	3	3
	Fanad peninsula	8	6	2
	Carrigart to Bloody Foreland	9	14	- 5
	West Donegal	8	9	-1
DONEGAL ISLANDS	Tory Island	16	17	-1
	Inishtrahull	1	0	1
	Inishbofin & Inishdooey	31	24	7
	Western Donegal Islands	11	19	- 8
	Co. Donegal Total	**90**	***92***	**- 2**
CO. MAYO	Mullet Peninsula	31	26	5
	Rest of Mayo Mainland	5	6	-1
	Mayo Islands	3	0	3
CONNEMARA	Connemara Islands	17	13	4
	Connemara Mainland	3	1	2
	Co. Sligo	2	1	1
	West Connacht Total	**61**	**47**	**14**
	Shannon Callows	0	0	No change
	Co. Kerry	0	1	-1
	NATIONAL POPULATION	**151**	**140**	**11**

Figure 10 shows the distribution of Corncrake locations in Donegal in 2018.

Figure 10: Corncrake locations in Donegal in 2018

In Co. Donegal, 31 calling males were confirmed on the mainland, one less than in 2017. Despite the overall stability there are larger variations at a local level. The greatest loss of birds this season was in the area from Carrigart to Bloody Foreland, which encompasses the Falcarragh to Meenlaragh SPA. Numbers in this area have dropped from 26 birds in 2016 to 14 in 2017 and 9 in 2018. This is a concern, as other than the loss of one bird in West Donegal, all other areas on the mainland saw an increase in calling males. More specifically the area in and around the SPA lost five birds in just one season, with only two calling males recorded in Killult this summer.

The greatest recorded increase was in Malin Head, from one calling male to six. Numbers in Fanad head were stable and two additional birds were recorded on the Fanad peninsula. A bird called in Ramelton over a period of three weeks and this is the first record in this area in several years. The second bird was recorded in Duntinny near Portsalon and while there are no recent records of Corncrakes in this townland, the landowner stated that Corncrakes are present every year in the same field.

On offshore islands, some decreases are of concern. No birds were recorded on Inishkerragh for the first time since 2008, when data is first available for this island in historical records. Locals reported seeing mink on the island later in the season, and with mink consistently being reported on the neighbouring Aranmore (less than 2km away), this is likely a contributing factor to the absence of birds this year. Locals did report two Corncrakes calling on Inishkerragh late in the season (down from five birds in 2017), however these were not confirmed by fieldworkers during a three-hour census of the island shortly after.

No birds were recorded on Inishkeel for the second consecutive year and Inishmeane only held 2 males again this year. Inishmeane has historically often had relatively high numbers (up to 14 birds), however the majority of the vegetation on the island today is too rank to provide suitable habitat and birds are solely present in small stands of nettles and umbellifers.

The first Corncrake was reported on April 6th in Fanad head, however the bird moved on and was unconfirmed. The first confirmed report was in Malin Head on May 3rd. The last male to be confirmed this season was also in Fanad Head; it was first heard on July 14th and called for over a week.

Figure 11 shows the distribution of Corncrakes in West Connacht in 2018.

Figure 11: Corncrake locations in West Connacht in 2018

The first confirmed calling male in West Connacht was reported on the Mullet peninsula on April 24th. In Co. Mayo, there were 31 breeding males on the Mullet Peninsula, an increase of five males relative to 2017. No breeding males were recorded in Surgeview, Eachleim, Tirraun or Glosh this year. These areas were key breeding locations for Corncrake in previous years and the cold spring and slow early cover growth may have affected Corncrake distribution on the Mullet Peninsula this summer. The exceptionally dry summer may have also contributed to the presence of three breeding males in Annagh Marsh this year, a location previously too wet and unsuitable for Corncrake. The townlands of Tonamace and Termoncarragh had the highest densities of calling male Corncrakes on the Mullet Peninsula, with six males each over the course of the season. It is worth noting that Tonamace had no birds in recent years.

The remainder of the mainland in Co. Mayo held five birds in 2018, one less than last year. These birds were in areas which had no Corncrakes recently; Lecanvy, Shraigh, Inver and Kilcummin. On the other hand, previous hotspots such as Louisbourgh had no calling males this year.

Two calling males were recorded by NPWS ranger Irene O'Brien on Inishkea North this summer. This is the first record of Corncrakes on Inishkea North since the project began, however birds have been recorded on Inishkea South before. There is very limited suitable cover on the island.

In Connemara, numbers increased from 14 birds to 20. On the mainland, two birds were recorded near Clifden and a third was present on Omey Island. On offshore islands, numbers on Inishbofin nearly doubled from 8 males in 2017 to 15 in 2018. Of concern is the absence of confirmed birds (one bird was reported) on Inishturbot for the first time since 2004, despite plentiful suitable habitat. In 2017, three birds were recorded on this island, which is part of the Inishbofin, Omey and Inishturbot SPA. Locals reported the presence of a large population of rats on Inishturbot early in the breeding season. The local predator control operative confirmed this report, however no control activities were carried out due to the difficulty of access, the ineffectiveness of traps in completely eradicating populations of this target species, and the potential for secondary poisoning should poison be used.

In Co. Sligo, two calling males were recorded in Templeboy. A single male was recorded there last year.

4.1.2 Offshore Islands

Offshore islands held 53% of the Irish population this year. Figure 12 shows the variation in the national population present on the mainland and on the islands from 1994 to 2018.

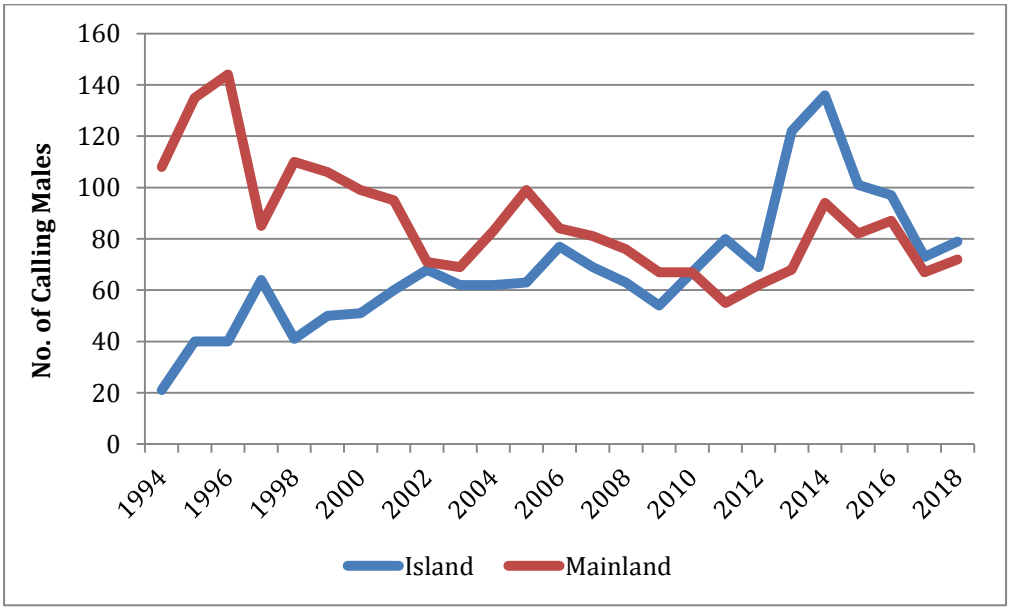


Figure 12: Variation in Corncrake population levels on offshore islands and the mainland from 1994 -2018.

Over the 24-year period from 1994 to 2018, the population present on the islands has almost quadrupled from 21 calling males in 1994 to 80 in 2018. Overall the mainland population decreased from 108 to 71 in the same period of time, which partially reflects the loss of the Shannon Callows population.

Islands are particularly important for the population in Co Donegal. Since 2000, islands have accounted for 50%-79% of the region's total. They have gained more importance with time, accounting for an average of 58% of the regional population from 2000-2008 and of 66% from 2009-2017.

4.1.3 The Corncrake SPA Network

Of the 151 individuals confirmed in 2018, 72 (48%) were located inside Corncrake SPA boundaries and 78 (52%) were associated with SPAs, i.e. inside or within 250m of SPA boundaries. Table 5 shows Corncrake numbers recorded within SPA boundaries, the expression of these figures as a percentage of the national total population, and the percentage difference in Corncrake numbers since 2017 in each area.

Table 5: Numbers and percentage population inside and outside of SPAs in 2018, and the change since 2017.

Area	Inside SPA network			Outside SPA network			Total	
	2018	% of Total*	% change 2017/18	2018	% of Total*	% change 2017/18	2018	% change 2017/18
Donegal Islands[1]	53	35	23	6	4	- 65	59	- 2
Donegal Mainland[2]	6	4	20	25	17	- 7	31	- 3
Co Donegal Total	**59**	**39**	**23**	**31**	**21**	**- 30**	**90**	**- 2**
Connemara[3]	7	5	17	13	9	62	20	43
Co Mayo[4]	6	4	- 33	33	22	43	39	22
Connacht Total	**13**	**9**	**- 13**	**46**	**30**	**48**	**59**	**28**
National population	**72**	**48**	**14**	**79****	**52**	**3**	**151****	**8**

**Total national population*

*** Includes birds recorded in Co. Sligo*

[1] *Includes West Donegal Islands SPA, Inishbofin, Inishdooey and Inishbeg SPA and Tory Island SPA.*

[2] *Includes Malin Head, Fanad Head and Falcarragh to Meenlaragh SPAs*

[3] *Includes Inishbofin, Co Galway SPA*

[4] *Includes Mullet Peninsula SPA network of sites*

Under the Corncrake Conservation Framework Strategy, population targets for 2022 and long-term targets were set for each SPA site within the Corncrake SPA network.

Table 6 shows a breakdown of numbers per SPA site in 2018 and compares them against these targets.

Table 6: Number of Corncrakes recorded in 2018, targets set for 2022 and long-term population targets for each Corncrake SPA site.

SPA Code	Site Name	Corncrake numbers 2018	2022 Target	Long Term Target
4146	Malin Head	3	15	> 20
4148	Fanad Head	1	7	> 10
4149	Falcarragh to Meenlaragh	2	12	> 25
4073	Tory Island	16	20	> 20
4083	Inishbofin, Inishdooey & Inishbeg	30	>20	> 20
4230	West Donegal Islands	7	20	> 20
4227	Mullet Peninsula (I. Termoncarragh)	6	20	> 26
4231	Inishbofin, Omey & Turbot Island	7	15	> 15
4096	Middle Shannon Callows	0	Present	Present
	TOTAL	**72**	**129**	**>136**

The 3 island SPAs in Co. Donegal (Tory Island SPA, Inishbofin, Inishdooey and Inishbeg SPA and West Donegal Islands SPA) are particularly significant, with 6 islands within them holding 35% of the Irish population and 74% of birds within the national SPA network.

Since 2017, overall occupancy of the SPA network increased in Donegal and Co. Galway, and decreased in Co. Mayo. Despite an overall increase of 20%, mainland SPAs in Donegal support very low numbers and breeding male numbers decreased in Fanad Head SPA (2 birds in 2017, 1 in 2018) and Falcarragh to Meenlaragh SPA (3 in 2017, 2 in 2018). The presence of 3 birds in Malin Head SPA created an overall increase, however their absence within this large SPA last year, as well as very low numbers in the wider area, suggests that this local population is no longer well-established and may be susceptible to extinction. Corncrake numbers increased within Tory Island SPA boundaries (despite a loss of 1 male from the island overall) as well as in Inishbofin, Inishdooey and Inisbeg SPA, while remaining stable at 7 individuals in West Donegal Islands SPA.

Numbers within the Mullet Peninsula SPA decreased from 9 to 6 birds, despite an increase in breeding males on the Mullet peninsula as a whole. This decrease is more indicative of a redistribution of birds in the area than of the health of the local population.

The percentage of birds recorded within the Inishbofin, Omey and Turbot Island SPA in Connemara increased by 13% relative to 2017 (6 birds in 2017, 7 in 2018). The islands

present different trends, with a loss of three Corncrakes (from 3 to 0) from Inishturbot, and an increase on Inisbofin (from 3 to 6) on Inishbofin and Omey (0 to 1).

4.2 The Corncrake Grant Scheme (CGS)

Table 7 summarises the number of participants and the total land area managed under the Corncrake Grant Scheme in each county, as well as the corresponding number of Corncrakes requiring protection in each region (i.e. birds on the mainland and on actively farmed islands).

Table 7: No. of CGS participants, land area entered and associated number of Corncrakes per county in 2018.

Area	No. of Participants	Area (ha)	No. Of Corncrakes
Co. Donegal	40	93.74	31
Co. Mayo	58	213.71	37
Co. Galway	22	33.17	18
Co. Sligo	5	12.16	3
National Total	**125**	**352.78**	**88**

In Co. Mayo, 37 Corncrakes required protection and 49 CGS participants delayed mowing/grazing activities with nine participants opting for Corncrake Friendly Mowing (CFM) only. The total area entered into the CGS in Mayo was 214 ha. In Donegal, the number of Corncrakes was similar (31), however only 36 participants delayed activities and four carried out CFM, covering a smaller area of 94 ha. In Co. Galway all 22 CGS participants delayed activities, and these figures relate to 18 birds on Inishbofin, Omey Island and Clifden. The 5 participants in Co. Sligo, including one CFM only, account for 3 birds (2 males and 1 female).

Table 8 shows the breakdown of the land area entered in the FPS, the Corncrake measure in GLAS, in the CGS (with a breakdown per delay date) as well as eligible areas which were not entered in any conservation scheme. It also shows an expression of these figures as a percentage of the total area of land within 250m of calling males which was eligible for the CGS, FPS and GLAS in 2018. Note that figures are rounded to the nearest hectare.

Table 8: Breakdown of all areas eligible for Corncrake schemes per region in 2018.

	Donegal		West Connacht	
Scheme / Delay Date	Area (ha)	% Total Area	Area (ha)	% Total Area
CGS: 05-Aug	28	19%	7	2%
CGS: 20-Aug	6	4%	31	8%
CGS: 01-Sep	49	33%	187	46%
CGS: CFM only	12	8%	34	8%
FPS/GLAS	11	7%	16	4%
Not entered	43	29%	130	32%
Total	**149**	**100%**	**405**	**100%**

An average of 4.8 ha of land per bird are eligible for the CGS in Co. Donegal (31 birds, 149 ha). In West Connacht, this figure rises to 7 ha (58 birds, 405 ha). This higher average likely reflects the higher quality of land and the consequent more widespread agricultural activity in West Connacht.

The percentage areas not entered into the CGS, entered into CFM only, FPS/GLAS and areas delayed until August 20th are very similar in both regions. Almost a third of the total eligible land area is not entered into the any Corncrake conservation scheme and the majority of this land is cut or grazed in June and July.

There is a marked difference in the percentage land area delayed until August 5th and September 1st between the two regions. In West Connacht almost half of all CGS eligible land is delayed until September 1st whereas this figure drops to a third in Donegal. Conversely activities are delayed until August 5th on 2% of eligible land in Connacht and a much higher 19% in Donegal. Given that dead chicks were found during Corncrake Friendly Mowing operations after August 5th (in 2017), it is reasonable to assume that not all 2nd brood chicks are capable of escaping to safety in early August. The higher rate of earlier mowing may therefore impact chick survival in Donegal.

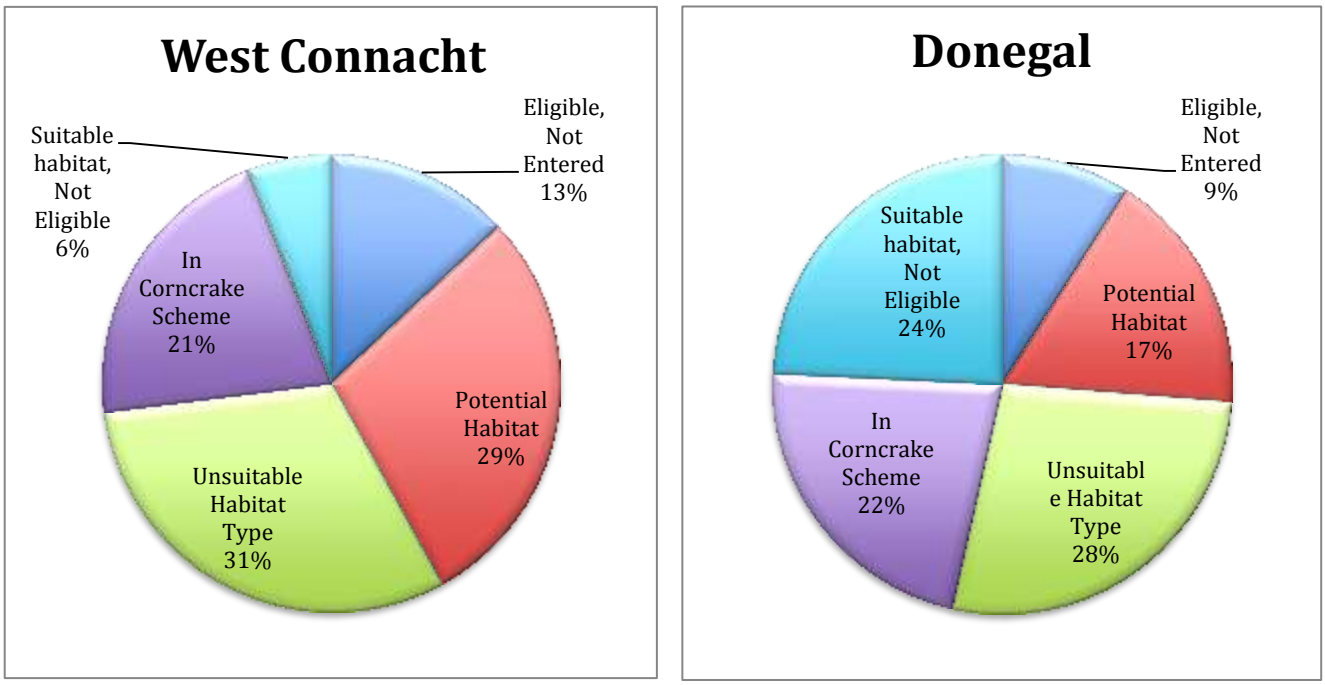
4.2 Land Use

Figures 13 and 14 break down land use within the 250m radius of all calling males in actively farmed areas in both regions. Land use was divided into 5 categories, described as follows:

1. **In Corncrake Scheme**: Includes land parcels delayed under the Corncrake Grant Scheme, Farm Plan Scheme and in the Corncrake measure in GLAS. This excludes land entered in CFM only in the Corncrake Grant Scheme.
2. **Eligible but not entered in the Corncrake Grant Scheme**: Landowners were offered the Corncrake Grant Scheme but did not enter it. This category concerns

63 plots across both regions and includes plots signed up for CFM only. The most commonly stated reason for refusal was that parcels were needed for grazing. Other reasons include loss of silage quality and insufficient CGS rates.

3. **Suitable habitat, but not eligible for the Corncrake Grant Scheme**: Land which has suitable habitat and may even have a calling male, but is not eligible for grants. The most common reasons for ineligibility are >30% rush cover, land not actively farmed/abandoned or land in a GLAS measure which is incompatible with Corncrake but which is not farmed in accordance with GLAS requirements.
4. **Potential habitat**: Land which was already grazed or cut when the calling male was first recorded.
5. **Unsuitable habitat type**: Includes infrastructure and all unsuitable natural habitats (e.g. heath, sand, scrub etc.)



Figures 13-14: Breakdown of land use in West Connacht and Donegal.

Note that the above figures are expressed as a percentage of the total land area. The main differences in land use categories between the two regions are in the 'potential habitat' and 'suitable but not eligible' categories. In West Connacht, 29% of the total land area in the 250m radius around calling males was potential habitat which was already grazed or cut when calling males were first recorded. In Donegal this figure was much lower at 17% and may reflect less intensive land use and later cutting dates.

On the other hand only 6% of the total land area was classed as suitable but not eligible for the CGS in West Connacht whereas this category accounted for 24% of land in Donegal. This difference may account for more widespread abandoned farmland in Donegal and may also reflect a difference in opinion of what constitutes suitable habitat due to different ground conditions. In Donegal it is likely that limited optimal habitat pushes Corncrakes into suboptimal habitat (see Figure 15, Section 4.6 for habitats used

by calling males in the early season), which would be classified as suitable but not eligible. If Corncrakes are less likely to use sub-optimal habitat in West Connacht, fieldworkers in this region would be more likely to classify this same habitat as unsuitable.

4.3 NPWS Farm Plan Scheme and ELC

4.3.1 Farm Plans and GLAS

On mainland SPA sites a key component to the achievement of population targets is the establishment and maintenance of sufficient areas of suitable Corncrake habitat. To address this, a new NPWS Farm Plan Scheme (FPS) for Corncrakes was introduced in 2012. One of the requirements of this scheme is the creation of a minimum of 0.1 ha of Early and Late Cover (ELC).

In 2016, DAFM also introduced the Green, Low-Carbon Agri-Environment Scheme (GLAS) as part of the Rural Development Program 2014-2020. One of the measures available to participants within Corncrake SPAs is the Corncrake Measure, which has similar but less stringent requirements than the NPWS Farm Plan Scheme.

An indicative timeline for the establishment of Farm Plan Schemes is included in 'A Framework for Corncrake Conservation to 2022' (NPWS 2014a). Table 9 compares the number of existing Farm Plans against the suggested targets for 2022. It also includes the number of active Corncrake GLAS plans overseen by DAFM (note these are 2017 figures). Although not overseen by the NPWS, the land parcels in these plans are managed for Corncrake.

Due to the recent demise of the population in the Shannon Callows SPA, no Corncrake farm plans are currently offered here although the CGS remains available if required.

Table 9: Active NPWS Farm Plan Schemes and GLAS plans in 2017, as well as 2022 target numbers.

SPA Site	Corncrake FPS 2018	Corncrake GLAS Plans 2017	Target 2022
Malin Head	2	11	15
Fanad Head	4	4	8
Falcarragh to Meenlaragh	0	9	12
Mullet Peninsula	4	13	20
Termoncarragh Lake/Annagh Machair	0	7	N/A
Tory Island	0	2	N/A
Inishbofin, Inishdooey and Inishbeg	0	1	N/A
Inishbofin, Omey and Turbot Island	0	17	N/A
TOTAL	**10**	61 (64*)	**55**

** No of GLAS plans with Corncrake measures in 2018*

In 2018, an additional 3 Corncrake GLAS plans were put in place however NPWS is not aware of the SPAs in which these are located. The 74 farm plans (10 NPWS farm plans and 64 GLAS plans) now surpasses the 2022 target of 55 plans. The total area being managed between NPWS and GLAS plans in 2018 was 272.52 ha (63.52 ha and 209 ha respectively).

Below is a breakdown of the number of farm plans, the ELC area created and the total land area managed under the NPWS Farm Plan Scheme in SPA sites:

1. Malin Head SPA (Code 4146): 2 farm plans, 5.94 ha managed for Corncrake and 0.24 ha of ELC. (One of these farm plans was discontinued in September 2018 but is included here as it was active throughout the 2018 breeding season).
2. Fanad Head SPA (Code 4148): 4 farm plans, 34.24 ha managed for Corncrake, and 2.53 ha of ELC.
3. Mullet Peninsula SPA (Code 4227): 4 farm plans, 23.34 ha managed for Corncrake, and 1.56 ha of ELC.

4.3.2. ELC creation, assessment and use

Table 10 compares the total ELC created and maintained by NPWS farm plan participants (and in one case by a voluntary agreement) within SPA boundaries to 2022 ELC targets set in the Corncrake Conservation Framework Strategy.

Table 10: A comparison of ELC created within SPAs in 2018 against 2022 targets.

SPA Site	ELC area (ha) in 2018	Target ELC area (ha) in 2022
Malin Head	0.34	1.5
Fanad Head	2.53	0.7
Falcarragh to Meenlaragh	0	1.2
Mullet Peninsula	1.56	2
TOTAL	**4.43**	**5.4**

Although the total ELC area within SPAs is close to the target of 5.4 ha, site-specific targets have only been met in Fanad Head SPA.

Of course, the quality of habitat is as important as the quantity, especially when it comes to early cover. This year fieldworkers used an Early Cover Assessment form created by the RSPB (see Appendix 5) to evaluate the quality of ELC created in farm plans. Assessments were carried out in late April/early May. In order to simplify the interpretation of results, the eight criteria evaluated were divided into two categories.

One category grouped criteria directly evaluating vegetation characteristics (sward height, composition, presence of ELC species and vegetation structure), the other grouped remaining criteria (size of ELC area, proximity to late cover, time since last used, distance to nearest regular Corncrake). Each farm plan was then given a pass rate for each category – i.e. the number of criteria passed was expressed as a percentage of the total number of criteria evaluated. Table 11 below shows the results of the assessments. Note that one farm plan in The Mullet Peninsula SPA was not assessed due to an oversight.

Table 11: ELC assessment results for each of the farm plans evaluated

Plan No.	ELC areas	SPA	Vegetation - Pass Rate	Other - Pass rate	Overall Pass Rate
FPS 1	2	Malin Head	37%	33%	**31%**
FPS 2	1	Malin Head	0%	50%	**25%**
FPS 3	2	Fanad Head	37%	50%	**44%**
FPS 4	2	Fanad Head	50%	50%	**50%**
FPS 5	5	Fanad Head	45%	40%	**43%**
FPS 6	1	Fanad Head	25%	50%	**38%**
FPS 7	7	Mullet Peninsula	75%	58%	**67%**
FPS 8	2	Mullet Peninsula	50%	50%	**50%**
FPS 9	2	Mullet Peninsula	50%	50%	**50%**

Overall, established ELC areas in Mayo were of better quality than in Donegal, with a higher pass rate in both categories. ELC created in Malin Head had the poorest pass rate and quality and results on Fanad farm plan are mixed. This corresponds to fieldworker observations on the ground.

Only one of 11 ELC patches in the Mullet Peninsula had reached the minimum sward height by the end of April, as opposed to six out of 13 in Donegal. Another notable difference is that only four out of 13 ELC patches passed the 'Presence of ELC species' criteria (i.e. >75% cover of ELC species) in Donegal, whereas all ELC patches passed this category in Mayo.

The vast majority of ELC patches in both counties satisfied the criteria for minimum size (0.1ha) and all satisfied the requirement for proximity to late cover. However, none of the 24 ELC patches nationwide had held a Corncrake the previous year and only one patch in Mayo had a calling male at the time of assessments.

Looking at the breeding bird's use of ELC and other habitat provided by farm plans in 2018, there is a marked difference between the two counties. In Donegal, three of the six farm plans were active, i.e. with a bird on or within 250m of designated plots. One bird held a territory in FPS grassland after then end of the census season and two other farm

plans were within 250m of a calling male. In the Mullet Peninsula, three out of four farm plans were active. Three birds were recorded calling in ELC patches from April-June and one bird was recorded on grassland in May.

4.4 Land management agreements

Land management agreements were introduced to the project in 2017 on offshore islands. Two agreements have since been created on the mainland in Donegal. Table 12 shows the number of agreements in each area and the types and extent of measures carried out to date in each area.

Table 12: Habitat management type and area covered on 3 offshore islands in Co. Donegal

Area	No of Agreements	Vegetation Clearance Only	ELC Creation	Sown Crop / Grassland	Total
Gola Island	12	4.94 ha	0.81 ha	2.39 ha	**8.14 ha**
Tory Island	5	N/A	0.3 ha	2.04	**2.34 ha**
Inishbofin, Donegal	1	1.86 ha	N/A	N/A	**1.86 ha**
Falc - Meen SPA	2	2.83 ha	N/A	0.3 ha	**3.13 ha**
Inishark, Galway	2	N/A	N/A	N/A	**N/A**
Total	**22**	**9.63 ha**	**1.11 ha**	**4.73 ha**	**15.47 ha**

Habitat creation on the islands was carried out in late April 2018 due to unfavourable conditions in early spring. ELC species planted include nettles, artichokes, reed canary grass. Crops planted include oats, kale and triticale, grey partridge mix, potatoes and a mix of tall, coarse grass species such as tall fescue and coxfoot.

Reed canary grass was the only species that did not yield a crop. Overall growth was successful in all areas except on one section of Gola Island where it was poorer. Iris have not yet been planted and will be planted prior to the next breeding season. Nettle ELC patches yielded 80-100% nettle cover on Tory and as little as 5% on Gola.

While there was no net increase of birds on either island, four birds used managed habitat on Gola and Tory. On Gola Island, two Corncrakes were recorded in managed habitat, and a third was reported by a reliable source but not confirmed by fieldworkers. On Tory, one bird used oats, and another was recorded in a newly created nettle patch. A third was noted foraging in potatoes. Calling males showed a clear preference for nettles and oats on both islands. One bird was also recorded in vegetation which has been cleared on Inishbofin.

In Falcarragh-Meenlaragh SPA, vegetation clearance was carried out in both areas in late

spring 2019 and potatoes were planted over 0.2 ha, however due to time constraints no further measures were carried out. It is intended to create an area of ELC on both plots prior to the next breeding season.

4.5 Voluntary habitat management

As previously mentioned, some landowners voluntarily agree to the creation of ELC patches on their land. Most landowners, however, view the introduction of the targeted plant species (usually nettles) on their land as undesirable. As an alternative, fieldworkers seek permission to fertilise and exclude stock from marginal plots of land. This encourages faster growth and may provide early cover in time for the arrival of breeding Corncrakes.

Habitat management was carried out in this manner on a total of 70.53 hectares in West Connacht this year. An additional 8.25ha of ELC was maintained. In Donegal, 7.14 hectares of land was fertilised on the Inishowen Peninsula. A list of landowners who are willing to create habitat in this way next year was also compiled throughout the breeding season.

Table 13 summarises the area and distribution of voluntarily managed habitat and the number of calling males that established territories in it. The figures relating to ELC in this table exclude that created within the framework of the Farm Plan Scheme. Land was fertilised both inside and outside of SPAs in Co. Mayo, Co. Galway and Co. Donegal.

Table 13: No of calling males in voluntarily managed habitat in 2018.

Area	ELC present (ha)	Land fertilised in 2018 (ha)	No. of calling males
Co. Donegal	0.12	7.14	0
Co. Mayo	6.26	48.32	6
Co. Galway	0.18	22.21	1
Total	**6.56**	**77.67**	**7**

In Co. Mayo, four of the six birds were in the 5 ha of nettles at the disused mushroom farm in Barauve. The two other calling males were in fertilised ELC and grassland. In Co. Galway, one bird used an ELC patch and no birds were recorded in fertilised grassland. In Donegal, no birds used either type of managed habitat.

Figure 15 shows the number of males recorded in various habitat types early in the breeding season, defined here as prior to June 1st. Note that these figures refer solely to areas that are actively farmed, i.e. mainland areas in both regions and Inishbofin in Co. Galway.

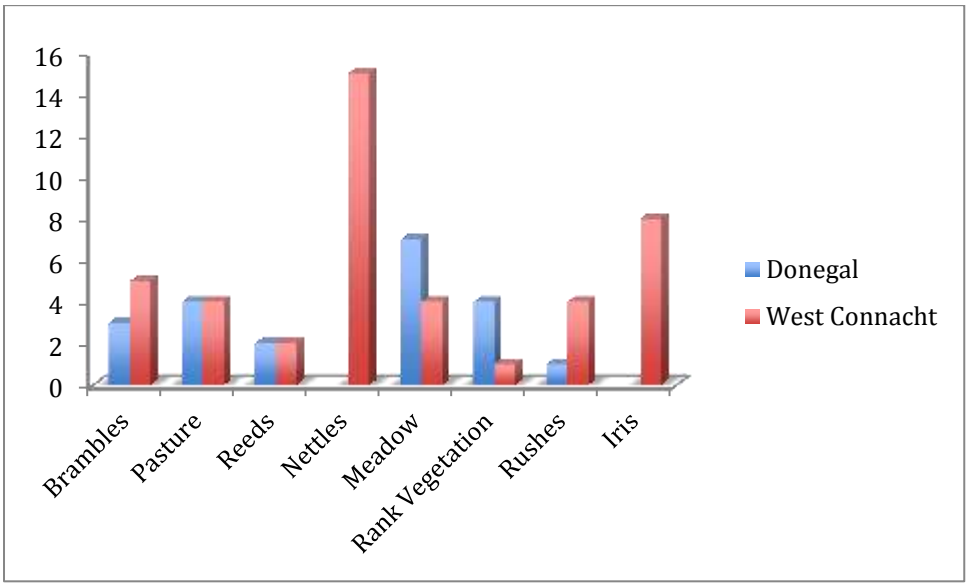


Figure 15: No. of males per habitat type used prior to June 1st in West Connacht and Donegal.

Fieldworkers recorded 21 calling males in Donegal and 43 in West Connacht prior to June 1st. Patterns of habitat use are very different in the two regions. In West Connacht the majority of birds were recorded in nettles and iris. Fewer birds used grassland, brambles or rushes. In Donegal no birds at all were recorded in nettles prior to June 1st and this is a departure from trends in previous years. The most widely used habitats were grassland, pasture and rough/rank vegetation.

There are also obvious differences in habitat use between the mainland and the islands in Co. Donegal. While Corncrakes recorded on islands in the early breeding season were noted using meadow, a large number also used early cover species. The species used varied according to availability, with the majority of birds using nettles on Tory Island and umbellifers or nettles in Inishbofin.

4.6 Corncrake Friendly Mowing watches

A total of 44 mowing watches were attended in West Connacht between May 26th and September 24th and 27 were attended in Donegal between June 10th and September 26th. The weather was clement in September and the majority of fields delayed until September 1st were cut in the first week of September.

Only one corncrake was found by fieldworkers during CFM watches. This was a juvenile with no apparent external injuries which was unable to run or fly. The animal was brought to a local vet who noted that it had very poor circulation in one wing and was not very alert or reactive. Following seizures that night the animal was euthanized. It is likely that the young bird had been injured by the landowner's dog in previous days as the dog was witnessed killing a Corncrake earlier that season and another the previous

season. Following discussions with the fieldworker, the landowner will fence the field to avoid similar occurrences in future.

4.7 Predator Control Programme

Table 14 shows the number of sites trapped and the number of each target predator captured in each of the four regions. This includes data up to and including September only. It should be noted that the main aim of the Shannon Callows predator control programme is the protection of breeding waders, rather than Corncrake.

Full details of the Predator Control Program and sites trapped are listed in Appendix 4.

Table 14: Number sites trapped and individuals caught per species and area.

Area Trapped	No of sites	Mink	Grey crow	Magpie	Fox
N Mayo	1	0	0	0	43
Connemara & S Mayo	6	2	122	14	12
Donegal	18	58	141	115	22
Shannon Callows	3	1	11	0	0
Total	**28**	**61**	**274**	**129**	**77**

4.8 Bioacoustics

All but two birds were recorded at least once with handheld recorders on the mainland. Numerous birds calling at the same location throughout the season were recorded multiple times and recordings of birds which were not assigned individual codes (i.e. which called less than five days at a given location) were also taken. On the islands, 45 of 59 birds were recorded. Some of the birds missed were recorded by rangers and predator controllers during the day and were not heard calling during night surveys. Others either called intermittently or stopped calling upon approach.

Recordings will be analysed by GMIT during the 2019 academic year in order to generate a population estimate using Corncrake song characteristics.

Passive recordings were obtained in five townlands in Donegal. Table 15 shows the dates, townlands and ITM locations of passive recorders throughout the breeding season.

Table 15: Details of passive recordings taken in Donegal in 2018.

Townland	Dates	X-Co-ordinates (ITM)	Y Co-ordinates (ITM)
Newmill, Ramelton	May 26 – June 2	622959	920743
Ballyhooriskey, Fanad	June 5 - 14	617052	944657
Magheroarty	June 15 - 16	589502	932588
Termon, Maghery	June 23	570931	909984
Dooey, Lettermacaward	July 6-8	576294	902163

Fieldworkers did not check battery and memory card storage levels regularly enough during the season. This led to a reduced recording time in some locations. A protocol will be created before the following breeding season to rectify this.

In Fota Island, the Corncrake pair which was isolated in a pen and which was filmed and audio-recorded continuously throughout the season did not breed. The data may nevertheless be useful in providing information on behaviour and calling patterns. It is currently stored in Fota Island and the best method of analysing all or part of this data will be determined over winter 2018/19.

5. Discussion

National population

With the exception of two Corncrakes recorded in Co. Sligo, all Corncrakes were located in the two core areas of Donegal and West Connacht this year. The 151 calling males recorded represent an increase of 8% relative to 2017 and it is the first time in four years that a population increase had been recorded. The numbers nevertheless represent a 34% decrease relative to 2014, when the highest figures were recorded, and a 20% decrease since 1993, when systematic population counts began. Given the conservation measures put into place nationwide, this long-term decreasing trend is of concern and puts a question mark on the Corncrake's long-term survival in Ireland in the absence of additional measures. Unfortunately the situation in Ireland is no different to that of other European countries that have put management practices into place, with the exception of Scotland.

Part of the 8% increase is likely attributable to the exceptional weather conditions this summer, with over 75% of nights being calm and/or dry during the census period, thereby increasing the likelihood of detecting calling males. It is also likely that true numbers are higher than recorded numbers, as survey results in some of the islands in Donegal did not reflect those of reliable local reports. In Gola for example, four calling males were heard by project staff during the day (figure used in the census), whereas only two males were heard during the three nocturnal counts. Locals on the island suggested even higher figures. Similarly, on Inishbofin, surveyors are confident that true numbers were higher than those recorded, with many birds calling for so little time that they could not be recorded with certainty or accuracy. In Fota Island, similar behaviour was observed with birds in captivity calling very little in comparison to other years (Sean Mc Keown, pers. comm, June 2018). This is thought to be due to the particularly cold spring restricting vegetation growth causing males to sing less frequently during the census period, possibly to reduce the risk of detection by predators in shorter, sparser vegetation (Wotton et al. 2015).

The species range has expanded slightly, with Corncrakes recorded in 26 10km squares this year, one more than last year. 16 of the 26 squares held only 1 or 2 birds, reflecting the fragmented nature of the population, in part consisting of isolated birds at risk of local extinction. Similarly to 2017, the presence of birds in new squares is often due to records in areas which have not held birds in several years and which may be one-off breeding attempts. In one such case in Templeboy, Co. Sligo, breeding was successful, with one 'new' bird recorded in 2017, two confirmed in the same townland this year, and a third calling male reported by locals but unconfirmed. This may be indicative of the re-establishment of a population in the area, however it is too early to draw conclusions.

In Donegal, numbers have remained stable overall. Similarly to previous years, there has been a redistribution of birds. This saw increases in Malin Head and Inishbofin, and on the mainland the only significant loss has been in the area from Falcarragh to Magheroarty. In 2016 there were 17 birds in this area, with only 2 this year. Some landowners reported grazing plots later than usual to deter Corncrakes coming onto their land. Each year there are reports of Corncrakes being harassed to cause them to vacate this area and this is a possible cause of the decline, although very difficult to prove.

Another loss of concern is on Inishkerragh (5 to 0 birds). This island has traditionally had good numbers and the absence of birds this year may be due to predation. Mink were reported on the island towards the end of the season and its proximity to Aranmore, which has a consistent mink population, would suggest this as a logical cause. No other apparent changes were noted on the island.

In West Connacht there was an overall increase from 47 to 61 birds. The greatest increases are on the Mullet peninsula and Inishbofin in Co. Galway. The cause of this increase is not immediately apparent. Southwest Mayo and Turbot Island experienced a decline in numbers. The lack of birds on Turbot island is of concern (3 birds in 2017, 1 reported in 2018, none confirmed). In the early season a large rat population was reported by locals and, if already present last year, this may have been a causal factor. Measures will be taken next spring to reduce this rodent population.

The SPA Network

Numbers within the SPA network increased by 14% since 2017. In Donegal, increases occurred in Malin Head SPA, Tory Island SPA, and Inishbofin, Inishdooey and Inishbeg SPA. Losses occurred from Fanad Head and Falcarragh-Meenlaragh SPA. Fanad Head SPA only had one bird this year, which was first recorded on 14 July. Numbers are favourable and stable in the larger area however, with birds favouring abandoned areas and intensive silage in nearby areas. Overall the mainland SPAs in Donegal hold very low numbers of birds, relative to their potential carrying capacity and historical figures. This reflects the larger picture on the mainland in this county.

Efforts have been made to engage with the community in Falcarragh to Meenlaragh SPA. A management plan for this SPA has begun, based on extensive consultations with the community. This has opened up a conversation with this community following a period of disengagement. In 2018, a 'Corncrake Talks and Tours' initiative operated by Killult Glasshouses (LAN Teo.) was partly funded by NPWS. This was a success and the tours will take place again next year. In terms of the Corncrake project, the initiative is symbolic and a start to shifting the perception of the Corncrake in the local psyche. LAN Teo. were also awarded a European Innovation Partnership in October. The initiative, named Cúlra Créafóige aims to revive cultivation in the coastal parishes from Bloody Foreland to the Rye River. While not wholly aimed at Corncrake conservation, many of the proposed actions should have a direct positive impact on Corncrake habitat quality and quantity in the area. This initiative may indicate a shift in local views, from the Corncrake being considered a burden to an asset in drawing down funding to benefit both the community and the species. In addition, the Corncrake Project submitted a bid for LIFE Nature and Biodiversity in April 2018. If successful, this will provide substantial funding for large-scale habitat management and other measures nationally and should have a direct and long-term impact on Corncrake habitat quality and, it is hoped, on Corncrake numbers in this and other areas.

In West Connacht, there was a loss of birds from both SPAs. In the Mullet this is due to a redistribution of birds on the peninsula. In Connemara, Inishbofin and Omey saw an increase while numbers fell on Inishturbot. Despite this, numbers have increased in all areas adjacent to the SPA's, excepting Inishturbot and Omey.

Three landowners breached SPA regulations this year. In the Falcaragh-Meenlaragh SPA, a field which held a calling male in Killult was mowed in late June following the landowners receipt of written notification regarding mowing constraints. A cross-compliance report will be sent to DAFM. In the Mullet SPA, two landowners cut in Carne in June and July. One had received written notification, the other had solely received verbal notification. In both cases, local NPWS staff sent a warning letter to landowner's and a cross-compliance report to DAFM.

ELC assessment results carried out on farm plans suggest that ELC quality is generally poorer in Donegal. The Farm Plan with the highest quality ELC in Mayo obtained a 75% pass rate on vegetation characteristics and a 67% overall pass rate. This plan holds birds every year, suggesting that assessment criteria may be too stringent or at least do not fully reflect the effectiveness of early cover. Nevertheless, assessment is useful in revealing trends and highlighting plans which most need improvement.

Farm Plan Scheme terms and conditions were amended this year to include the earlier cessation of winter grazing on ELC plots (now set at 01 January instead of 01 March). This should be beneficial to ELC quality and in particular to vegetation height in the early stages of the breeding season. There is also room for the earlier removal of stock from the main grassland area in plans if required, for example where vegetation growth is poor. Finally, a 20% bonus payment is available to participants in the event of a Corncrake calling from parcels in their plan, making the scheme more attractive to prospective participants. This is to reflect the additional encumbrance associated with changing plans by the farmer in how s/he manages his/her forage management.

The Corncrake Grant Scheme

The land area entered in the Corncrake Grant Scheme in 2018 was 15% higher than in 2017, for an 8% increase in birds. This higher participation rate is partially explained by the fact that the majority of GLAS participants are once again eligible for the CGS, following temporary ineligibility in 2017. The newly introduced margins measure was also an incentive for a number of participants. In line with 2017, intensive CGS rates did not have a significant impact on uptake in 2018 – only two participants availed of them.

In both regions, just under one-third of all land eligible for Corncrake schemes (within 250m of calling males) was not entered in any scheme. Another 8% was entered into CFM only, which has limited benefits to Corncrake, given repeated incidences of female mortality and nest destruction observed during CFM in previous years. Landowners who do not delay activities on eligible lands predominantly state that land is needed for grazing. Cutting and insufficient compensation are also cited. A recurring issue is that of birds setting up their territories in two-cut silage in the early season when there is little ELC available, and subsequent early mowing taking place while birds are still actively calling. No solution has been found to date for this issue which almost certainly causes mortalities annually.

Overall, CGS uptake is similar in both regions but likely more effective in Connacht. 33% of eligible land in Donegal and 46% in West Connacht is delayed until September 1st. Landowners in Donegal are often anxious to delay until September, given that mowing may not be possible if weather is too poor. In Connacht 2% of eligible land was delayed until August 5th and this figure rises to 19% in Donegal. Given that dead chicks were found during Corncrake Friendly Mowing operations after August 5th (in 2017), it is reasonable to assume that not all 2nd brood chicks are capable of escaping to safety in early August. The higher rate of earlier mowing may therefore negatively impact chick survival in Donegal.

Habitat Management – Offshore Islands

Offshore islands are crucial to the Corncrake's survival in Ireland, yet island populations are quite vulnerable. Habitat management and predator control are two core issues requiring sustained action to safeguard these numbers. The proportion of the national population held on offshore islands relative to the mainland has been steadily decreasing since 2013. In 2013, 64% of the population was held on offshore islands. This year, the figure has dropped to 53%. This declining trend is potentially of concern and may be indicative of the decreasing habitat quality on islands that have been abandoned to varying degrees for several decades. While land abandonment temporarily favours the species, areas become unsuitable as vegetation becomes too dense and this leads to loss of suitable habitat in as little as 5-10 years (Birdlife International 2016).

To address this issue, habitat management works were initiated on three offshore islands in 2017/18. Habitat creation carried out on Gola and Tory in late April 2018 yielded limited results this season, as expected in the first year of such works. There was no increase in numbers, nevertheless birds did use managed and created habitat, in some cases early in the season. Calling males almost exclusively used nettles and oats. Oats could be a particularly suitable ELC species in the future, as the species is adapted to harsh climatic conditions, is easier to grow and is more beneficial to landowners than nettle patches. It also grows fast; oats planted on 21 April held a calling male by 04 June on Gola Island. The remainder of the species trialled also provided tall cover but were not used by calling males. Their suitability as foraging habitat is undetermined and should not be dismissed at this early stage. The increased invertebrate diversity and abundance should have created improved foraging quality and in turn reproductive success. Pollinators in particular were abundant in created habitat. It is hoped that results in terms of Corncrake numbers will become apparent in time.

Habitat management works will continue on three islands this season, including Inishark in Co. Galway. On a number of key islands however, including Inishbofin, Inishmeane and Owey in Donegal, no landowner co-operation has yet been secured due to grievances around existing SPAs or fears of future designation. Efforts are being made in the way of landowner communication, however these will need to be intensified in 2019. Cúlra Créafóige, the EIP which will be implemented in Gaeltacht parishes within and adjacent to the Falcarragh to Meenlaragh SPA from November 2018 onwards, is a welcome development in this area. It is hoped that this community driven project will generate a greater degree of collaboration than NPWS schemes and begin to reverse local antagonism towards the species. This will hopefully have positive knock-on effects in the long-term for Corncrake both on the mainland and in nearby island Corncrake SPAs, in particular Inishbofin, Inishdooey and Inishbeg SPA.

Habitat management – mainland

No new ELC creation took place on the mainland this year. Just under 80 ha of grassland and ELC were fertilised and three birds were recorded using these areas this season – two in ELC and one in grassland. This is a poor success rate and may be partly explained by the fact that birds redistributed away from areas targeted this year. However in 2017 a similar area was fertilised, with similar results; two birds in ELC and none in grassland. It is suggested to reconsider fertilisation measures going forward, given their limited results. By far the most successful habitat management measure on the mainland to date has been the creation of large areas of nettle at the defunct mushroom factory in Barauve on the Mullet Peninsula. 2.5ha of nettle ELC attract 4-6 birds annually at this location, and it is likely that lack of disturbance and higher invertebrate abundance are leading to increased productivity at this site. Consideration could be given to purchasing plots in strategic locations on the mainland for the creation of 100% ELC cover. The Corncrake Project submitted a bid for LIFE Nature and Biodiversity in April 2018. If successful, this will provide substantial funding for measures such as this, as well as to address crucial large-scale habitat management works required on the mainland and offshore islands.

Predator Control

In a number of instances in recent years, predation is suspected to have caused the demise of some island populations (Inishkerragh and Inishturbot in 2018, Inishmeane in 2016). Predator control may require more sustained and intensive efforts on offshore islands in particular.

While predator control operatives are actively trapping numerous areas for Corncrake and other species, some gaps remain. No trapping was carried out in East Donegal this year. In West Donegal, no predator control activities are carried out by the project in parts of the Falcarragh to Meenalaragh area. Similarly in North Mayo, no trapping activities were carried out by the predator control operative on the Mullet peninsula until the end of the season. In Connemara the main Corncrake sites are trapped. Nevertheless, a large population of rats was reported and confirmed on Inishturbot this year, but was not trapped. The reason for some of these gaps is that several gun club members are considered active in these areas and their activities were deemed sufficient to control predator populations locally. Nevertheless, their actual level of activity is unclear and it is becoming apparent that gun clubs should not be relied upon for predator control as they have been in the past. For example, lamping carried out by the project's predator control operator on the Mullet peninsula, an area with active gun club members, from September to November yielded at least 41 foxes.

It is recommended to review the operation and management of the predator control programme prior to 2019. Predator controllers are currently doing excellent work, however the programme's overall efficiency can still be improved. Regular communication between fieldworkers, operatives and their supervisors in advance of and during the breeding season is recommended. Operatives should also be trained to use the Corncrake App viewer which provides an up-to-date distribution of Corncrake locations throughout the season. Consideration could also be given to updating the way in which data is collected; an App would make data review and analysis much easier, as

has been the case for Corncrake data. Trapping efforts could also be more effective if most recent distribution patterns were taken into account, and if trapping efforts were intensified on islands, given their vulnerability.

6. Conclusion

This year, 151 calling male Corncrakes were recorded throughout Ireland. This represents an 8% increase compared to last year's population and a 20% decrease relative to 1993, when conservation measures were first introduced. Offshore islands continue to be crucial for the species and continued habitat management and predator control measures are required to ensure that conditions remain suitable in these areas. Overall occupancy of the SPA network has increased by 14% since 2017, however declines are recorded in many mainland SPAs. An overall Corncrake scheme uptake of 70% nationwide (including GLAS, FPS and the CGS) is encouraging, however it would be of direct benefit to Corncrake numbers to continue exploring options with a view to achieving a higher uptake and efficacy of these schemes.

A number of significant positive Corncrake-related developments have taken place this year, due to actions taken by both the project and local communities. Cúlra Créafóige, a European Innovative Partnership which commenced in November 2018 in north Donegal, includes measures such as ELC creation for Corncrake, new crops trials and engagement at a community level, which should have both direct and indirect benefits for Corncrake. In addition, the Corncrake Project submitted a bid for LIFE Nature and Biodiversity in April 2018. If successful, this will provide substantial funding for large-scale habitat management and other measures nationally and should have a direct and long-term impact on Corncrake habitat quality and, it is hoped, on Corncrake numbers.

ACKNOWLEDGEMENTS

Thanks to all the farmers and landowners for their continued role to ensure the survival of this critically endangered bird.

We would like to thank Denis Strong for his excellent support and continued role in managing the project.

Thank you to all the National Parks and Wildlife Service regional staff who were involved in the project and Julie Kearney for her consistent help and assistance throughout the season.

Thanks to Barry O'Donoghue, Andy Bleasdale and William Cormacan for their much-appreciated help and advice on all aspects of the project.

For their invaluable assistance and work on the Corncrake Application and Viewer, we are grateful to Michelle Molumby and Gareth John in the NPWS GIS Unit.

For their help in Donegal, we thank the following NPWS staff: Dave Duggan, Ger O'Donnell, Emer McGee, Emmett Johnston, Lee Mc Daid, David McNamara and Carl Byrne.

For their invaluable assistance in Donegal; Tommy Gallagher, Anita Donaghy, Freddie Gallagher, Michael Martyn, Wilton Farrelly, Anton Meenan and Padraig Diver.

For their essential help with the census in West Connacht: Irene O'Brien, Dermot Breen, Eoin McGreal, Helen Carty, and Patrick Mangan.

For their continued invaluable help and advice in West Connacht; Feicin Mulkerrin (Connemara), Tony Lyons (SW Mayo) and Patrick Mangan (N Mayo).

Thanks to the local media and businesses who helped to publicise the project on the radio, in the newspapers and on their premises.

.

BIBLIOGRAPHY

Alcorn, S., Donaghy, A. & Moloney, D. (2009) Corncrake fieldwork in North and West Donegal 2009. Unpublished report. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

BirdLife International. (2012) Crex crex. The IUCN Red List of Threatened Species. Version 2014.3. www.iucnredlist.org.

BirdLife International. (2012a) Crex crex. The IUCN Red List of Threatened Species. Version 2012.2. www.iucnredlist.org.

BirdLife International (2014) Species factsheet: Crex crex. Downloaded from http://www.birdlife.org on 12/10/2014.

BirdLife International 2016. Crex crex. The IUCN Red List of Threatened Species 2016: e.T22692543A86147127. http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22692543A86147127.en. Downloaded on 21 November 2018.

BirdWatch Ireland (BWI) (2016) Annual Report of the Corncrake Conservation Project. Daniel Moloney and Anita Donaghy.

Cadbury, C. J. (1980) The status and habitats of the Corncrake in Britain 1978/79. Bird Study 27: 203-218.

Casey, C. (1998) Distribution and conservation of the Corncrake in Ireland, 1993-1998. Irish Birds, 6: 159-176.

Colhoun, K. & Cummins, S*. 2013.* The Birds of Conservation Concern in Ireland 2014-2019*.* Irish Birds, *9, 523-544.*

Collar, N.J. & Andrew, P. (1988) Birds to Watch: the ICPB World Checklist of Threatened Birds. ICPB, Cambridge.

Cramp, S. & Simmons, K. E. L. (1980) Handbook of the birds of Europe, the Middle East and North Africa. Volume 3. Oxford University Press, Oxford

Donaghy, A.M. (2007) Management of habitats on the Shannon Callows with special reference of Corncrake *Crex crex* PhD thesis. NUI Cork.

Donaghy, A. M., Green, R. E. And O'halloran, J. (2011) Timing of autumn migration of young Corncrakes *Crex crex*. Ibis, 153: 425–428.

England, B. (2016). *Corncrake Report 2016*. RSPB, Inverness.

Fletcher, K., Aebischer, N. J., Baines, D., Foster, R. and Hoodless, A. N. (2010), Changes in breeding success and abundance of ground-nesting moorland birds in relation to the experimental deployment of legal predator control. Journal of Applied Ecology, 47: 263–272

Green, R.E., (1995) The decline of the Corncrake *Crex crex* in Britain continues. Bird Study, 42: 66-75.

Green, R.E. (1996) *Factors Affecting the Population Density of the Corncrake Crex crex in Britain and Ireland.* Journal of Applied Ecology, 33: 237-248

Green, R.E., Rocamora, G. & Schäffer, N. (1997a) Populations, ecology and threats to the Corncrake Crex crex in Europe. Vogelwelt, 118: 117-134.

Green, R.E., Tyler, G.A., Stowe, T.J. & Newton, A.V. (1997b) A simulation model of the effect of mowing of agricultural grassland on the breeding success of the corncrake Crex crex. Journal of Zoology, London 243: 81-115.

Green, R.E. (1999) Survival and dispersal of male Corncrakes Crex crex in a threatened population. Bird Study 46: 218-229.

Green, R.E. 2008. Demographic mechanism of a historical bird population collapse reconstructed using museum specimens. Proc. R. Soc. Lond. B 275: 2381–2387.

Green. R.E, Tyler, G.A., Stowe, T.J. and Newton, A.V. (2009) A simulation model of the effect of mowing of agricultural grassland on the breeding success of the Corncrake (*Crex crex*). Journal of Zoology, London, 243: 81-115.

Green, R. E. (2010) Timing of breeding, primary moult and duration of maternal care of chicks by adult female Corncrakes *Crex crex*. Ibis, 152: 826–829.

Hennique, S., Deceuninck, B., Mourgaud, G. & Chanson, C., (2013) Deuxieme plan national d'actions en faveur du Rale des genets (Crex crex) 2013-2018. LPO, LPO Anjou, Minist.re de l'ecologie, du D.veloppement Durable et de l'energie, DREAL des Pays de la Loire 140 pp.

Hoffmann, M. 1997. Rufplatzwahl des Wachtelkönigs Crex crex und Verbleib von Individuen nach Verlust des Bruthabitats in Nordostpolen. Diplomarbeit, Universität Freiburg. 84 pp.

Hudson, A.V., Stowe, T.J., & Aspinall, S.J. (1990) Status and distribution of Corncrakes in Britain in 1988. British Birds, 83: 173-186.

Koffijberg, K. & Schaffer, N. (2006) International Single Species Action Plan for the Conservation of the Corncrake. CMS Technical Series No. 14 & AEWA Technical Series No. 9. Bonn. Germany.

Mayes, E. & Stowe, T. J. (1989) The status and distribution of the Corncrake in Ireland. Irish Birds 4: 1 - 12.

Mikkelsen, G. (2010) Individual Corncrake Crex crex song reveals long distance movements within the breeding season. Masters Thesis, Dept of Ecology and natural ressource management, Norwegian University of life sciences.

National Parks and Wildlife Service (NPWS) and Environment and Heritage Service (EHS) (2005). All Ireland Species Action Plan. http://www.npws.ie/publications/speciesactionplans/2005_Group_SAP.pdf

National Parks and Wildlife Service (NPWS) (2014) A framework for Corncrake conservation to 2022. Department of Arts, Heritage & the Gaeltacht, Dublin.

O'Brien, M., Green, R.E. & Wilson, J. 2006. Partial recovery of the Corncrake Crex crex population in Britain 1993–2004. Bird Study 53: 213–224.

O'Meara, M. (1979) Distribution and numbers of Corncrakes in Ireland in 1978. Irish Birds, 1: 381-405.

Ottvall, R. 1999. Female Corncrake (Crex crex) singing in the wild. J. Ornithol. 140: 453-456

Peake, T. M. & McGregor, P. K. (2001) Corncrake Crex crex census estimates: a conservation application of vocal individuality. Animal Biodiversity and Conservation, 24.1: 81–90.

Peake, T.M., McGregor, P.K., Smith, K.W., Tyler, G., Gilbert, G., Green, R.E. (1998) Individuality in corncrake Crex crex vocalization. Ibis 140:120–127

Pinechot, J. (2017) Suivi bioacoustique du Râle des genêts en MVO –ANNEE 2016 Rapport 12/09/2017 - B.E.C.

Schäffer, N. & Green, R.E. (2001) The global status of the Corncrake. RSPB Conservation Review 13: 18–24.

Schäffer, N. and Koffijberg, K. (2006) Corncrake Crex crex. In: The Birds of the Western Palearctic on interactive DVD-ROM. 2006 Update. BirdGuides Ltd. and Oxford University Press.

Stowe, T.J., & Hudson, A.V., (1988) Corncrake studies in the. Western Isles. RSPB Conservation. Review 2: RSPB, Sandy, Beds.

Tucker G.M., Heath M.F. Birds in Europe: their conservation status. - Cambridge. U.K. Bird Life Conservation Series №. 3. 1994.

Tyler, G. A. (1996) The Ecology of the Corncrake with special reference to the effect of mowing on breeding production. PhD thesis, NUI Cork.

Tyler, G.A. & Green, R.E. (2004) Effect of weather on the survival and growth of Corncrake Crex crex chicks. Ibis 146: 69-176.

Tyler, G.A, Green, R.E. & Casey, C. (1998) Survival and behaviour of Corncrake Crex crex chicks during the mowing of agricultural grassland. Bird Study 45: 1, 35-50.

Walther, B.A., Taylor, P.B., Schaffer, N., Robinson, S. & Jiguet F. (2012) The African wintering distribution and ecology of the Corncrake Crex Crex. Bird Conservation International, 23: 309-322

Wotton, S. R., M. Eaton, S. R. Ewing & R. E. Green 2015: The increase in the Corncrake *Crex crex* population of the United Kingdom has slowed. Bird Study 62: 486-497.

Appendix 1: NPWS Farm Plan Scheme and the Corncrake Grant Scheme

(A) NPWS Farm Plan Scheme

The NPWS Corncrake Farm Plan Scheme (CFPS) is currently available in the following mainland Special Protection Areas (SPAs)

- Malin Head SPA (no. 4146)
- Fanad Head SPA (no. 4148)
- Falcarragh to Meenlaragh SPA (no. 4149)
- Mullet Peninsula SPA (no. 4227)

The primary aim of the CFPS is to sign up farmers to a five year plan of Early and Late Cover (ELC) creation, its maintenance and delayed mowing of adjacent meadows. Key to the 5-year plan is that the farmer would delay mowing only until 15 July on nominated plots. However if a calling male is recorded in or within 250m of these lands then the farmer is obliged to delay mowing until 20 August or 01 September and to mow in a Corncrake Friendly Manner (CFM) i.e. slow and centre-out.

Delayed mowing of nominated fields with Corncrakes is mandatory if participating in CFPS. The 5-year CFPS also allows the farmer to plan to farm in a manner that the occurrence of Corncrake on his land will not seriously disrupt his/her year to year practices.

Suitable cover (in particular early cover) is an essential requirement, currently limiting Corncrake populations on mainland sites in Donegal and Mayo. Satisfactory Early and Late Cover (ELC) creation may take 2-3 years to establish, so requires a 5-year period for effective delivery. ELC is needed from first arrival in late April. Meadows dominated by soft grasses tend to lodge overwinter and become impenetrable, which is why early cover prescriptions focus on rigid or stiff-stemmed but sparsely-growing species like cow parsley, iris and nettles.

If opting to apply to join CFPS, the farmer will nominate fields/areas within the designated SPA where he must take up measure 1 and/or 2 in combination with measure 3 and/or 4. The farmer must also allow for access by NPWS or their agents to carry out predator control if required.

Measure 1 to create and maintain a suitable area of Early and Late Cover Plots

Measure 2 to maintain and enhance existing areas as ELC

Measure 3 to establish a Corncrake friendly mown grassland management regime

Measure 4 to establish a Corncrake friendly grazed grassland management regime

Please note on entry into the Corncrake Farm Plan Scheme the farmer may be required to undertake management measures on his non-nominated lands, which are contiguous to those areas nominated in the particular plan:

1. 'Centre-out' mowing of meadow/silage fields contiguous with the nominated fields but outside of the SPA is required if a calling male Corncrake is recorded within 250 m of the field in question.

2. For those fields within the SPA, contiguous with the fields nominated in the FPS and within 250m of a recorded calling Corncrake, entry into the Corncrake Grant Scheme (CGS) may be a requirement – this may involve delayed harvesting of the crop and mowing in a 'centre-out' manner.

Payment Rates under the CFPS

Measure 1

Measure 1a Spread over the five year plan payment will be available to successfully create an ELC plot(s) at the following rates:

- €1.75 per m2 for the first 0.1 ha
- €1.50 per m2 is payable for areas greater than 0.1ha (noting that the maximum area payable under this Measure is 0.5ha)

Measure 1b this is a yearly payment to cover the costs of maintaining the newly created ELC plot. It is payable at Measure 2 rates (see below). Once created, the ELC must remain in place for the full five year duration of the plan.

Measure 2

A per hectare rate is payable annually for the maintenance and enhancement of existing ELC plots - provided the required cover is present throughout the breeding season of each year (i.e. Late April to late September). The rates are as follows:

Up to 0.1ha @ €880 per ha

0.11 – 0.25ha @ €440 per ha

Greater than 0.26ha @ €275 per ha

Measure 3

A per hectare rate is payable annually for the delayed mowing of the nominated fields

- Post 15 July meadow mowing: €275 per hectare
- Post 20 August meadow mowing: €450 per hectare
- Post 01 September meadow mowing: €510 per hectare

Measure 4

A per hectare rate is payable annually for the delayed grazing of the nominated fields

- post 15 July pasture grazing: €275 per hectare
- post 20 August pasture grazing: €450 per hectare

Multi-annual agri-environment schemes for Corncrake

There are 11 NPWS Farm Plans currently in operation in the North West and West (Table 11). The total expenditure on these plans was €35,662 in 2017 (average €3242 per plan) and €42,669 in 2016 (average €3879 per plan). There is a very good working relationship between NPWS Agri-Ecology Unit, local NPWS staff and fieldworkers, the farm planner and the farmers. The farmers largely understand how important their land is for Corncrakes and there is two-way communication as to the presence of Corncrakes in their locality. Many of the farmers have elected to erect the farm plan signs designed by NPWS Agri-Ecology Unit (Figure 16).

The Department of Agriculture run agri-environment scheme GLAS, has the greatest budget available for Corncrake farm plans (overall national budget of €250m per annum) in Ireland. The prescription for Corncrake was developed with significant input from the Agri-Ecology Unit of NPWS and BirdWatch Ireland, using experience gained through the NPWS Farm Plan Scheme and elsewhere. GLAS was launched in summer 2015, though the first plans did not begin until October 2015. Essentially then, the first Corncrake breeding season during which GLAS plans will

be active was 2016 and the fruits of this scheme (including ELC creation and management) may not be apparent until future years. The Corncrake prescription is applicable in Corncrake SPAs in the west and north-west. Due to the loss of Corncrakes in the Shannon Callows, the measure does not apply there.

NPWS Agri-Ecology Unit retains a relatively small budget to step in and deliver management agreements with landowners, where additional benefit above and beyond GLAS have been identified (e.g. special measures, developing a contiguous management block, etc. etc.).

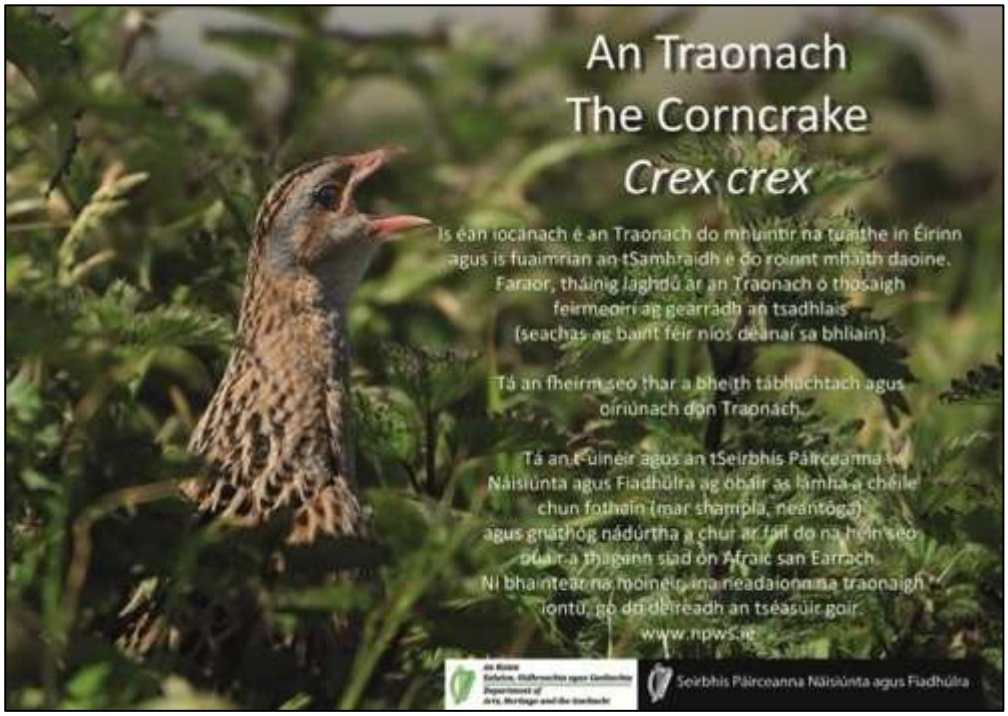


Figure 16: Corncrake signs erected on NPWS Farm Plan Scheme lands, showing the positive cooperation between NPWS and local farmers, in managing habitat for the threatened Corncrake. Thanks to Andrew Kelly Photography for the use of the Corncrake image on this sign.

(B) Corncrake Grant Scheme

(Excerpt from the Corncrake Grant Scheme Application form 2018)

National Parks & Wildlife Service

Corncrake Grant Scheme Application Form

Terms and Conditions of the Corncrake Grant Scheme:

1. *This application form applies to all areas outside of the Shannon Callows.*
2. *The presence of Corncrakes must be confirmed by a NPWS Corncrake Fieldworker. An application form must be completed as soon as possible after a visit by the Fieldworker. This must be signed by both the Applicant and the Fieldworker.*
3. To enter the scheme an application form must be completed by the **1st July** and mowing must be delayed until at least the 5th August 2018. The later cutting dates of 20th August and 1st September will be offered in Corncrake priority areas at the Fieldworker's discretion. The three cutting dates are outlined in the table below. Applications after the 1st July will usually involve delaying mowing for not less than six weeks from the date of the application.

OPTION	PAYMENT €/ha
Delay mowing until 5th August	250
Delay mowing until 20th August	325
Delay mowing until 1st September	375
Centre-Out Mowing	45

- A minimum payment of €25 will be paid to all Applicants who comply with the conditions of the scheme.
- A top-up payment of €150/ha is available to farmers in the scheme who take more than one cut of silage in a year. This is decided at the discretion of the Fieldworker.
- A maximum payment of €1500 is permitted for each individual applicant, excluding payments made for margins (see Section 4).
- These payment rates may change for applicants who are in AEOS/GLAS and are receiving payment for habitat management actions on parcels where the Corncrake Grant Scheme is being sought.

4. The following conditions apply to payments made for leaving margins in place:
   - If a plot is signed up to the margin option, as agreed by the Corncrake Fieldworker, the payments outlined in the table below will be available for leaving a 2.5 metre (8 ft) unmown strip of meadow along the edge of the plot.
   - **It is not allowable to mark out the boundary of the plot by driving around the edge** (ie through the margin area) **before starting mowing. This reduces the effectiveness of the margin as a refuge area by flattening the grass. The margin payment will be lost if this occurs.**
   - Margins may be cut any date from the 15 September but must be left for 24 hours if mowing on or after 15th Sept. Margins should be cut at least every second year,

when weather conditions permit. Further details relating to this option will be given by the corncrake fieldworkers when they visit.

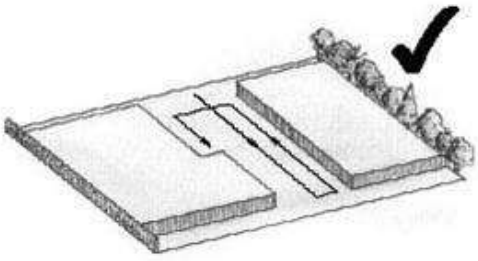
Plot Length	Category	PAYMENT RATE (€)
Between 50 – 100 metres	A	100
Between 100 – 200 metres	B	200
Between 200 – 300 metres	C	300
Between 300 – 400 metres	D	400
Over 400 metres	E	500

5. In relation to Corncrake Friendly Mowing, the Applicant must notify the Fieldworker as early as possible before mowing the relevant area. **If no attempt is made to contact the Fieldworker in advance of mowing, the grant may not be paid.**
6. Corncrake Friendly Mowing involves:
   - cutting a small area for turning at either end of the field, mowing down the centre of the field and then continuing to mow from the centre outwards; *or*
   - driving to the centre of the field, leaving a small island of grass in the middle and continuing to mow in a spiral outwards. The remaining island in the middle can then be slowly strip-cut at the end; *or*
   - cutting the field in strips from one side to the other.

Ideally Corncrake Friendly Mowing should adhere to the following:

- Meadows must be cut by the "centre out" method – *see diagram below*.
- Mower speed should be kept at a low enough speed (e.g. 4mph.) to allow corncrakes move away.
- The mower must not exceed 10 feet in width. Mowers greater than 3.6m (12 feet) are generally not permitted.
- Applicants must notify the NPWS 24 hours in advance of the intention to mow.

The decision of the Fieldworker on what constitutes Corncrake Friendly Mowing is final.



5. **It is not allowable to cut any rounds around the outside of the field before starting centre-out mowing**. If any rounds are cut outside-in, this does not constitute Corncrake Friendly Mowing and will not qualify for this payment. If you are unsure about the best method to use, please consult the NPWS Corncrake Fieldworker before starting.
6. **The decision of the fieldworker on Corncrake Friendly Mowing is final. Please note that failure to abide by the conditions for Corncrake Friendly Mowing may incur a penalty of 25% of the grant for delayed mowing in addition to the loss of the grant for Corncrake Friendly Mowing.**
7. Payments for delayed mowing and Corncrake Friendly Mowing may be combined.

8. Areas of hay or silage within a circle of 250 metres radius around the Corncrake's night-time calling point, as determined by the Corncrake Fieldworker between midnight and 3 a.m., are eligible. The exact determination of the areas to be included will be assessed and mapped by the Fieldworker.
9. Livestock must continue to be excluded from grant-aided areas between the date of application and the agreed mowing date. Rolling, fertilising or spraying of grant-aided areas is not allowed. Areas that have already been mown in the current year may be entered into the scheme at the Fieldworker's discretion, but will not be eligible for the €150 top-up payment.
10. The grants are payable to the landowner or, in the case of rented land, to the tenant. Payments will be made within three months of verification of compliance.
11. Completion of the application form does not automatically confer acceptance into the scheme. Due to the limited funding available, not all applications can be accepted. Unsuccessful applicants will be informed no later than 4 weeks after submitting the completed application form.
12. Any variation in the conditions is only acceptable if it is agreed in writing with the National Parks & Wildlife Service.

(C) Land management license agreement

LAND MANAGEMENT LICENCE AGREEMENT
BETWEEN
THE NATIONAL PARKS AND WILDLIFE SERVICE
OF THE
DEPARTMENT OF CULTURE, HERITAGE AND THE GAELTACHT
AND

Name _____

PARTICULARS

Date _____
Licensor _____
Address _____
Licensee _____

National Parks and Wildlife Service,
Department of Culture, Heritage and the Gaeltacht,
Ballinafad,
Via Boyle,
Co. Roscommon.

Licence Period From _____ Until _____
Full Licence Fee _____

First instalment (50% of full license fee) payable in the first year of the license period:
_____

Second Instalment (remaining 50% of full license fee) payable in the final year of the license period:
_____

The Land (see attached map)
Field Number and Area _____

Rights

- The rights to graze stock, to cut crops, to fertilize, manure, spray or in any way treat the land.
- The right of unrestricted access to the well for water.
- The right to cut hedges, and to establish or remove crops or other vegetation, including ploughing and cultivation.
- The right to erect and repair fences.
- The right to dig and maintain ditches.
- The right of public access and use, the right to conduct scientific survey and to hold demonstration events, etc.
- The right to erect signage.
- The right to control pest species of bird and animal by traps, fences, shooting or scaring device.

Fees
Fees for the rights stated in the above section amount to €100 per acre per annum.
A one-off additional fee of €500 shall be payable for the rights to create an area of Early and Late Cover species (e.g. Nettles, Flag Iris, Umbellifers , etc.) over 0.1ha for the duration of the license period.

Special Conditions

NPWS has the right to select and appoint contractors to implement any of their rights
The Licensor shall ensure that no stock grazes the land from March 1st – September 30th and that gates installed as access points to the land remain closed at all times during this period. Failure to do so may result in termination of the Land Management Agreement.
These are the Particulars referred to in the attached Land Management Licence Agreement, which together constitute the Land Management Agreement as witnessed by the parties hereto:

Signed by the Licensor ……..

In the presence of ……...

Signed by the Licensee ……

In the presence of ……..

ACCEPTANCE OF TERMS

If either of the parties do not agree with any of the above terms then notice must be given in writing stating the substance of the disagreement within 7 working days of the date of this agreement otherwise the terms will be deemed to be accepted by both parties.

LICENCE AGREEMENT

THIS LICENCE is made on the Date set out in the Particulars between the Licensor and the NPWS named in the Particulars

IT IS AGREED as follows:

1. THE RIGHTS

The Licensor grants the NPWS the Rights for the Licence Period as described in the Particulars in accordance with the terms of this Agreement and subject to the Special Conditions as described in the Particulars and the Obligations affecting the Rights as set out in Schedule 1

2. LICENCE

The Licensor permits the NPWS to enter onto the Land to the extent necessary to exercise the Rights and for no other purposes during the Licence Period on the terms set out in this Licence.

3. AGRI-ENVIRONMENTAL SCHEMES

The lands are not eligible for the Agri-Environmental Options Scheme (AEOS), Green Low-Carbon Agri-Environment Scheme (GLAS), NPWS Farm Plan Scheme, Corncrake Grant Scheme, Breeding Wader Grant Scheme or other farm plan scheme/management agreement for the period of the licence.

4. TERMINATION

The Rights and this Licence shall terminate immediately if the NPWS commits any grave breach or persistent breaches of this Licence and the Licensor having given written notice to the NPWS of such breach or breaches the NPWS fails within such period as the Licensor may specify to rectify such breach or breaches (if capable of rectification) .

5. OTHER AGREEMENTS BETWEEN LICENSOR AND LICENSEE

a. The Rights and this Licence are personal to the NPWS and shall not be capable of being assigned or otherwise dealt with. However, the NPWS may sublet the land for the period 1st October to the 28th February, to ensure that it will be appropriately grazed.
b. The NPWS enters into this Agreement wholly in reliance on his own investigations about the Land and not in reliance on anything said or done by the Licensor or his agent
c. This Agreement is the entire agreement

6. COVENANTS

The NPWS agrees with the Licensor:

a. To pay to the Licensor the Licence Fee on the dates contained in the Particulars.

b. To exercise the Rights in such manner as not to do or cause or permit to be done any act or thing on or near the Land which may be or become a nuisance or inconvenience or cause damage or annoyance to the Licensor or owners of neighbouring premises.

c. To indemnify and keep the Licensor indemnified from and against all actions proceedings costs expenses claims and demands by third parties in respect of any damage or liability caused by or arising from the exercise by the NPWS of the Rights.

d. Not to do or cause to be done anything which interferes with the Licensor's ability to meet his obligations for Good Agricultural and Environmental Condition and should the NPWS breach this agreement he agrees to indemnify the Licensor for all the Licensor's consequent losses and expenses.

e. To comply with Legislation so far as it relates to the exercise of the Rights and the Licensee's use of the Land and access to the land and to indemnify the Licensor for all consequent losses and expenses relating to any non-compliance with Legislation.

f. Not to include the Land (or any part of it) in any claim for the Basic Payment Scheme or other subsidy by agreement with the Licensor or grant scheme nor enter any other Management Agreement in relation to the Land.

SCHEDULE 1

NPWS's Obligations affecting the Rights

The NPWS shall:

a. Reimburse the Licensor for any charges for water consumed on the Land during the Licence Period.

b. Repair any damage done by the NPWS, his servants or stock to any gates, fences and ditches during the Licence Period.

c. Not allow diseased or quarantined stock or confirmed fence breakers onto the Land.

d. On termination of this Agreement immediately remove his stock and crops from the Land.

Appendix 2: Informational Flyer – Falcarragh to Meenlaragh SPA

Corncrake Conservation

The Corncrake's distinctive call was once an unforgettable part of our summer evenings. Unfortunately the Corncrake has suffered a drastic decline in recent decades and now only survives in small numbers in Donegal and Connacht.

The Corncrake Conservation Project is operated by the National Parks and Wildlife Service (NPWS) and aims to halt further declines by encouraging Corncrake friendly practices with the co-operation of farmers and landowners. NPWS offers financial and advisory support to those who wish to participate in available schemes and engage in Corncrake friendly management practices to deliver a suitable environment for these birds.

Corncrakes are an integral part of our natural and cultural heritage, and their survival in modern times largely depends on people. NPWS is committed to supporting local communities and nature to thrive within the Falcarragh to Meenlaragh SPA. A consultation process was initiated to understand and address local people's concerns in relation to the SPA designation. It is now intended to create a suitable management plan for the locality, which takes into account socio-economic and environmental issues alike.

Report a Corncrake

If you hear a Corncrake, please report it to your local fieldworker. Don't worry if you are unsure, as all reports are checked in the field.

Your local fieldworker is:

CONTACT US

Contact us for more information if you would like to find out more and put land management practices in place, either formally through one of our schemes, or in a more informal manner.

Local queries:

Ger O'Donnell (NPWS Regional Manager):
tel: 076 100 2540
email: ger.o'donnell@chg.gov.ie

Farm Plan Scheme and related inquiries:

Agri-ecology unit:
tel: 01 888 3947
email: Agri.Ecology@chg.gov.ie

For more information on some of the schemes, please visit:

www.npws.ie/farmers-and-landowners/schemes

CORNCRAKES, COMMUNITIES AND CONSERVATION

FALCARRAGH TO MEENLARAGH SPA, CO. DONEGAL

Why Support Corncrakes?

Financial incentives and advisory support are available for those wishing to integrate Corncrake friendly measures into their farming practices. This can supplement income on low and medium intensity farmland.

The species is of high conservation concern in Ireland. Maintaining the Corncrake population in the area could be advantageous in drawing down additional targeted national and EU funding in future.

A healthy Corncrake population can attract tourists which support local businesses, as evidenced by the popularity of Tory Island and the success of the Corncrake bus tours launched in Killult in 2018. Additional community Corncrake based initiatives could further benefit the local economy in the future.

Falcarragh - Meenlaragh SPA:

The Falcarragh to Meenlaragh area highlighted above is designated as a Special Protection Area for Corncrakes.

The draft Site Specific Conservation Objectives for the SPA identify the target population within the SPA boundary as 12 calling males. One third of the land (103ha) should also be managed for the species, of which at least 3.5ha should be high quality early/late cover (ELC), such as iris, nettles, oats and other suitable herbaceous plants. Excepting some ELC species, managed lands can be harvested as a crop or meadow following the end of the breeding season.

Within this SPA, the following Activities Requiring Consent (ARC)• apply:

1. Introduction / re-introduction of plants or animals not found in the area. [Not applicable to planting of crops on established reseeded grassland or cultivated land.]
2. Construction/alteration of tracks, paths, roads, bridges, culverts or access routes.
3. Mowing of grass. [Consent is not required unless the landowner has received notice that delayed mowing is required.]
4. Planting of trees or multi-annual bioenergy crops.
5. Developing or operating commercial recreational/ visitor facilities or activities.

• The ARCs listed above are subject to change once the Statutory instrument (S.I.) process is finalised.

Please note that other activities within the SPA may require the consent of other authorities.

Current Schemes

The following schemes operate in the SPA, involving farmers and non-farmers alike:

Corncrake Grant Scheme: This offers compensa-tion for delayed cutting, grazing and Corncrake Friendly Mowing (CFM) on suitable habitat within 250m of a calling male. Delayed cutting and CFM are the only compulsory measures within SPAs and no measures are compulsory outside the SPA. Delay dates are August 5th, 20th and September 1st. This is an annual scheme and renewed participation depends on the presence of a calling male.

Farm Plan Scheme: A 5-year plan in which the farmer plays an important role in the establishment and maintenance of Corncrake habitat. This includes the creation of Early and Late Cover and annual delayed mowing/grazing (until July 15th if the site is inactive, or Aug 5th – Sept 1st if active). Payment rates vary accordingly.

Cúlra Créafóige: A locally-led agri-environmental project, financed under the European Innovation Partnership initiative. This project aims to work with local people to consider new approaches to managing their land for increased farm viability, corncrake habitat creation, tourism and micro-business opportunities.

Land Management Agreement: A 5-year lease whereby NPWS carry out conservation measures with the agreement of the landowner. Previously abandoned farmland may be entered in this scheme.

GLAS: Offered by the Department of Agriculture, Food and the Marine, this 5-year scheme includes a measure for Corncrake, however the scheme is now closed to new applicants.

Appendix 3: Corncrake census guidelines

Methods

The Corncrake census is carried out using a standard methodology (Stowe and Tonkin, 1985). All 10km squares in which Corncrakes have been recorded in recent years are visited, focusing on traditional locations and nearby areas of suitable habitat, as well as locations from where reports from the public have been received.

Fieldworkers should familiarise themselves with all areas to be surveyed by visiting in day-time and noting the presence or absence of suitable habitat before making any night-time visits.

Each area is to be visited at least twice during the period 20 May to 10 July, between BST 00.00 and 03.00 hours. (However, in perfect weather conditions, it may be appropriate to continue censusing until the start of the dawn chorus.) In areas where there are multiple birds, census visits should be more frequent, to keep tabs on movements and to allow for an accurate count to be made from accumulated records at season's end.

Visits should be made, where possible, in calm, mild conditions. Corncrakes call less during cold, wet and windy weather, and are not easily heard in wind speeds above Beaufort force 4. When surveying a wide area, perfect conditions allow for most 1km squares to be covered by two stops. More stops are required to cover the same area in less suitable conditions. When checking a specific site for a report, very good listening conditions are not so important, but in all instances, the absence of a calling bird in even perfect conditions does not mean there is no Corncrake present – particularly when mating, calling can be interrupted – hence the need for several visits. Vehicles were driven throughout pre-determined survey areas, with frequent stops to listen for calling corncrakes. Geo-referenced OSI 1:50,000 maps and GPS units were used to ensure that all areas were adequately surveyed. Surveyors were familiar with the survey areas and their gross habitat composition prior to the census period.

At each stop, listen for a minimum of 2 to 3 minutes, which is sufficient to ascertain whether or not a bird is calling within earshot. Where a report is being checked-out, stay considerably longer, and if nothing is heard but the report is reliable and the habitat is suitable, where possible return to check again within a week.

Often, birds will be calling from the middle of farmland where they can't be safely approached at night. Precise locations can be pinpointed by triangulation (take bearings from two different spots) or by marking the spot and returning in daylight (e.g. a bird is estimated to be 100m inside a fence – mark the point where the bird is perpendicular to the fence by tying a plastic bag to the wire, returning in daylight to visit and scan the spot. Often, the plot of vegetation or feature - a bank or ditch - where the bird was calling from can be identified, and then accurately mapped. The bird may also be heard again from the same "nocturnal calling perch" (NCP) in daytime.)

Recording results

The first location and every subsequent new location of every calling male heard during the season is recorded as a 12 figure grid reference on form AV, which also asks for details of dominant habitat type (see below for abbreviations used) and whether a bird is at its first, second, third, etc location, where this is known. (Where a fieldworker has not got access to Arcview, precise locations should be marked on an aerial print-out.) It is also helpful for the fieldworker to keep tabs on each bird if locations are also recorded in brief description (e.g. Tom Dunning's south field, near sheds) as this is readily recognisable (to the fieldworker when compiling records) where a grid reference is not.

A record of each night's census is recorded by listing 10km square and each townland visited on each date.

Also keep a record of all birds heard during daytime and outside the census period early and late season, along with sightings and recoveries. (Records of birds seen during mowing are recorded separately, within the mow survey data, on form Crex F).

Also keep a record of all additional available reliable reports of calling Corncrakes at each location throughout the season. Record location in as much detail as possible (12 fig grid ref if available, otherwise six figure input in 12 digits (e.g. 06120 12060) or even four figure (06100 12100), as these can be a valuable tool in helping to determine final numbers.

Each breeding bird's location was digitised on an aerial photograph using a GIS (ArcView 3.2 or 10.2.2) and a circle (r=250m) was drawn around it. The site was subsequently visited during daylight hours and any actively managed suitable habitat situated wholly or partially (>30%) within the circle was identified. Eligible landowners were then offered the Corncrake Grant Scheme. Within corncrake SPAs adherence to the Corncrake Grant Scheme (CGS) was compulsory and mowing was not permitted prior to 5 August. Outside of SPAs, CGS participation was voluntary. If landowners were not willing to delay farming activities, compensation was offered for Corncrake Friendly Mowing.

On uninhabited islands where night census is difficult or dangerous, the presence of Corncrakes can be confirmed by use of a tape lure during daytime – played for short periods (c.15 seconds at a time, two or three times across a few minutes, is generally sufficient to elicit a response, although again no response is not necessarily conclusive). Use of a tape lure requires a license. Members of the public should not be let see (or hear) this in action, and should be discouraged from using recordings (e.g. on mobile phones or to enable photography) as this may disrupt breeding or expose birds to increased risk of predation, etc.

Safety

In addition to standard safety precautions regards driving and taking sufficient rest and being familiar with the area and terrain, fieldworkers engaged in census must set up a buddy system to alert others in the event that they suffer a mishap and need assistance.

With a partner or colleague, leave details of each night's intended route and return time and agree a procedure (beginning with checking by phone if ok, rising to notifying An Garda of your disappearance) should you fail to return. Details of car make and reg. should be left with your buddy. Replies to text messages to notify of route or safe return must be acknowledged to ensure they have been received.

Criteria for counting birds

Senior fieldworkers make a final tally of the season's Corncrake population from compiled records at season's end.

Some birds inhabit essentially the same territory all season and are easily counted, while others move and some may be heard for only part of the season or more briefly. To be accepted as likely to be breeding, and so afforded protection under conservation measures, a bird should be heard twice at least seven days apart in the middle of the breeding season.

To be counted in the census, a bird has either stayed in the same territory all season, or it is heard first at one location and then at another nearby, usually within 1km, but perhaps 3-5km. Judgment on whether a bird arriving at a new location is the same as one already counted or a new one is made in the context of any records or reports of calling in the vicinity, which may suggest the same bird is moving through rather than settling, or has moved on. Note that early in the season (April to early May) and again late (after mid-July) birds are much more likely to be unpaired and seeking a mate. Note in particular that males arriving early typically call for a week from a prominent spot from where it will move to a nesting area once a female has been attracted.

Habitat type abbreviations used:

GDM – Grass-Dominated Meadow
HRM – Herb-Rich Meadow
GDP – Grass-Dominated Pasture
HRP – Herb-Rich Pasture
PP – Permanent Pasture
JDP –Juncus Dominated Pasture
SDM/SDP–Sedge-Dominated Meadow/Pasture
IDP – Iris-Dominated Pasture
Red't M – Redundant Meadow
TRV – Tall Rank Vegetation
RP – Rough Pasture

Also record nettles, iris or other stands of single species (or any combination of the above e.g. nettles/GDM):

N – Nettles
Umb – Umbellifers (hogweed, etc)
B - Bracken
I – Iris
M – Montbretia
R – Reeds/Phragmites

Appendix 4: NPWS Predator Control Programme

The tables below list the sites trapped for the protection of Corncrakes (Table 16) and for other bird species (Table 17) in each region.

Table 16: Predator control sites trapped for Corncrakes

West Donegal		Shannon Callows	Connemara & S. Mayo	N. Mayo
Aranmore	Gola Island	Bunthulla Hill	Crosslough	Mullet
Cruit Island	Horn Head	Inchinalee	Louisbourgh	
Carrickfin	Maas	Inishee	Inishbofin	
Clochglas	Meenacross		Omey Is	
Corveen	Maghery		Roonagh	
Derrybeg	Murroe		Ballyconneely	
Falcorrib	Owey Island			
Glasserchoo	Portnablagh			
Portnoo	Ray			

Table 17: Predator control sites trapped for other species

West Donegal	Shannon Callows & Lough Ree	Connemara & S. Mayo	N. Mayo
Ardsbeg	Black Brink Bay	Dowros	Bleangeragh
Belcruit	Black Island	Letter	Lagduff
Carrownamaddy	Bunthulla Hill	Rosleague	Lough Carra
Craghy	Carrownure	Dunloughan	Newport
Crolly	Clawinch		Uggol
Daire na Mainsir	Hodson Bay		Lough Conn
Derryconnor	Inch Mc Dermott		Westport
Dungloe	Inch Turk		Fahy
Glasserschoo	Inchbofin		Derrycorrib
Glenthorman	Inchenagh		Lettra
Greenhill	Inchinalee		Ballygarrraun
Kilcreggan	Inishee		Derry Lower
Loughacher	Lough Funshinagh		
Loughlacha	Rinanny Point		
Magheragallon	Pollagh Point		
Moneybeg	Ross Lake		
Sheskinmore	Yew Point		
Termon			
Tully			
Tullynagreane			
Gweedore			
New Lake			

Table 18 shows the number of individuals of each target species caught in each area.

Table 18: Number of individuals caught per species and area.

Area Trapped	Days of Trapping Effort	No of sites	Mink	Grey crow	Magpie	Fox
N Mayo	168	13	19	223	30	19
Connemara & S Mayo	129	10	2	202	30	13
Donegal	367	40	44	128	68	49
Shannon Callows	249	17	15	113	20	15
Total	**913**	**70**	**80**	**666**	**148**	**96**

Regional notes:

- In North Mayo, 168 trapping days were carried out from March to September. Mink traps were set in March, June, July and August and all mink were caught in July and August. Corvids were trapped on a monthly basis using Larsen, ladder and multi-catch traps and shot with the use of a shotgun. Lamping was carried out at 5 sites. Bycatch included a pine marten, a feral cat, 2 rooks and a jackdaw. Additional trapping was carried out in October, however this dataset was not available at the time of writing.

- In Connemara and South Mayo, 126 trapping days were carried out from April to July. Mink traps were set from Apr-Jun and were solely caught in April. Corvid traps (Ladder, Larson and multi-set) were set on a monthly basis. By-catch included 4 rats and 4 pine marten. Lamping was carried out in April, May and July.

- In Co. Donegal, 366 trap days were carried out from March to September. Corvids were trapped every month using Larsen, Hexagonal and ladder traps. Mink traps were set on a monthly basis, with the majority caught in March, April and September. All foxes were shot while lamping every month except in April. Additional trapping was carried out in October, however this dataset was not available at the time of writing.

- In the Shannon Callows 205 trapping days were carried out from February to September. Mink traps were set from Feb-Apr and July-Sept. Corvid traps (Funnel, Larsen and multi-set) were set from Feb-Apr, and catches were shot with a shotgun. Foxes were shot using both shotgun and rifle. By-catch included 1 water rail, 6 pine marten and a cat.

Appendix 5: ELC assessment form and guidelines (RSPB 2011)

(A) Early Cover Assessment Form

SITE CONDITION ASSESSMENT FOR CORNCRAKE HABITAT 2011														
Site:														
Date:	Team members:													
Early Cover Assessment	**Number of Early Cover Areas (ECA) assessed:**													
Attribute	**Target condition**	**Team Assessment**												**Score**
Sward height (cm) at end of April/start of May[1]	>=15cm	<5		5-10		10-15		>=15						
Sward composition at end of April/start of May[2]	<25% Grass and/or *Juncus*	*Juncus*		Fine grass		Bare ground		Other						
						0		0						
Presence of early cover species[3]	>=75% of ECA covered by one or more early cover species	Nettle	Iris	Cow parsley	Hog weed	Grasses	Meadowsweet	Other						
Vegetation structure [4]	<25% thatched grasses	76-100%		51-75%		26-50%		0-25%						
Size of early cover area[5]	>=0.1ha each	<=0.1ha		0.2-0.5ha		0.6-1ha		>1ha						
Proximity to late cover/late cut crop[6]	At least one side adjacent to late cover	1 side		2 sides		3 sides		4 sides						
Distance to nearest regular corncrake[7]	Regular use of early cover area	>100m		51-100m		<50m		Area used						
Time since last used[8]	Previous year	Never		3yr		2yr		1yr						
Suggestions for improving management:														

(B) Early Cover Recording Form – Guidance Notes

1) Sward height (cm) at end of April/start of May

Tick the height categories applicable for the vegetation in the early cover area and give an approximate percentage cover of vegetation that is >=15cm e.g.

<5	5-10	10-15	>=15
√	√		√ 75%

For early cover areas with >=75% of early cover species at or above 15cm give a √ in the final score box.

2) Sward composition at the end of April/start of May

Tick the boxes and indicate the percentage of the early cover area which is not providing early cover e.g.

Juncus	Fine grass	Bare ground	Other
√ 10%		√ 5%	

For early cover areas with <25% non-target species/bare ground give a √ in the final score box.

3) Presence of early cover species

Similarly to section 2, tick the boxes to indicate the early cover species present in the early cover area and indicate their percentage cover. For species that are present but provide less that 10% of the early cover, indicate with a tick only. For early cover areas with >=75% cover of early cover species give a tick in the final score box.

4) Vegetation structure

Indicate with a tick the proportion of vegetation that has become thatched (often fine grasses) and is therefore likely to impede corncrake movement through early cover e.g.

76-100%	51-75%	26-50%	0-25%
			√

For early cover areas with <25% thatched vegetation give a tick in the final score box.

5) Size of early cover area

For ECAs that exceed 0.1ha give a tick in the score box.

6) Proximity to late cover/late cut crop

For ECAs with at least one side adjacent to late cover/late cut crop give a tick in the final score box.

7) Distance to nearest regular corncrake

For ECAs already used by corncrakes give a tick in the final score box.

8) Time since last used

For ECAs used by corncrakes in the previous year give a tick in the final score box.

Appendix 6: Number of calling males per 10km square in 2018

County	10 km Grid Square						
Donegal	B61	B70	B72	B82	B83	B84	B93
No. of Corncrakes	2	2	14	1	31	16	2
Donegal	C03	C14	C22	C23	C24	C45	C46
No. of Corncrakes	7	3	1	1	3	6	1
Mayo	F52	F61	F63	F72	F73	G23	
No. of Corncrakes	2	2	25	1	5	2	
S. Mayo	L67	L88					
No. of Corncrakes	1	1					
Galway	L46	L55	L56				
No. of Corncrakes	2	2	14				
Sligo	G43						
No. of Corncrakes	2						

Relative to 2017, there was a loss of Corncrakes from the following squares:

- In Donegal: C32
- In Mayo: F62, F83, F89, L78,
- In Galway: L63
- In Kerry: Q30

Relative to 2018, calling males were recorded in the following 'new' squares:

- In Donegal: B82, C22, C23, C46
- In Mayo: F52, F72, G23, L88

Appendix 7: Corncrake numbers recorded per breeding site in 2017 & 2018

Area	10km Square	Corncrake No. 2018	2017
DONEGAL - MAINLAND			
Malin Head	C45	6	1
Ballyliffin/Doagh Isle	C34/C45	0	1
Inch	C32	0	1
Fanad peninsula	C14/C24	6	6
Ramelton/Portsalon	C22/C23	2	0
Rosguil/Downings	C14	0	1
Falcarragh/Killult	B93	2	2
Rosses/Gweedore	B71/B82	1	1
Portnablagh/Marble Hill	C03	0	1
Carrickfinn	B72	5	7
Maghery	B70	2	1
Horn Head/Dunfanaghy	C03/B93	7	5
Magheroarty/Derryconnor	B83	0	4
Gortahork	B93	0	1
DONEGAL - ISLANDS			
Tory Island	B84	16	17
Inishbofin & Inishdooey	B83	31	24
Arranmore	B61	2	2
Inishkeeragh	B61	0	5
Inishmeane	B72	2	2
Gola Island	B72	4	6
Go Island	B72	1	0
Owey Island	B72	2	4
Inishtrahull	C46	1	0
MAYO			
Mullet Peninsula	F61-63 F83, L69	31	26
N.Mayo & Achill	F72-73, G23	4	3
SW Mayo	L77-78, L88	1	2
Inishturk, Inishkea North	L67, F52	3	1

Area	10km Square	Corncrake No. 2018	2017
CONNEMARA			
Mainland	L55, L65	2	1
Turbot Island	L55	0	3
Omey Island	L55	1	0
Inishark	L46	2	2
Inishbofin	L56	15	8
OTHER			
Shannon Callows	N/A	0	0
Co. Sligo	G43	2	1
Co. Kerry	Q30	0	1
NATIONAL TOTAL		**151**	**140**

Appendix 8: Project Expenditure

Table 19 shows project expenditure on conservation schemes and measures carried out in 2018 in each area. Note that the Farm Plan Scheme figures correspond to projected expenditure and payment is subject to landowner compliance with scheme conditions.

Table 19: Expenditure per scheme and area in 2018.

Area	Corncrake Grant Scheme	Farm Plan Scheme	Predator Control
Co. Donegal	40,704.40	17,491.70	23,347.00
West Connacht	77,742.88	13,023.85	36,818.91
Shannon Callows	0	0	15,250.00
General Expenses	0	0	2,675.01

Table 20 shows the number of participants, total expenditure, and total land area entered in each conservation scheme at a national level in 2018.

Table 20: Participants, cost and area entered in each Corncrake conservation scheme in Ireland in 2018.

	No. of participants	Expenditure (€)	Area entered (Ha)
Corncrake Grant Scheme	125	118,447.62	352.78
Farm Plan Scheme	10	30,515.55	63.52
Predator Control Programme	N/A	79,090.92	N/A
Total	135	228,054.09	416.30

Table 21 shows expenditure and land area managed under CGS in Ireland for each delay date in 2017 and 2018.

Table 21: Expenditure and area managed under CGS per delay date in 2017/2018.

	2018			2017		
Payment type	Area (ha)	% Total Area	Cost (€)	Area (ha)	% Total Area	Cost (€)
05-Aug	34.82	10%	17,309.64	114.32	37%	36,844.73
20-Aug	37.03	10%	10,896.78	30.03	10%	8,066.80
01-Sep	235.57	67%	87,100.00	157.03	41%	58,825.13
CFM only	45.36	13%	3,141.20	4.52	2%	203.4
Total	352.78	100%	**118,447.62**	305.9	100%	**103,940.06**

In 2018, a greater proportion of mowing and grazing activities were delayed until September in comparison with 2017 (67% of the total area entered in 2018, 41% in 2017). On the contrary activities were delayed until August 5th on a much lower percentage of lands this year (10%) compared to last year (37%). This may due to drought conditions which limited growth and restricted 'second growth' mid-summer, which would reduce the negative impact of delayed mowing. The eligibility of GLAS participants in the CGS would also contribute to the increase in September delays, as landowners likely altered their fertilisation regime to adjust to GLAS measures. Two-thirds of the 36 GLAS land parcels that were entered in the CGS were in Traditional Hay Meadow and Twite measures. Traditional Hay Meadow limits Nitrogen application to 40kg/ha and Twite requires a delay date of August 15th. In both cases, the impact of delaying until September 1st for Corncrake would be greatly reduced in comparison with more heavily fertilised, conventionally farmed lands.

13 applicants availed of the new margin measure this year, at a total cost of €4,600. In a number of cases this additional payment was a determining factor in the participant's entry into the CGS. Nine payments were capped at €1,500 (where one bird is present) and two payments were capped at €3,000 (for multiple birds). Only two payments were made at higher intensive rates this year. Both of these were in Donegal for delay dates of August 5th; one at a rate 735€/ha, the other at 905€/ha.

Appendix 9: Summary of measures on the French Corncrake Conservation Project

A French national Corncrake conference was attended by the project supervisor in May 2018. Below are a summary of measures implemented for Corncrake conservation in France:

- The main measure is akin to the Corncrake Farm Plan Scheme; a 5-year contract with certain compulsory requirements. Most of land within traditional breeding areas is entered in this measure (figures vary depending on the region). In this contract, fertilisation is prohibited, delay dates requested are June 20th, July 1st or July 14th, and 20% of the total land area must be left uncut until September 1st (thus creating a refuge zone). Compensation rates are 275€/ha for June 20th and 372€/ha for July 14th. The positioning of the refuge zone is variable from year to year, and decided by the fieldworker according to the location of calling males if present, or other species' requirements if Corncrakes are absent.
- A CGS type measure, termed 'emergency measure', was trialled in 2017. Prior to this, if land was not in the FPS type measure, no conservation measures were implemented. The emergency measure entails the advance purchase of the crop from the landowner at a rate of 500€/ha. The crop is then left in situ and subsequently shredded by the project in September.
- No ELC is created in France.
- Studies are being carried out to improve knowledge of the timing of fodder quality loss and increase accuracy of permissible mowing dates and payments.
- Corncrake Friendly Mowings are attended by 8-10 volunteers in some places, with birds being spotted much more regularly than in Ireland. From these accumulated observations of nests and chick locations relative to males, it has been determined that females are very often very close to the calling male.
- The 250m rule is not applied in France; in fact no fixed area is protected. Fieldworkers on the ground survey each site 1-2 times a week and triangulate the male's location each time. In this way they determine the exact extent of the range of singing posts. From their aforementioned CFM experience, fieldworkers have determined that females are often located within this range. Therefore a refuge zone is created to integrate and surround this range, extending over as little as 1ha, with the rest of the area cut in June and July. It is worth noting that Corncrake arrival dates in France are the same as in Ireland – the first birds are generally heard in mid-April, and the census period is from April-June. Note that in Belgium a similar method is used, with protection being extended over a minimum of 1-2ha and a maximum of 4ha around the male. The scientific study used as guidance is that of Tyler & Green (1996) which finds that the mean distance of nests from calling males is 100m (based on a study of 9 pairs).
- The project is considering using fixed lures on a nightly basis to attract birds to areas in which the project has control of land parcels.
- Successful measures for other species in France were mentioned, based on a collective management plan and a extensive communication operations.

Appendix 10: Photographs

Plate 1: A week-old chick found alone at Carrickfinn, Co. Donegal, and transferred to Fota Island.

Plate 2: Corncrake at Ballihillion, Malin Head.

Plate 3: Presentation on Ireland's Corncrake Project in Nantes, France, at a national Corncrake conference.

Plate 4: NPWS staff and contractors with President Higgins at the National Ploughing Championships 2018

Plate 5: Sign placed on Omey Island, Co.Galway, in response to disurbance of birdlife by unleashed dogs.

Plate 6: CFM being carried out in Curclough, Mullet Peninsula.

Plate 7: Oats planted on Tory Island. (July 2018)

Plate 8: Nettle ELC created on Tory island in 2017 – this held a calling male in 2018.

Plate 9: July 2018 – area cleared of rank vegeation in Oct 2017 near Portoquin, Gola Island.

Plate 10: Kale planted on Gola Island

Plate 11: July 2018; an area planted with coarse grass mix on Gola Island. This vegetation provided little cover this season.

Plate 12: Nettle ELC pactch planted on Gola Island. ELC creation on Gola was not as successful as on Tory Island, in spite of the same source materials being used.

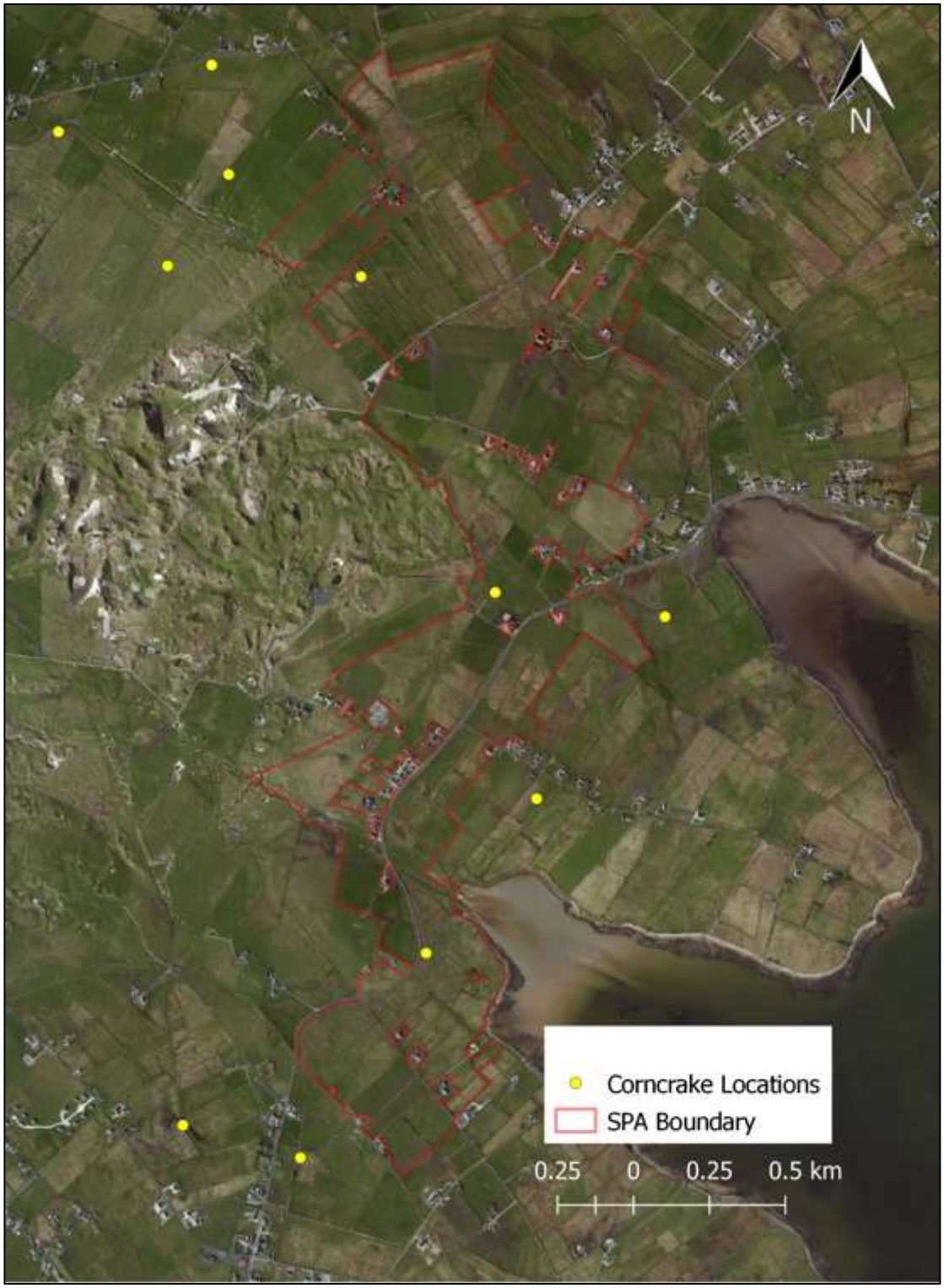
Plate 13: Adult killed on the road in June in Shraigh, Co. Mayo. This area has not had a calling male in several decades.

Plate 14: Injured juvenile encoutered during CFM in Dunfanaghy. The bird was brought to a vet and had to be euthanised.

Plate 15: Group attending Corncrake talks and tours at Gortahork, Co. Donegal.

Appendix 11: Corncrake Locations in relation to Corncrake SPAs

Mullet Peninsula SPA (4227) – North



Mullet Peninsula SPA (4227) - South

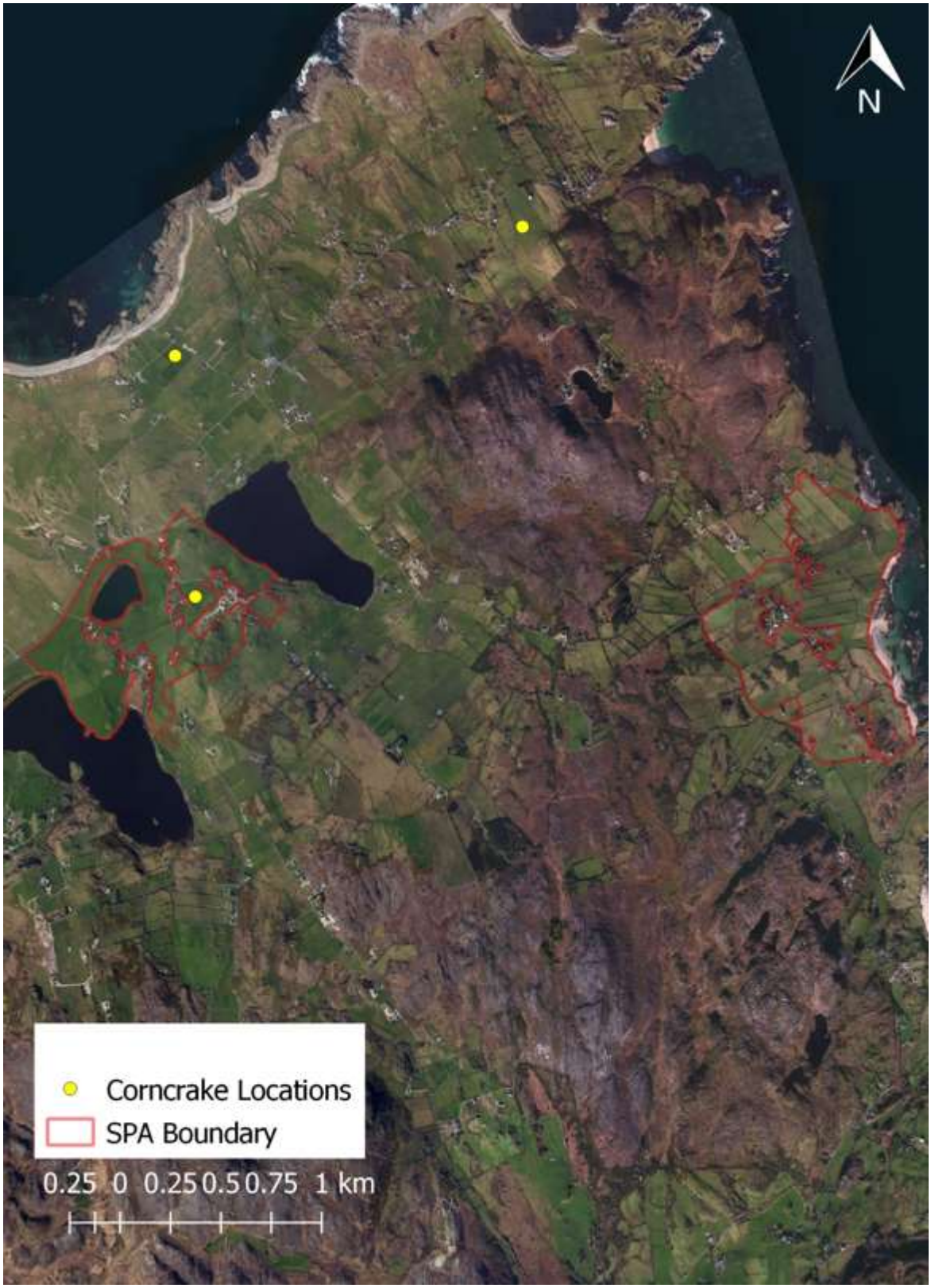
Termoncarragh Lake and Anna Machair SPA (4093)

Inishbofin, Omey Island and Turbot Island SPA (4231) - Inishbofin

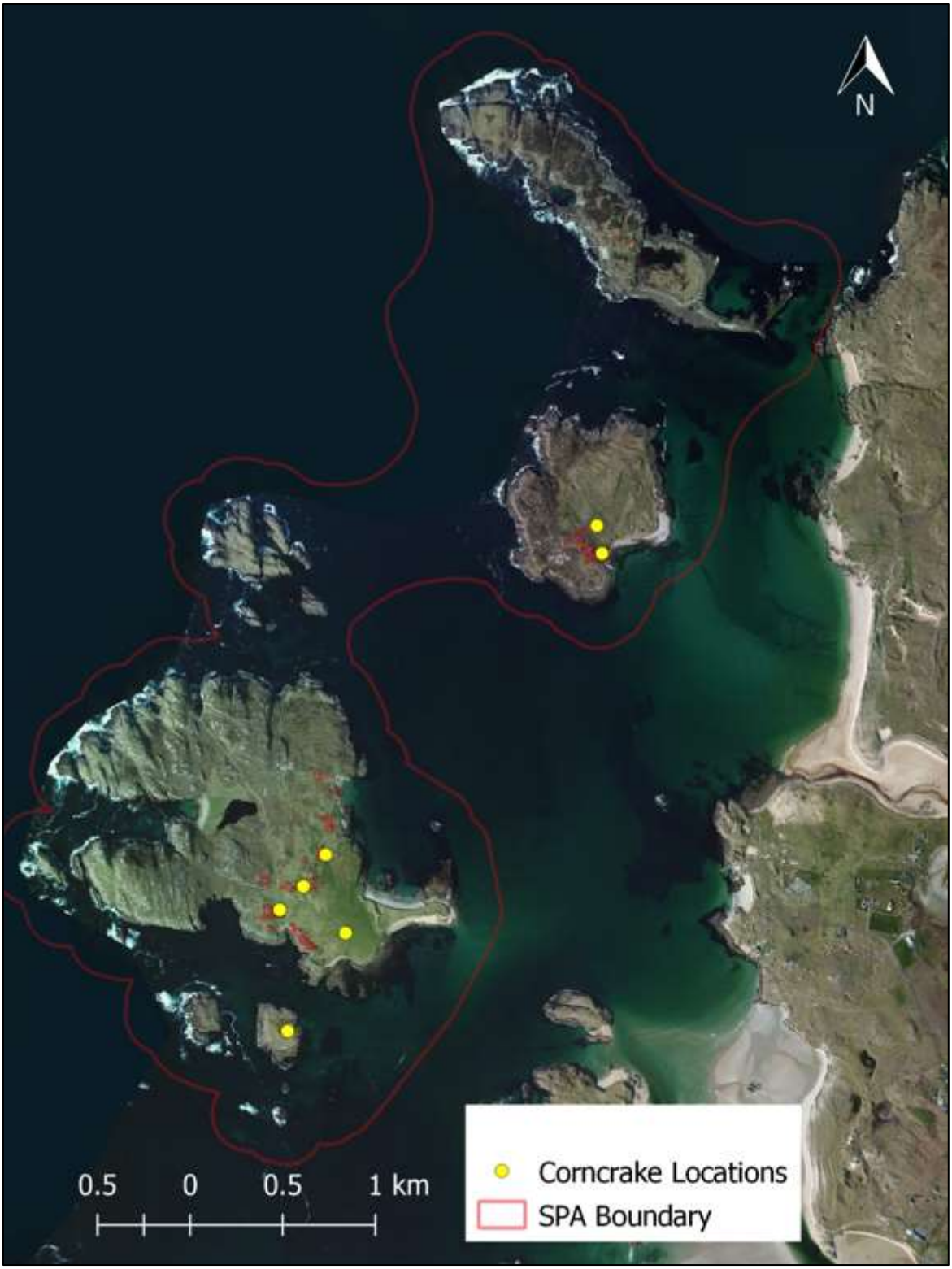
Inishbofin, Omey Island and Turbot Island SPA (4231) – Omey Island and Turbot Island

Malin Head SPA (4146)

Fanad Head SPA (4148)

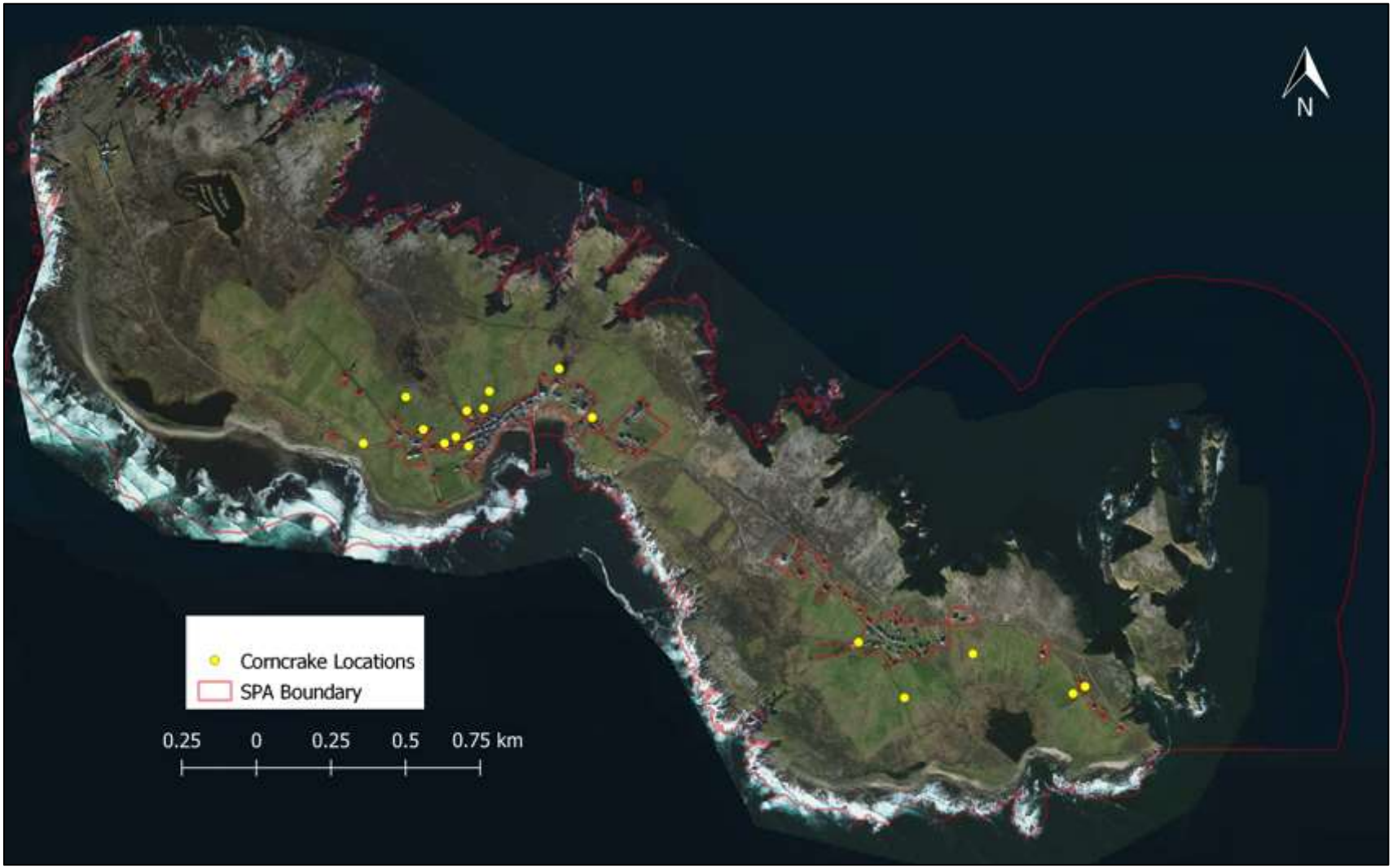


West Donegal Islands SPA (4230)



Falcarragh to Meenlaragh SPA (4149)

Tory Island SPA (4073)



Inishbofin, Inishdooey and Inishbeg SPA (4083)