

# Curlew Conservation Programme



## Annual Report 2021



**An Roinn Tithíochta,  
Rialtais Áitiúil agus Oidhreachta**  
Department of Housing,  
Local Government and Heritage



**An Roinn Talmhaíochta,  
Bia agus Mara**  
Department of Agriculture,  
Food and the Marine

Cover Photo: Curlew chick hatching in County Donegal (Photo: Martin Moloney / CCP).

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## Overview

- The Curlew Conservation Programme was established in 2017 to pioneer Curlew conservation efforts in Ireland. It is funded and coordinated by the National Parks & Wildlife Service (NPWS) of the Department of Housing, Local Government & Heritage and the Department of Agriculture, Food & the Marine, with a comprehensive framework that includes habitat restoration, maintenance, enhancement and creation; survey effort, nest protection; public and community engagement and much more.
- The Curlew Conservation Programme involves a wide range of actors, proactively working to help Curlew. Central among these are the farmers and owners of land where Ireland's last remaining Curlew breed.
- A locally-led approach is taken. In 2021, nine geographical areas that are important for breeding Curlew in Ireland were assigned locally based teams, working with local people and adapting techniques, efforts and priorities to what works best locally.
- The fifth year of the Curlew Conservation Programme, 2021, saw direct efforts in the following areas:
  - Stack's Mountains (Kerry)
  - Lough Corrib North (Galway)
  - Lough Ree (Roscommon/Westmeath)
  - North Roscommon/Mayo
  - Mid-Leitrim
  - North Monaghan
  - Donegal
  - Slieve Aughties (Clare/Galway)
  - Laois-Kildare
- The local teams, known as Curlew Action Teams (CATs), are comprised of three main roles:
  - A Curlew Conservation Officer
  - A Nest Protection Officer
  - A Curlew Champion.
  - An assistant role is assigned to CATs where required.
- The Curlew Conservation Programme is well received on the ground, where the local teams liaise closely with landowners and local communities (who are a central part of conservation efforts) in the search and protection of breeding Curlew.

- In the nine operational areas, a total minimum of 34 pairs were confirmed breeding, with possibly 27 additional (probable) pairs breeding (a total of up to 61 breeding pairs). The total number of pairs recorded by the CCP annually since 2017 has been 54 in 2017, 45 in 2018, between 41 and 56 pairs in 2019, and between 42 and 64 pairs in 2020. When the Curlew Action Team areas that were covered in each of the five years are compared, those figures are 46 in 2017, 42 in 2018, 41-56 in 2019 and 41-58 in 2020, and 30-50 in 2021.
- Of the 34 pairs for which breeding was confirmed in 2021, at least 22 reached hatching stage (65%), with a minimum of 57 chicks hatched. A minimum of nine pairs produced fledglings (possibly others did so but were not confirmed), so the breeding success rate was at least 26%. The total number of juveniles recorded to have fledged was at least 17, but again may have been more. This represents a breeding productivity of 0.50 fledglings/breeding pair, which is above the threshold of 0.43 fledglings/pair required for a stable population. It is a decrease on the breeding productivity recorded in 2019 and 2020. The first year of the CCP (2017) saw a breeding productivity in the action areas of 0.38 and in 2018, it was 0.43. In 2019, it was 0.81 fledglings per breeding attempt, and 0.60 in 2020.
- This productivity estimate is only for those pairs where we have a known outcome, and represents a subsample of the CCP pairs, which are likely to have a higher productivity thanks to conservation efforts. This does not include pairs outside the CCP, who likely have lower productivity. The Irish population of breeding Curlew as a whole is very probably below the threshold required for a stable population.
- The Curlew Conservation Programme continues to build skillsets, experience and momentum. The programme is widely supported, both nationally and internationally and most importantly in the local areas where it is active.
- For the first time this year, the satellite-tagging of a several adult males was pioneered by NPWS. This was carried out under licence to help Curlew Action Teams track adult birds' movements, locate nests more easily and learn more about Curlew ecology and behaviour in Ireland.
- It is intended that the principles applied by the Curlew Conservation Programme will continue into the future, acting for Curlew conservation with local people, particularly landowners. The CCP is multifaceted, with various aspects of conservation applied, from nest protection to habitat enhancement to education, promotion and community liaison and much more.



## Background

The first national breeding Curlew survey, undertaken between 2015 and 2017, found drastic declines of the national breeding population of Curlews. Whereas 3,300-5,500 pairs are estimated to have bred in the Republic of Ireland in the late 1980s, there now remains no more than 150 pairs (O'Donoghue *et al.*, 2019). This represents at least a 96% decline. Breeding productivity is so low that population viability analysis, undertaken in 2017, predicted that unless an average of 0.425 fledglings were produced per breeding pair, the Curlew will go extinct as a breeding species in Ireland before 2030 (A. Lauder, unpubl. data, 2017). This figure matches closely with the more recent generic threshold estimate of 0.43 produced by Cook *et al.* (2021).

The National Parks & Wildlife Service (NPWS) of the Department of Housing, Local Government and Heritage established the Curlew Conservation Programme (hereafter CCP) in 2017. Since 2020, the Department of Agriculture, Food & the Marine have been partners on the CCP. This brought many positives, including the facility for the programme to have a presence in two additional areas, namely the Slieve Aughty Mountains and Laois-Kildare. This brought the total number of Curlew Action Teams operating across the country to nine. This report presents the main points of the Curlew Conservation Programme in 2021.



Figure 1. A Curlew calling at Lough Ree (Photo: Joe Carr / CCP)

# Introduction

The Curlew Conservation Programme (CCP) has been designed to deliver action on the ground, at a local level, engaging with local people so that they are part of the project, not apart from it. The Agri-Ecology Unit of the NPWS manages the CCP. In 2021, the Programme was financed by both the Department of Housing, Local Government & Heritage, and the Department of Agriculture, Food & the Marine, with a total budget of approximately €500,000. The additional support from both Departments in 2021 allowed the Curlew Conservation Programme to begin earlier and to have a presence in nine geographical areas across Ireland.

In parallel, in 2018 the [Irish Breeding Curlew EIP](#) was established, co-funded by the Department of Agriculture, Food & the Marine and the EU's European Agricultural Fund for Rural Development (EAFRD). This three-season project focusses on two areas (Lough Corrib South and South Leitrim), with a budget of €1.1m (€0.36m per annum) and has an Organisational Group comprised of BirdWatch Ireland, the Irish Natura and Hill Farmers Association (INHFA), the Irish Grey Partridge Conservation Trust and Teagasc.

In addition, the national agri-environment programme, GLAS, is scheduled to pay approximately €8m over 5 years (€1.25m per annum) for farmers in any area where Curlew were recorded in the past decade, to voluntarily manage their lands in a Curlew-friendly manner by delivering a suitable sward structure, avoiding machinery operations during the breeding season and avoiding chemical inputs.

All of these efforts are undertaken in a wider context of ongoing threats and pressures, which have been identified, along with proposed solutions, by the [Curlew Task Force](#), which in May 2019, produced a suite of recommendations for Curlew conservation.

The Curlew Conservation Programme was implemented on the ground in the form of field surveys, working with landowners to protect nests from disturbance and predation (an acute issue in relation to breeding success) and habitat maintenance, restoration, creation and enhancement. Community liaison, promotion of the Curlew and education were also significant aspects of the work undertaken. Each area had a locally based team (primarily consisting of local people) to carry out this action. In total, 36 people (including a Project Manager) were contracted to form the local teams between late March and August. Early season contracts (January to mid-March) were given to Nest Protection Officers and Curlew Advisory Officers in particular areas. National Parks & Wildlife Service regional staff were centrally involved in a number of areas.

# Curlew Action Teams

## Curlew Action Teams

1. Stack's Mountains
2. Lough Ree
3. North Roscommon-East Mayo
4. Leitrim
5. North Monaghan
6. Donegal
7. Lough Corrib
8. Slieve Aughties
9. Laois-Kildare



Figure 2. The nine Curlew Conservation Action Areas.

N.B. Given the sensitive nature of the species, the locations of Curlew breeding territories are held by the National Parks & Wildlife Service, and are not disclosed in this report.



# Curlew Action Teams and the Curlew Conservation Partnership

The introduction of Curlew Action Teams in some of the most important areas has allowed for dedicated surveys and concrete conservation action there. The Curlew Conservation Programme (CCP) has now built a tangible profile for conservation efforts with the local communities and nationally. These teams were given dedicated geographical areas and the support and autonomy to provide local solutions that were appropriate to the sites in question.



Figure 3. Curlew Action Team – sum of the parts

The roles involved in the Curlew Action Teams are described as follows:

## Curlew Advisory Officer

This is the lead role locally. The Curlew Advisory Officer (CAO) is the primary link between their local project team, the local community and the CCP Project Manager. The CAO is tasked with nest finding, nest protection, liaising with and providing advice to landowners and coordinating efforts on curlew conservation, local administration and ecological recording. In the early season, CAOs engage with members of the public, landowners and agri-environmental consultants that are acting as planners for Curlew GLAS plans.

### Curlew Nest Protection Officer

Predation is believed to be a primary cause of breeding failure for Curlew, who are experiencing increasing difficulties in hatching eggs and rearing young (Ainsworth *et al.*, 2016; Franks *et al.*, 2017). In order to give Curlew a better chance of rearing their young, nests are fenced to exclude ground predators, and selected predators (Red Fox *Vulpes vulpes*, American Mink *Neovison vison*, Hooded Crow *Corvus cornix* and Eurasian Magpie *Pica pica*) are removed from the vicinity of Curlew breeding territories (primarily within 1km of nest sites) and disturbed when coming close to nests by the Nest Protection Officers (NPO). This is all carried out under licence and in accordance with the law. The NPOs also assist in efforts to find breeding Curlew, and in various other tasks undertaken by the wider team.



Figure 4. Lead NPO Mark Craven (right) introducing new material to members of the CAT in Donegal (Mark Davenport – left; Jim Sheridan – centre) (Photo: Martin Moloney / CCP)



### Curlew Champion

This is a vital role in fostering and maintaining positive relations between the project and the community. One of the main ingredients in realising success in any conservation effort is to gain real 'buy in' from the landowners and local community. The Curlew Champion is tasked with encouraging close working relationships between project personnel and landowners, building a positive profile for Curlew and the CCP among landowners and local community, highlighting issues and proposing solutions. Most people contracted on the Curlew Action Teams are from the local area themselves and this further helps with community and landowner engagement. In 2021, physical engagements were limited by the pandemic, so the efforts of the Curlew Champion focused primarily on helping with surveys and liaising with local and national media.

### Curlew Action Team Assistant

The breadth of work involved in Curlew conservation efforts is significant and additional resources are required in some of the larger and busier areas. The assistant helps with various tasks, whether in terms of supplementing survey effort or community engagement or any other aspect of the local team effort. While the key tasks and responsibilities are set out for each individual team member, each team effectively functions as a unit and all teams together strive towards a common goal across the nine areas of the Programme.

### Curlew Conservation Partnership

In order to engage proactively with those who own and manage lands where Curlew breed, the Curlew Conservation Partnership (the public engagement aspect of the Curlew Conservation Programme) has been designed to allow payments for landowners (primarily farmers, but also others as appropriate), for their time and efforts with the Curlew Conservation Programme. Payments are operated under the auspices of the NPWS Farm Plan Scheme (NPWS, 2020) and any double-funding/contradiction for works planned under the Green Low-carbon Agri-environment Scheme (GLAS) are avoided. Where there are other agri-environmental programmes (e.g. the Hen Harrier Project in the Hen Harrier SPAs), communication between projects at management level and on the ground ensures compatibility and synergies. Plans are designed and agreed with landowners/land managers to deliver a better environment for breeding Curlew. Payments can be made for various aspects of maintaining, creating and improving habitats and for a participant's time investment in liaising with the local CAT. The partnership element is very important in building strong and positive relationships between the local landowners/land managers and the local CAT.

At the time of publication, a community fund under the Curlew Conservation Partnership is open for applications for local projects with objectives to help Curlew. These grants will allow for local efforts to be undertaken in advance of or throughout the 2022 breeding season.

# Conservation Action in 2021

## Areas

As already stated, the fifth year of the Curlew Conservation Programme saw direct efforts in the following Curlew areas:

- Stack's Mountains (Kerry)
- Lough Ree (Roscommon/Westmeath)
- North Roscommon/East Mayo
- Mid-Leitrim
- North Monaghan
- Donegal
- Lough Corrib North (Galway)
- Slieve Aughties (Clare/Galway)
- Laois-Kildare

## Surveys

While the above named geographical areas were targeted for survey and conservation effort in 2021, when Curlew were reported during the breeding season outside of but relatively close to these areas, CATs were encouraged to follow up on these reports and to monitor the breeding efforts and apply conservation action where possible. Therefore, as the season progressed, the footprint of efforts in 2021 did not exactly match that of previous years.

Surveys were largely focussed within 3km of Curlew territories known since 2015 (the first year of the national survey), but were not limited to these areas and a wide net was cast by the Curlew Action Teams where they sought and received reports of Curlews from elsewhere in their regions. Word of mouth, local and social media and outreach materials were used to seek reports of Curlew during the breeding season. Curlew Action Teams and/or NPWS staff in each area adopted survey techniques to suit their landscape, terrain and individual site requirements. A combination of walkover surveys, vantage point surveys, use of tape lures and discussions with local landowners were used. For the lake areas (Lough Corrib and Lough Ree), additional logistics included the use of boats to access islands and this brought its own intricacies, for instance, in terms of avoiding disturbance of birds as boats approached the islands. Even though each CAT had the flexibility to adopt the survey techniques that best suited the local circumstances, data collection was standardised and collated centrally.

Some of the core objectives of the survey work were to determine where the Curlew were nesting, where they were feeding and the outcomes of the breeding efforts. Determining nest and feeding locations was imperative to directing nest protection efforts and informing habitat maintenance, creation and enhancement works. These data and data pertaining to breeding results were also central to providing data to the Birds Unit of NPWS, which has the remit for Curlew policy, data and research.

In 2021, survey efforts were also aided by the introduction of satellite-tagging, carried out under licence. NPWS Birds Unit captured seven adult curlews (six males and a female) and fitted them with small, glued-on satellite tags to track their movements. Those tags provided the Curlew Action Teams with invaluable information on roost sites, feeding sites and, vitally, nest locations.



Figure 5. A satellite-tagged (and ringed) male Curlew in the Slieve Aughties (Photo: Jack O'Donovan / CCP)



Figure. 6. Example of location data obtained from a satellite tag at a traditional site.



## Nest Protection

Predation of Curlew nests (eggs and chicks) has been identified as excessive and population viability analysis shows that in the absence of action, Curlew will become virtually extinct as a native Irish breeding bird after 2025 (Alan Lauder, unpubl. data). Large-scale afforestation of Curlew breeding grounds including peatlands and high Nature-value farming lands in the last 30-40 years has provided the Curlew's natural predators with new areas of cover, shelter and breeding habitat (Hancock *et al.*, 2020). The need for Predation Risk Management was recently outlined in a publication by McMahon *et al.* (2020) and has been discussed in other publications and various fora including the [Curlew Task Force](#). Nest Protection efforts primarily focussed on the selective removal of North American Mink (*Neovison vison*), Red Fox (*Vulpes vulpes*), Eurasian Magpie (*Pica pica*) and Hooded Crow (*Corvus cornix*) in defined areas. Predation Risk Management (PRM) under the CCP strives to reduce the threat of direct predation to the Curlew's nest or chicks (or indeed the adults themselves), and to give the birds an increased chance of survival during that short but crucial window of opportunity between egg laying and fledging. PRM employs several different approaches (as outlined above in the NPO role description) and the efforts of the CCP are believed to benefit a wider array of ground nesting bird species beyond Curlew alone.

The Curlew Action Teams did particularly well to locate nests as soon as possible. Nest protection fences were deployed by CAT members at ten sites in 2021. Six of these successfully reached hatching stage. Two of those fenced nests were predated by avian predators, another one was abandoned (despite the birds initially returning to incubate after fence erection), and another one had eggs which were found to be non-viable at the time of fence erection. The usefulness of nest protection fences and the impact that ground predators are having on the species is evident in the hatching rate for those sites where nest protection fences were erected.



Figure 7. Members of the Donegal Curlew Action Team erecting a nest protection fence (Photo: Martin Moloney / CCP)



### Engagement with Landowners, Communities and the Wider Public

Curlew is a well-known and much-loved bird in Ireland, with links to landscape, literary, cultural and social heritage dating back centuries. It holds a special place in the rural communities within which the CCP operates and these communities are vital to the future of *'their Curlew'*. Curlew sculptures made of willow by Donegal artist Brendan Farren were put up at seven different locations this year to mark World Curlew Day. These locations were: Lyreacrumpane, Co. Kerry; Roscommon Town, Co. Roscommon; Drumshanbo, Co. Leitrim; Cong, Co. Mayo; Ballyhaunis, Co. Mayo; Buncrana, Co. Donegal and Emyvale, Co. Monaghan. Naturally, given the serious decline of the population, conservation efforts for Curlew in Ireland have been of interest to the public, and the work of the Curlew Conservation Programme has been featured in local, national and online media including newspapers, radio, television and social media. The Curlew and CCP featured prominently in the 2021 TG4 production *'Cumhacht an Naduir'* that aired at the end of March. The positive profile of the CCP is important in building and maintaining public support for the species and efforts to save it from extinction. This is backed up on the ground by good public relations through the local Curlew Action Teams, which themselves are primarily composed of local people.



Figure 8. David Ryan (NPO, left) and John Higgins (CAO, right) from the Lough Corrib team with a Curlew wicker sculpture and World Curlew Day flag outside Cong Abbey, Co. Mayo (Photo: John Higgins / CCP)

Engagement with local people, especially farmers and landowners, was a central tenet of the Curlew Conservation Programme in 2021 again. Many Curlew territories were discovered thanks to the help of members of the local communities, who play an invaluable role with their knowledge of their local areas. Some nests were protected from mowing by machinery or trampling by stock, all in close cooperation with the farmers. Habitat enhancement works have been undertaken with some

landowners, including removal of conifer trees in bogs and control of scrub near nesting sites. An online meeting with Teagasc, held in March, formally introduced individual agri-environmental planners to their respective Curlew Conservation Programme CAOs, with a view to keep building relationships and influence local planning to enhance Curlew habitats. Localgun clubs have been particularly helpful in lessening the risk of Curlew egg and chick predation in many areas. Signs were erected at sites to inform dog-walkers or other individuals to be mindful of breeding birds and avoid undue disturbance.

Unfortunately, the issue of illegal and unmanaged fires, which have plagued several sites annually, is still very much pressing. Despite universal outrage, such fires remain a serious threat to wildlife, people and property. Illegal burning of land is particularly rife in the Stack's Mountains of Co. Kerry and there is hardly a bog there that has not now been burnt during the months of March, April and May in recent years. It will take concerted efforts, and a lot of goodwill, from various stakeholders (regional NPWS, landowners, turbary rights owners, farmers, fire services, Gardai, local authorities, media, communities, etc.) to stop such environmental crimes.



Figure 9. A bog burnt at a traditional Curlew nesting site in Co. Kerry. (Photo: Hubert Servignat / CCP).

## Populations (numbers and breeding outcomes)

Being ground nesters, Curlew mostly rely on camouflage and concealment for rearing their chicks successfully. They are by nature elusive birds during their breeding season, and as such are notoriously difficult to survey in their breeding habitat. For that reason, determining precise nest locations and number of young fledged (breeding productivity) takes significant effort and sometimes cannot be precisely defined. Minimum (confirmed breeding attempts) and maximum (confirmed plus possible/probable breeding attempts) number of pairs are presented in Table 1, which summarises the survey results for each of the CAT areas. Where a pair was noted to have fledged young (e.g. young seen/heard or adults exhibiting protective/chick communicative behaviour more than five weeks after hatching) and where the number of fledglings was not certain, a value of one fledgling was noted. Though a greater number may have fledged, it could only be definitively stated that at least one fledged. Furthermore, in the interests of consistency and reliability, breeding productivity was taken as the minimum number of fledglings that were produced by pairs that were confirmed breeding.

Table 1. Survey results for breeding Curlew in the CAT areas 2021

Region	Min Pairs	Max Pairs	Min. Pairs Reached Hatching	Min. Pairs Reached Fledging	Min. Number of Fledglings	Min. Breeding Productivity*
<b>Stacks</b>	1	1	0	0	0	0
<b>Lough Ree</b>	8	16	4	4	5	0.62
<b>Roscommon/Mayo</b>	4	8	3	0	0	0
<b>Mid-Leitrim</b>	5	9	3	0	0	0
<b>Monaghan</b>	2	5	0	0	0	0
<b>Donegal</b>	3	4	3	1	3	1
<b>Lough Corrib (North)</b>	7	7	5	3	8	1.14
<b>Slieve Aughties</b>	3	6	3	1	1	0.33
<b>Laois-Kildare</b>	1	5	1	0	0	0
<b>TOTAL</b>	<b>34</b>	<b>61</b>	<b>22</b>	<b>9</b>	<b>17</b>	<b>0.50</b>

\*the minimum number of chicks that fledged from confirmed breeding pairs

Population figures are not readily comparable across years since the inaugural year of the CCP in 2017. This is principally because the Irish Breeding Curlew EIP was established in subsets of two of the areas the CCP originally operated in: South Lough Corrib (EIP established presence in 2018) and South Leitrim (EIP established presence in 2019). Consequently, there were no surveys by the CCP in South Leitrim since 2017, nor in South Lough Corrib since 2018. Data for those two areas since then are held by the Irish Breeding Curlew EIP. Also, the original CAT area of North Roscommon-Leitrim has evolved into two areas, Roscommon/Mayo and Mid-Leitrim.



Table 2. Number of recorded Curlew breeding pairs in the 2021 geographical footprint of the CCP.

Region	2017	2018	2019	2020	2021
Stacks	6	6	2-6	2-5	1
Lough Ree	16	16	14-17	14-18	8-16
Roscommon/Mayo	5	5	5-6	5-7	4-8
Mid-Leitrim	4	5	8-11	8-11	5-9
Monaghan	4	5	3-6	2-7	2-5
Donegal	2	2	4	3	3-4
Lough Corrib (Nth)	9	3	5-6	7*	7*
Slieve Aughties	n/a	n/a	n/a	0-2	3-6
Laois-Kildare	n/a	n/a	n/a	1-4	1-5
<b>TOTAL</b>	<b>46</b>	<b>42</b>	<b>41-56</b>	<b>42-64</b>	<b>34-61</b>

\*one of these pairs was on South Lough Mask (7km from the nearest Lough Corrib pair)

The number of confirmed breeding pairs in the areas covered by the CATs since 2017 had remained relatively stable until 2020, but it dropped significantly in 2021. This is disappointing given breeding productivity in previous seasons suggested the threshold for a viable population was being met. The decline in breeding pairs could be indicative of an aged population. The fact that the total maximum number of pairs appears stable should leave no room for complacency. Many of those pairs never seemed to have made it to nesting stage – a very worrying situation. The loss of a single Irish breeding Curlew at any time in the year could be the difference between a pair being active or not in future years. Overall, it is worrying that the minimum number of pairs hatching chicks has decreased, and that the minimum breeding productivity (number of minimum chicks fledged divided by number of confirmed breeding pairs) also decreased slightly in 2021.

Of the 34 pairs for which breeding was confirmed in 2021, at least 22 reached hatching stage (65%), with a minimum of 57 chicks hatched. A minimum of 9 pairs produced fledglings (possibly others did so but were not confirmed), so the breeding success rate was at least 26%. The total number of juveniles recorded to have fledged was at least 17, but again may have been more. This represents a breeding productivity of 0.50 fledglings/breeding pair, which is above the threshold of 0.425 fledglings/pair required for a stable population according to Irish specific data (A. Lauder, unpubl. data), above the threshold of 0.43 calculated by Cook *et al.* (2021) and just below the threshold of 0.48-0.62 previously calculated by Grant *et al.* (1999). The national survey (2015-2017) estimated breeding productivity to be as low as 0.15 (albeit this was not a primary focus of the national survey); the first year of the CCP (2017) saw a breeding productivity in the action areas of 0.38 and in 2018, it was 0.43. In 2019, it was 0.81 fledglings per breeding attempt, and 0.60 in 2020.

For 2021, all the key indicators: number of confirmed breeding pairs, percentage of confirmed pairs progressing to chick stage, percentage of pairs fledging chicks, and overall number of chicks confirmed as fledged, were down on 2020. This is disappointing, given the progress made by the CCP in the preceding years, and it is of extreme concern that five (one more than in 2020) of the nine areas saw no chicks fledged in 2021. This is also particularly difficult for the local Curlew Action Teams' morale, and CCP management and local landowners, who invested so much time and effort to safeguard the chicks, following them on a daily basis from egg stage through to nearfledged.



It is clear that the pressing issues of habitat loss, degradation and fragmentation, which have led to the current situation for Curlew, are still very much present and in fact continue to expand and intensify, despite the best efforts of agri-environmental and conservation measures. Until traditional breeding habitats are properly restored, Curlew in Ireland are likely to continue to decline and be lost from some areas. The situation of breeding Curlew in the Stacks Mountains, specifically, is extremely worrying as only one active pair was found in the area, and this despite intense survey efforts by the local CAT and much interest and local knowledge shared by farmers and landowners. This mirrors the situation for other birds of conservation concern that share the Stack's Mountains, most notably the Hen Harrier, for which the area is designated a Special Protection Area.

Nest protection fences have proven beneficial in progressing breeding attempts beyond the egg stage to chick stage. Of a total of 30 breeding attempts protected by fencing to date, 22 have hatched chicks, representing a 73% hatching success rate. An interesting observation was made in 2020 by the NPO in County Monaghan, when he noticed (using night vision equipment) that each night for the first couple of weeks of their lives, the male Curlew was brooding his chicks within the nest protection fence, i.e. the family would return to the fence each evening presumably having recognised the safety that it provided them from predators. While fences have proven useful against predation by mammals (e.g. Red Fox, Badger, Pine Marten), they offer no protection against avian predators (e.g. corvids, gulls), and at least two nests were predated in 2021 despite being fenced. One of those incidents was captured on live camera (see figure 10 below). Lesser Black-backed Gulls have previously been suspected of stealing nests in this area and this was proven by the camera in 2021.



Figure 10. Lesser Black-backed Gull predated a Curlew egg (screenshot from live nest camera)



Reviewing results from the CCP to date, over the 2017-2021 period, it is apparent that the lake areas (**North Lough Corrib** and **Lough Ree**) are the only ones performing consistently well in terms of breeding productivity. The primary ground predators of Curlew eggs and chicks are either not present or easily removed; by the natural barrier afforded by expanses of water surrounding those islands being an obvious asset. That said, several chicks disappeared from island sites without any apparent explanation, possibly relating to avian predation or food or other factors.



Figure 11. Co. Kerry's only nest, located precariously close to a turf bank (Photo: Hubert Servignat / CCP)

The **Stack's Mountains**, and indeed County Kerry, have not seen Curlew fledglings reared in the past four years. 2021 was another year of very poor results in this area, where there has been a year-on-year decline in breeding pairs. The single active pair in 2021 nested in a bog, had a nest protection fence erected, returned to incubate eggs inside the fence, but later abandoned the nest due to unknown reasons. The nest was located on an active turf bank and was extremely conspicuous (Figure 11). One of the root causes of issues in the Stack's Mountains and indeed many areas for Curlew, is that decades of afforestation have created a very fragmented landscape that is acting against Curlew breeding success and survival. Hancock *et al.* (2020) show how the population of predators like foxes can increase substantially when previously open areas are planted with forestry. Furthermore, modern agricultural practices favour so-called 'generalist species' such as Hooded Crows, Common Raven, Common Buzzard, Red Fox, Badger, all with stable or increasing populations, to the detriment of 'specialist species', such as the Curlew, which suffers doubly from the degradation and fragmentation of its traditional habitats, and from the increase in range and density of some of its main predators.

**Roscommon/Mayo** was another area with hugely disappointing outcomes in 2021. Only 4 pairs were confirmed to have bred, with one nest containing a single egg found predated. One brood of chicks was assumed to have been predated, and two of the broods were suspected to have been lost to machinery, one by a mower and the other by an excavator. Those incidents highlight the difficulty in trying to follow adults' and chicks' movements after hatching stage; despite CAT's great rapport with landowners, and the willingness of those to get on board and adopt protection measures, the birds can end up in the 'wrong' area.

**Mid-Leitrim** was much the same, with up to nine pairs reported active at various sites and five nests found (among which three were fenced), but those nests only hatched seven chicks between them, none of which are believed to have fledged.

**Monaghan** suffered a similar fate. Five pairs were identified as being active, two of which abandoned their sites, likely due to disturbance, and only two nests were found, with six eggs in total. Both of those nests were abandoned, with one having unviable eggs.

In **Donegal**, one traditional site recorded a new nesting pair, very likely the result of conservation efforts from the CAT there over the years. At that site, two chicks, (possibly three), ended up fledging, and another fledged after being pen-reared and released into the wild (see below). A pair nested at another traditional site, but its four chicks were lost, most likely to predation. Another active pair was discovered at another traditional site in late May but did not seem to get to nesting stage, and left.

### ***Pen-rearing of chicks***

Tragic events at a traditional Donegal site forced the improvisation of novel methods to save Curlew. On 30 April, an electric fence was erected to protect a nest, containing 3 eggs. After a couple of days, the local team noticed that there was no sign of birds returning to the nest, and they became suspicious that something was amiss. When the nest was checked on 03 May, the 3 eggs were still in it. The Agri-Ecology Unit of NPWS was then contacted and AEU advised the eggs should be collected and artificially incubated under licence, in the absence of parents doing so naturally. On 04 May, Curlew feathers were discovered 200 metres from the nest, which suggested the female had been predated, confirming the correct decision had been taken the day before. The eggs were incubated



and one of the three eggs hatched; the chick was reared in a pen and subsequently released back at its natal site. While this protocol has been trialled in 2020 in Northern Ireland, and used for some years in Great Britain by e.g. Curlew Country, this is the first egg to have successfully hatched using artificial incubation, and the first chick reared in pens in the Republic of Ireland. The chick was subsequently released to the wild. The Curlew Conservation Programme is grateful to Daniel Moloney and David Ferguson for their dedicated work on this. The experience gained will no doubt be precious going forward, given head starting has been identified for some years now as a necessary tool for Curlew conservation in Ireland. NPWS Birds Unit continues to consider the feasibility of a Curlew head starting programme.



Fig. 12. The pen in which a chick was successfully reared at the Eddie Fullerton site, Co. Donegal (Photo: Martin Moloney).

Both areas of Roscommon-Mayo and Slieve Aughty Mountains were noted towards the end of the breeding season to be important post-breeding areas for Curlew to congregate. The origins of those birds are unknown. The use of colour rings and/or electronic tags could provide further insight on this and how the birds use and move across the Irish landscape. Should such work be progressed in future years, it would have to be run in parallel to the CCP, given the focus of the CCP is on immediate nest protection, community engagement and habitat improvements.

More breeding pairs were found in the **Slieve Aughties** in 2021 than in 2020, when Curlew conservation efforts were first established there. Nine active pairs were found, but only three were confirmed breeding, with six classified as 'possible' breeding pairs. A minimum of three chicks were known to have hatched, and one chick at least made it to fledging. Those figures could well be higher in reality, as the monitoring of chicks proved very difficult in the tall vegetation of the sites in question. It is taken that the pairs found were traditionally breeding in the Aughties, and that the enhanced survey effort in 2021 led to their discovery (i.e. this is not an increase in real terms).

**Laois/Kildare** was another area with very disappointing outcomes. It is a large area that only yielded



a handful of active pairs. One nest was found and fenced, hatching four chicks, but these failed to fledge, probably predated.

In many areas it is highly likely that more chicks were fledged than were confirmed (i.e. one chick), but for obvious reasons, the CCP can only include definitive data in its results.

It is of particular concern that all 'mainland' areas, with the exception of Donegal and the Slieve Aughties, failed to fledge any chicks at all in 2021. Despite systematic Predation Risk Management, 2021 saw more breeding attempts come to a premature halt than in any other year. A total of 34 breeding attempts were confirmed across the CCP areas, with a total minimum of 75 eggs laid. At least 19 of those eggs were confirmed predated, and a further 13 chicks, and potentially many more, may have been predated. The issue of predation, especially that of chicks, is a difficult one to prove with absolute certainty as the evidence is often impossible to gather, with the victims' remains having been eaten, or taken away. Disturbance, especially from machinery, was also a significant issue, with at least two pairs thought to have deserted potential nesting areas in Monaghan, and three broods of chicks potentially killed by machinery elsewhere.

Lastly, a cold early spring weather might go some way towards explaining the relatively poor breeding success of Irish Curlew in 2021. April was colder than usual, and fresh northerly winds prevailed throughout; vegetation growth was slow, and cover was low at the time when Curlew were looking to pair up and establish territories. Many CATs reported birds being uncharacteristically flighty and moving between different potential territories, possibly looking for taller vegetation to nest safely or indeed looking for their mate. Furthermore, some light ground frost occurred as late as the first week of May in many areas, most certainly affecting populations of invertebrates upon which Curlew chicks are so dependent in their early days. Those conditions would have made the early stages of breeding particularly challenging and would go some way in explaining some of the nest/brood failures. Generally, it appeared to be a 'later' season in 2021 than in previous years. One nest (possibly a re-lay) hatched as late as the first week of July.

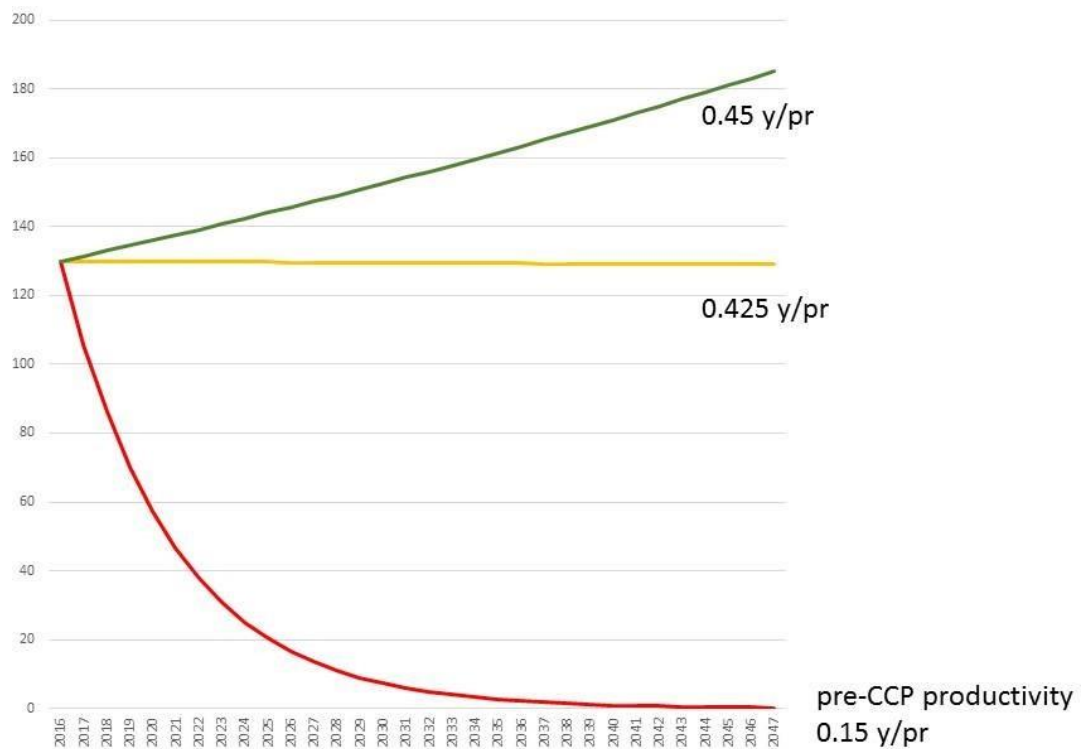


Figure 13. National Population Viability Analysis Graph based on mixed data sources from NPWS/BWI/BTO/RSPB (Lauder, unpubl. data).

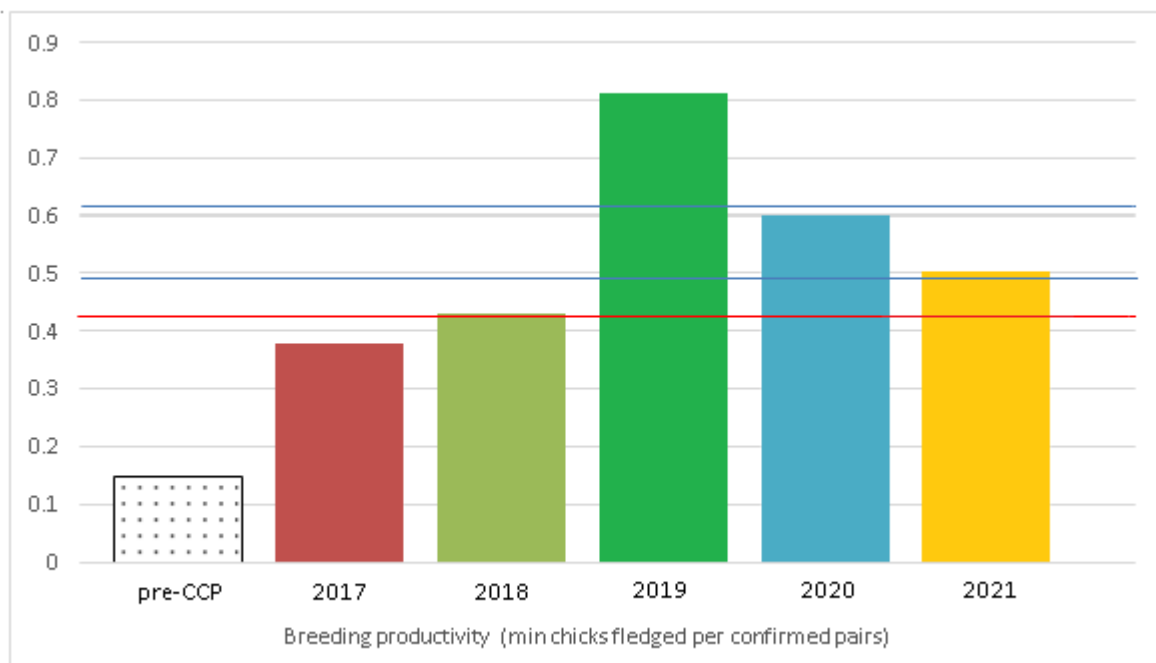


Figure 14. Breeding productivity within the CCP areas. The CCP began in 2017. The 2016 data comes from the national survey undertaken prior to the CCP. The red horizontal line denotes the 0.425 fledglings per pair calculated by A. Lauder as necessary for a stable population. The navy horizontal lines denote the 0.48-0.62 fledglings per pair calculated by M. Grant as necessary for a stable population.

## Conclusion

Until this year, the populations of the areas where the Curlew Conservation Programme has been active had remained relatively stable. 2021 however, saw the apparent loss of a number of sites where breeding pairs were active in recent years. This, in the face of apparently sufficient breeding productivity in recent years, points to an old population, akin to the Freshwater Pearl Mussel situation in Ireland, where animals may still be present, but ultimately dying out. Given the 96% decrease, which has occurred in the past 30 years, it is sadly unsurprising that the population continues to decrease. The process of extinction is not halted overnight and until the factors that led to such a massive population collapse in the first place are fully addressed, pairs will continue to be lost. At this point, entire geographical areas will likely soon be lost. The recommendations of the Curlew Task Force, particularly in relation to land-use policy and head starting are particularly relevant in relation to addressing the wider issues driving the decline of the Curlew. The efforts of the Curlew Conservation Programme (or other efforts) alone, while trying to keep the candle alive, are dwarfed by the larger landscape issues that have driven the decline. Even what should be smaller issues in the wider landscape (e.g. increasing numbers of feral geese ousting Curlew from their nesting site) are now significant issues given the small number of breeding pairs, every pair and every chick is significant proportion of the remaining national population. In relation to what has been taken to be the minimum number of chicks required to maintain a stable population (a figure that has been met by the CCP annually), it is taken that the more the breeding population decreases, the higher that threshold should become if we are to maintain the population we started with in 2017, let alone 30 years ago. Evidence of senescence (birds becoming too old to breed) was suggested at a number of sites in 2021 and 2020. This is more likely to become an issue in 2022 and beyond also of course.

Only four of nine areas are known to have fledged chicks for certain (including one area that fledged only one chick), and two areas failed to record any hatching. This is all the more concerning given the greater effort and investment in the 2021 season compared to previous years (particularly 2020 when the programme was briefly put on hold in line with the first Covid-19 lockdown). One can only assume that where no action was taken in other areas across the country, the situation was just as bad or even worse.

It is clear that greater intervention will be required, given the crisis situation which the Curlew is in. Large-scale habitat remediation and improvement works will be required in many if not all areas, concentrating firstly in those areas where breeding productivity has been consistently low. In the interim, head starting (rearing chicks in captivity to the point of release at fledging) appears essential, to ensure that the birds are not lost from those areas before the landscape and wider environment is improved for them. At a very minimum, if breeding Curlew are to remain a sight and sound in the Irish countryside, policies and circumstances and activities (legal and illegal) leading to habitat loss and degradation need to be urgently addressed.



Fig. 16. Aerial photo of a traditional Curlew site in Co. Kerry, which may have seen its last Curlew in 2020. The overview illustrates many of the threats facing Curlew's habitats there, from burning to forestry to land abandonment to agricultural reclamation and wind farms. This is also a Hen Harrier breeding site (and SPA for Hen Harriers). The fragmentation and loss of habitat by various forces is evident across this photo, which typifies the current landscape of much of Curlew's traditional strongholds.  
(Photo Joe Carr / CCP)

The efforts of the CCP, particularly the local teams, in building and maintaining a positive profile for the Curlew cannot be over-stated. Oftentimes, conflict can arise between the desires of those involved in conservation and the desires of landowners to manage their land as they see best. The understanding and communication skills (which involve listening as well as talking) of those involved in the CCP has been exemplary and the experience to date has been largely positive with countless landowners and local people helping with reporting sightings, facilitating access, providing advice and undertaking efforts to help the Curlew. With widespread concerns over the future of farming in these areas, many farmers are also seeing the value to conserving the Curlew (and other habitats/species), by way of deriving an additional income via agri-environmental schemes, which may be the difference between their farming enterprise continuing or not.

It should be remembered at all times, that while conservation efforts such as the Curlew Conservation Programme and the Irish Breeding Curlew EIP and GLAS are striving to help the Curlew, the factors that brought a 96% decline in 30 years are still very much present, and active on a larger and more intensive scale. The wider policy context that influences conservation, particular in relation to land-use, has been examined by the Curlew Task Force, with a range of recommendations put forward for the immediate, medium and long-term future of Curlew in Ireland. Many sites and areas across Ireland have not received any targeted intervention and the national survey of 2021 should provide some insight on how the populations are faring there. The coming years will be pivotal for Curlew and for the efforts of all concerned.



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The various media outlets and community groups that featured the Curlew Conservation Programme in 2021. While operating at a national level, this is very much about the local story and the local efforts to protect a bird that is very much part of our local areas.

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Fig. 16. A juvenile Curlew on the shore of an island on Lough Ree (Photo Owen Murphy / CCP)