Curlew Conservation Programme

Annual Report 2022

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Local Government and Heritage

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Citation: Servignat, H. and O'Donoghue, B.G. (2022). Curlew Conservation Programme Annual Report 2022. National Parks & Wildlife Service.

Cover Photo: Young Curlew fledgling upon release from its rearing pen in County Monaghan (Photo: John Cusack / CCP).

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Overview

- The Curlew Conservation Programme was established in 2017 to pioneer Curlew conservationefforts 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 engagementand 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 2022, 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 sixth year of the Curlew Conservation Programme, 2022, 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 breedingCurlew.

- In the nine operational areas, 46 pairs were recorded, 26 of which were confirmed breeding and 20 of which were probable breeders. The total number of pairs recorded by the CCPannually since 2017 has been 54 in 2017, 45 in 2018, between 41 and 56 pairs in 2019, between 42 and 64 pairs in 2020, and between 34 to 61 in 2021. 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 30-42 in 2021.

- ‘Head starting’ consists of collecting eggs from the wild and incubate them artificially, and then rear the hatched chicks in a pen until they are deemed ready for release, thus protecting them from the threat of early predation. Head starting is now a tool that is used with greater frequency and scope in many conservation programmes. Its aim is to help populations of endangered species recover, or at least sustain themselves, while the root causes of their declines are being addressed. While a Curlew chick was reared by head starting in 2021 due particular circumstances (see 2021 CCP report), in 2022, the Curlew Conservation Programme undertook a small scale pilot head starting operation in a pre-planned and strategic manner. This took the form of two pilot projects in counties Kerry and Monaghan. A total of 3 pairs had chicks head started from 10 eggs. With one of these three pairs, two of their four eggs were head started and two of their four eggs were left with the parents to hatch and rear. Thus, in presenting data on breeding pairs and outcomes, ‘head started’ pairs are separated from ‘wild’ pairs with 2 pairs that had fully head started clutches/broods and 24 pairs that were not head started. A total of 7 chicks were brought to fledging stage from the 10 head started eggs.

- Of the 24 pairs which were confirmed breeding and not head started, at least 21 reached hatching stage(88%), with a minimum of 37 chicks hatched. At least seven of those pairs reared young to fledge (possibly others did so but were not confirmed), so the breeding success rate was at least 29%. The total number of juveniles recorded to have fledged (without head starting) was at least 12, but again may have been more. This represents a breeding productivity of 0.50 fledglings/confirmed breeding pair (like in 2021), which is just above the threshold of 0.425 required for a stable population. It is a slight increase on the breeding productivityrecorded in 2017 and 2018. 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, 0.60 in 2020, and 0.50 in 2021. The minimum number of chicks fledged for each year of the CCP were: 16 in 2017 (first year of the CCP, 6 areas covered), 19 in 2018 (7 areas covered), 33 in 2019 (7 areas covered), 25 in 2020 (CCP extended to 9 areas) and 17 in 2021 (9 areas covered). Breeding productivity, while important, is not the sole determinant of Curlew population trends at present. The number of breeding pairs has continued to decline on the back of a 98% decline in the past three decades and the number of chicks reared has subsequently declined in line with this.

- The Curlew Conservation Programme continues to build skillsets, experience and momentum.The programme is widely supported, both nationally and internationally and most importantlyin the local areas where it is active. 2022 was the final year of the CCP’s current incarnation; 2023 should give way to larger, more landscape and habitat-centred projects such as the CAP 2023-27 Co-operation projects and EIPs, but there will need to be continued focus on the Curlew across all efforts, whether agri-environmental programmes or wider Government policy (particularly in relation to land-use and land-use change).

- The satellite-tagging of a several adult males, pioneered for the CCP by NPWS in 2021, was carried out again in 2022. This tool helped Curlew Action Teams track adult birds’ movements, locate nests more easily and learn more about Curlew ecology and behaviour in Ireland.

Background

The first national breeding Curlew survey, undertaken between 2015 and 2017, found drastic declinesof the national breeding population of Curlews. Whereas 3,300-5,500 pairs are estimated to have bredin 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).

The National Parks & Wildlife Service (NPWS) of the Department of Housing, Local Government and Heritage established the Curlew Conservation Programme (hereafter CCP) in 2017. In 2020, the Department of Agriculture, Food & the Marine became partners on the CCP. This brought many positives, including the facility for theprogramme 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 2022.

Figure 1. Curlew (identified as a male by its short bill) returning to its breeding grounds on Lough Ree (Photo: Owen Murphy / 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 2022, 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 supportfrom both Departments in 2021 allowed the Curlew Conservation Programme to begin earlier and tohave 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), witha 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, paid approximately €8.75mover 7 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, 36people (including a Project Manager) were contracted to form the local teams between late March and the end of July. 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 several areas.

Curlew Action Teams

Figure 2. The nine Curlew Conservation Action Areas.

Figure 3. A Curlew nest (Photo: James Owens / CCP)

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 localsolutions that were appropriate to the sites in question.

Figure 4. Curlew Action Team – sum of the parts

The roles involved in the Curlew Action Teamsare 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 CAOis 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 a primary cause of breeding failure for Curlew, who are experiencing increasing difficulties in hatchingeggs 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 whenever appropriate, 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 Curlewbreeding 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 5. Fox (right) represents a serious predation threat to Curlew eggs and chicks (left)
(Screen grab from Reolink camera on known Curlew feeding ground / CCP)

Curlew Champion

This is a vital role in fostering and maintaining positive relations between the project and the community and widening the understanding among the general public of the situation in which Curlew have been left. 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 apositive 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 communityand landowner engagement. In 2022, 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, role is to be utilised as required, 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.

Secondment from RSPB

This year also saw a pioneering initiative between NPWS and the Royal Society for the Protection of Birds (RSPB, UK) in the form of a secondment. One of RSPB's Conservation Advisors (Species and Land Management Department) from Scotland took a sabbatical and was involved with teams across several areas between 09 May and 03 June. The objectives of that collaboration were mostly related to information exchange and cross pollination of approaches to applied conservation action. The RSPB advisor engages with farmers and landowners on Shetland in relation to habitat, especially for waders. The secondment allowed for sharing of practical experiences with the fieldworkers on curlew monitoring, habitat use and management. During their time with the CCP in Ireland, the RSPB Advisor attended meetings with agri-environmental advisors, met local farmers and landowners, and assisted regional Curlew Action Teams as a fieldworker to survey breeding curlews, helping find and monitor curlew nests.

The RSPB Advisor will be sharing information about the Irish Agri-Environmental models with their colleagues and partners in NatureScot's POBAS/NCAPP team leading the development of a new scheme in Scotland. The results-based approach, regional targeting and delivery through co-operation project teams is particularly relevant to ongoing discussions on future schemes.

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. Gun clubs operating in areas where Curlew breed have also been supported financially in line with plans that they outlined to help breeding Curlew.

Conservation Action in 2022

Areas

As already stated, the sixth 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

At the outset of the breeding season, the same geographical areas were targeted as in previous years. Should Curlew have been reported to the Curlew Action Team or NPWS 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 if possible. Therefore, as the season progressed, the footprint ofefforts in 2022 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 and local 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 tosuit 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 lakeareas (Lough Corrib and Lough Ree), added 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 thelocal 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. Determiningnest 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 2022, survey efforts were also aided by the roll-out of satellite-tagging (under licence), a procedure first pioneered by NPWS in 2021. NPWS 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 invaluable information on roost sites, feeding sites and, vitally, nest locations – at which targeted conservation actions could be put in place, including predator control, nest protection and farm/habitat management actions (e.g. farmers delaying mowing)

Figure 6. A satellite-tagged (and ringed) male Curlew in County Mayo (Photo: Conleth Farrell / CCP)

Figure 7. Example of location data obtained from a satellite tag at a traditional site (NPWS)

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. 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 hatching and fledging. PRM employs several different approaches (as outlined 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. Nest Protection efforts included 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.

Another widely used tool on the Predation Risk Management spectrum is the fencing of known nests; it has proved particularly effective in 2022. Nest protection fences were deployed by CAT members at eleven sites in 2022, the largest number in a season so far. All of these nests successfully reached hatching stage, bar one, which was thought to have been predated by avian predators. The usefulness of nest protection fences and the impact that ground predators are having on the species is evident in the high hatching rate for those sites where nest protection fences were erected.

Figure 8. A nest protection fence at a traditional site in Co Leitrim (Photo: Philip Connolly / 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, reminding people of long summer days in the bogs, accompanied by the Curlew's call. 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 coverage. Education in local schools has been a feature of the CCP annually, to instil a sense of pride and knowledge as to how important the local areas are for Ireland's last remaining Curlew. An attractive school workbook was created for school children to learn about Curlew. A piece on the situation with Irish Curlew featured on the Curlew Action podcast series, which featured efforts by some prominent figures to help Curlew across the world. The positive profile of the CCP is important in maintaining the public support that the species has enjoyed.This is backed up on the ground by good public relations through the local Curlew Action Teams, whichthemselves are primarily composed of local people. Finally, to mark World Curlew Day, Curlew structures made of willow by Donegal artist Brendan Farren were put up at different locations including Lyreacrumpane in County Kerry, Roscommon Town, Drumshanbo in County Leitrim, Cong and Tooreen in County Mayo, Buncrana in County Donegal and Emyvale in County Monaghan.

Figure 9. Some of the Leitrim CAT members with local councillors and landowners celebrating World Curlew Day around a Curlew wicker sculpture. (Photo: Jim Flynn / CCP)

Engagement with local people, especially farmers and landowners, was a central tenet of the Curlew Conservation Programme in 2022 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. Habitat enhancement works have been undertaken with some landowners. 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. Thankfully, no wildfires were recorded on Curlew territories within the CCP in 2022, for the first time since its inception in 2017. Those illegal fires had plagued many breeding sites in the past.

Figure 10. The threats to Curlew are numerous and varied, and can include the risk of disturbance from people and dogs.

Head starting

Head starting, carried out under licence, is a procedure by which eggs are collected from wild birds' nests and incubated artificially. Chicks are hatched under controlled conditions and reared in pens, until they are deemed ready to be released in the wild. The main benefit provided by head starting is the protection from early predation, which has become a driving factor of population decline in Curlew. Head starting has been used successfully in many conservation projects for species like Spoon-billed Sandpiper, Black-tailed Godwit, and now Eurasian Curlew, and it is gaining traction as a powerful conservation tool.

Figure 11. Release pen in county Kerry (Photo: Hubert Servignat/CCP).

As noted previously, the situation of breeding Curlew in Ireland is now at such a precarious stage that the loss of a single bird, the failure of a single pair, the predation of a single chick, are all of tremendous consequence for the future of the species here. Following the last-minute rescue of a handful of nests in the past couple of years, and the subsequent fledging of chicks, and inspired by such programmes already in place, notably in the United Kingdom, two head starting pilot projects were proposed, and approved, in the areas of Monaghan and Stacks Mountains in Kerry. The breeding productivity of wild Curlew populations in both those areas had fallen to such low levels that it was considered if head starting was not employed, similarly low breeding success would follow again in 2022 and the chances of the population being consolidated would reduce even more. Furthermore, collaborations have been established between the CCP and other bodies involved in head starting including Fota Wildlife Park, Wildfowl and Wetlands Trust and Curlew Country. Prior planning with these institutions and wider research has led to a greater confidence in the ability to undertake head starting here.

A total of ten eggs (four in Kerry, six in Monaghan) were collected from three different nests and incubated artificially, by the Curlew Action Team in Monaghan, and by Fota Wildlife Park for the Kerry eggs. All ten eggs hatched successfully and produced healthy chicks, whose growth and development were closely monitored, with specialist avian veterinary support available when required. The expertise and experience of the Fota team in relation to all aspects of head starting proved invaluable.

Figure 12. Four Curlew chicks, aged 15 days, inside a release pen (Photo: Hubert Servignat/CCP).

Out of the ten eggs initially collected, seven chicks made it to fledging stage and were released after careful observation of their behaviour, and discussions within the teams. All of those chicks were colour-ringed, and one of them was satellite-tagged. Information obtained from that tag revealed that the latter bird had died (predated, most likely by a fox) 19 days after its release from the pen, some 60 kilometres away at a known Curlew breeding and roosting area. Remains of another fledged chick, including feathers, but also the colour rings, were found a few days after its release from its county Kerry pen. This just highlights the danger that predators such as foxes represent for Curlew, especially young.

Figure 13. Remains of Curlew chicks predated by foxes (Photos l-r: Giada Porcedda (l+c)/Donal Beagan (r) /CCP)

This pilot project, the first fully planned of its kind for Ireland, proved that head starting can be undertaken on a relatively small scale and budget, and produce chicks ready to fledge. For its first year, the project brought seven chicks to fledging stage out of ten eggs; a great level of achievement for a project in its infancy. For comparison, most similar projects undertaken in the UK typically claim around eight fledglings out of every ten eggs. Little remains known about young birds' dispersal and migration patterns though. It remains to be seen whether those birds will come back to their rearing grounds and start breeding themselves.

Populations (numbers and breeding outcomes)

Being ground nesters, Curlew rely on camouflage and concealment to rear their chicks successfully. They are by nature elusive birds while breeding, and as such are notoriously difficult to survey in their breeding habitat. Hence, it can be frustratingly hard to determine precise nest locations and number of young fledged (breeding productivity). In some cases, it could not be determined with certainty if a single bird had a mate, or if two birds together settled to breed. Therefore, a minimum and a maximum number of pairs are presented in Table 1, which summarises the survey results for eachof 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 wherethe number of fledglings was not certain, a value of one fledgling was noted (though there may have been more 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.

N.B. For ease of interpretation and to keep consistency with historical records, only population figures excluding the head started chicks will be discussed here. A separate table (Table 3, see below) will detail population outcomes when those head started chicks are included.

Table 1. Number of recorded Curlew breeding pairs in the 2022 geographical footprint of the CCP, compared to previous years of the CCP.

Region	2017	2018	2019	2020	2021	2022
Stacks	6	6	2-6	2-5	1	1
Lough Ree	16	16	14-17	14-18	8-21	8-14
Roscommon/Mayo	5	5	5-6	5-7	4-11	3-7
Mid-Leitrim	4	5	8-11	8-11	5-9	6
Monaghan	4	5	3-6	2-7	2-5	2-3
Donegal	2	2	4	3	3-4	2
Lough Corrib (Nth)	9	3	5-6	7*	7*	1-5
Slieve Aughties	n/a	n/a	n/a	0-2	3-9	2-4
Laois-Kildare	n/a	n/a	n/a	1-4	1-5	1-4
TOTAL	**46**	**42**	**41-56**	**42-64**	**34-72**	**26-46**

*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, and it continued to drop further again in 2022. This is disappointing given breeding productivity (at least of pairs where productivity was confirmed) 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. Many of those 'active' pairs never seemed to have made it to nesting stage – a very worrying situation. Overall, it is worrying that the minimum number of pairs hatching chicks has decreased, and that (when excluding the head starting initiative), the minimum breeding productivity (minimum number of chicks fledged divided by number of confirmed breeding pairs) remains just around the 0.5 mark.

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 2018 in South Leitrim and in 2019 in South Lough Corrib, both areas where the CCP was originally active. 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 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. Survey results for breeding Curlew in the CAT areas 2022 – **(excluding head started chicks)**

Region	Min Pairs[+]	Max Pairs*	Min. Pairs Reached Hatching	Min. Pairs Reached Fledging	Min. Number of Fledglings	Min. Breeding Productivity*
Stacks	N/A	N/A	N/A	N/A	N/A	N/A
Lough Ree	8	14	6	4	7	0.875
Roscommon/Mayo	3	7	2	1	1	0.33
Mid-Leitrim	6	6	5	0	0	0
Monaghan	1	2	1	1	1	1
Donegal	2	2	2	0	0	0
Lough Corrib (North)	1	5	1	1	3	3
Slieve Aughties	2	4	2	0	0	0
Laois-Kildare	1	4	1	0	0	0
TOTAL	**24**	**44**	**20**	**7**	**12**	**0.50**

[+]Confirmed breeding pairs only (i.e. does not include probable breeding pairs, where breeding was not confirmed)
*the minimum number of chicks that fledged from confirmed breeding pairs

Table 3. Survey results for breeding Curlew in the CAT areas 2022 – **including head started chicks**

Region	Min Pairs[+]	Max Pairs*	Min. Pairs Reached Hatching	Min. Pairs Reached Fledging	Min. Number of Fledglings	Min. Breeding Productivity*
Stacks	1	1	1	1	3	3
Lough Ree	8	14	6	4	7	0.875
Roscommon/Mayo	3	7	2	1	1	0.33
Mid-Leitrim	6	6	5	0	0	0
Monaghan	2	3	2	2	5	2.5
Donegal	2	2	2	0	0	0
Lough Corrib (North)	1	5	1	1	3	3
Slieve Aughties	2	4	2	0	0	0
Laois-Kildare	1	4	1	0	0	0
TOTAL	**26**	**46**	**22**	**9**	**19**	**0.73**

[+]Confirmed breeding pairs only (i.e. does not include probable breeding pairs, where breeding was not confirmed)
*the minimum number of chicks that fledged from confirmed breeding pairs

Of the 24 'wild' pairs for which breeding was confirmed in 2022, at least 20 reached hatching stage (83%), with a minimum of 37 chicks hatched, a drop of 20 chicks compared to 2021. A minimum of 7 pairs produced fledglings (possibly others didso but were not confirmed), so the breeding success rate was at

least 29%. The total number of juveniles recorded to have fledged was at least 12, 5 less than in 2021, but again may have been more. This represents a breeding productivity of 0.50 fledglings/confirmed breeding pair, which is above the threshold of 0.425 required for a stable population according to Irish specific data (A. Lauder, unpubl. data), and just within the threshold of 0.48-0.62 previously calculated by Grant et al. (1999). The nationalsurvey (2015-2017) estimated breeding productivity to be as low as 0.15 (although this should be interpreted with considerable caution as this survey was not designed to accurately assess productivity); 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, 0.60 in 2020, and 0.50 in 2021.

For 2022, 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 2021. This is disappointing, given the progress made by the CCP in the preceding years, and it is of extreme concern that, like in 2020, four of the nine areas saw no chicks fledged in 2022. 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.

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 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, in particular, 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 local knowledge shared by farmers and landowners. This mirrors the situation for other birds of conservation concern locally, 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 42 breeding attempts protected by fencing to date,33 have hatched chicks, a 78.5% hatching success rate. In 2022 alone, 10 out of 11 nests fenced hatched chicks (91% hatching success rate). In 2020, the NPO inCounty Monaghan noticed (using night vision equipment) that each night for the first coupleof 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 one nest was predated in 2022 despite being fenced, very likely by Hooded Crows. Additionally, once the chicks are mobile, they move beyond the fence at which point their risk of predation greatly increases – this highlights the important role of high intensity, systematic professional predator control in addition to landscape management to reduce the risk of predation to Curlew eggs, chicks and adults.

Figure 15. Female Curlew on the nest with two freshly hatched chicks (Screen grab from nest camera / CCP)

Discussion

Overall, 2022 was a disappointing year in terms of the number of pairs that returned to breed and the number of chicks that were fledged without head starting. The various landscape, habitat and environmental issues threatening the very survival of Curlew as a breeder in Ireland are still prevalent and have probably intensified again. Modern agricultural practices such a silage production on a landscape level, sees large areas of reseeded grassland cut up to three times a year, depriving a vast array of ground nesters (bird species including Curlew, as well as mammals, not to mention invertebrates) of any chance to successfully reproduce. Decades of afforestation, especially on uplands bogs, have created a very fragmented landscape that is acting against Curlew's breeding success and survival. Hancock *et al*. (2020) show how the population of predators like foxes can increasesubstantially when previously open areas are planted with forestry. The loss of bog habitats and wet fields continues. While various regulations have been enacted, it is clear that damage and degradation continues to arise from various sources. Two particular case studies are provided here as an illustration of such damage.

In late 2021, at a known Curlew breeding site on the Sligo/Mayo border, the Curlew Action Team was alerted during the winter that a large part of the bog where Curlew had nested was being stripped of its top scraw, and drained. By March 2022, bog was being reseeded and fertilised. National Parks & Wildlife Service contacted the Department of Agriculture, Food & the Marine for their role in regulating the EIA (Agriculture) Regulations and Sligo County Council for their role in regulating the Planning and Development Regulations.

Elsewhere, at a traditional site in Roscommon, the top scraw of a bog was removed over approximately 8ha. The bog was subsequently drained (see picture below), and pipes laid every 200m. Roscommon County Council were contacted on this for their role in regulating the Planning and Development Regulations.

Figure 14. Drains dug at a traditional Curlew site in Co. Roscommon. The removal of the top scraw, leaving the upper part of the bog exposed, is also evident on this picture. (Photo: CCP)

Furthermore, changes in the landscape and in land use favour so-called 'generalist species', often predators of Curlew nest and chicks, 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 Eurasian Curlew, which suffers twice, once from the degradation and fragmentation of its traditional habitats, and secondly from the increase in range and density of some of its main predators. The development of wind farms and other renewable energy projects is also of particular concern. All of these issues, as well as the Curlew and the people who manage or have managed the Curlew's habitats, sit within a framework of land-use and land-use change.

The **Stack's Mountains area** saw its first chicks (three) known to have fledged in five years thanks to the head starting initiative. The standing of the species in that area is still of great concern, with only one pair again confirmed in 2022 despite intense survey work and great communication with the public and local landowners. Only a handful of sightings of single individuals were reported outside of the known breeding site. Kerry is of national importance given the range extent of Curlew in Ireland.

Lough Ree, traditionally one of Curlew's strongholds in Ireland, is the only area covered by the CCP to have seen its breeding population maintain itself to historical levels. Consistent Predation Risk Management work over the last ten years, especially the control of the invasive American Mink, has paid dividends in that area, which also benefits from its island location: the vast expanses of water surrounding the islands ensure that one of young Curlew' main predators, Red Fox, is absent there.

Roscommon/Mayo had very disappointing outcomes in 2022. Out of the 3-7 pairs considered active in the area, only three were confirmed to have bred. One of those three nests, containing three eggs, was predated. Only one fledgling was observed in this area in 2022, and a brood of four chicks disappeared after the end of June. A lot of the bogs in this region are notoriously hard to survey, and it is possible that some pairs may have escaped detection. Satellite tracking of birds in 2022 revealed greater clarity in relation to land-use by individual pairs, giving greater certainty on breeding numbers in this area.

Predation (or suspected predation at least, this being very hard to prove with absolute certainty in the case of chicks being lost) was a major issue in **Mid-Leitrim** this year. Six pairs were found to be active with as many nests known (among which five were fenced), and hatching rate was very high, with only one nest predated. However, what is thought to be predation by fox decimated the chick population; none of which are believed to have fledged.

Monaghan also suffered a drop in the number of its breeding pairs, with only three found in 2022. The proximity of the border with Northern Ireland proves a particular challenge in this area, where birds are known to cross from one jurisdiction to the next. Six eggs were taken from two different nests in the context of the head starting initiative, and like in the Stack's Mountains area, this proved successful, with four chicks fledged from the release pen. One chick also fledged 'in the wild'.

Hopes were high in **Donegal** after a 2021 successful season where four chicks fledged from the area. Margins are very thin however here: only two pairs were proven to breed in 2022, and they both failed to produce fledglings. One nest only hatched one chick, while another hatched all four. However, all chicks were eventually lost, with be predation thought to be the most likely cause.

The area of **North Corrib** proved the most puzzling of all of those covered by the CCP in 2022. A

traditional stronghold of the species, Lough Corrib only saw one confirmed pair, which produced three fledglings. Many more birds, and indeed what were thought to be pairs, were seen, with activity noted at five different islands, but all but one failed to settle to nest. This is particularly worrying, and disconcerting, given that the team there is one of the most experienced and longer-established of the CCP. They themselves were at a loss to explain the reasons for this decline; possible reasons may include a lack of breeding fitness among pairs due to poor early spring weather conditions (see below), but this is currently only speculative. A large post-breeding flock was observed in an area of neighbouring Lough Mask at the end of the breeding season, which had been surveyed this year. No Curlew were found to have been breeding there, and the origin of those birds is unknown.

The **Sliabh Aughties** also had a disappointing season in 2022, where only between two to four pairs were found to have bred, and no chicks known to have fledged. This is a serious decline on 2021, which had seen a good measure of success and gave good grounds for hope, with between four to nine pairs found to be active. The only mitigating factor for this decline in 2022 was that access to one particularly active site was restricted, and it could well be that figures there could be somewhat higher due to the impossibility for the team to survey the site at close range.

Laois/Kildare was another area with very disappointing outcomes. It is a large area that only yielded a handful of active pairs. Two pairs were known to have nested in the Slieve Bloom Mountains, and at least two others near the Laois/Offaly border, but none of those are believed to have seen any chick get to fledging stage. Silage production was an issue at the latter site, and further engagement with local landowners will be needed in future if Curlew are to be saved as breeders locally.

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.

Unfortunately, like in 2021, most 'mainland' areas, except for Mayo/Roscommon and Monaghan, failed to fledge any chicks 'in the wild' in 2022. 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. However, it is likely that predation is a significant driver of decline on such low populations, and it is reported, or presumed, as the cause for most nest/brood failures. In total, just 16 nests (a big drop from 34 in 2021) were found across the CCP areas, containing a total combined of 56 eggs (75 in 2021), seven of which are known to have been predated. A further 17 chicks, and potentially many more, were likely predated, including two of the head started birds, whose remains were found respectively 3 and 19 days after their release from the pen. This highlights the importance of Predation Risk Management to be undertaken and maintained in the vicinity of any release pens in the context of a head starting programme. That said, the second chick was found predated some 60 km from its release site.

Figure 16. A male Curlew being fitted with leg rings including a Darvic (coloured) ring (Photo Philip Connolly / CCP)

Weather might go some way towards explaining the poor breeding success of Irish Curlew in 2022. The months of April, May and June were significantly colder than usual, with temperatures averaging just above 10-12°C many days, and fresh northerly winds prevailed throughout; vegetation growth was slow, and cover was low when Curlew started pairing up and establishing territories. Many CATs reported birds being uncharacteristically flighty and moving between different potential territories, possibly looking for taller vegetation to nest safely, just as had been the case in 2021.

N.B. Given the extremely precarious conservation status of the species, the exact locations of Curlew breeding territories are held by the National Parks & Wildlife Service and are not disclosed in this report.

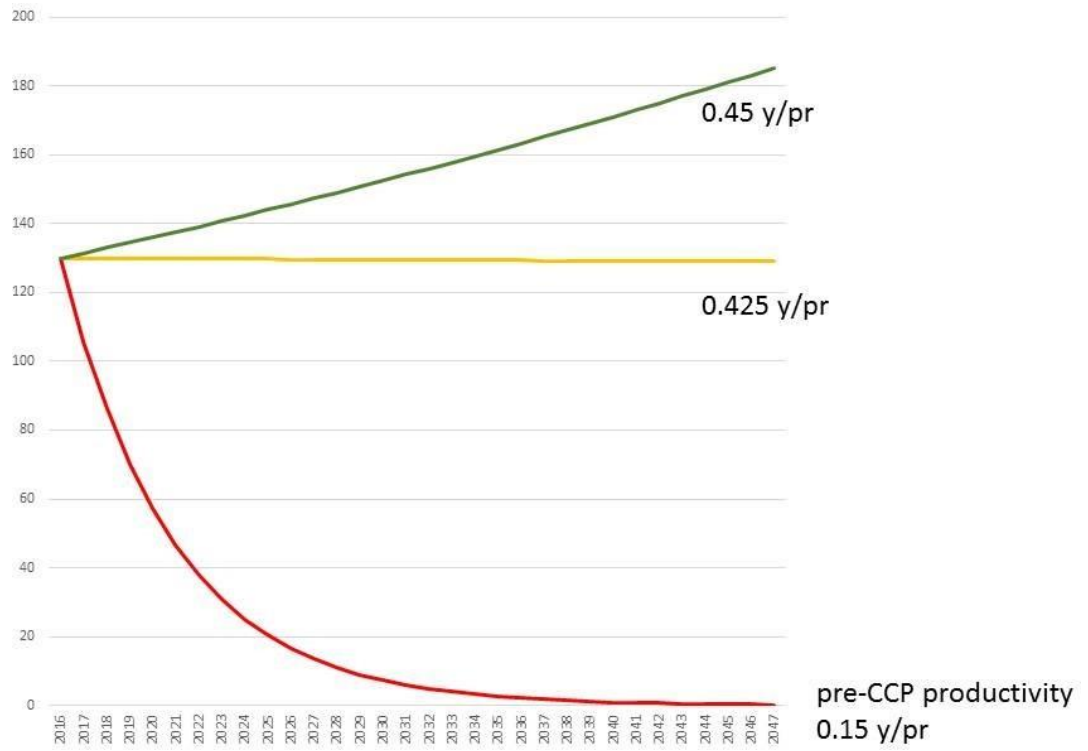

Figure 17. National Population Viability Analysis Graph based on mixed data sources from NPWS/BWI/BTO/RSPB (Lauder,unpubl. data).

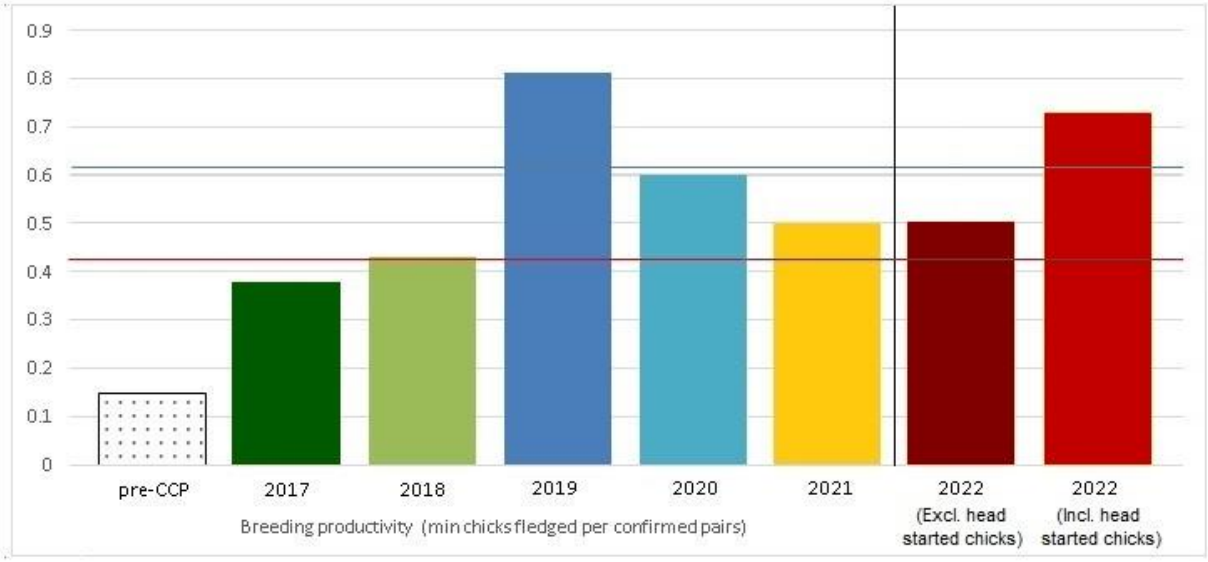

Figure 18. Breeding productivity within the CCP areas. The CCP began in 2017. The 2016 data comes from the national survey undertaken prior to the CCP. The red horizontal line denotes the 0.425 fledglings per pair calculated by A. Lauder asnecessary for a stable population. The navy horizontal line denotes the 0.48-0.62 fledglings per pair calculated by M. Grantas necessary for a stable population.

Conclusion

Sadly, the pessimistic conclusions drawn at the end of the 2021 Curlew Conservation Programme season are still very much relevant today, aligned with decades of habitat loss degradation and a continuation of this loss and degradation. The number of Curlew pairs breeding continues to decline in correlation with this loss. Senescence (birds becoming too old to breed) may well be a major issue, compounding what has happened over the past 30 years by way of calamitous decline. At a number of sites, even when Curlew did return, they may not have settled to breed, while at other sites, just one bird may have returned, with its long standing partner missing, presumably having died over the course of the winter. Curlew are rapidly dying out, before our very eyes. Following a 98% decrease, which has occurred in the past 30 years, the process of extinction is not halted overnight. 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, numbers on the ground are so low that entire geographical areas will 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.

Figure 19. A picture painting a thousand words. Aerial photo of a burnt bog at a traditional Co. Kerry site, illustrating many of the threats facing Curlew's habitats. 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)

It is taken that the more the breeding population decreases, the higher that threshold should become if we are to maintain the population that existed in 2017, let alone 30 years ago. Only four of nine areas are known to have fledged chicks for certain 'in the wild' (including two areas that fledged only one

chick). It is understood that from the 2021 national survey, areas where no dedicated conservation projects have been in place have seen greater declines than where conservation efforts have been enacted. Indeed, the CCP received even less spontaneous sightings reports from the general public this year than in previous years.

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. 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.

After a pilot project in two areas this year, head starting (rearing chicks in captivity to the point of release at fledging), has shown to be relatively easy to implement, even on a small scale and budget. More importantly, it has shown its potential, with seven chicks fledged out of ten eggs collected, giving a productivity of 2.3 fledglings per pair for the three pairs whose eggs were head started – a great measure of a success for a new project and a rate of productivity that is many times that achieved in the wild in Ireland. Head starting is no silver bullet however; the challenges facing young birds, especially those related to predation, will still be there in a degraded environment. But it appears more necessary than ever to ensure that the birds are not lost from those areas before the landscape and wider environment are improved for them. Head starting can give the critically low population a significant boost in a very short period of time, ensuring that the risk of extinction is greatly reduced, and buying further time in which to implement large-scale conservation measures that will ultimately improve productivity of wild birds. However, it should be noted that head starting alone is not a sustainable option.

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 andundertaking efforts to help the Curlew. With widespread concerns over the future of farming in theseareas, 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 differencebetween 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 have been striving to help the Curlew, the factors that brought a 98% decline in 30 years have been and continue to be 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.

Acknowledgements

All landowners, many of whom went above and beyond what was expected or required, who engaged proactively with and facilitated the efforts of the Curlew Action Teams. Your assistance and encouragement were greatly appreciated by all concerned.

Ministers of State Malcolm Noonan and Pippa Hackett, for their support of and interest in the Curlew Conservation Programme. Niall Ó Donnchú and Andy Bleasdale of National Parks & Wildlife Service for their leadership and vision. Niall Ryan and Ted Massey of the Department of Agriculture, Food & the Marine for their continued support of and partnership in the CCP.

All who worked, contributed to or provided input and advice to the Curlew Conservation Programme, including Donal Beagan, Emma Birtwistle, Rebecca Birtwistle, Vincent Campbell, John Carey, Michelle Carey, Joe Carr, Alfie Cavaliero, Pat Compton, Eoin Connolly, Philip Connolly, William Cormacan, Mark Craven, Niall Cribbon, Michael Cunniffe, Peter Curran, John Cusack, Peter Daly, Mark Davenport, Emmett Dolan, Eoin Duffin, Conleth Farrell, David Ferguson, Joseph Finlass, Kathryn Finney, Jim Flynn, Laura Gallagher, Lorna Grehan, Cathryn Hannon, John Higgins, Brian Hughes, Laura Hynes, James Keane, Dr. Seán Kelly, Evelyn Kirwan, Kevin Kyne, Peter McDonnell, Steven McGonigal, Pat McKenna, Tom McKenna, Sue Moles, Daniel Moloney, Martin Moloney, Fergal Monaghan, Owen Murphy, Aidan O'Donoghue, Conor O'Donoghue, Tim O'Donoghue, Jack O'Donovan, P.J. O'Dowd, Eddie O'Flaherty, Piaras Ó Giobúin, Kevin O'Meara, Louis O'Sullivan, James Owens, Nathalie Pion (RSPB), Giada Porcedda, Brian Reidy, Tim Roderick, David Ryan, Dr. David Scallan, Joe Shannon, Jim Sheridan, John Slattery, Andrew Speer, Catherine Vernor, Alyn Walsh and Gemma Weir.

Members of the public, colleagues in the NPWS and the Hen Harrier Project EIP who submitted recordsof Curlew during the breeding season, inside and outside of the core CCP areas.

Management and staff at Fota Wildlife Park for their invaluable assistance and expertise on the head starting pilot project: Jessica Hodnett, Sean McKeown, John McLaughlin and Declan O'Donovan.

Staff from Curlew Country, especially Amanda Perkins and Amber Bicheno, for their willingness to share their expertise and experience of head starting Curlew. So too, Geoff Hilton and Nige Jarrett at the Wetlands and Wildfowl Trust.

Colleagues in various sections of the Department of Housing, Local Government & Heritage for their goodwill and support. Most notably Rónán Casey and Bobby Lockwood for their assistance in social media and IT.

All those who contributed to World Curlew Day, making it a success in raising awareness and supportfor the bird, even when coronavirus restrictions curtailed physical events.

The various media outlets and community groups that featured the Curlew Conservation Programme in 2022. While operating at a national level, this is very much about the local story and the local effortsto protect a bird that is very much part of our local areas.

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Figure 20. Two juvenile Curlews in the vicinity of their release pen in County Kerry (Screen grab from remote camera / CCP)