

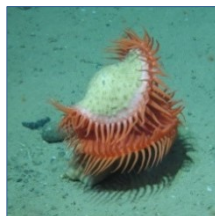
NATIONAL PARKS AND WILDLIFE SERVICE



RECORDING AND ADDRESSING  
PERSECUTION AND THREATS  
TO OUR RAPTORS (RAPTOR):  
A REVIEW OF INCIDENTS



Barry G. O'Donoghue, Mícheál J.  
Casey, Edward Malone, John G.J.  
Carey, Damian Clarke & Kevin Conroy



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

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Front cover, small photographs from top row:

**Limestone pavement**, Bricklieve Mountains, Co. Sligo, Andy Bleasdale; **Meadow Saffron** *Colchicum autumnale*, Lorcan Scott; **Garden Tiger** *Arctia caja*, Brian Nelson; **Fulmar** *Fulmarus glacialis*, David Tierney; **Common Newt** *Lissotriton vulgaris*, Brian Nelson; **Scots Pine** *Pinus sylvestris*, Jenni Roche; **Raised bog pool**, Derrinea Bog, Co. Roscommon, Fernando Fernandez Valverde; **Coastal heath**, Howth Head, Co. Dublin, Maurice Eakin; **A deep water fly trap anemone** *Phelliactis* sp., Yvonne Leahy; **Violet Crystalwort** *Riccia huebeneriana*, Robert Thompson

Main photograph:

**The RAPTOR logo**, created by Barry O'Donoghue



## **Recording and Addressing Persecution and Threats to Our Raptors (RAPTOR): a review of incidents 2007–2019**

Barry G. O'Donoghue<sup>1</sup>, Mícheál J. Casey<sup>2</sup>, Edward Malone<sup>3</sup>, John G.J. Carey<sup>1</sup>, Damian Clarke<sup>1</sup> & Kevin Conroy<sup>1</sup>

<sup>1</sup>National Parks & Wildlife Service, Dublin 7; <sup>2</sup>Veterinary Laboratory Service, Backweston, Co. Kildare;

<sup>3</sup>State Laboratory, Backweston, Co. Kildare.

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The NPWS Project Officer for this report was: Barry O'Donoghue; Barry.O'Donoghue@chg.gov.ie

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**An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta**, 90 Sráid an Rí Thuaidh, Baile Átha Cliath 7, D07 N7CV  
Department of Housing, Local Government and Heritage, 90 North King Street, Dublin 7, D07 N7CV

### **Important note**

Members of the public are advised to contact their local National Parks & Wildlife Service office (see [www.npws.ie/contactus](http://www.npws.ie/contactus)) or An Garda Síochána with any information regarding poisoning or persecution incidents. These matters will be treated confidentially. If the incident occurs out of normal office hours, please take a photograph of the carcass/poison and record its precise location. There is a dedicated RAPTOR email address ([RAPTOR@chg.gov.ie](mailto:RAPTOR@chg.gov.ie)). As well as NPWS personnel, An Garda Síochána are also Authorised Officers under the Wildlife Act and are authorised to investigate and tackle wildlife crime.

Local wildlife rehabilitators are usually the best placed to treat injured wildlife (see [www.irishwildlifematters.ie](http://www.irishwildlifematters.ie)).

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## Executive Summary

This Irish Wildlife Manual describes the findings of a collaborative approach between the National Parks & Wildlife Service (NPWS), the Veterinary Laboratory Service and State Laboratory, known as the RAPTOR (Recording and Addressing Persecution and Threats to Our Raptors) protocol. This collaboration was developed in 2011 on the back of an EU 'Pilot Case' relating to the absence of a formal investigation protocol for bird of prey injury and mortality in Ireland. With a recent (1 January 2020) handover in responsibility for the RAPTOR protocol within NPWS, it was felt timely to review the cases to date (up to 31 December 2019). The RAPTOR protocol entails a significant amount of effort between the three Government Departments, from collecting and handling carcasses, injured birds and evidence, to X-rays, Post-Mortem examinations, DNA sampling, toxicological testing and follow-up investigations, data analysis, interpretation and reporting. A number of training events and on-going mentoring has been delivered to personnel involved.

This Irish Wildlife Manual provides an overview of incidents up to 31 December 2019 and investigates statistics, patterns and trends to provide a useful knowledge base for addressing such issues going forward, whether by enforcement, education or planning. While the RAPTOR protocol was officially initiated in 2011, there were 26 related incidents confirmed and recorded between 2007 and 2010, inclusive. Being confirmed incidents with reliable data, they are included in this review. Between 2007 and 2019, a total of 338 incidents were confirmed and recorded on the RAPTOR database. Those incidents were comprised of 214 incidents involving poison (poison in the system or poisoned bait), 58 incidents involving shooting, one trapping and one mutilation, in addition to 57 road collision incidents, six wind turbine strike incidents, three 'traumatic death' incidents, two disturbance incidents, two fence collision incidents and one powerline collision incident. Some incidents would have had multiple issues (e.g. a shot bird of prey that also had poison in its system), while a number of incidents would have been comprised of multiple birds (e.g. more than one individual killed by a poisoned bait incident). A number of anecdotal and unconfirmed incidents have also been recorded and are held in a database for informative purposes. Of the total 338 incidents, 294 involved birds of prey, with a total of 301 individual birds of prey impacted. All regularly breeding native Irish raptor species were confirmed to have suffered some form of poisoning, persecution or other direct anthropogenic non-habitat related cause of injury or mortality. The birds of prey recorded as most frequently impacted were Common Buzzard (100 casualties), Red Kite (n=46), Barn Owl (n=43), Peregrine Falcon (n=36), White-tailed Eagle (n=18), Hen Harrier (n=17), Sparrowhawk (n=16), Kestrel (n=11), Long-eared Owl (n=8), Golden Eagle (n=2) Merlin (n=1) and Short-eared Owl (n=1). While the protocol and report are primarily concerned with birds of prey, other related incidents were also recorded, which could have impacted birds of prey. Large numbers (n=346) of other wildlife such as crows and pigeons were illegally poisoned or persecuted, while there were five individual domestic animals (dogs) illegally poisoned. There are likely to have been numerous other such cases that did not come to the attention of the RAPTOR protocol. The actual number of raptors (and other wildlife) affected is believed to be much higher. It is clear however, that human, non-habitat related threats to Irish raptors are widespread, with incidents recorded in every county of Ireland. In terms of incidents involving illegal acts or misuse of poisons, poison incidents accounted for 71.5% of such cases, while shootings accounted for 28% and trapping/mutilation accounted for 0.5% of such cases. There are notable blackspots for such incidents throughout the country, and particular risk periods, namely springtime for illegal/misuse of poison incidents and late summer/autumn and winter for shooting incidents.

As well as assisting directly with individual wildlife crime investigations, the RAPTOR protocol underpins the NPWS RAPTOR database, providing important information on the species affected, the modus operandi, timing and hotspots of such incidents. Continuing to record confirmed and possible events in a systematic fashion will build on the database and provide stronger background information to target illegal activity through enforcement and education and in turn combat human-related raptor injury and mortality. Likewise, the information garnered from recording and analysing incidents of disturbance, road, turbine or fence collisions can help inform forward planning on such matters.

## Acknowledgements

The authors would like to acknowledge all the individuals and organisations who have contributed to the RAPTOR protocol since its inception in 2011 and so too those who investigated and recorded incidents prior to that. In particular, we would like to thank our colleagues in the National Parks & Wildlife Service, the Veterinary Laboratory Service (and wider afield in the Department of Agriculture, Food and the Marine) and the State Laboratory for their professionalism and dedication. We would like to thank the private veterinary practices who undertook X-rays as part of the protocol. We would also like to thank An Garda Síochána for their support on a number of incidents through the years. We would like to thank Wildlife Rehabilitation Ireland, in particular Emma Higgs for her spirit in addressing wildlife crime. We would like to acknowledge the role that eNGOs such as the Irish Raptor Study Group, Birdwatch Ireland and the Golden Eagle Trust played from the outset of the protocol, including discussions on the establishment of the protocol and provision of data (including pre-2011). We would like to thank the Irish photographers who provided the marvellous images of our native Irish birds of prey, shown in their splendour, wild as they should be. The photographers include John Carrig, Joe Huggard, Andrew Kelly, Mario McRory, and Marc Ruddock. Finally, we would like to acknowledge the support of the public and the media in unearthing incidents and highlighting that such impacts on our native raptor populations are socially and morally unacceptable.



## 1 Introduction

Raptor persecution and poisoning is a concern globally, impacting on the abundance and range of species at various scales (Ogada, 2014; Whitfield *et al.*, 2003; Brochet *et al.*, 2019; Madden *et al.*, 2019). There are various other anthropogenic, non-habitat related threats and pressures acting on raptor populations also, including collisions (Eccleston & Harness, 2018) and disturbance (Richardson & Clint, 2007; Rosenfield *et al.*, 2007; Ruddock & Whitfield, 2007).

The RAPTOR (Recording and Addressing Persecution and Threats to Our Raptors) protocol is designed to investigate and document direct, non-habitat related threats and pressures to birds of prey in Ireland. It was first initiated in 2011, between the National Parks and Wildlife Service (Department of Culture, Heritage and the Gaeltacht), the Veterinary Laboratory Service (Department of Agriculture, Food and Marine) and The State Laboratory (Department of Public Expenditure and Reform). This was in response to a pilot case from the European Commission which outlined that Ireland needed such a system in order to satisfy its obligations under Article 10 of the EU Birds Directive (2009/147/EC). The RAPTOR protocol over the period 2011-2019 had five primary interests:

- Monitoring anthropogenic, non-habitat related pressures on Irish raptor species and maintaining a database of such incidents.
- Monitoring the incidence of poisoning (illegal and secondary), poisoned baits and persecution.
- Quantifying the use of specific poisons.
- Supporting the collection of evidence (including via Post Mortem) to support investigations/prosecutions.
- Provide statistics and intelligence to support strategies to address such issues.

Accompanying the protocol is the RAPTOR database. The RAPTOR database is maintained by the National Parks & Wildlife Service and contains records of cases submitted under the RAPTOR protocol, including poisoning and persecution incidents, other human related incidents of raptor injury or deaths (apart from habitat change), as well as cases that were examined but found to be without any determined cause of injury/death.

## 2 Methods

The RAPTOR protocol was initially established in 2011 by Principal Officers from National Parks and Wildlife Service, the Veterinary Laboratory Service and the State Laboratory. This followed a period of dialogue between the relevant authorities, with input from eNGOs. A coordinating role was assigned to the NPWS Agri-Ecology Unit from 13 January 2013, following an interim arrangement with an NPWS Conservation Ranger. The Agri-Ecology Unit of NPWS coordinated the protocol until 31 December 2019. As of 1 January 2020, the RAPTOR protocol has been coordinated by the Birds Unit of NPWS.

The assistance of Department of Agriculture, Food and the Marine Inspectors, An Garda Síochána, eNGOs, private veterinary practices, wildlife rehabilitators and the general public has been central to the investigation of cases and collation of data.

Given the involvement of multiple stakeholders and the handling and processing of samples and evidence, it was essential that the protocol was carefully followed and adhered to. The workings of the protocol, in sequential form, are outlined below.

### 1. National Parks and Wildlife Service (NPWS) or An Garda Síochána (AGS)

- a. An NPWS official or a member of An Garda Síochána discover or receive information about an injured or dead bird of prey or an incident involving poisoning (including poisoned bait), persecution or other human related, non-habitat impact(s) on birds of prey.
- b. Investigation ensues as appropriate, including documenting of scene and particulars.
- c. Any evidence is handled with gloves and placed in approved evidence bags, sealed, clearly labelled with relevant details (submitting official's name and details, species, location, *etc.*) and documented.
- d. Specimens such as suspected bait, faecal samples, digested pellets, *etc.* are placed in a leak-proof container (*e.g.* evidence bag, zip lock bag, plastic box) contained within approved evidence bag(s).
- e. Any samples that are to be processed in line with the RAPTOR protocol are brought directly to one of six Regional Veterinary Labs (RVLs). Prior to submission to the RVL, all carcasses must be X-rayed at a designated private veterinary practice (see step 2). In the case of injured birds, a decision is made on the appropriateness and feasibility of undertaking an X-ray.
- f. Only officials involved in an investigation or officials of NPWS are approved to submit samples to RVLs. This is vital from a chain of custody point of view. The individual who submits the body/substance/evidence to the protocol is known as the 'submitting official'. The submission of the sample(s) must be accompanied by the official RAPTOR submission form (Appendix 1). This form also serves as a chain of custody form that accompanies the sample(s)/evidence throughout the entire process.
- g. Any prosecutions or actions that are to be pursued, should be pursued in line with the relevant legislation or regulations and are a matter for the NPWS or the Director of Public Prosecutions. In cases of misuse of biocides or medicines, other relevant authorities such as the Department of Agriculture, Irish Medicines Board, *etc.* should be consulted. The role of the RAPTOR protocol in investigations/prosecutions is to assist by providing findings, data or confirming evidence. The role of the RAPTOR protocol is not to coordinate, pursue or lead on investigations/prosecutions.
- h. The submitting official is responsible for providing complete details to the NPWS RAPTOR database (Appendix 2).

## 2. Private Veterinary Practice

- a. Where a body is being examined as part of the investigation protocol, it is important to confirm whether there have been any bone fractures or breakages or ballistic evidence. This is determined by means of X-ray imaging, undertaken at one of six officially designated private veterinary practices, each of which are located close to one of the six receiving Regional Veterinary Labs.
- b. The submitting official must make contact with the private veterinary practice in advance of delivery, to arrange a suitable time for undertaking X-ray(s).
- c. In the case of dead raptors, the member of staff at the veterinary practice who will be undertaking the X-ray(s) confirms that the evidence bag is sealed and takes possession of the evidence bag (and carcass therein), signing the chain of custody part of the submission form, which at all times accompanies the sample which may be used in evidence.
- d. After the X-ray, in the case of dead raptors, the evidence bag is returned to the submitting official, and the chain of custody part of the submission form is signed again, recording the handing of evidence from the private vets back to the submitting official.
- e. Any X-rays are saved to a labelled and signed CD and/or emailed to the official NPWS RAPTOR email address (RAPTOR@chg.gov.ie) and the RVL that will be performing the post-mortem examination. X-rays are at this stage part of the evidence relating to the case and should be documented on the chain of custody form also.

## 3. Veterinary Laboratory Service

- a. The submitting official must make contact with the Regional Veterinary Laboratory (RVL) in advance of delivery, to arrange a suitable time for the RVL to accept the carcass/sample/specimen.
- b. For the purpose of minimising the number of people in possession of the sample(s), every effort should be made for the RVL attendant who will be undertaking the Post Mortem (PM) to accept the sample(s) upon delivery and sign the submission/chain of custody form.
- c. The RVL determines the usability of the evidence submitted. In cases of biocides or medicines, it may be decided that the most appropriate action is for the submitting official to take these directly to the State Lab for toxicological tests (this will depend on logistics, but in many cases the RVL will take these to the State Lab along with other routine RVL submissions). In cases where a carcass has been too badly decomposed, the RVL will advise that further post-mortem examination may be limited or impossible.
- d. Upon accepting the submission, the RVL receiving official signs the chain of custody part of the submission form, takes the form (which will accompany the samples/evidence through the protocol) and provides the submitting official with a photocopy of the form.
- e. The case is then assigned an official reference number by the RVL and this number is used to uniquely identify the case. The submitting official should be provided with this reference number prior to leaving the RVL.
- f. The case is treated as routine or urgent. Urgent cases must be approved by the co-ordinating officials of the NPWS, RVL and State Lab and are only used in limited circumstances where determining a result will inform time-bound decisions on the next steps in the investigation *e.g.* in preventing further damage, securing a search warrant, *etc.* Results of routine cases will normally be produced within 28 days, whereas results of urgent cases will be provided within five days.
- g. In suspected poisoning cases, the affected bird/carcass is weighed and the weight recorded for comparison to expected weights in line with standard textbooks (*e.g.* Snow & Perrins, 1998).

- h. In the case of post-mortem examinations, the carcass is photographed before the PM, concentrating on any significant lesions or deformities, ensuring that the case number and scale are visible in the photos.
- i. The body's condition is recorded in respect of fat, muscle and degree of crop fill.
- j. Plumage condition is similarly recorded, while any evidence of bruising, chemical staining, burns or breakages are also sought.
- k. In the case of satellite-tagged birds, any anomalies/ physical influences arising from tags/harnesses are sought.
- l. In the case of intact and fresh carcasses, a full standard post mortem examination is then undertaken, with sampling for bacteriology, virology, histology as judged appropriate by the duty pathologist, keeping a contemporaneous record as a hard copy.
- m. In the case of decomposed or scavenged carcasses, the RVL pathologist will determine what can be done with regard to post mortem; necropsy may be directed primarily at sampling *e.g.* to extract liver or kidneys where possible.
- n. A sample of fresh kidney is tested for lead content in the RVL.
- o. Toxicological tests will have to be undertaken by the State Lab. To do this, the RVL takes samples of liver and stomach contents and sends these to the State Lab. Where these matrices are not available, two of the following are sent in their stead (ranked in order of importance): Crop contents, kidney, intestinal contents, cloacal contents, skeletal muscle, blood.
- p. A separate aliquot for each sample is created and stored in a sealed container (universal type, or larger). It is critical that the matrices/organs are not sent in the same tube/container.
- q. Each tube is labelled with sample ID and the matrix it contains (*e.g.* blood, faeces)
- r. As the aim of sampling is to recover a sample for testing and a sample for archiving, up to 10 g/10 ml of each of the above is sampled, if available.
- s. The RVL provides notes to inform State Lab of any specific reasons to suspect toxicity, and any circumstantial evidence seen at PM *e.g.* yellow staining seen in cases of Nitroxylnil poisoning.

#### 4. State Laboratory

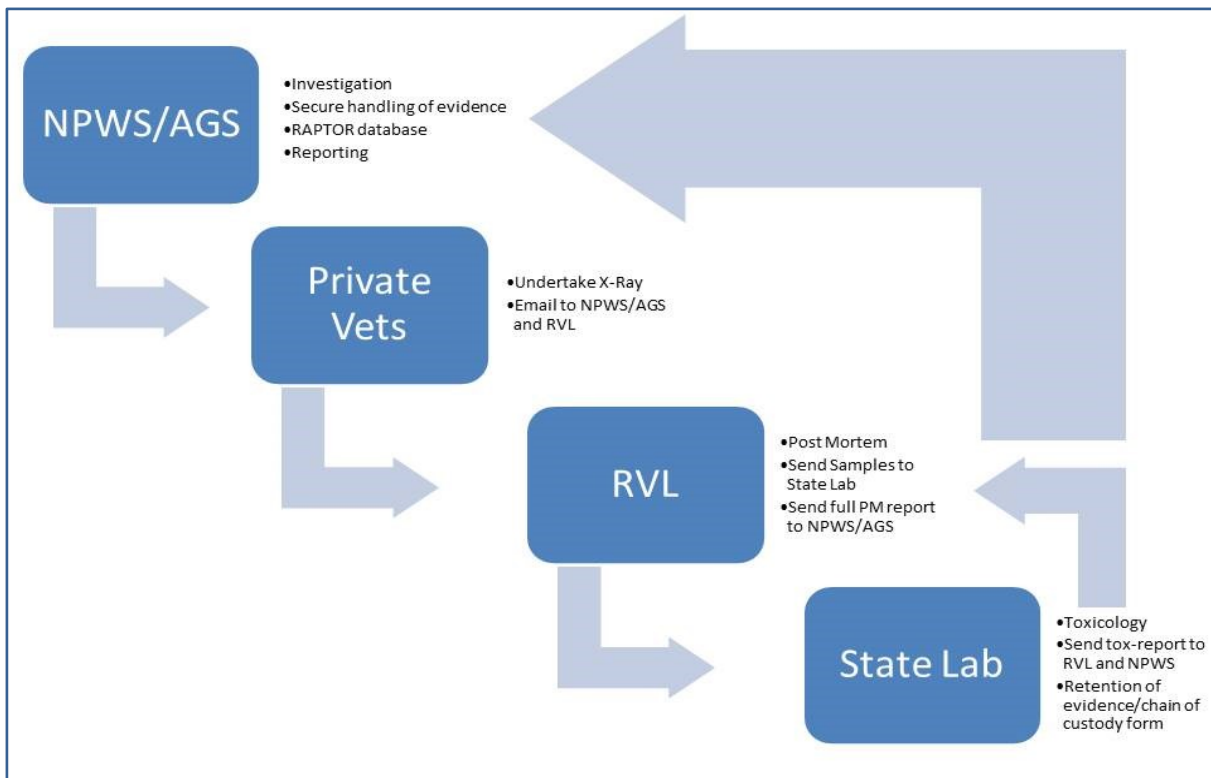
- a. The RVL notifies the State Lab contact point (by email) in advance of the arrival of samples and only dispatches samples when it is confirmed that somebody will be available to receive them.
- b. All samples (which should be in individual sealed and labelled evidence bags) are delivered in person or by registered post to the State Laboratory in Backweston, Co. Kildare, clearly marked as "RAPTOR Protocol Samples".
- c. The original submission/chain of custody form continues to accompany the submission, with a photocopy kept on file at the RVL. The attendant at the RVL who will be processing the samples signs the submission/chain of custody form. This form is kept on file with the State Lab as the final destination for the samples/evidence.
- d. Unless the samples are to be tested immediately, prior to analysis the samples are stored in a freezer in a secure room, which can only be accessed by staff from the Veterinary Toxicology Section of the State Laboratory.
- e. The analysis is performed by using an organic solvent extraction technique to remove the toxicants from the sample. This is then treated further with another organic solvent and an anhydrous sulphate to remove proteins and moisture. The resulting sample is evaporated and reconstituted in an aqueous solution. This is then analysed on a Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS); using confirmatory criteria commonly as set out in Commission Decision 2002/657/EC and applied in others areas of similar testing.

- f. The State Laboratory have a validated and accredited, quantitative confirmatory method for the analysis of twenty toxicants in avian liver. The method is accredited in accordance with ISO17025 with analytical detection performed by LC-MS/MS, which is a recognised as a confirmatory technique.
- g. The State Lab tests for the analytes as detailed in Appendix 3, at the range of concentrations presented in avian liver samples.
- h. The State Lab also analyses other matrices and species using the same protocol but the results of those analyses are not covered by the scope of accreditation and the validation parameters may not necessarily apply to these results.
- i. Routinely both liver and stomach contents are tested in all cases received. If insufficient amounts of these are available for testing then other matrices such as crop contents, kidney or blood may/will be tested.
- j. The State Lab holds an archive of the tissues submitted. Tissues will be released for subsequent testing on a case-by-case basis, by agreement between the designated representatives of the State Lab Veterinary Lab Service and NPWS or on the basis of a further protocol on sample sharing.
- k. The State Lab have validated a separate method for the detection of paraquat and diquat. Samples requiring paraquat and diquat analysis may need to be batched and may result in longer reporting times than 30 days.
- l. From time to time there may be requests from NPWS/DAFM RVL for testing for other analytes not covered by the protocol *e.g.* Bendiocarb *etc.* In these instances where analysis can be performed by LC-MS/MS and the analysis is compatible with current methods the State endeavour to screen the samples for the presence of this analyte(s) however it will not have in place validated and accredited methods for same.
- m. If a substance/substances not covered is/are regarded as being of particular importance when the method comes to be revalidated these will be included.

## 5. Collation and reporting of data

- a. The State Lab checks the results from their procedure and produces an official report on its toxicology findings. This is provided to the submitting official, the central NPWS RAPTOR email address and the relevant RVL.
- b. The relevant RVL then includes the toxicology report in its consideration of the final RVL report, which will include details and findings of the wider necropsy, ultimately leading to a confirmed or likely cause of death, or an inconclusive post-mortem report.
- c. The final report is issued to the submitting official and the central NPWS RAPTOR email address.
- d. The submitting official then uses the PM report as appropriate, in terms of progressing the investigation.
- e. Where a prosecution is pending, both the investigating RVL and the State Lab are made aware at the earliest possible opportunity by the submitting official, through the NPWS coordinator, including notification as to whether attendance at any hearings may be necessary. In normal circumstances, the NPWS coordinator (and subsequently the State Lab and investigating RVL) is made aware of this at the same time that the submitting official makes a recommendation to advance a prosecution.
- f. At the end of each year, the NPWS coordinating official with responsibility for the RAPTOR protocol collates all relevant data from submitting officials across the country. The types of data recorded are presented in Appendix 2. These ultimately comprise the NPWS RAPTOR database.

- g. Various statistics are analysed and reported on as part of the annual RAPTOR report, which is published on behalf of the three State bodies that coordinate the RAPTOR protocol.



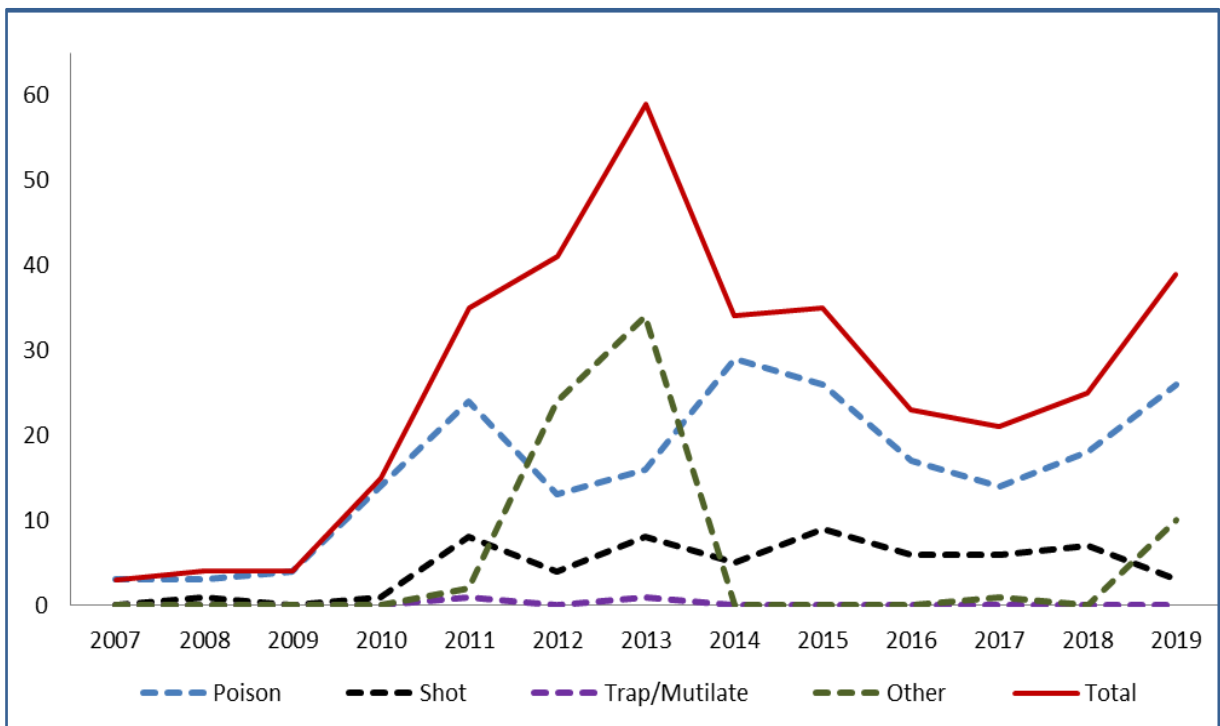
**Figure 1** Flow chart of the RAPTOR protocol.

In presenting data, an ‘incident’ is taken as a single event where a raptor or raptors were injured or killed as a result of an anthropogenic non-habitat related impact or where poisoned bait was placed either with or without casualties (whether raptor or non-raptor). An incident may have no casualties (in cases where poisoned bait was discovered without casualties), a single casualty or multiple casualties (in cases where multiple individuals died from a single shooting or poisoning incident). Data are presented in various ways in the results section to illustrate the number of incidents and the number of individuals impacted by various incidents recorded by the RAPTOR protocol.

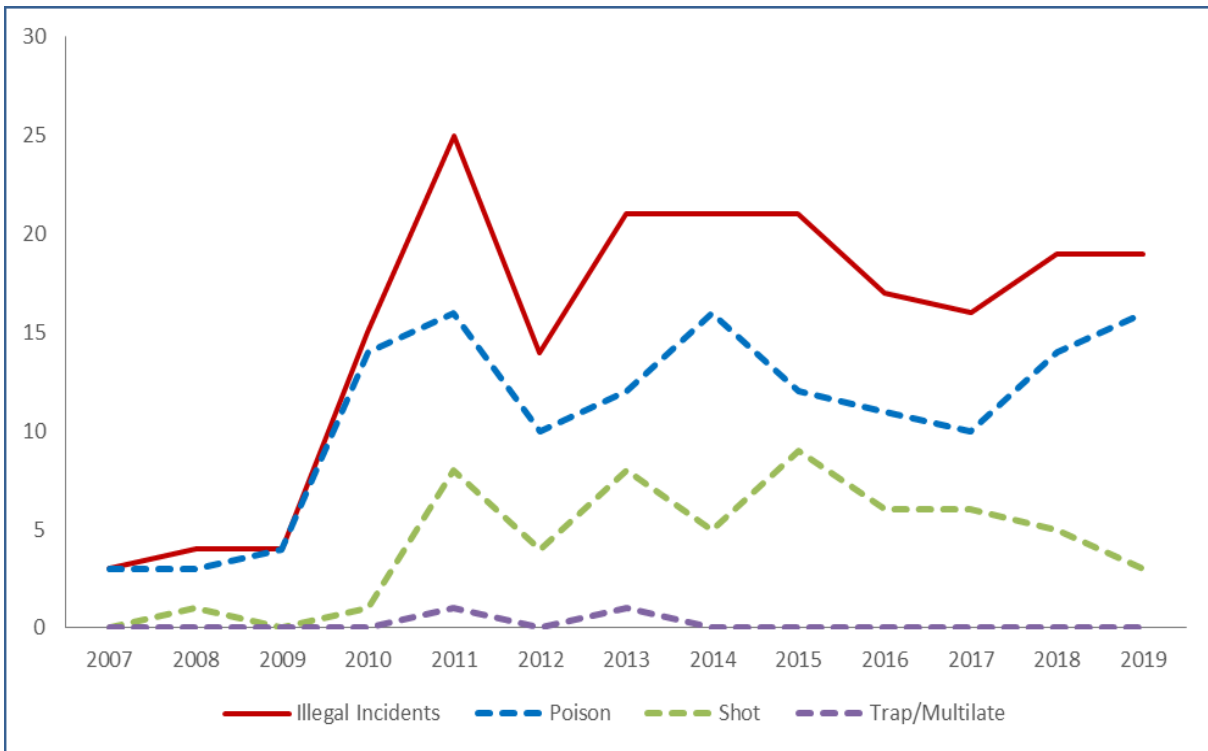
### 3 Results

#### 3.1 National overview

Prior to the RAPTOR protocol being officially initiated in 2011, there were 26 incidents that were confirmed and recorded between 2007 and 2010. Being confirmed incidents with reliable data, they are included in this review. Between 2007 and 2019, a total of 338 incidents were confirmed under the RAPTOR protocol. These were comprised of 214 incidents involving poison (poison in the system or poisoned bait), 58 incidents involving shooting, one trapping and one mutilation in addition to 57 road collision incidents, six wind turbine strike incidents, three 'traumatic death' incidents, two disturbance incidents, two fence collision incidents and one powerline collision incident. Some incidents would have had multiple issues (*e.g.* a shot bird of prey that also had poison in its system), while a number of incidents would have been comprised of multiple birds (*e.g.* more than one individual killed by a poisoned bait incident). The types of incident per year are summarised in Figure 2, based on the 'primary' incident. Figure 3 focusses on the pressing issue of direct persecution and misuse of poisons, without secondary rodenticide poisoning and the 'Other' category that includes collisions, disturbance, *etc.* A number of anecdotal and unconfirmed incidents have also been recorded and are held in a database for information purposes.



**Figure 2** Number and types of RAPTOR incident by year.



**Figure 3** 'Illegal' persecution and misuse of poison incidents by year.



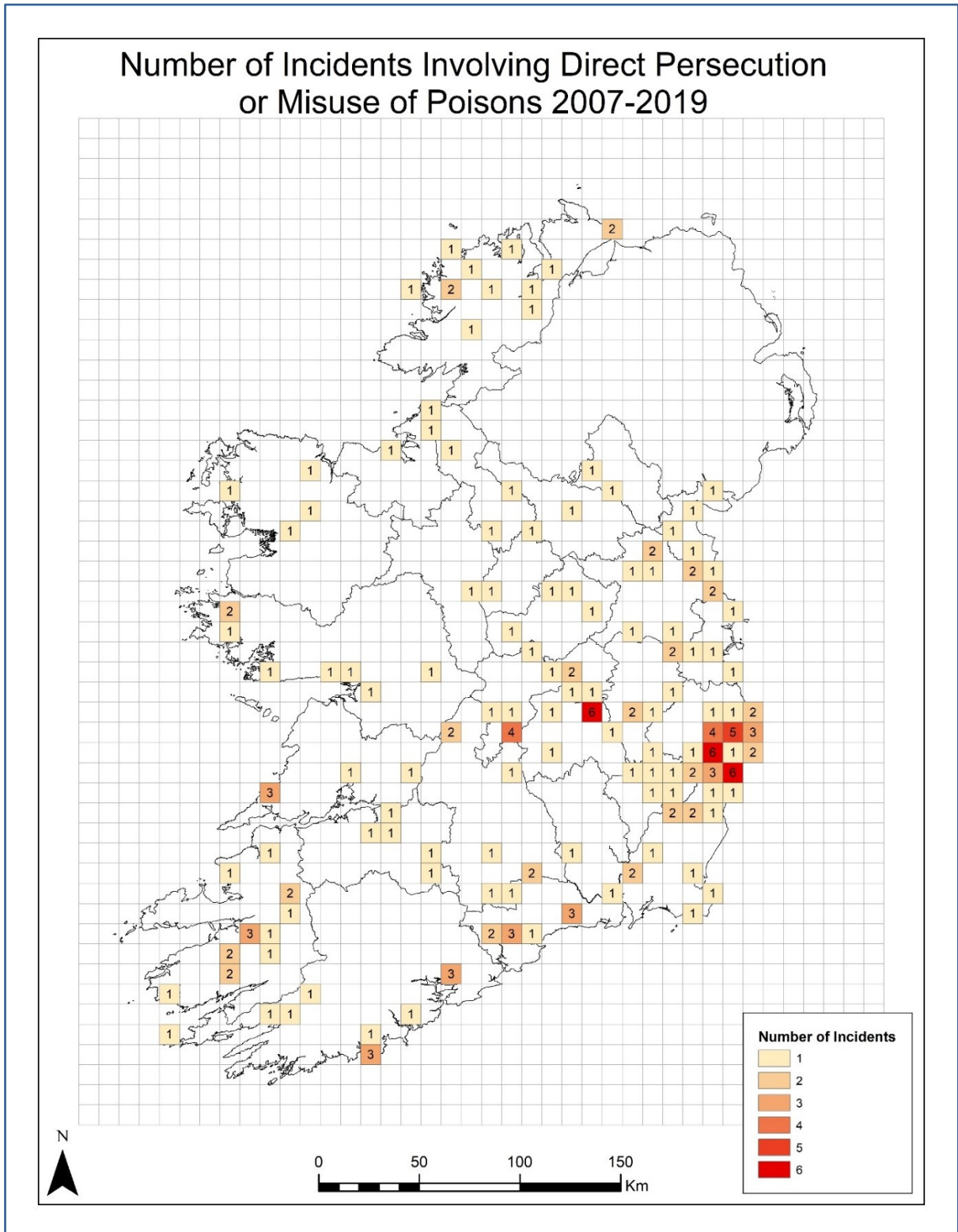


There was a higher than average number of incidents in the east of the country. The highest number of incidents (n=11) in any 10 km grid square was in north Co. Dublin, primarily involving birds of prey that had died with rodenticides in their systems, while a specific area in Co. Laois with 10 incidents had a number of birds of prey illegally targeted for persecution. County Wicklow had the highest number of incidents (n=57) for any one county, followed by Co. Tipperary (n=33), Co. Kerry (n=30), Co. Dublin (n=28) and Co. Cork (n=22). A breakdown of incidents per county is provided in Table 1.

**Table 1** Number of RAPTOR incidents per county

County	Number of Incidents
Wicklow	57
Tipperary	33
Kerry	30
Dublin	28
Cork	22
Wexford	20
Offaly	19
Donegal	18
Galway	13
Meath	11
Laois	11
Waterford	10
Limerick	10
Kildare	8
Clare	8
Westmeath	6
Louth	6
Mayo	5
Kilkenny	5
Leitrim	4
Monaghan	3
Sligo	3
Roscommon	3
Cavan	2
Carlow	2
Longford	1

The distribution of all direct persecution and misuse of poison incidents recorded under the RAPTOR protocol is summarised in Figure 5. Misuse of poison includes the use of poisoned meat bait or the use of illegal poisons or the use of poisons in a manner that is not in line with label requirements.



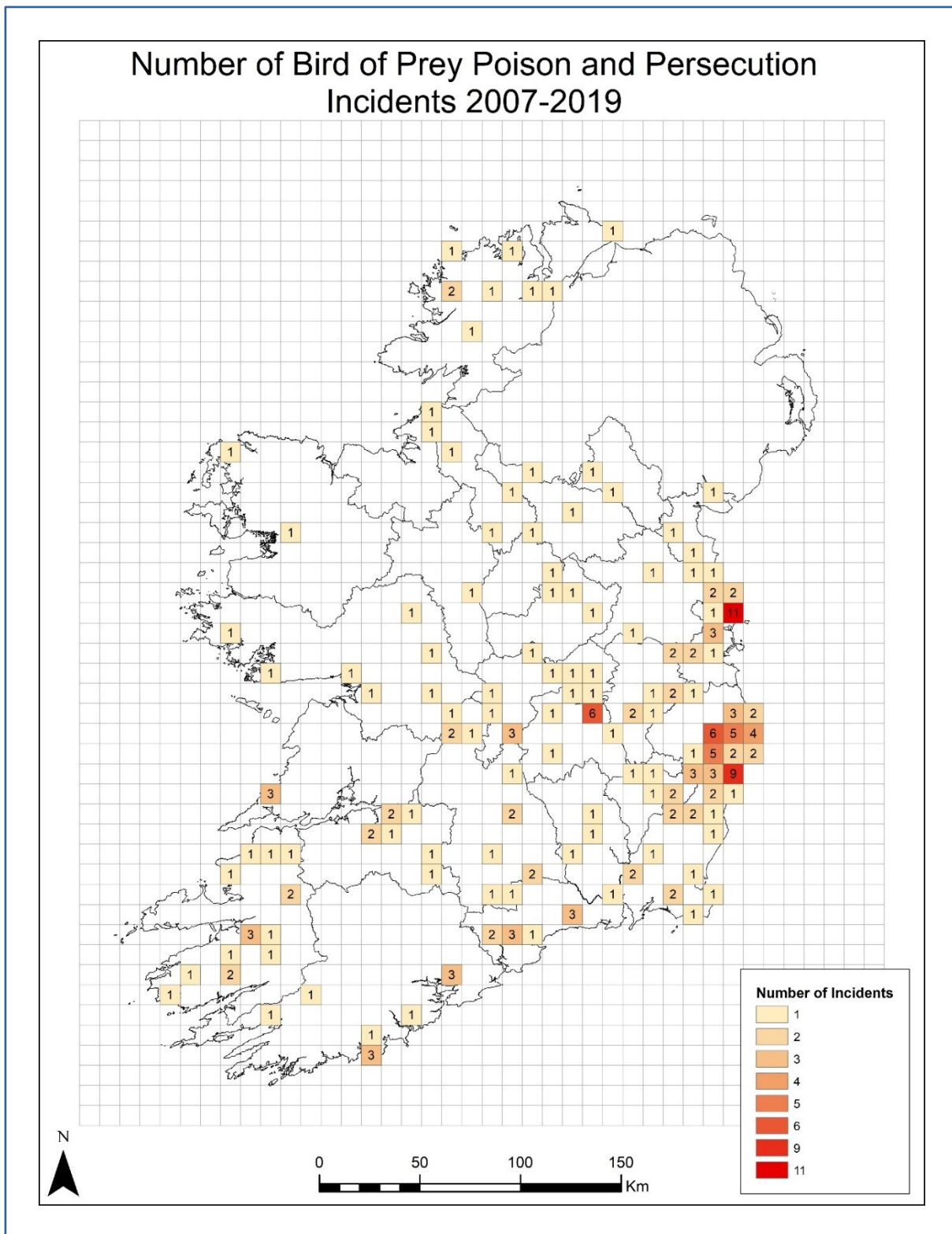
**Figure 5** Distribution of all persecution and misuse of poison incidents recorded on the RAPTOR database.



**Table 2** Number of birds of prey killed or injured per county.

<b>County</b>	<b>Number of birds of prey killed or injured</b>
Wicklow	53
Tipperary	33
Kerry	30
Dublin	24
Cork	22
Wexford	19
Offaly	16
Donegal	11
Limerick	10
Waterford	10
Galway	9
Laois	8
Kildare	7
Meath	7
Clare	6
Kilkenny	6
Louth	6
Westmeath	5
Leitrim	3
Monaghan	3
Roscommon	3
Carlow	2
Cavan	2
Mayo	2
Sligo	2
Longford	0

Figure 7 presents the distribution and number of incidents with birds of prey that were shot or had poison in their systems.



**Figure 7** Number and distribution of bird of prey incidents involving poison or persecution, confirmed between 2007 and 2019

All regularly breeding native Irish birds of prey were confirmed to have suffered some form of poisoning, persecution or other direct anthropogenic non-habitat related cause of injury or mortality. The birds of prey most frequently recorded as negatively impacted were Common Buzzard (100 casualties), Red Kite (n=46), Barn Owl (n=43), Peregrine Falcon (n=36), White-tailed Eagle (n=18), Hen Harrier (n=17), Sparrowhawk (n=16), Kestrel (n=11), Long-eared Owl (n=8), Golden Eagle (n=2), Merlin

(n=1) and Short-eared Owl (n=1). Results for individual species are presented in the Species account sub-section.

As well as birds of prey, other species including Dog, Fox, Otter, Raven, Rook, Hooded Crow, Pigeon, Starling and Herring Gull were also impacted by poisons. These were analysed and recorded under the RAPTOR protocol because such misuse of poisons in the environment could also impact birds of prey either directly or indirectly. The distribution of incidents involving other wildlife and the numbers killed or injured is presented in Figure 8.

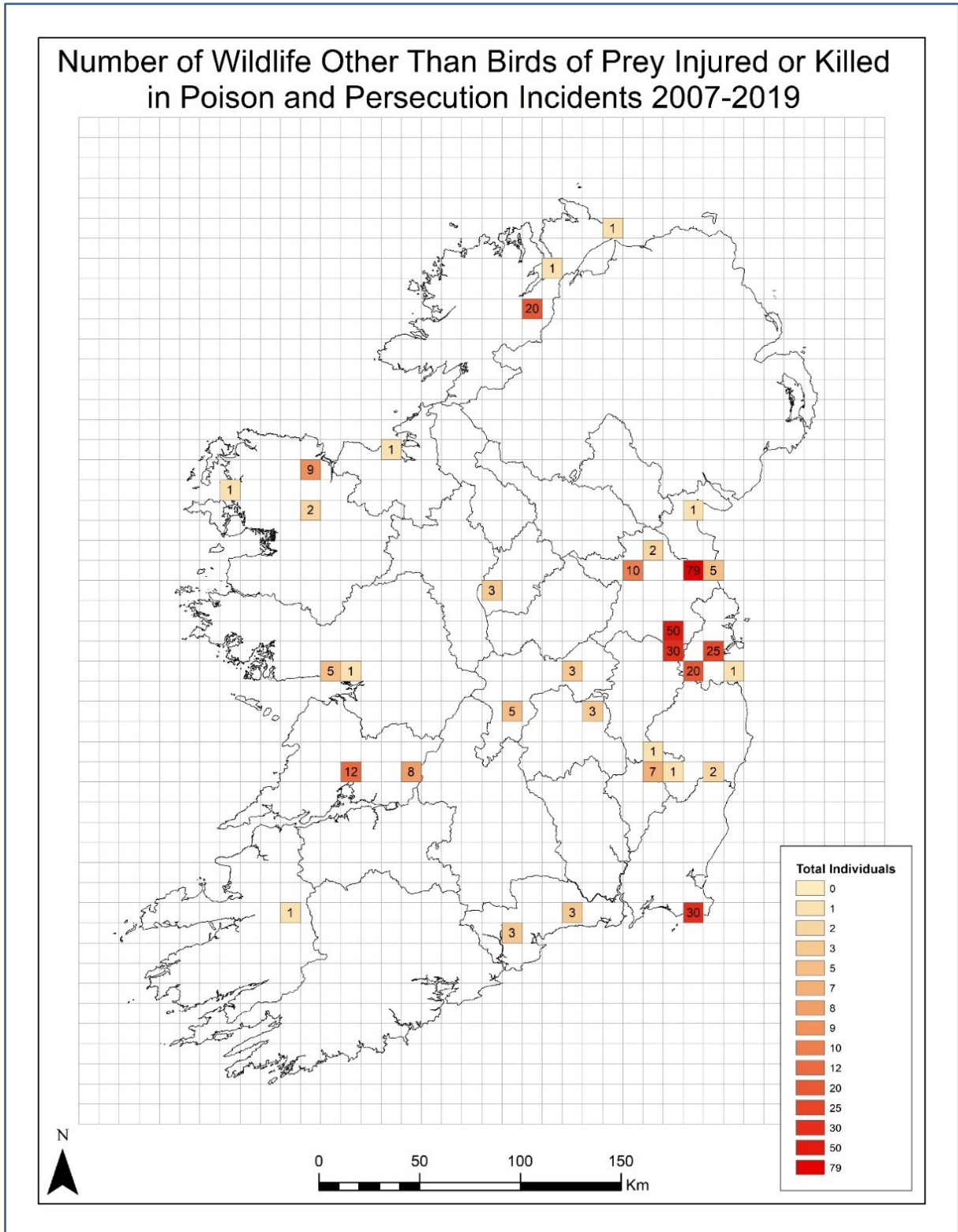
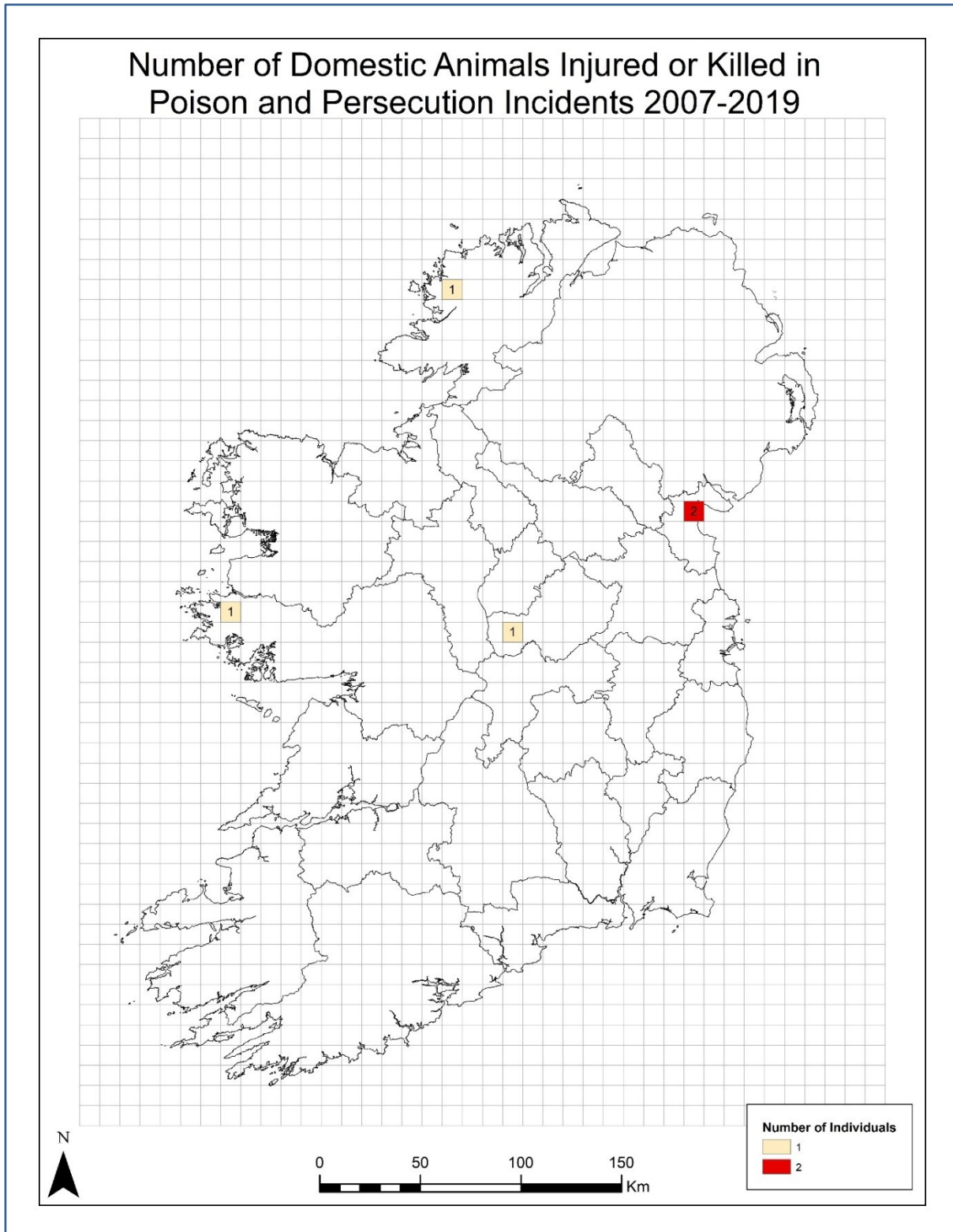


Figure 8 Other (non-raptor) wildlife incidents confirmed between 2007 and 2019.

The distribution of incidents involving domestic animals (namely dogs) which died or were injured as a result of poisoned meat bait, and which came to the attention of the RAPTOR protocol is presented in Figure 9.



**Figure 9** Domestic confirmed animal poison incidents brought to the attention of the RAPTOR protocol between 2007 and 2019.



## 3.2 Species accounts

This section presents a tabular account for each species, summarising the breeding population in the Republic of Ireland (taken from Ireland's 2019 Article 12 report available from <https://nature-art12.eionet.europa.eu/article12/report?period=3&country=IE>), the conservation status (as per Colhoun & Cummins, 2013), the number of incidents involving the individual species and the number individuals involved in those incidents, as well as the types of incidents and a synopsis of the main threats and pressures recorded under the RAPTOR protocol pertaining to the species, followed by some general notes. A map for each species is presented, showing the distribution of incidents involving the species (per OSI 10 km square) and the number of individuals confirmed dead or injured.

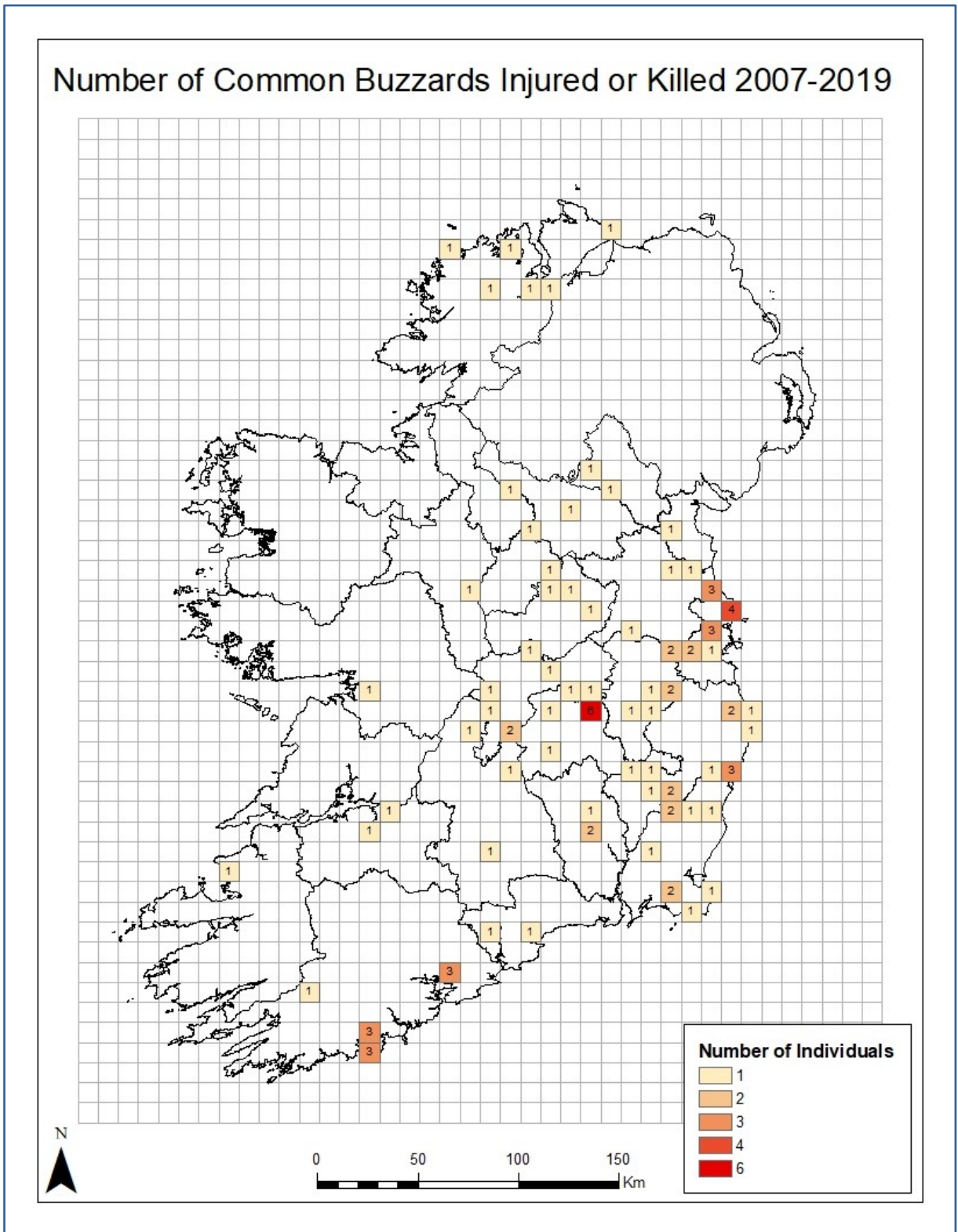
### 3.2.1 Common Buzzard



**Figure 10** Common Buzzard (Andrew Kelly).

**Table 3** RAPTOR statistics: Common Buzzard.

Irish name	Clamhán
English name	Common Buzzard
Scientific name	<i>Buteo buteo</i>
Breeding population	c. 1938 pairs
Conservation status	Green
Number of confirmed incidents involving Common Buzzard	98
Number of individuals confirmed killed/injured	100
Types of incidents recorded	Secondary poisoning, direct poisoning, shooting, fence collision, road collision.
Incidents most frequently recorded under RAPTOR	Secondary poisoning, direct poisoning, shooting. Trapping also strongly suspected.
Notes	Population and range increasing. Significant number (n=23) of individuals killed in a Carbofuran poisoning incident in Square W44 (west Co. Cork) in January 2020 (post the timeline of this review). In March 2018, there were three Common Buzzards poisoned in the same area by Carbofuran (they were also decapitated and had their legs removed) and three other Common Buzzards in the neighbouring 10 km square poisoned by Carbofuran in October 2018.



**Figure 11** Distribution of RAPTOR-related incidents involving Common Buzzard and the number of individuals involved 2007–2019.

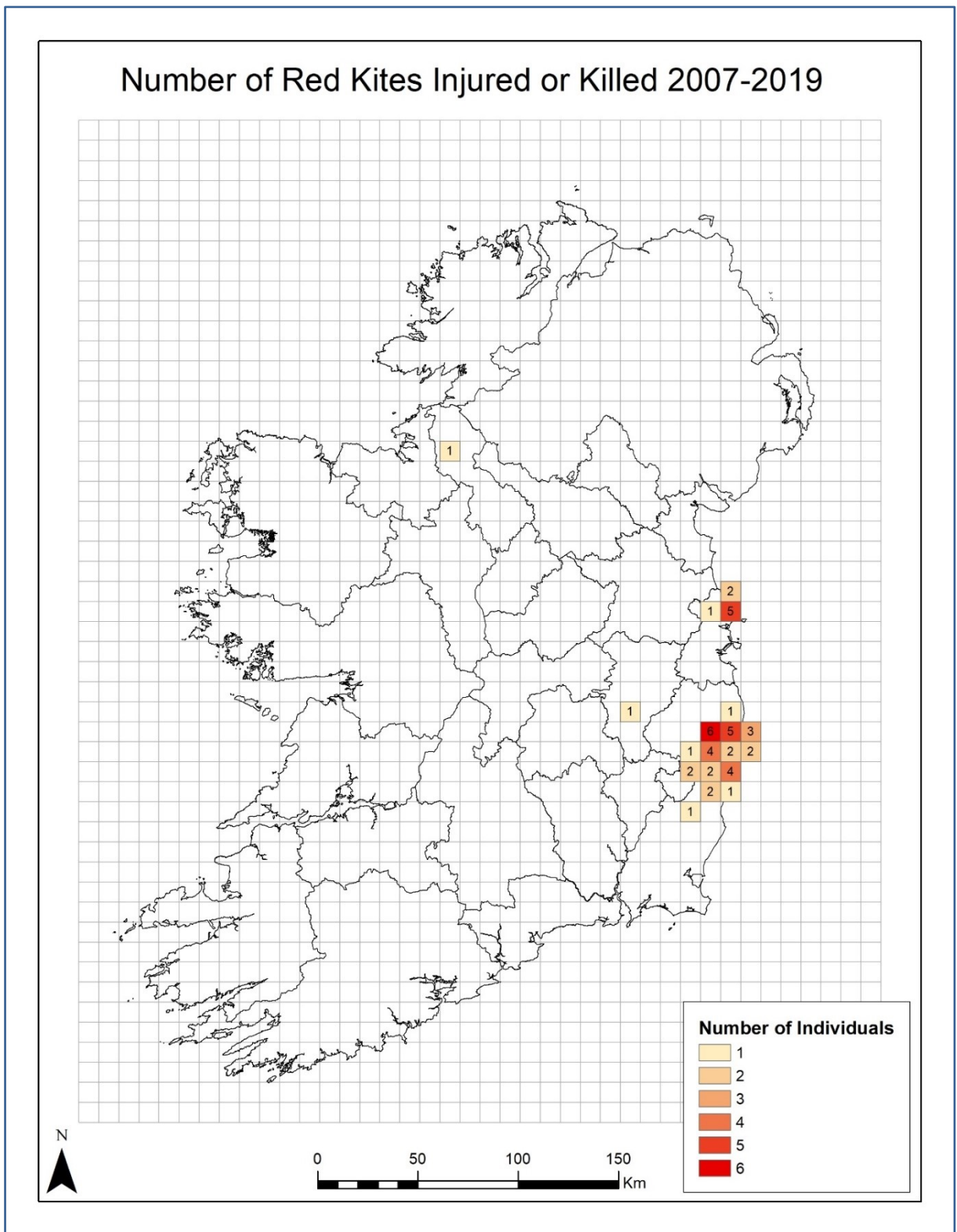
### 3.2.2 Red Kite



**Figure 12** Red Kite (Andrew Kelly).

**Table 4** RAPTOR statistics: Red Kite

Irish name	Préachán na gCearc
English name	Red Kite
Scientific name	<i>Milvus milvus</i>
Breeding population	c. 63 pairs
Conservation status	Amber
Number of confirmed incidents involving Red Kite	46
Number of individuals confirmed killed/injured	46
Types of incidents recorded	Secondary poisoning, direct poisoning.
Incidents most frequently recorded under RAPTOR	Secondary poisoning, direct poisoning.
Notes	Reintroduced to the east of Ireland since 2011, after an absence of almost 200 years. Particular issues with direct poisoning in Co. Wicklow (through illegal poisoned baits) and secondary poisoning by rodenticides in north Co. Dublin.



**Figure 13** Distribution of RAPTOR-related incidents involving Red Kite and the number of individuals involved 2007–2019.

### 3.2.3 Barn Owl



**Figure 14** Barn Owl chicks (Andrew Kelly).

**Table 5** RAPTOR statistics: Barn Owl.

Irish name	Scréachóg Reilige
English name	Barn Owl
Scientific name	<i>Tyto alba</i>
Breeding population	c. 562–702 pairs
Conservation status	Red
Number of confirmed incidents involving Barn Owl	45
Number of individuals confirmed killed/injured	45
Types of incidents recorded	Secondary poisoning, road collision.
Incidents most frequently recorded under RAPTOR	Secondary poisoning, road collision.
Notes	Population trend unknown and range decreasing. High percentage of individuals carry levels of rodenticides. Significant number of mortalities recorded at new motorways including M7 and M8.



### 3.2.4 Peregrine Falcon



**Figure 16** Peregrine Falcon fledgling (John Carrig).

**Table 6** RAPTOR statistics: Peregrine Falcon.

Irish name	Fabhcún Gorm
English name	Peregrine Falcon
Scientific name	<i>Falco peregrinus</i>
Breeding population	c. 425 pairs
Conservation status	Green
Number of confirmed incidents involving Peregrine Falcon	33
Number of individuals confirmed killed/injured	36
Types of incidents recorded	Secondary poisoning, direct poisoning, shooting, powerline collision, road collision, traumatic death.
Incidents most frequently recorded under RAPTOR	Direct poisoning, shooting. Trapping also strongly suspected.
Notes	Population and range increased after a nadir associated with Dichlorodiphenyltrichloroethane (DDT). Vulnerable to intentional persecution at nest sites to which they remain faithful.



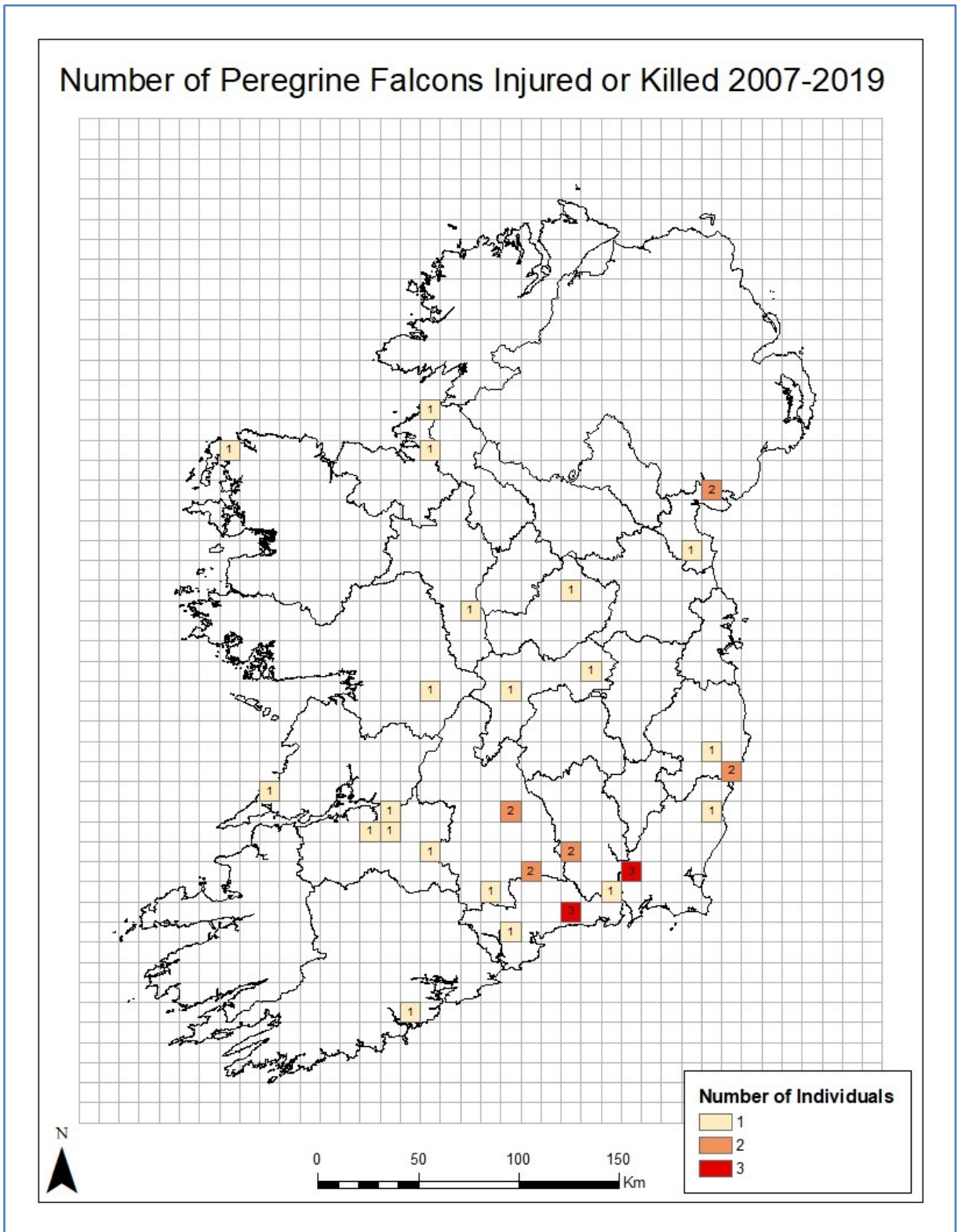


Figure 17 Distribution of RAPTOR-related incidents involving Peregrine Falcon and the number of individuals involved 2007–2019.

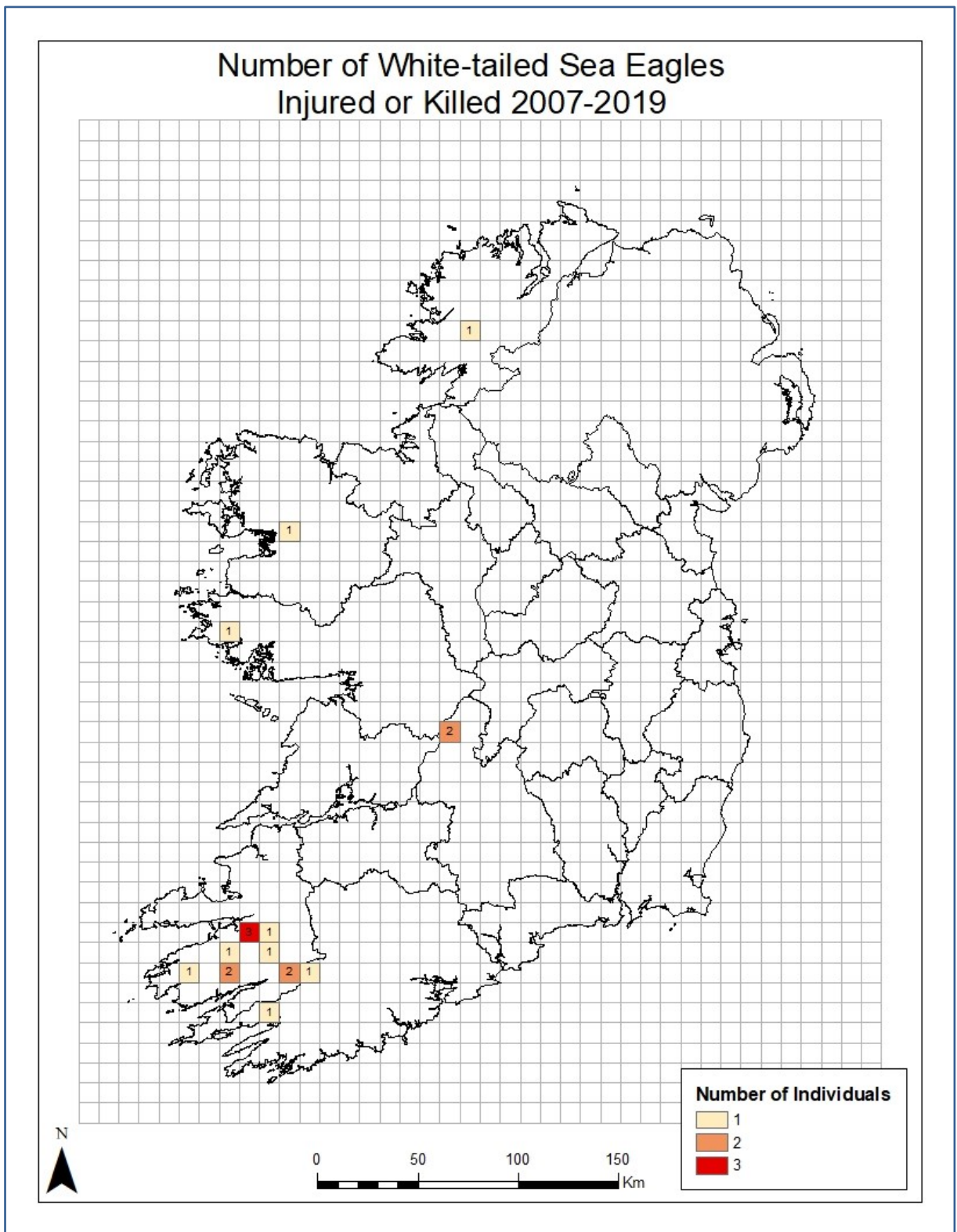
### 3.2.5 White-tailed Eagle



Figure 18 White-tailed Eagle (Joe Huggard).

Table 7 RAPTOR statistics: White-tailed Eagle.

Irish name	Iolar Mara
English name	White-tailed Eagle
Scientific name	<i>Haliaeetus albicilla</i>
Breeding population	c. 12 pairs
Conservation status	Red
Number of confirmed incidents involving White-tailed Eagle	18
Number of individuals confirmed killed/injured	18
Types of incidents recorded	Secondary poisoning, direct poisoning, shooting, wind turbine strike.
Incidents most frequently recorded under RAPTOR	Direct poisoning.
Notes	Reintroduced to Ireland (Co. Kerry) in 2007 after an absence of over 100 years.



**Figure 19** Distribution of RAPTOR-related incidents involving White-tailed Eagle and the number of individuals involved 2007–2019.

### 3.2.7 Hen Harrier



**Figure 20** Hen Harrier delivering food to nest (Barry O'Donoghue).

**Table 9** RAPTOR statistics: Hen Harrier.

Irish name	Cromán na gCearc
English name	Hen Harrier
Scientific name	<i>Circus cyaneus</i>
Breeding population	c. 108–157 breeding females
Conservation status	Amber
Number of confirmed incidents involving Hen Harrier	15
Number of individuals confirmed killed/injured	17
Types of incidents recorded	Direct poisoning, shooting, disturbance, road collision, wind turbine strike, traumatic death.
Incidents most frequently recorded under RAPTOR	Shooting, disturbance, road collision, traumatic death.
Notes	Population and range decreasing. Movements of Hen Harrier between Ireland and UK highlights importance of landscape and persecution issues in a metapopulation.

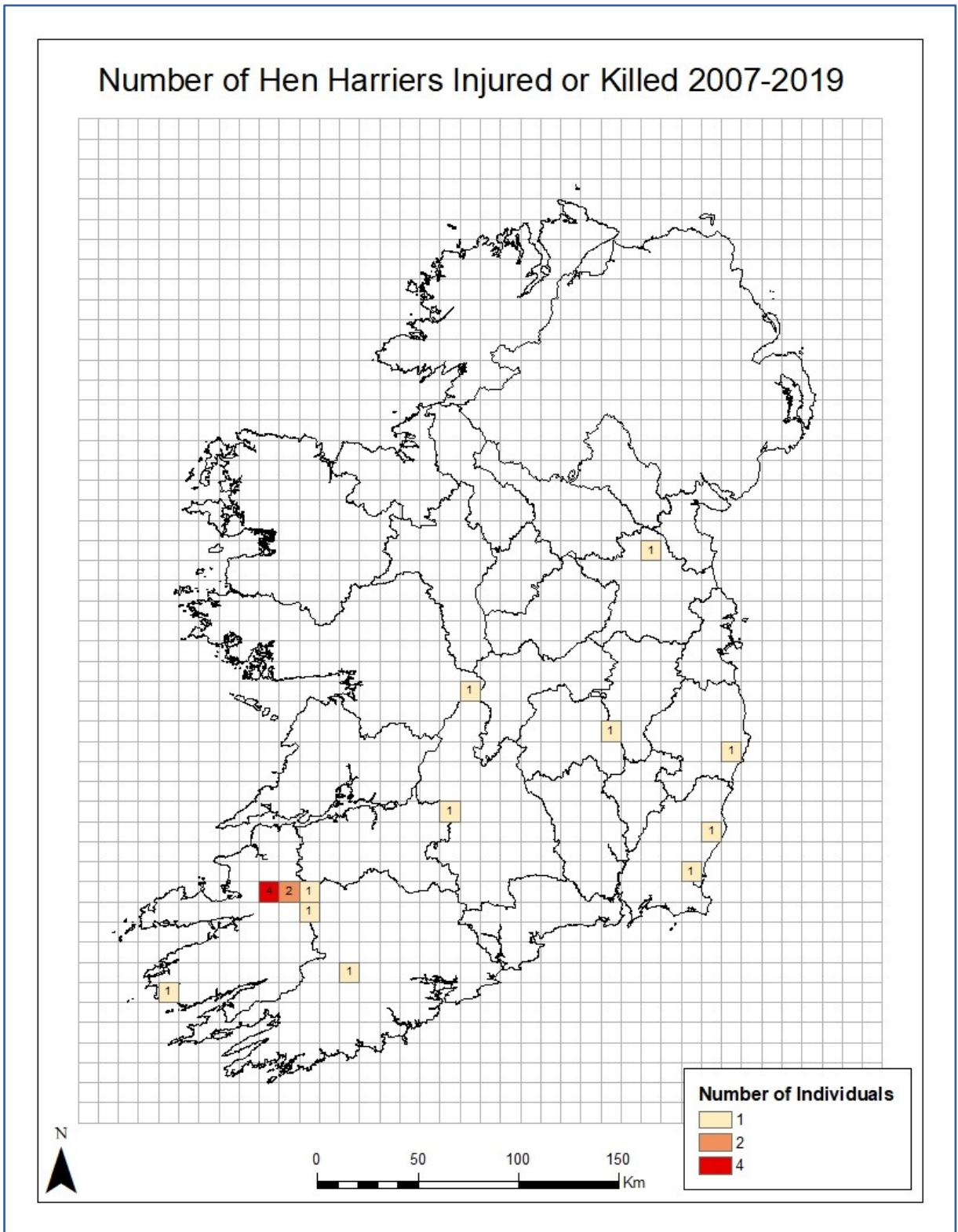
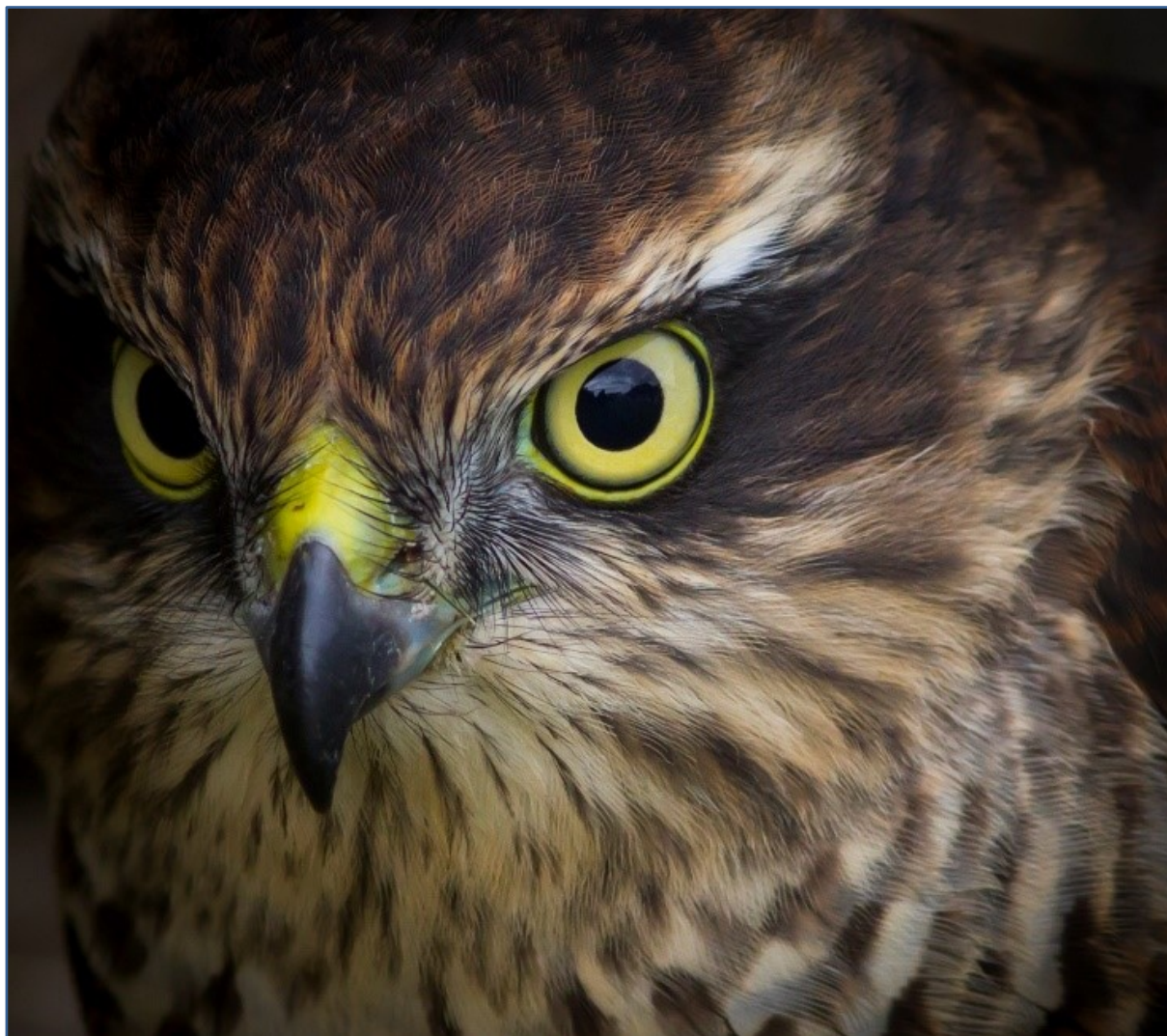


Figure 21 Distribution of RAPTOR-related incidents involving Hen Harrier and the number of individuals involved 2007–2019.

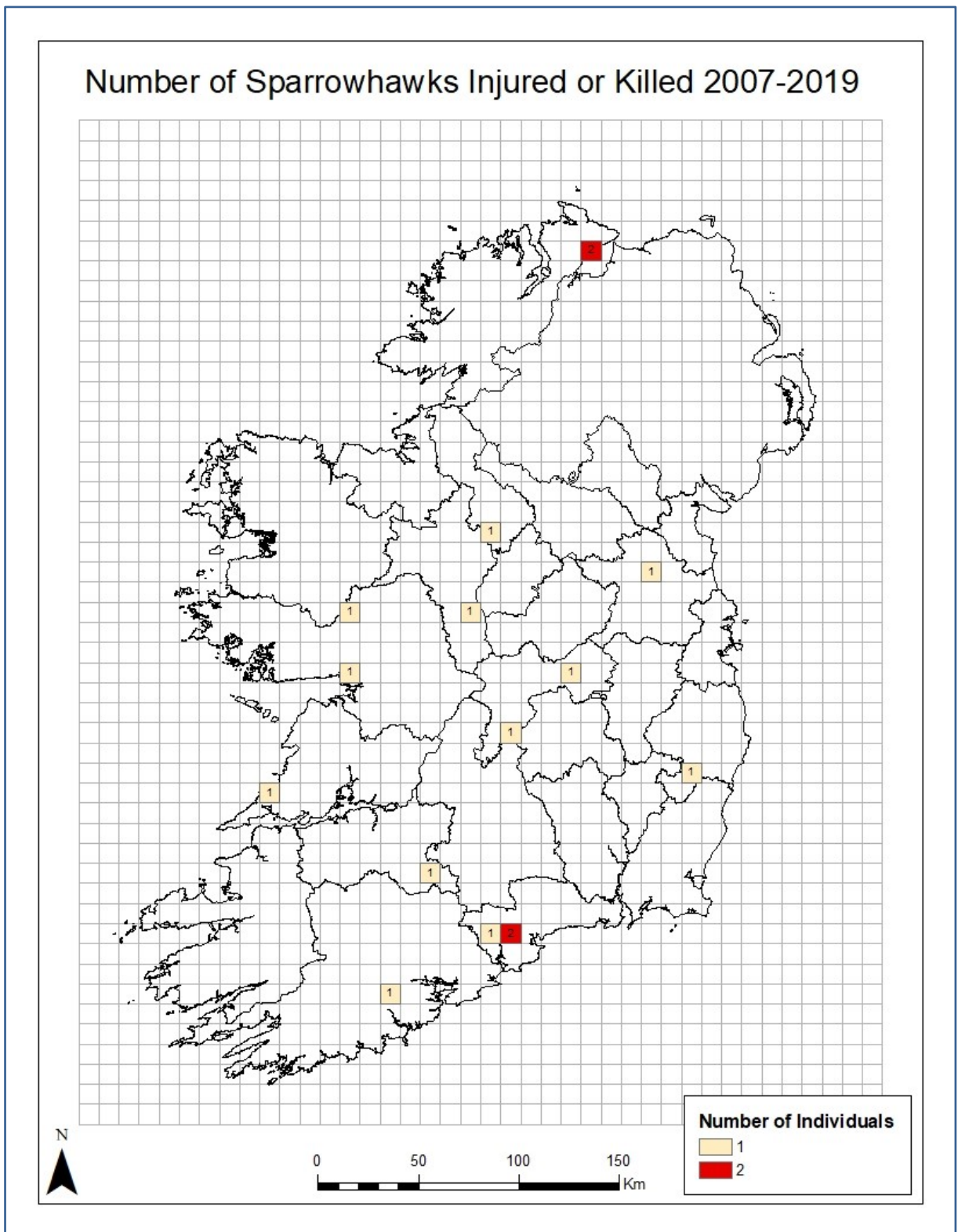
### 3.2.7 Sparrowhawk



**Figure 22** Sparrowhawk (Mario McRory).

**Table 8** RAPTOR statistics: Sparrowhawk.

Irish name	Spioróg
English name	Sparrowhawk
Scientific name	<i>Accipiter nisus</i>
Breeding population	c. 8476–14252 individuals
Conservation status	Green
Number of confirmed incidents involving Sparrowhawk	16
Number of individuals confirmed killed/injured	16
Types of incidents recorded	Direct poisoning, shooting, trapping, road collision.
Incidents most frequently recorded under RAPTOR	Direct poisoning, road collision, shooting.
Notes	Vulnerable to collisions due to its fast and low flying nature. Directly targeted for persecution via poison, shooting and trapping.



**Figure 23** Distribution of RAPTOR-related incidents involving Sparrowhawk and the number of individuals involved 2007–2019.

### 3.2.8 Kestrel

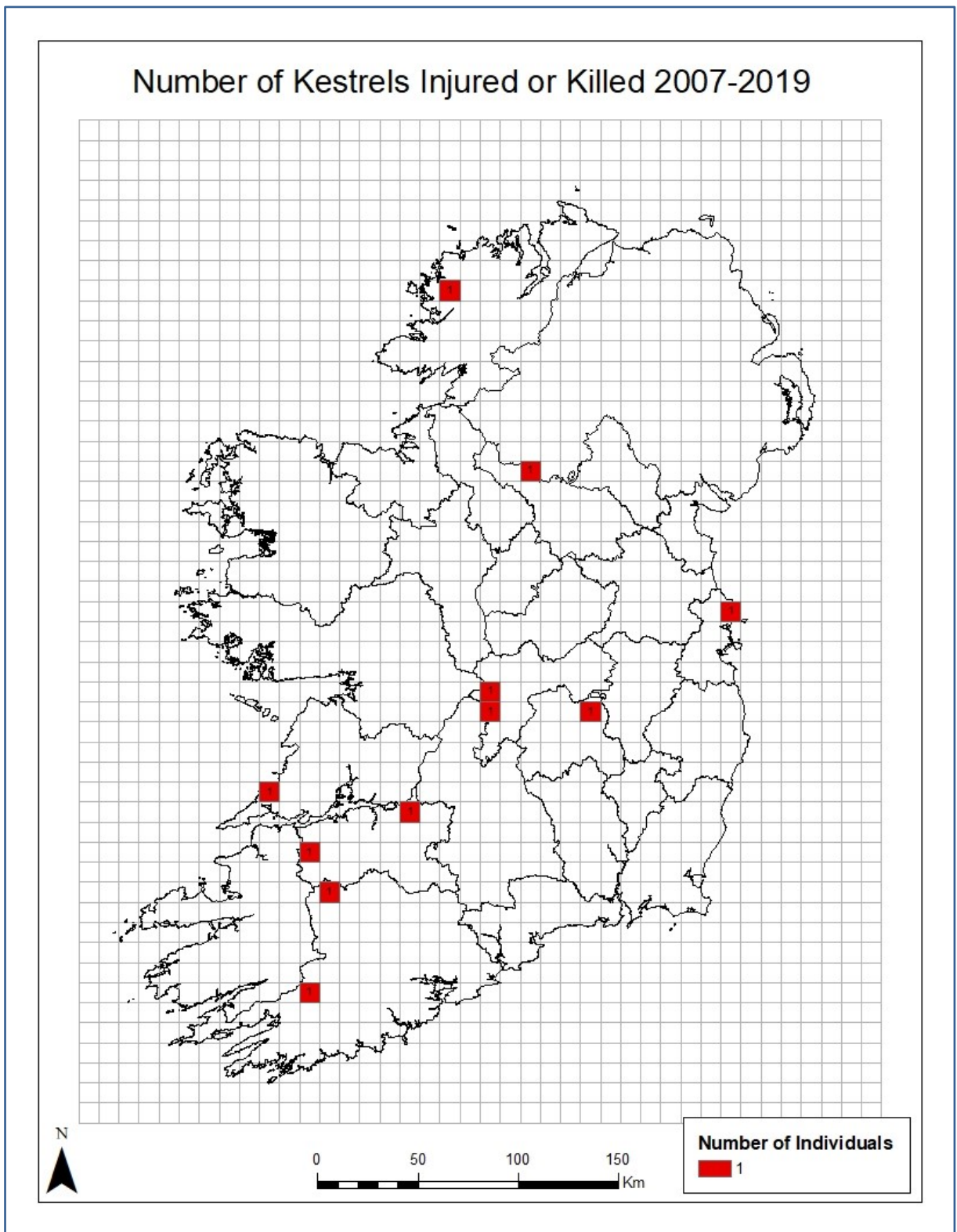


**Figure 24** Kestrel feeding young (John Carrig).

**Table 10** RAPTOR statistics: Kestrel.

Irish name	Pocaire Gaoithe
English name	Kestrel
Scientific name	<i>Falco tinnunculus</i>
Breeding population	c. 9918–17393 individuals
Conservation status	Amber
Number of confirmed incidents involving Kestrel	11
Number of individuals confirmed killed/injured	11
Types of incidents recorded	Secondary poisoning.
Incidents most frequently recorded under RAPTOR	Secondary poisoning.
Notes	Population and range decreasing. All 11 RAPTOR related incidents involving Kestrel were linked to secondary poisoning by rodenticides, reflecting the species' dependence on rodents for food.





**Figure 25** Distribution of RAPTOR-related incidents involving Kestrel and the number of individuals involved 2007–2019.

### 3.2.9 Long-eared Owl



**Figure 26** Long-eared Owl (John Carrig).

**Table 11** RAPTOR statistics: Long-eared Owl

Irish name	Ceann Cait
English name	Long-eared Owl
Scientific name	<i>Asio otus</i>
Breeding population	c. 1484–2703 pairs
Conservation status	Amber
Number of confirmed incidents involving Long-eared Owl	8
Number of individuals confirmed killed/injured	8
Types of incidents recorded	Secondary poisoning, shooting, road collision.
Incidents most frequently recorded under RAPTOR	Road collision. Secondary poisoning suspected to be more prevalent than shown by the number of confirmed cases.
Notes	Population trend unknown and range increasing.

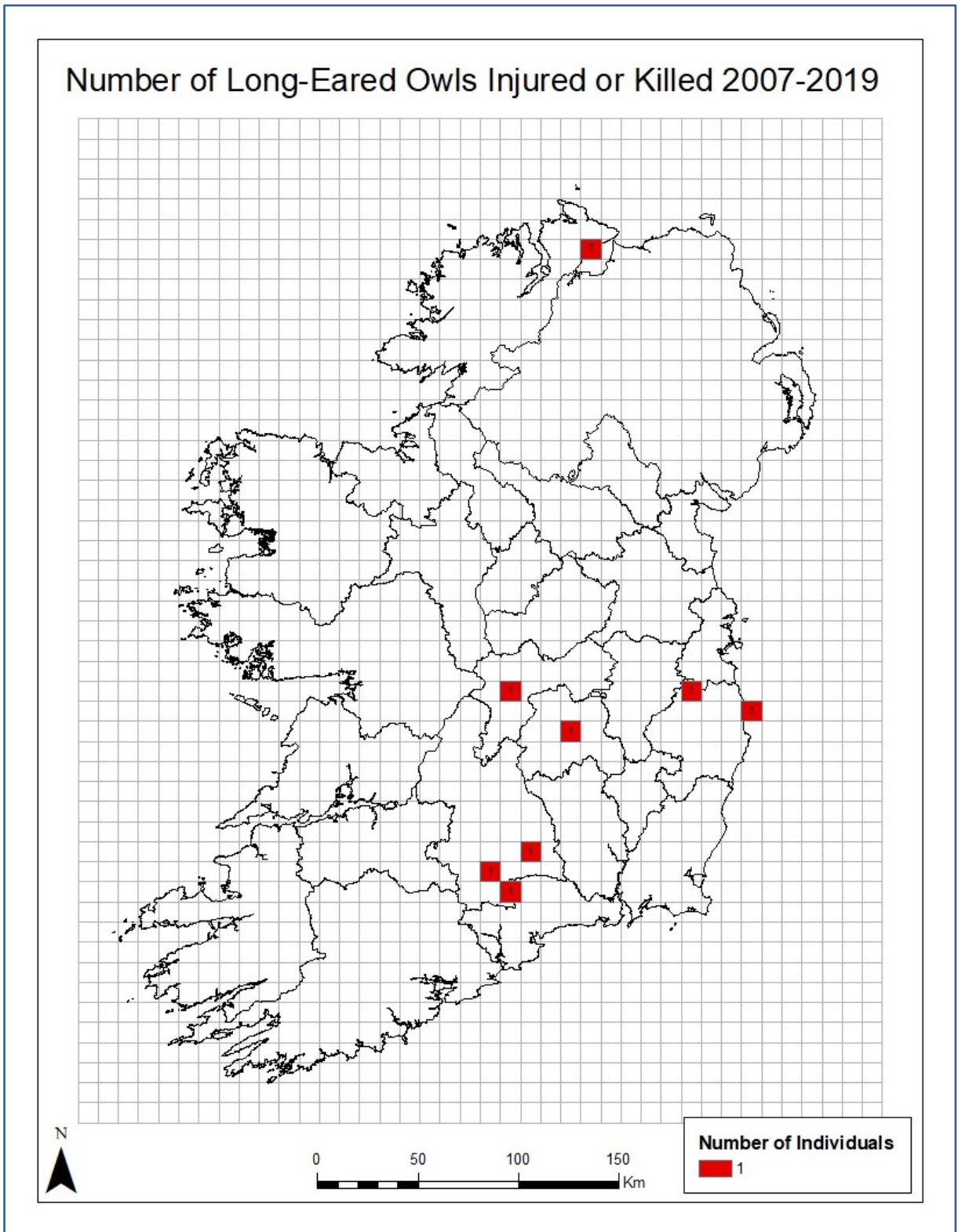


Figure 27 Distribution of RAPTOR-related incidents involving Long-eared Owl and the number of individuals involved 2007–2019.

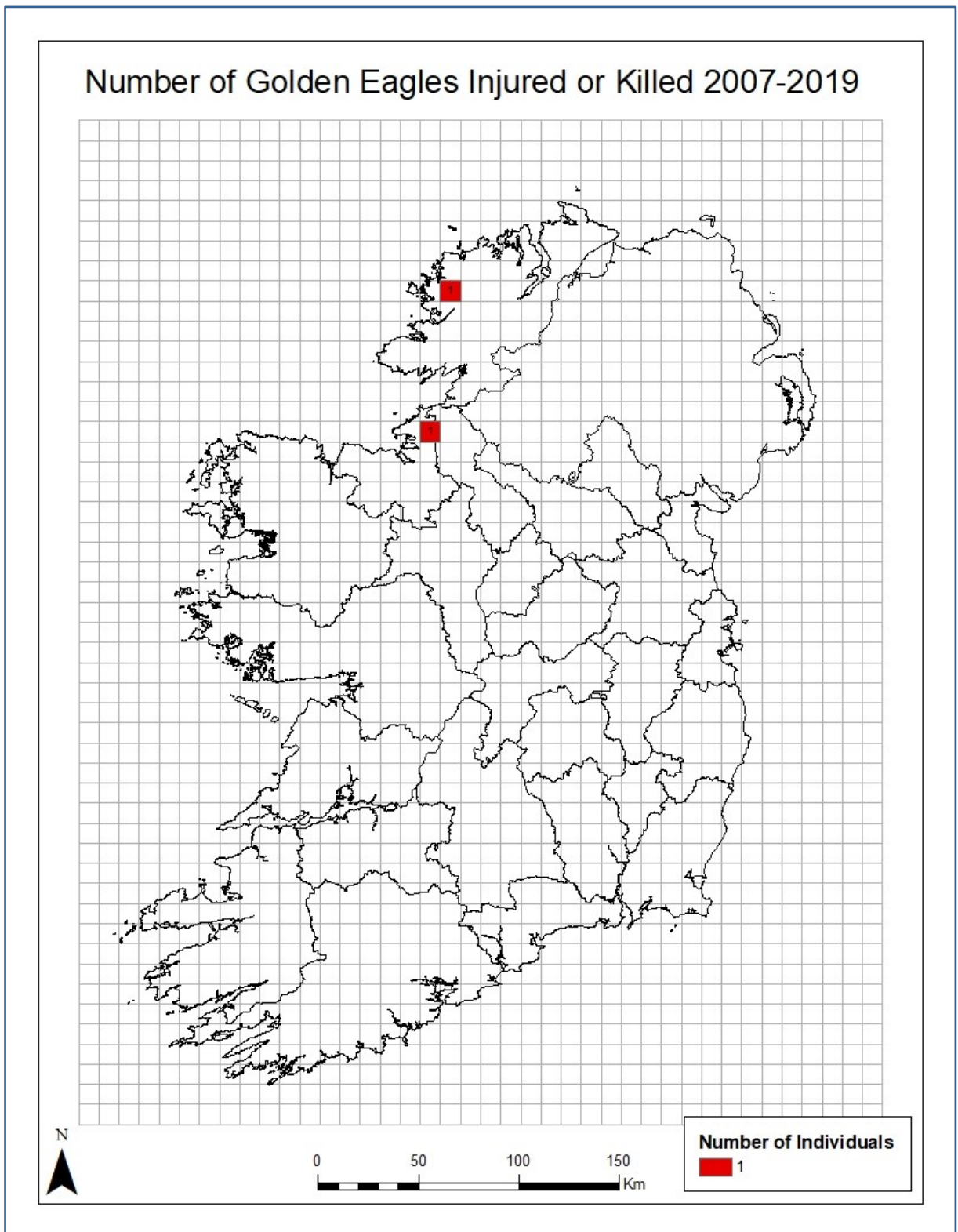
### 3.2.10 Golden Eagle



**Figure 28** Golden Eagle on the point of release to the Irish countryside (Marc Ruddock).

**Table 12** RAPTOR statistics: Golden Eagle.

Irish name	Iolar Fíréan
English name	Golden Eagle
Scientific name	<i>Aquila chrysaetos</i>
Breeding population	c. 5 pairs
Conservation status	Red
Number of confirmed incidents involving Golden Eagle	2
Number of individuals confirmed killed/injured	2
Types of incidents recorded	Direct poisoning.
Incidents most frequently recorded under RAPTOR	Direct poisoning.
Notes	Reintroduced to Ireland (Co. Donegal) since 2001 after an absence of 90 years.



**Figure 29** Distribution of RAPTOR-related incidents involving Golden Eagle and the number of individuals involved 2007–2019.

### 3.2.11 Short-eared Owl



**Figure 30** Short-eared Owl (Andrew Kelly).

**Table 13** RAPTOR statistics: Short-eared Owl.

Irish name	Ulchabhán Réisc
English name	Short-eared Owl
Scientific name	<i>Asio flammeus</i>
Breeding population	Unknown
Conservation status	Amber
Number of confirmed incidents involving Short-eared Owl	1
Number of individuals confirmed killed/injured	1
Types of incidents recorded	Shooting
Incidents most frequently recorded under RAPTOR	Shooting
Notes	The individual recorded was shot in Co. Kerry. While only one individual was recorded, it is likely that other Short-eared Owls have been shot/poisoned but undiscovered, primarily due to the remote and densely vegetated areas that they frequent.

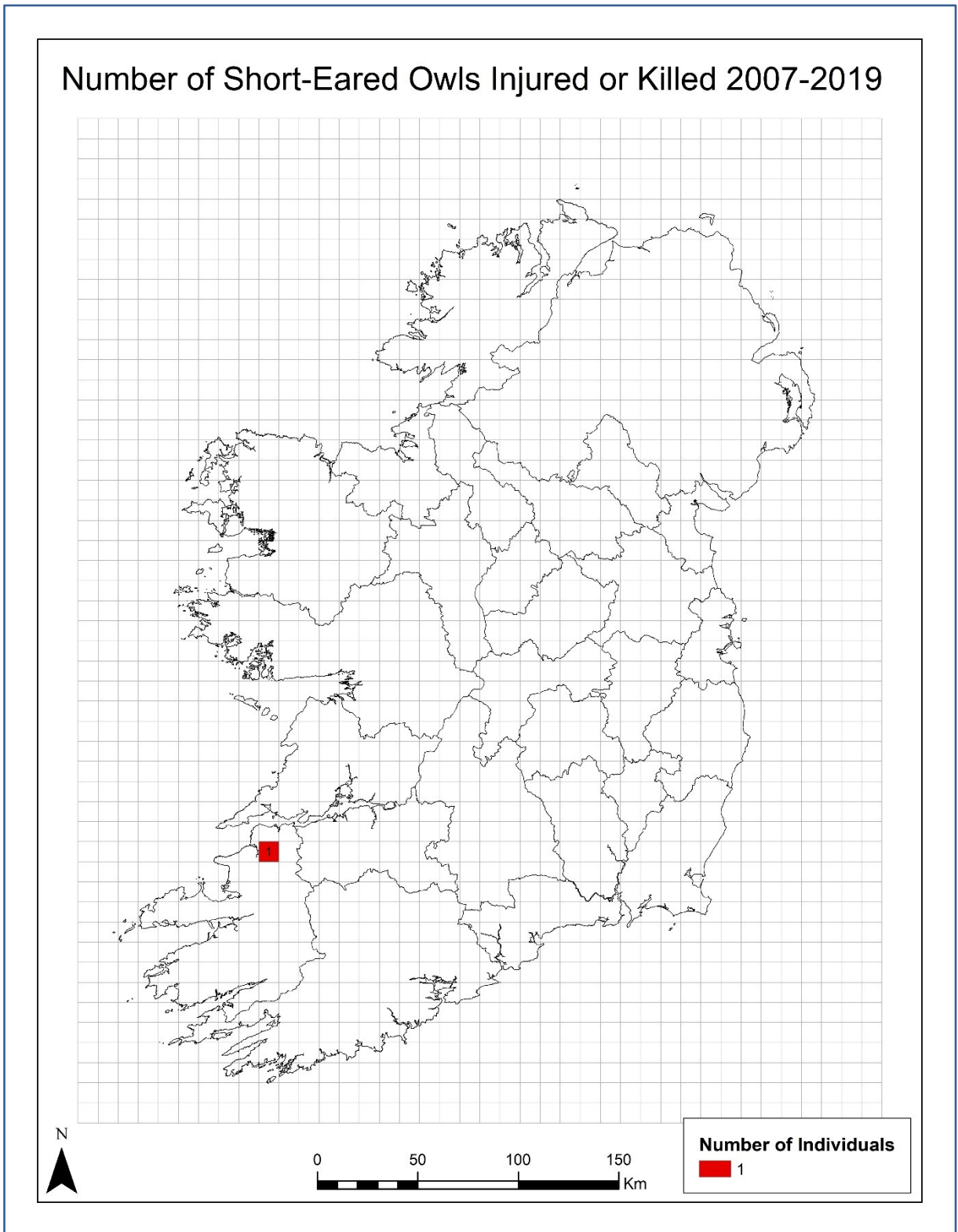


Figure 31 Distribution of RAPTOR-related incidents involving Short-eared Owl and the number of individuals involved 2007–2019.

### 3.2.12 Merlin

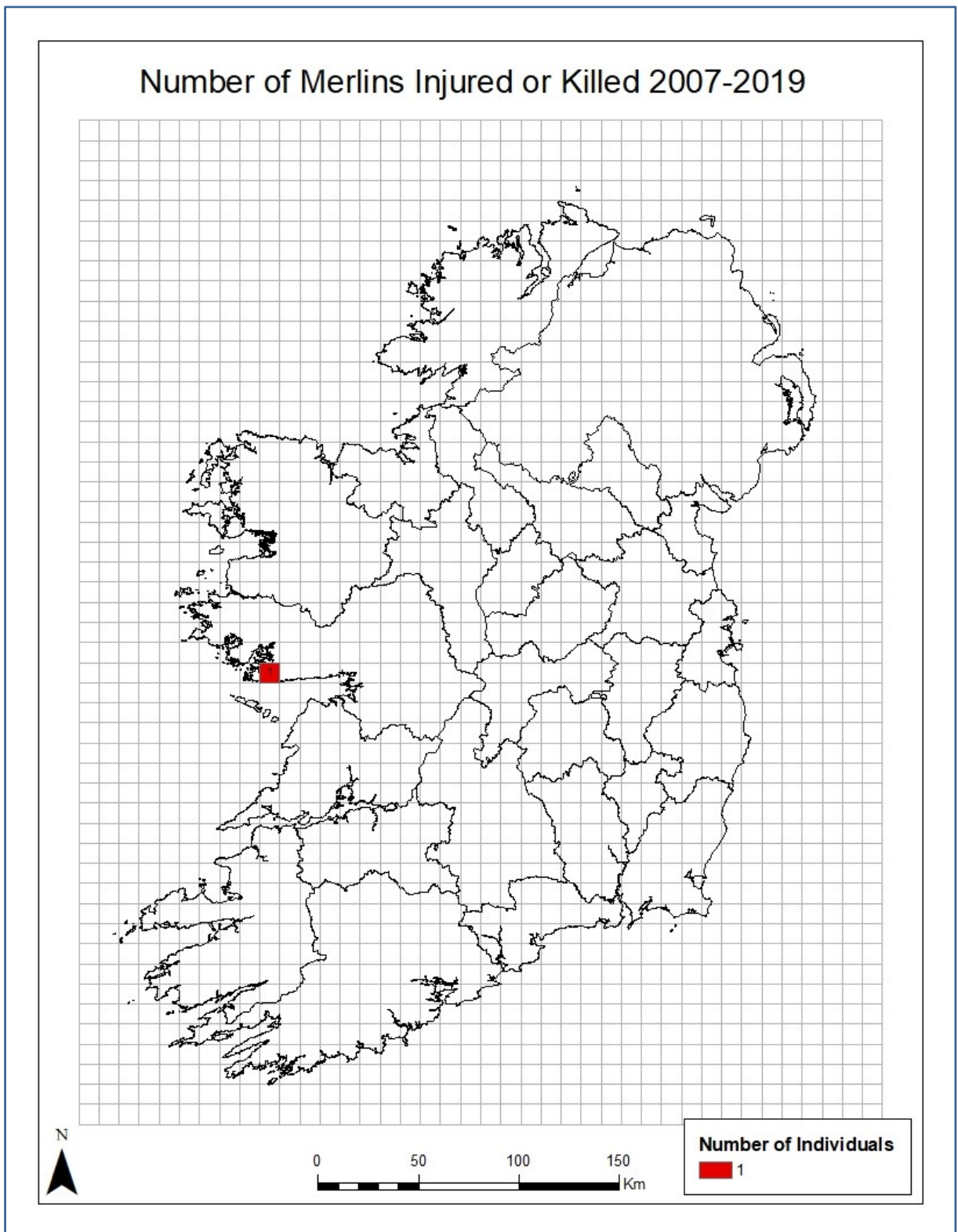


**Figure 32** Merlin (Mario McRory).

**Table 14** RAPTOR statistics: Merlin.

Irish name	Meirliún
English name	Merlin
Scientific name	<i>Falco columbarius</i>
Breeding population	c. 200–400 pairs
Conservation status	Amber
Number of confirmed incidents involving Merlin	1
Number of individuals confirmed killed/injured	1
Types of incidents recorded	Poisoning
Incidents most frequently recorded under RAPTOR	Poisoning
Notes	Interestingly, the individual in question had lead poisoning. It is unknown how this accumulated in the bird's system.

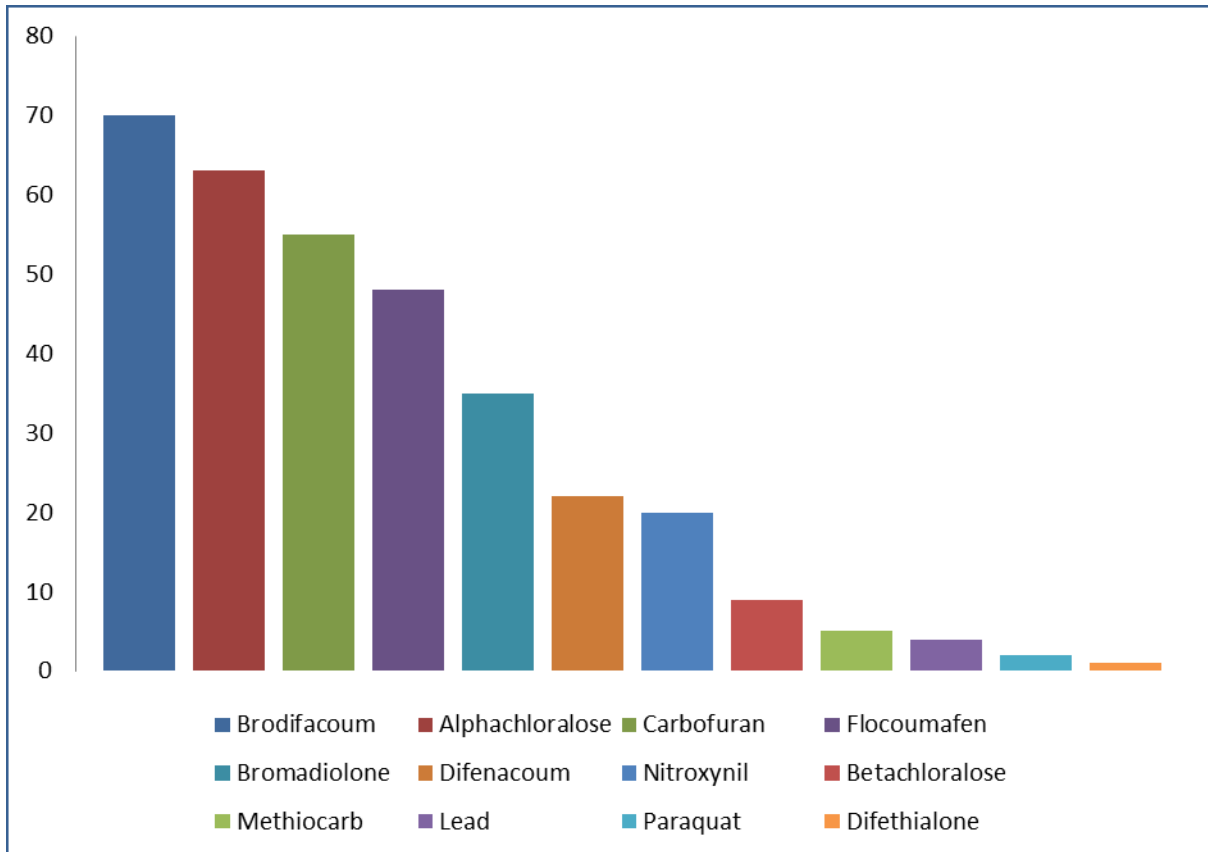




**Figure 33** Distribution of RAPTOR-related incidents involving Merlin and the number of individuals involved 2007–2019.

### 3.3 Poison incidents

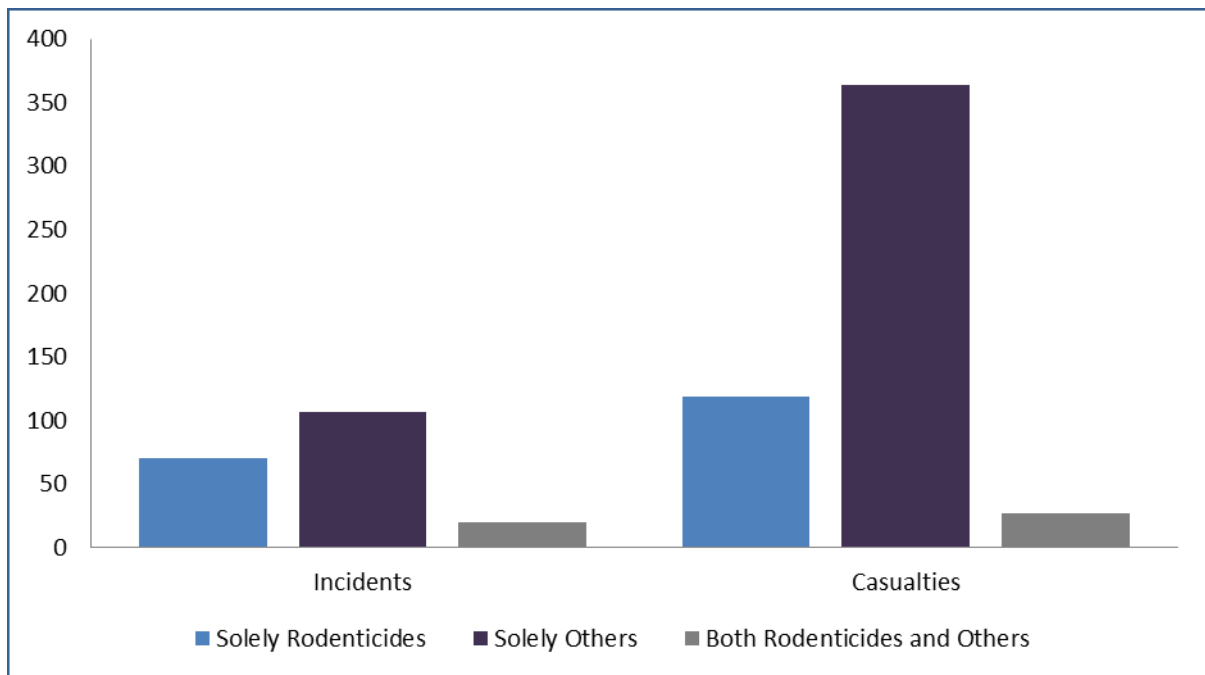
In total, poisons were detected in a total of 197 incidents, involving a total of 510 individual animals killed or injured (including raptors, other animals and domestic animals). A total of 12 different types of poison were detected and their prevalence (the number of times presented in individual incidents) is presented in Figure 34. Poisons were regularly found acting in tandem, particularly in the case of the rodenticides (Brodifacoum, Flocoumafen, Bromadiolone, Difenacoum and Difethialone).



**Figure 34** Frequency occurrence of poisons (number of times detected in RAPTOR incidents) between 2011 and 2019.

The principal poisons that were implicated in RAPTOR incidents were Brodifacoum (70 incidents), Alphachloralose (n=63), Carbofuran (n=55), Flocoumafen (n=48), Bromadiolone (n=35), Difenacoum (n=22), Nitroxylnil (n=20), Betachloralose (n=9), Methiocarb (n=5), Lead (n=4), Paraquat n= (2) and Difethialone (n=1).

Brodifacoum, Flocoumafen, Bromadiolone, Difenacoum and Difethialone are all Second-Generation Anti-Coagulant Rodenticides (SGARs). Figure 35 provides a breakdown of prevalence between rodenticide type poisons and other poisons.

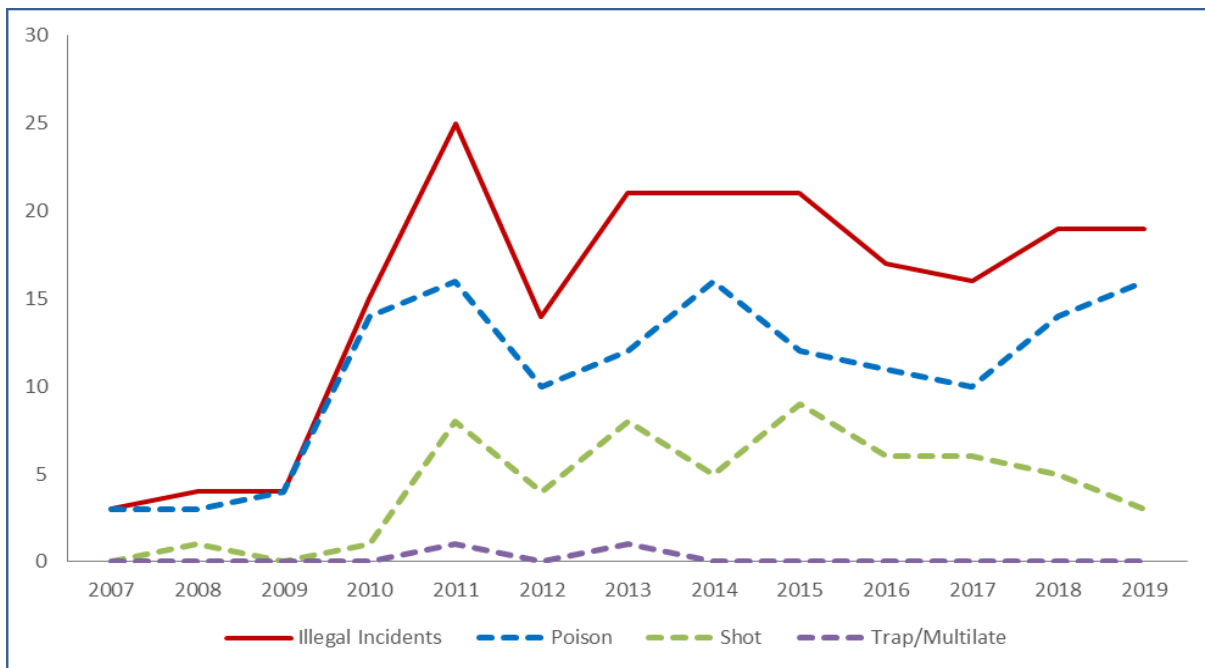


**Figure 35** Poison Cases (with injury or mortality): Rodenticide vs 'Others'.

Rodenticides have been recorded in 45% of all confirmed incidents (and 60% of the incidents confirmed and recorded since the RAPTOR protocol was initiated in 2011). As per Figure 34, Flocoumafen, Brodifacoum and Bromadiolone were the main rodenticide compounds detected, followed by Difenacoum and Difethialone. The number of wildlife casualties caused by 'other' poisons *i.e.* non-rodenticide poisons is much higher than that relating to rodenticides. The multiplier (coefficient) of rodenticides was found to be 1.7. In other words, for every incident involving rodenticides, 1.7 wildlife individuals were injured or died, whereas for 'other' poisons, the multiplier was 3.4. In particular, Alphachloralose stands out as the poison that has been attributed to the highest number of casualties; 303 wildlife individuals injured or killed across 63 incidents, a multiplier of 4.8.

### 3.4 Illegal incidents and prosecutions

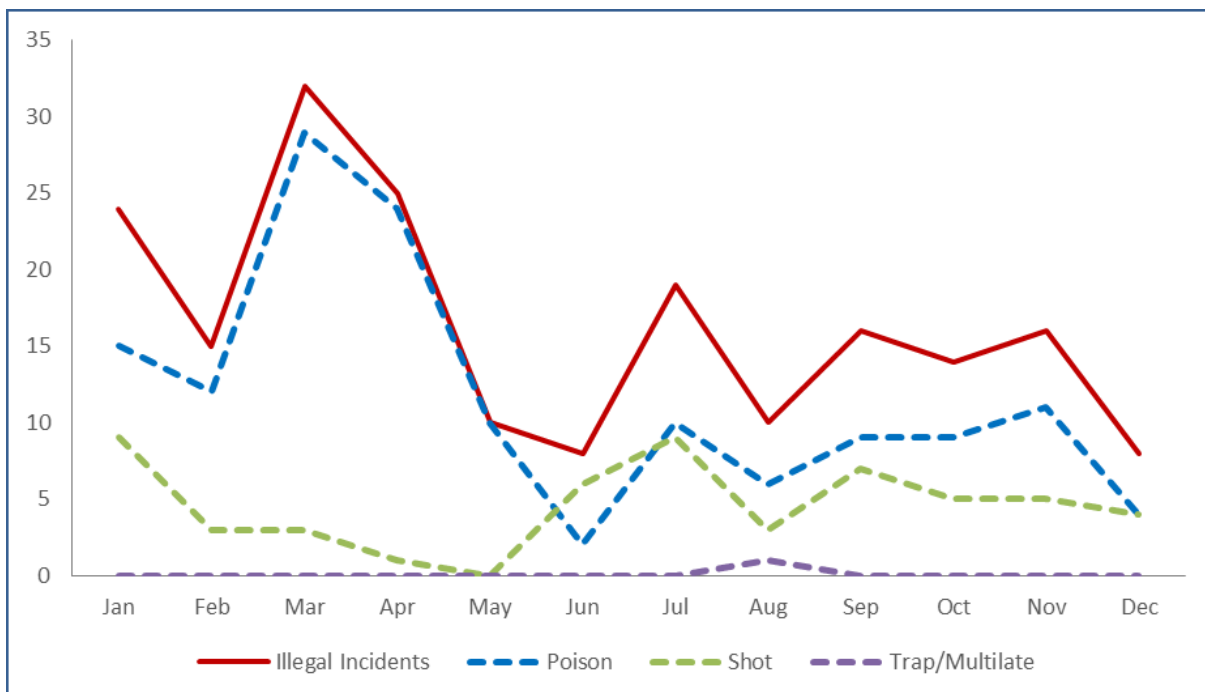
Between 2007 and 2019, 199 incidents of that could be termed 'illegal' (*i.e.* involving direct persecution or misuse of poisons) were recorded. Poison incidents (involving poisoned meat bait or illegal poisons) accounted for 71.5% of such cases, while shootings accounted for 28% and trapping/mutilation accounted for 0.5% of such cases. A total of 392 individual animals were impacted by such incidents, including a total of 164 birds of prey. There are notable blackspots for such incidents throughout the country and particular risk periods, namely springtime for illegal/misuse of poison incidents and late summer/autumn and winter for shooting incidents. Figure 36 presents the number of illegal incidents detected between 2007 and 2019.



**Figure 36** Number of illegal incidents recorded each year.

As might be expected, there was an increase in the number of illegal incidents detected from the time the RAPTOR protocol was initiated in 2011. Indeed, 2011 saw the largest number of illegal incidents recorded in any one year (n=25). Since then, the number of illegal incidents recorded has fluctuated between 14 (in 2012) and 21 per year (in 2013 and 2014).

The number of illegal incidents recorded in any of the 12 months of the year is presented in Figure 37.



**Figure 37** Illegal incidents recorded per month (including the years 2007–2019).

While an average of 16.5 illegal incidents were detected for each month over the 12 years from 2007 and 2019 (an average of 14.25 for each month excluding the years prior to the initiation of the RAPTOR protocol), March had the highest number of illegal incidents recorded for any month between 2007 and

2019 (n=32), followed by April (n=25). The months when fewest incidents were recorded are June and December.

A total of seven prosecutions were pursued, relating to 12 incidents in Co. Waterford, Co. Meath, Co. Offaly, Co. Louth and Co. Galway. One prosecution relating to the poisoning of 10 rooks with poisoned bait, resulted in a €50 fine, while another prosecution relating to the poisoning of three Rook with poisoned bait, resulted in a €250 fine. Three cases were struck-out, two of which (relating to poisoned meat bait including Carbofuran and Alphachloralose) were struck-out on the condition that the defendants gave donations (€300 each) to eNGOs. Another case was withdrawn by the prosecution before a court case. A significant prosecution in Co. Waterford saw four defendants prosecuted in relation to targeted Peregrine Falcon persecution with fines of €600, two of €700 and €7,500. At the time of publication, a significant case involving raptor persecution in Co. Donegal is proceeding through the judicial system.

## 4 Discussion

It is clear that human, non-habitat related threats to raptors in Ireland are widespread and indeed prevalent. Poison and persecution incidents have been recorded in every county, with particular blackspots in the East and South-west. It is crucial to understand that the cases presented in this review are merely those that came to light under the RAPTOR protocol and that any statistics or trends discernible (*e.g.* the number of cases per year) may be indicative only. It would be naive to think that any more than a fraction of raptor poisoning and persecution have been detected and officially recorded. The chances of finding a bird carcass, given a varied landscape and terrain, tall vegetation and scavengers can be considered as slim. It is even more difficult to discover birds that have been shot illegally, as the perpetrator will often remove or conceal the carcass to reduce the chance of being apprehended. Given an average of 35 incidents were recorded annually since the inception of the RAPTOR protocol in 2011, it is not unreasonable to speculate that hundreds of birds of prey are injured or killed each year in Ireland as a result of direct anthropogenic impacts including poison and persecution. The global figure for the number of incidents recorded each year has not fluctuated significantly since the protocol was initiated in 2011, apart from 2012, when data from a specific study on road collisions was included in the statistics.

It is notable that other wildlife including corvids, gulls, Otter, and Red Fox were also impacted by illegal poisoning, as were dogs. There is no dedicated surveillance protocol for non-raptor species, but these were recorded co-incidentally under the RAPOR protocol, given the poisoned bait involved could have also impacted birds of prey.

In terms of geographical spread, RAPTOR related incidents were confirmed in a total of 181 10 km squares, giving a 21% coverage of all 10 km grid squares in the Republic of Ireland (some of which along the coast may have a miniscule land area). While there was a higher than average number of incidents in the east of the country and in Co. Kerry, west Co. Cork and Co. Donegal, this may be somewhat biased by the use of satellite tags (*e.g.* on reintroduced eagles and Red Kite) and a greater number of people in the east of the country (*i.e.* more people with a chance of encountering and reporting a dead bird of prey).

March and April were noted to be peak months for illegal incidents, particularly poison incidents. Of the 57 illegal incidents that were recorded to occur in the months of March and April, 48 involved poisons such as Nitroxylin, Carbofuran and Alphachloralose, with poisoned bait discovered in nine of those incidents.

The use of poison has been greatly restricted under EU law. It is illegal to poison any animal (including birds) other than rats, mice or rabbits, in Ireland and only then using certain registered products. However, it is clear that particular poisons are causing serious damage, both deliberately and unintentionally.

The majority of incidents involving SGARs are believed to have emanated from the bio-accumulation of such poisons by the ingestion of rodents who themselves had ingested the rodenticides are thus taken to be indirect and unintentional. There were however a limited number of poisoning cases where rodenticides were laced on poisoned meat bait. While their presence and impact is largely taken to be secondary and unintentional, they can have lethal and sub-lethal effects and their presence (and prevalence) in protected wildlife is unwelcome. The Campaign for Responsible Rodenticide Use<sup>1</sup> (CRRU) has been established with key objectives that involve reducing the prevalence of rodenticides in protected wildlife.

Brodifacoum, an ingredient in rodenticides, was the most prevalent poison found in birds of prey. It is particularly striking to note Alphachloralose and Carbofuran as the second and third most prevalent

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<sup>1</sup> [www.thinkwildlife.org](http://www.thinkwildlife.org)

poisons, given both are illegal to use. Both have the capacity to result in mass poisonings. In addition, both were often used in combination, particularly in cases where live pigeons were used as bait for Peregrine Falcon and Sparrowhawk. Of the 20 incidents involving Nitroxylnil, all happened during the period November – May in upland areas, using poisoned meat bait. One particular incident of an uncooked chicken laced with Nitroxylnil was found by children on a school outing, west of Killarney in Co. Kerry, showing that poisoning is not just of concern for wildlife or domestic animals, but so too public health and safety. Alphachloralose, Carbofuran, Nitroxylnil, Betachloralose, Methiocarb and Paraquat are all believed to have been used with the intent of targeting wildlife, whether mammalian or avian predators.

Examining the incidents involving the raptor most commonly impacted, there were two peak periods in terms of illegal incidents involving Common Buzzard, namely January to March and October, with those four months accounting for 57% of such incidents. Of the 67 illegal incidents involving Common Buzzard, 36 were poison incidents (including 16 incidents with Carbofuran and 11 incidents with Alphachloralose) and 31 were shot.

Red Kite has suffered greatly through direct and indirect poisoning, but thankfully continue to expand its population since reintroduction. While there have been cases of Red Kite involving the deliberate targeting of Red Kite, by and large it is believed that most direct poisoning events come from poisoned meat baits illegally placed for other species (including Red Fox). It is interesting to note that 25 of the 34 cases of Red Kite injury/mortality in Co. Wicklow involved poisons such as Alphachloralose, Carbofuran and Nitroxylnil, whereas all of the eight cases of Red Kite injury/mortality in Co. Dublin involved rodenticide poison (with all those cases involving Brodifacoum).

Barn Owl is also known to suffer a high incidence of poisoning from SGARs, but the majority of Barn Owl deaths recorded under the RAPTOR protocol have been attributed to road collision, further highlighting the importance of such information prior to future infrastructure planning. Peregrine Falcon and Hen Harrier are clearly targeted for persecution and the number of individuals lost through persecution is all the more concerning given their population sizes, particularly Hen Harrier, with just 108 breeding pairs confirmed in the most recent (2015) national survey, and a continuing decline of population mainly due to habitat loss and degradation. White-tailed Eagle also features prominently, despite a small (reintroduced) population. Considering the small population and the fact the majority would have been fitted with tracking devices highlights the extent to which other birds may be lost to poisoning or persecution, yet never found. In addition, Kestrel, Sparrowhawk, Golden Eagle, Merlin, Long-eared Owl and Short-eared Owl were among those confirmed to have been lost to anthropogenic, non-habitat related pressures.

Other issues relating to collisions with wind turbines, powerlines or traffic, highlight the need for careful planning, while risks pertaining to disturbance should continue to be monitored and considered carefully in relation to licencing of particular activities.

## 5 Conclusion

The data collected under the RAPTOR protocol and presented in this review clearly points to the fact that there are widespread, serious and significant issues facing birds of prey in Ireland, even beyond the wider landscape and habitat loss and degradation issues that are ultimately leading to the decline of many of these species. The RAPTOR protocol has given an important insight as to the species affected, the modus operandi, timing and hotspots of such incidents. The intelligence gathered and presented here can be utilised to inform strategies to counteract the various threats and pressures that may include training, engagement with relevant stakeholders, surveillance and forensic analysis of wildlife crime scenes. Much more damage will likely be caused in the absence of such action. Continuing to record confirmed and possible incidents in a systematic fashion will build on the database and provide stronger background information to target illegal activity through enforcement and education, contribute towards informing policies related to the possession, availability and use of poisons and in turn combat human-related raptor injury and mortality. Likewise, the information garnered from recording and analysing incidents of road, turbine or fence collisions can help inform forward planning on such matters.



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# Appendix 1 RAPTOR Submission Sheet



**RAPTOR**  
(Submission and chain of custody form)

<b>URGENT CASE *</b>	<b>ROUTINE CASE</b>	<b>INVESTIGATING NPWS OFFICER NAME (CAPITALS):</b>	
		<b>EMAIL ADDRESS (CAPITALS)**:</b>	<b>@CHG.GOV.IE</b>

\*APPROVED BY NPWS WILDLIFE INSPECTOR

\*\*RVL to send reports to this person by email and cc to RAPTOR@chg.gov.ie

<i>DETAILS OF SPECIMEN FOR COMPLETION BY NPWS SUBMITTING OFFICER</i>		<b>CHAIN OF CUSTODY RECORD FOR COMPLETION AT ALL TRANSFERS AFTER INITIAL COLLECTION</b>				<b>EVIDENCE BAG IS INTACT AND BAG NUMBER RELATES TO FORM</b>	
SPECIES (ENGLISH NAME)		GIVEN TO	BY	DATE	TIME	YES	NO
FOUND AT							
FIRST DATE IN NPWS POSSESSION							
SUBMITTED BY							
NPWS SIGNATURE							
EVIDENCE BAG NUMBER							
NPWS OFFICE ADDRESS							
<b>TICK IF TOXICOLOGY TEST ONLY REQUIRED (NO NEED FOR X-RAY)</b>		<b>RVL SDG NUMBER</b>	<b>RVL PRELIMINARY NOTES</b>				
/ /							



## Appendix 2 RAPTOR Database Fields

Please send copy to: <a href="mailto:raptor@ahq.gov.ie">raptor@ahq.gov.ie</a>	Case 1	Case 2
<b>Discovery</b>		
Incident Reported to You (1 for yes, 0 for no)		
Incident Found by You (1 for yes, 0 for no)		
Your (Ranger) Contact Details - Name & No. (held confidentially and will not be disclosed to 3rd parties)		
<b>Date of Incident (or report/submission etc.)</b>		
<b>Type of Incident</b>		
Report without physical evidence (1 for yes, 0 for no)		
Suspected or Likely Poisoning/Persecution (1 for yes, 0 for no)		
Confirmed Poisoning/Persecution (1 for yes, 0 for no)		
Accidental		
<b>Species (English name)</b>		
No. of Individuals		
Male/Female/Unknown		
Adult/Juvenile/Unknown		
Possibly rearing young at time of incident (1 for yes, 0 for no)		
Definitely rearing young at time of incident (1 for yes, 0 for no)		
<b>Injury (1 for yes, 0 for no)</b>		
Description of Injury		
Cause of Injury (indicate whether probable or confirmed)		
<b>Death (1 for yes, 0 for no)</b>		
Cause of Death (indicate whether probable or confirmed)		
<b>Poison Bait or Suspected Poison Bait (1 for yes, 0 for no)</b>		
Description of poison bait or suspected poison bait		
<b>Details of Location Available (1 for yes, 0 for no)</b>		
Address		
County		
Grid Reference (see <a href="http://www.gridreference.ie">www.gridreference.ie</a> if unsure)		
10K Grid Square (see <a href="http://www.gridreference.ie">www.gridreference.ie</a> if unsure)		
Elevation (metres above sea level, see <a href="http://www.gridreference.ie">www.gridreference.ie</a> if unsure)		
Land Use where found (e.g. tillage, horticulture, dairy, sheep, industrial, wind farm, road, etc.)		
Recent activity at or around location (e.g. reseeded, lambing, hunting, planning application, etc.)		
<b>Sent to Wildlife Rehabilitator (1 for yes, 0 for no)</b>		
Released (1 for yes, 0 for no)		
Survived but unfit for release (1 for yes, 0 for no)		
Died while in care (1 for yes, 0 for no)		
<b>NPWS Involvement (1 for yes, 0 for no)</b>		
NPWS Ranger contacted (1 for yes, 0 for no)		
NPWS Ranger name		
NPWS file opened (1 for yes, 0 for no)		
Date NPWS file opened		
<b>X-Rated at Veterinary Practice (1 for yes, 0 for no)</b>		
Gunshot Detected (1 for yes, 0 for no)		
<b>Sent to RVL for post mortem in accordance with Govt. Agencies Protocol (1 for yes, 0 for no)</b>		
RVL Case Number		
Post Mortem Verdict		
<b>Sent to State Lab for post mortem in accordance with Govt. Agencies Protocol (1 for yes, 0 for no)</b>		
Poison(s) Detected (1 for yes, 0 for no)		
Types of Poison(s) Detected		
Post Mortem Verdict		
<b>Sent to other vet lab outside of Govt. Agencies Protocol (1 for yes, 0 for no)</b>		
Vet Lab Details		
Post Mortem Verdict		
Foul Play Confirmed (1 for yes, 0 for no) Veterinary Report or substantiated evidence required		
Foul Play Suspected but not proven (1 for yes, 0 for no)		
Foul Play Not Suspected (1 for yes, 0 for no)		
<b>Suspect Identified (1 for yes, 0 for no)</b>		
Suspect Interviewed (1 for yes, 0 for no)		
Prosecution pursued (1 for yes, 0 for no)		
Court Hearing (1 for yes, 0 for no, P for Pending)		
Date of Court Hearing		
Outcome of Court Hearing		
Penalty		
<b>Other Notes</b>		
<b>Photographs (please attach with reference to file name here)</b>		

### Appendix 3 Analytes tested for by the State Lab under the RAPTOR protocol

Analyte	Lowest Reporting Concentration (ug/kg)	Quantitative Analytical (ug/kg)	Uncertainty of Measurement (%)
Alpha Chloralose	60	60-600	50
Beta Chloralose	60	60-600	50
Brodifacoum	15	15-150	35
Bromadiolone	15	15-150	35
Carbofuran	30	30-300	35
Chlorophacinone	15	15-150	35
Coumatetralyl	15	15-150	35
Diclofenac	60	60-600	35
Dicumarol	60	60-600	65
Difenacoum	15	15-150	65
Difethialone	30	30-300	50
Diphacinone	15	15-150	35
Flocoumafen	15	15-150	35
Flunixin	30	30-300	35
Meloxicam	60	60-600	35
Methiocarb	30	30-300	35
Methiocarb sulfoxide	30	30-300	50
Nitroxylnil	30	30-300	35
Strychnine	60	60-600	50
Warfarin	15	15-150	35

