

IRD Duhallow LIFE Project

Wildlife recording by
national schoolchildren;
Mixing Education and
Science

Action D5

LIFE 09 NAT/IE/ 000220 Blackwater SAMOK

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March, 2015

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I.R.D. Duhallow Ltd.



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Background/ Introduction

IRD Duhallow Ltd. is a rural development company based in Newmarket, Co. Cork. Established in 1989, to promote the tourism potential of the rivers in Duhallow. The company administers LEADER and other local development programmes. An environmental programme that IRD Duhallow has engaged in is the EU LIFE programme, which is the European Union's funding instrument which supports environmental and nature conservation projects.

The LIFE programme began in 1992 and has co-financed over 3000 projects across the EU, for the protection of the environment. The IRD Duhallow LIFE Project (Blackwater SAMOK) aims to restore the populations of Freshwater Pearl Mussel (*Margaritifera margaritifera*), Atlantic salmon (*Salmo salar*), Otter (*Lutra lutra*), Kingfisher (*Alcedo atthis*) and Irish Dipper (*Cinclus cinclus hibernicus*), in the upper Blackwater catchment, primarily the Allow River. A core action for the project was information dissemination, creating awareness of the target species and highlighting the rivers status as a Special Area of Conservation (SAC) amongst the local communities, stakeholders and school children in the Duhallow region.

School children as citizen scientists

'Citizens have been helping collect data since 1880, when light house keepers began collecting data about bird strikes; the National Weather Service Cooperative Observer Program began in 1890; and the National Audubon Society started its annual Christmas Bird Count in 1900' - Droege (2007).

Youth was the focus of a school based wildlife recording and mapping project, entitled Duhallow Nature Detective. The project aimed to promote awareness of both common and rare species and the range of habitats within the River Allow catchment and beyond. There are 36 national (primary) schools and 5 post-primary schools in the region. The recording project informed schoolchildren on the flora and fauna native to the locality. This highlighted the value of nature in their environment and made the children aware of species of high conservation importance (e.g. Otter and Hen Harrier *Circus cyaneus*). Students recorded a variety of different species in their locality including birds, plants, invertebrates, trees and mammals. *'Developing and implementing public data-collection projects that yield both scientific and educational outcomes requires significant effort'* (Bonney, et al., 2009).

Study Area

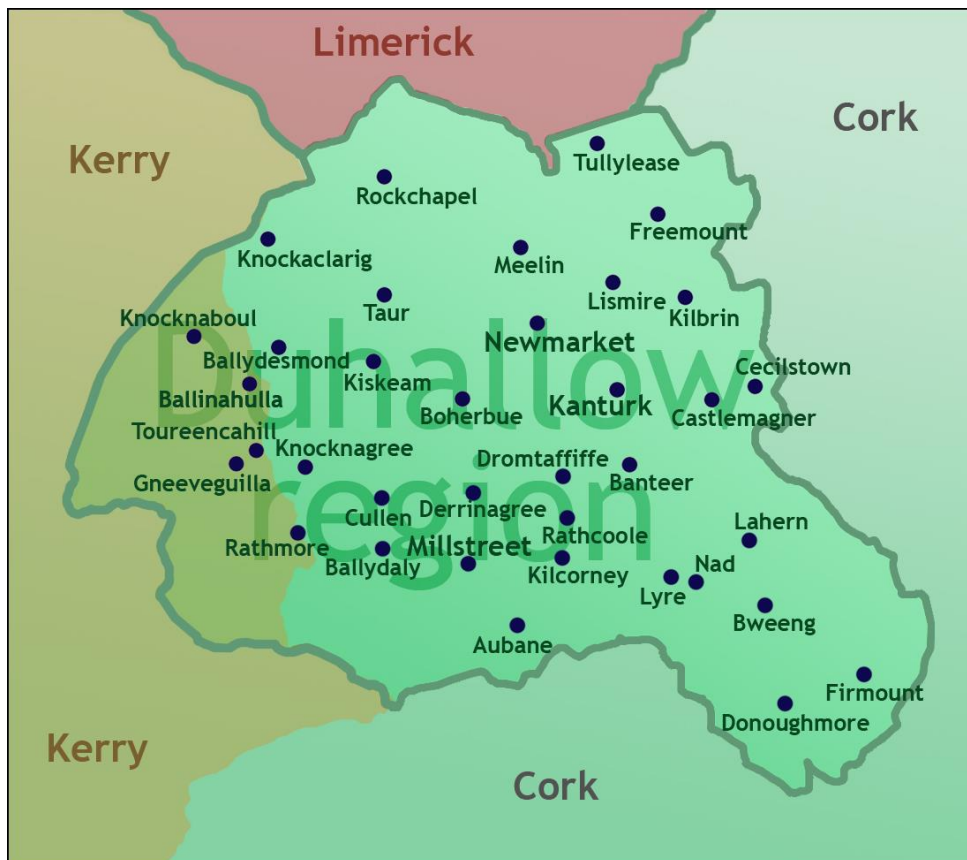


Figure 1: Duhallow region, county boundaries, towns and villages. Source: www.Duhallow.Blogspot.com



Figure 2: Online Map viewer system (<http://maps.duhallowlife.com/>) showing the Duhallow region within Ireland.

The Duhallow region is over 1,300km² in area and contains a population of some 30,000 people. Duhallow has four market towns; Kanturk (Pop 1915), Millstreet (Pop 1401), Newmarket (Pop 949), Rathmore (Pop 611) and 32 villages. Duhallow has a mixture of land but 90% of the land in Duhallow is classified as disadvantaged by the Department of Agriculture. This land is subject to poor drainage and is of limited use for farmers. The Mullaghareirk Mountains cover much of the north and west of Duhallow, while the Derrynasaggart and Boggeragh ranges cover the area south of Rathmore, Millstreet and Banteer. This land is unproductive. There are also some upland areas where land use is limited with reclaimed podzol and peaty podzol soils and around the villages of Gneeveguilla, Ballydesmond and Rockchapel much of the land is covered by raised bog. Duhallow has one of the highest concentrations of forestry in Ireland.

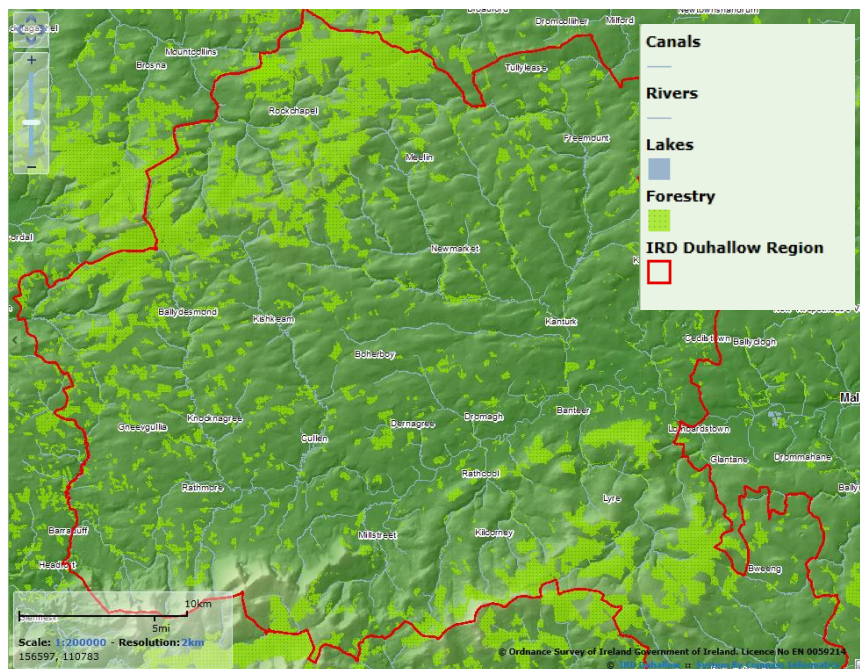


Figure 3: Duhallow region and forestry. Source: www.Duhallow.Blogspot.com

The upper reaches of the River Blackwater flows through Duhallow. The Blackwater and its tributaries are designated as Special Areas of Conservation (SAC) due to the presence of many species and habitats of European importance, including the freshwater pearl mussel. The Upper Blackwater catchment occupies the northern parts of the Barony of Duhallow, in North Cork (figure 4).

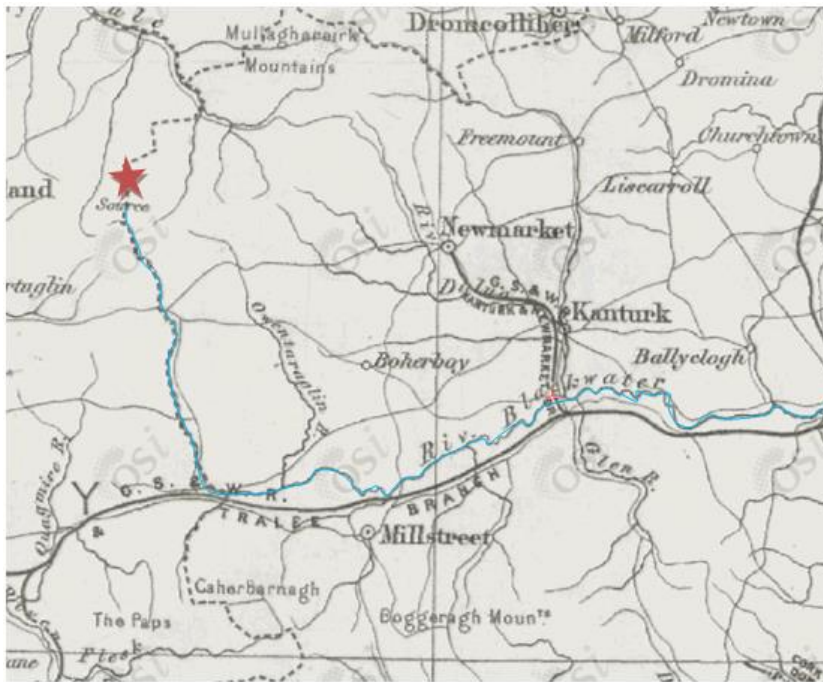


Figure 4: The River Blackwater and its source in the Mullaghareirk mountains. Source: www.OSI.ie

The IRD Duhallow LIFE + project is located within the Allow catchment. The main stem in the catchment, the River Allow, rises on the eastern side of the Mullaghareirk Mountains in the town land of Reanahoun on the Cork side of the Limerick/Cork border. It flows in an easterly direction for 12 kilometres before turning south at Freemount, and continues for a further 12 kilometres to Kanturk town, the largest urban area along the Allow River catchment. Five kilometres downstream of Kanturk the Allow flows into the Blackwater River, which has been designated SAC due to the presence of freshwater pearl mussels. The Allow catchment is 323.46km² and is located in the South Western River Basin District. The main tributaries are the Dalua and the Brogeen. The Dalua rises in the Mullaghareirk Mountains and flows south, and then east for 8 km before entering the Allow at Kanturk. The Brogeen enters the Allow from the west, south of Kanturk town.

The Allow catchment is dominated by gleys soils. Brown earths/podzolics are present along the river flood plain. Peat and peaty gleys occur in the extreme upper reaches of the catchment. The most common land use within the Allow catchment is pasture farming (73.22%). Some of the other uses include coniferous forests (6.08%), transitional woodland scrub (5.46%) and peat bogs (3.04%). The remaining land consists of urban areas.

Methods

Citizen science is key tool for both community engagement and the collection of large amounts of data during a period of time. The LIFE+ project targeted the schools in the area, getting the children and their parents actively involved in a citizen science exercise. There were three phases of the project.

- Training the schoolchildren to be wildlife detectives. This introduced the schoolchildren to the project and provided resources including information leaflets on key species and maps of the catchment. The aim was to help participants to learn about the organisms and experience the processes of scientific investigation. *'Citizen Science projects also strive to help participants learn about the organisms they are observing and to experience the process by which scientific investigations are conducted'* (Bonney, et al., 2009). By giving the school volunteers the information on the wildlife in the Duhallow region, it educated them about the species they were investigating. It is important to educate young people as they are the next guardians of our environment. They will be the decision makers when it comes to the long term management of the Environment. It will increase their ability to watch and record information about the organisms after participating in the project, potentially forming a network of champions for nature conservation. The Duhallow Nature Detective survey booklet given to the schoolchildren contained information about the IRD Duhallow LIFE Project, target conservation species, survey instructions, species identification sheets and a map of the local town land. The survey consisted of five main species categories (birds, plants, invertebrates, trees and mammals) with 12 identification pictures for each category. The survey therefore aimed to gather recordings for a total of 60 species of which 20 species were of conservation importance and were highlighted in red on the survey sheets.
- Field work involved wildlife surveys, identifying and recording the location of the key species, and collecting the data from the schoolchildren. Primary school volunteers were provided with a standard issue OSI printed map of the 5km² area surrounding their home. The student volunteers were requested to search their locality for species on the survey sheet, under the supervision of a parent or guardian. The school volunteers were also asked to mark their geographic location on the OSI map so that the coordinates could then be transferred into the web-based geo-referenced mapping database. *'A Basic wildlife record is a documented occurrence of an organism at a location, at a point in time by a named person'* (NBN, 2011). Once the schoolchildren carried out the

survey they had attained the experience of basic scientific field investigations. When the LIFE team revisited the schools the surveys and maps were collected. After discussions around the species recorded, the wildlife detectives (school children) created a poster of the rare and important species within their locality.

- Secondary School students in transition year. The students participated in practical work such as digitising the data collected by the Primary School students and generating maps of species distribution using Geographic Information Systems (GIS). This allowed for more detailed map based interrogation of the data both spatially and in the context of habitat availability.

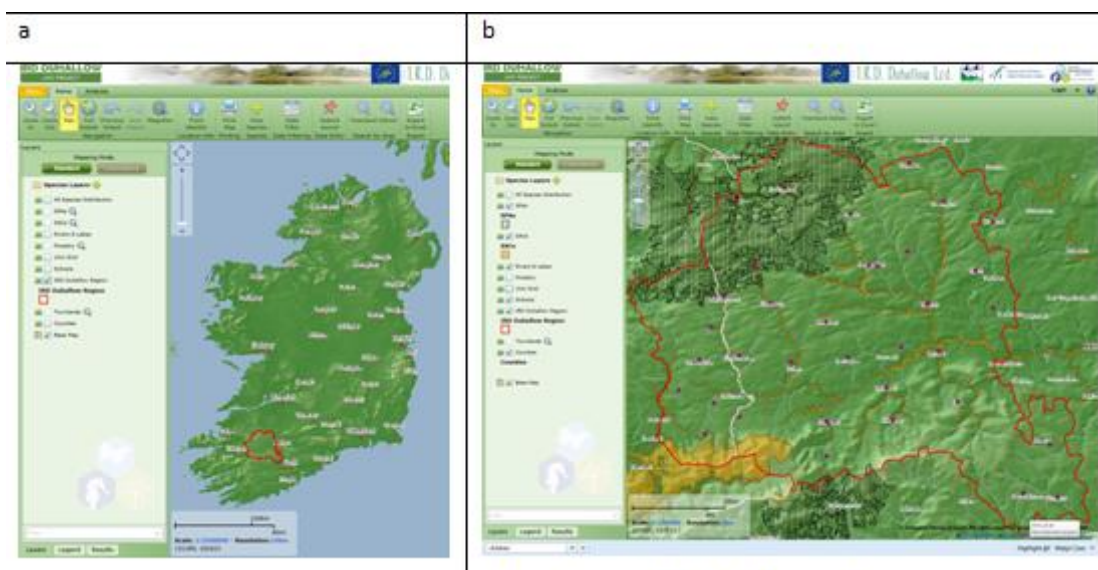


Figure 5: Online Map viewer system (<http://maps.duhallowlife.com/>) showing layers (a) Ireland base map and IRD Duhallow region (b) IRD Duhallow region, county boundaries, SPAs, SACs, rivers and schools.

The students created a spatial database which will house all of the data collected by the primary schoolchildren; the mapping system displays a map and records (i) the date of the survey, (ii) the name of the student, (iii) the area name, (iv) grid reference, (v) species name, (vi) conservation status and (vii) name of the school. The map has areas colour-coded to highlight species of high conservation status and of local importance, and the data is linked to the Project Website (www.duhallowlife.com) for public viewing. *‘Other participants have demonstrated that they have used online data tools to answer a variety of questions... such as when certain species were present in their area’* (Bonney, et al., 2009). The online mapping system enabled spatial representation of the occurrence of species at a 1 km² resolution and allowed comparison of rare and common species in this area. The online mapping system enabled the species records to be exported to an Excel spreadsheet. When exported in ASCII (text) format each

species record has its own row on the spreadsheet with descriptors in columns (date of record, name of the student, area name, grid reference, species name, conservation status, and name of the school). Any raw data that becomes available from citizens is beneficial and can be forwarded to duhallow@eircom.net.

To get feedback for this action of the project, a questionnaire was sent to the principal of each National School (Figure 6). Only twelve schools responded.




<p>About this questionnaire</p> <p>Dear Principal/Teacher:</p> <p>In 2012 and 2013, IRO Duhallow through the Dubai@You!E project, visited all national schools in Duhallow and invited the school children to participate in a wildlife recording exercise in their neighbourhood (i.e., to become a nature detective).</p> <p>The results of this programme are now plotted on an online map at www.duhallow.ie. We are carrying out an evaluation of the exercise and would be grateful if you could take time to fill this short questionnaire and return to the LIFE project, IRO Duhallow, James O'Keefe Institute, Newmarket, Co. Cork. If you have any queries please don't hesitate to contact us at 022-40853. Thank you for your assistance with this project initiative.</p> <p>Feedback on the Species Recording/Nature Detective Survey</p> <p>School Name: _____</p> <p>1. Did the schoolchildren appear enthusiastic prior to being a Species/Nature Detective? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure</p> <p>2. Did the presentation from the LIFE + team alert the schoolchildren on nature and wildlife in Duhallow? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure</p> <p>3. On a scale from 1 to 5 did the children enjoy being a Nature Detective: <input type="checkbox"/> 1 = Not Enjoyable <input type="checkbox"/> 2 <input type="checkbox"/> 3 = Neutral <input type="checkbox"/> 4 <input type="checkbox"/> 5 = Enjoyable</p> <p>I.R.D. Duhallow Ltd. </p>	<p>4. When carrying out the survey did the children have problems (e.g. mapping, identifying species)? <input type="checkbox"/> 1 = Extremely Difficult/problems raised <input type="checkbox"/> 2 <input type="checkbox"/> 3 = Neutral <input type="checkbox"/> 4 <input type="checkbox"/> 5 = Extremely Easy/no problems raised</p> <p>If there were problems please state them: _____ _____ _____</p> <p>5. Were the children more aware of other species in their area after finishing the survey? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure</p> <p>6. After the Nature Detective Survey did the schoolchildren show a greater interest in nature? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not sure</p> <p>7. After the Nature Detective Survey did the school experience any feedback from citizens? <input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> None</p> <p>I.R.D. Duhallow Ltd. </p>	<p>8. Did the exercise inspire the school to carry out extra nature activities with the children (outdoor field trips, planting, green school, bird feeding)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes please state the active/activities: _____ _____ _____</p> <p>9. Would the school like the life team to redo the nature detective survey? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>10. Do you have recommendations to improve the nature detective survey? _____ _____ _____</p> <p><i>LIFE + team would like to thank you for filling out this survey</i></p> <p>I.R.D. Duhallow Ltd. </p>
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Figure 6; Questionnaire that was complete by the National school as feedback from this action D5, Species recording project. (See Appendix for printable version)

Results

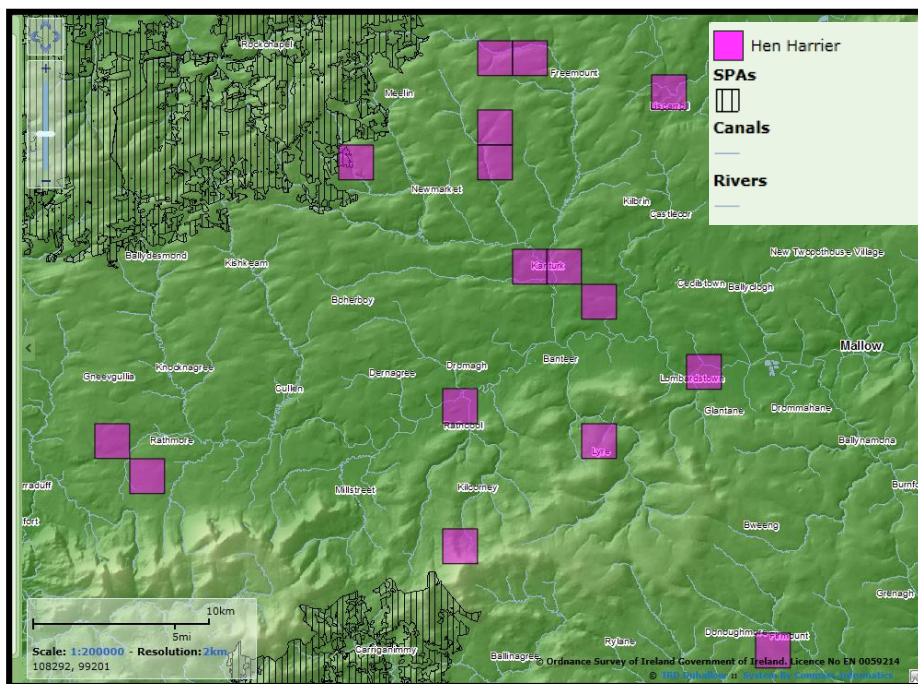


Figure 6: Spatial representation of the Hen Harrier in the Duhallow region in 1km² grids.

Spatial representation of the hen harrier that was recorded by the schoolchildren is surprising, as the hen harrier prefers upland habitats where heather moorlands are present. The Mullaghareirk Mountains, an SPA region (North West on the map; figure 6), is where hen harriers breed between the months of March and July. Dr Barry O'Donoghue tracked hen harriers in the Duhallow region. He observed a hen harrier nest in the Mullaghareirk Mountains. During his studies he noted that due to changes in the landscape hen harriers were no longer plentiful. These changes resulted in increased energy expenditure and weaker adult birds, lower food delivery rates to the nest, fewer eggs and chicks and weaker chicks. The nest he monitored resulted in the chicks dying because the parents needed to travel far for food supplies.

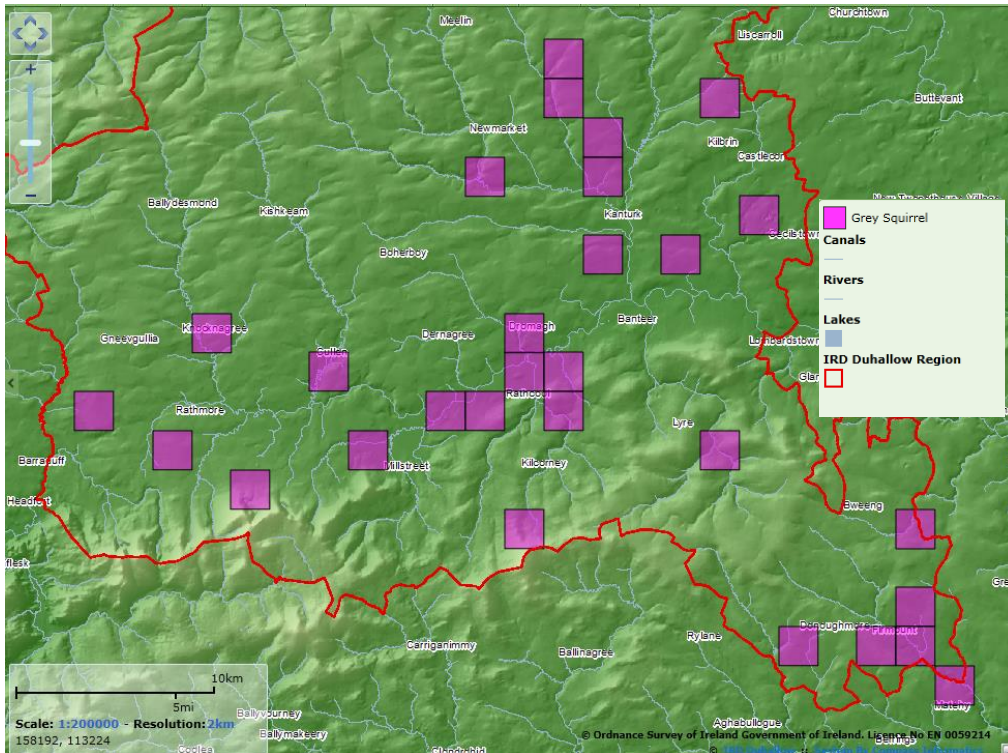


Figure 7: Spatial representation of the grey squirrel in the Duhallow region in 1km² grids.

The spatial representation of the grey squirrel (*Sciurus carolinensis*) (figure 7) was recorded. The grey squirrel has not been recorded in this area to date (figure 9). The grey squirrel data recorded by the children may be a new finding for the region. A survey conducted in 2012 did not find the grey squirrel to be present in the Duhallow region (figure 9).

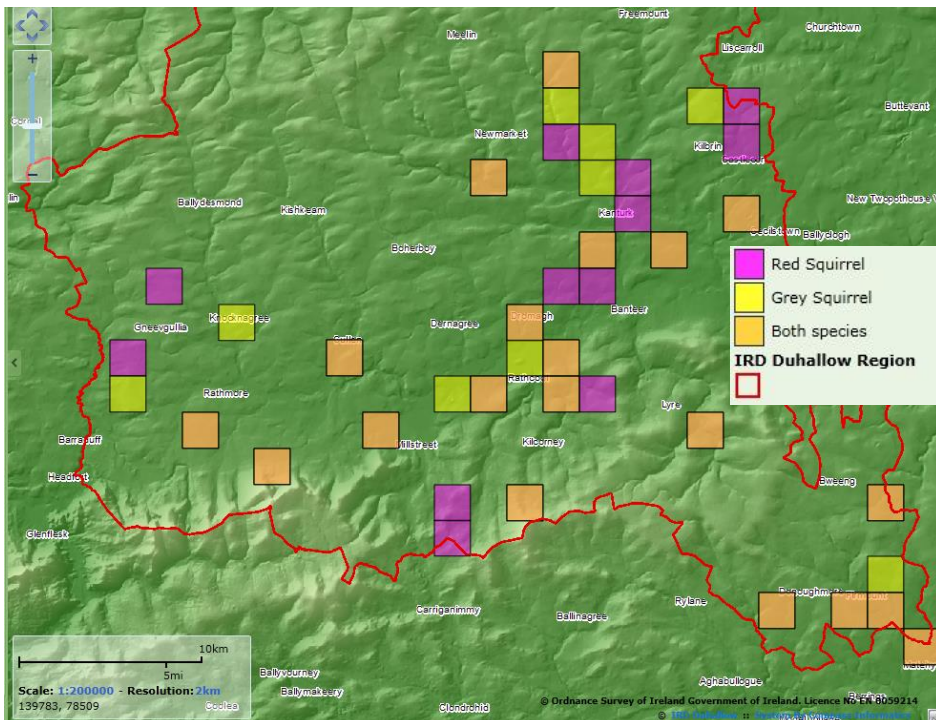


Figure 8: Overlap of the red (*Sciurus vulgaris*) and grey squirrel habitat in the Duhallow region.

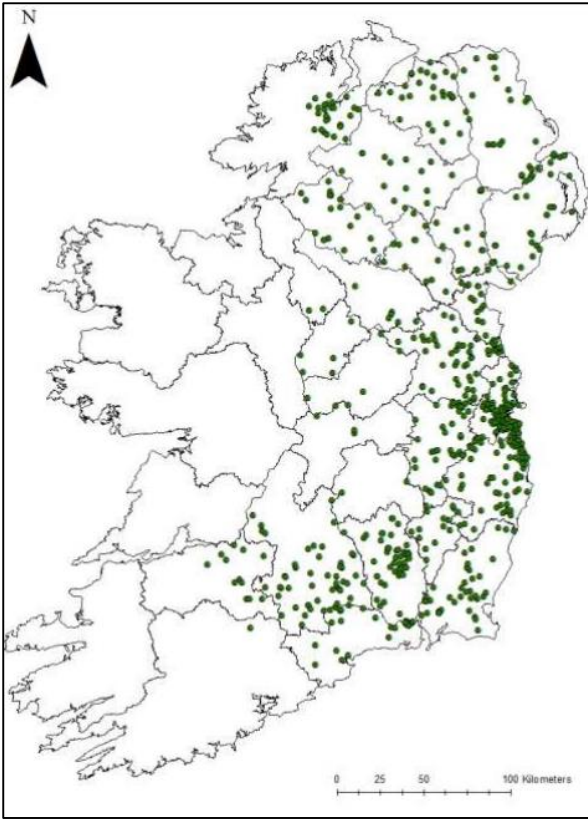


Figure 9: Locations of grey squirrel records received in the 2012 Irish Squirrel Survey (N=767)

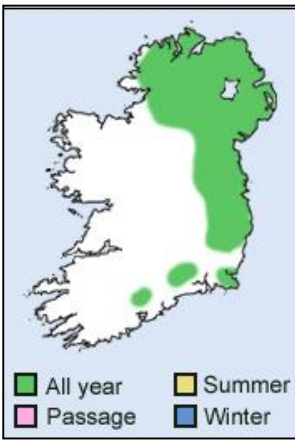


Figure 10: Spatial representation of the Buzzard in Ireland; source: Birdwatch Ireland.

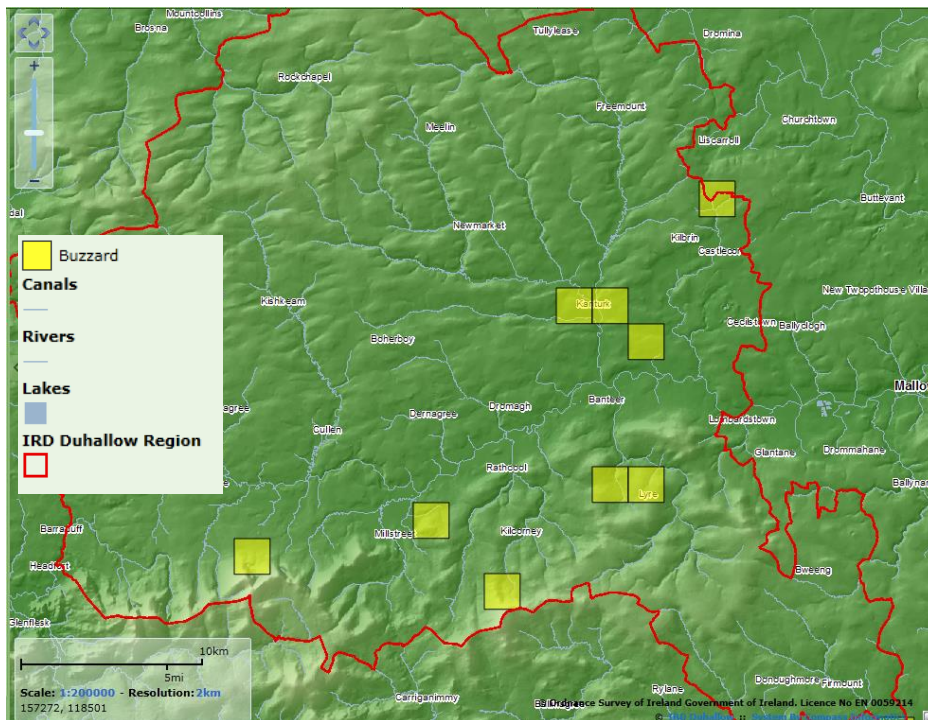


Figure 11: Spatial representation of the buzzard in the Duhallow region in 1km² grids.

Buzzards (*Buteo buteo*) are found in the north and east of the country, as mapped by Birdwatch Ireland (figure 10). Co. Donegal is the main strong hold of the species in the Republic. Buzzards are found in a variety of habitats particularly woodland, moorland, scrub, pasture, arable and marsh bog. The Irish situation is however possibly reflecting widespread afforestation and poor quality moorland habitats. Figure 11 shows that the buzzard was recorded in urban areas e.g. the town of Kanturk and Millstreet. These sightings are probable flight paths as this is not a suitable nesting ground. The buzzard was recorded near upland areas e.g. south of the village Lyre at the foot of the Boggeragh mountain range and west of Millstreet town at the foot of the Caherbarnagh Mountain. These areas provide suitable nesting opportunities for buzzards.

The students were asked to take a photograph of any birds whose picture has a red border; one student from Dernagree N.S. took a picture of the bullfinch (*Pyrrhula pyrrhula*) and the jay (*Garrulus glandarius*) in his garden.

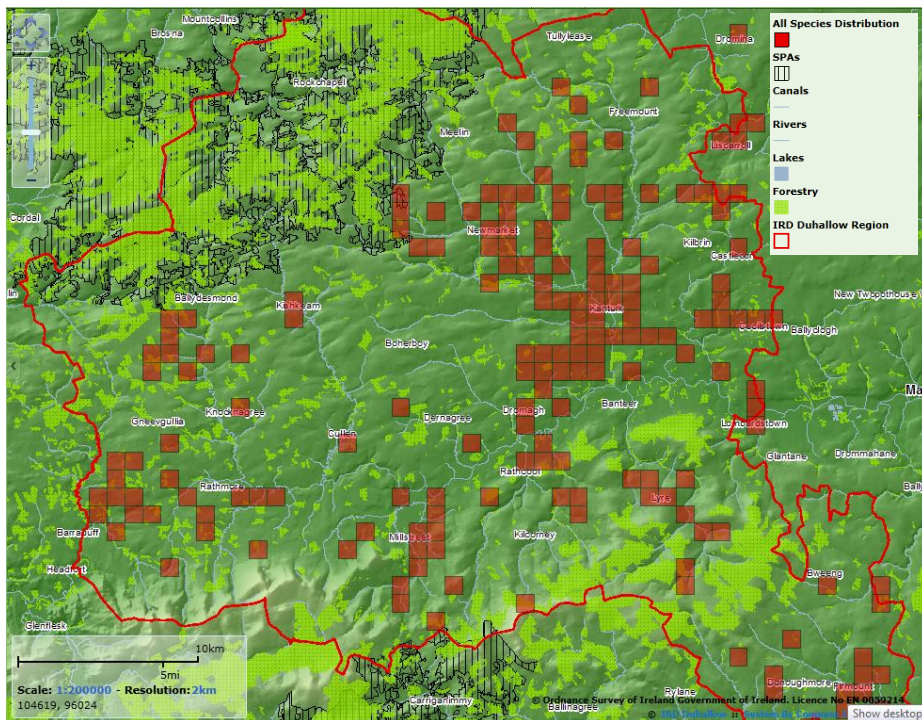


Figure 13: Map of the species distribution in the Duhallow boundary.

The questionnaires completed by the principal or teachers of the National schools between 2012 and 2013 allow this action to be evaluated. The main aim was to create awareness with the youth of the Duhallow community. This was achieved with the feedback from question two on the questionnaire that had a 100% yes; ‘*Did the presentation from the LIFE+ team alert the schoolchildren on nature and wildlife in Duhallow?*’. Also 92% of school teachers agreed children were more aware of species in their area after the nature survey (*question 5 of the questionnaire, Table 2*). Question nine of the questionnaire; ‘*Would the school like the life team to redo the nature detective survey?*’ got a 100% yes vote to repeat and was recommended (*Table 2; question 10*) to be repeated every two years.

Table 1 Set of questions posed to the principals of the primary schools in Duhallow

1. Did the schoolchildren appear enthusiastic prior to being a Species/Nature Detective?
2. Did the presentation from the LIFE + team alert the schoolchildren on nature and wildlife in Duhallow?
3. On a scale from 1 to 5 did the children enjoy being a Nature Detective
4. When carrying out the survey did the children have problems (e.g. mapping, identifying species)?
5. Were the children more aware of other species in their area after finishing the survey?
6. After the Nature Detective Survey did the schoolchildren show a greater interest in nature?
7. After the Nature Detective Survey did the school experience any feedback from parents.
8. Did the exercise inspire the school to carryout extra nature activities with the children (outdoor field trips, planting, green school, bird feeders)?
9. Would the school like the life team to redo the nature detective survey?
10. Do you have recommendations to improve the nature detective survey?

Table 2 Response to questionnaires from 12 principals

School Name	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10
Firmount N.S.	Yes	Yes	4	4	Yes	Yes	None	Yes	Yes	Asked for it to be repeated
Millstreet Boys N.S.	Yes	Yes	5	4	Yes	Yes	Positive	Yes	Yes	
Knocknagree N.S.	Yes	Yes	4	3	Yes	Yes	None	No	Yes	
Cullen N.S.	Yes	Yes	5	5	Yes	Not sure	Positive	Yes	Yes	Enjoyable, valuable survey for the children towards wildlife
Kilcorney N.S.	Yes	Yes	5	3	Yes	Yes	None	Yes	Yes	
Kiskeam	Yes	Yes	5	3	Yes	Yes	Positive	Yes	Yes	
Kanturk Girls N.S.	Yes	Yes	5	3	Yes	Yes	Positive	Yes	Yes	Great project created awareness. Important to maintain
Newmarket Boys N.S.	Yes	Yes	4	3	Yes	Yes	Positive	Yes	Yes	
Rockchapel N.S.	Not sure	Yes	5	4	Yes	Yes	None	No	Yes	Reinforce and repeat
Rathcoole	Yes	Yes	3	3	No	Not sure	Negative	No	Yes	Explain habitats, clearer maps and guided fieldtrip
Tullylease	Yes	Yes	5	4	Yes	Yes	None	Yes	Yes	Definite time frame, collect when arranged
Dromagh	yes	yes	5	4	yes	Yes	None	Yes	Yes	Thanks to IRD Duhallow for promoting care for wildlife & environment, we are grateful

Conclusions

The data collected by the schoolchildren has to be viewed as it is: data collected by untrained, albeit eager, individuals. *Figure 6* shows the hen harrier was recorded in urban areas (e.g. Kanturk). Built up urban areas are classified as unsuitable habitats for these birds. The hen harrier prefers upland and moorland regions. From a distance, a buzzard may be mistaken for a female hen harrier, especially to an untrained eye. Buzzards have been spotted around the arable farmlands east of Kanturk by the members of the LIFE Project. The National Biodiversity Centre has also recorded Buzzards around the Kanturk area (Biodiversity Ireland, 2015). The photographs of each species provided in the species recording booklet are of a large brown bird of prey. The sightings of buzzards around towns like Kanturk may well have been mistaken for hen harriers.

Lawton et al. (2015) found no record of grey squirrels in the Duhallow with only one record in the whole of County Cork (*Figure 9*). The positive grey squirrel records included in the Nature Detective returns show that the exercise may not have been robust enough to prevent mistakes and misidentification between similar species (e.g. native red squirrels and invasive non-native grey squirrels). Incorrect species identification may possibly be due to the lack of education on the difference of the red and grey squirrel and the similarities in the identification photographs provided by in the Species Recording sheets. By viewing the data collected for the grey squirrel one could argue that schoolchildren may not be suited to real time data collection. Be that as it may, the main purpose of this exercise was to make children, and their parents/guardians, aware of the wildlife and environment in their areas.

The projects main aim was to create awareness of the SACs and SPAs, demonstrating their importance for a multitude of species. Judging by the high number of species recorded by the students, this aim was achieved. The primary schools in the Duhallow region were made aware of the target species living in and along the River Allow and highlighting the river's status as an SAC. '*... making a wildlife record, there is not much point in doing so unless it is as correct and complete as possible. It becomes increasingly important for wildlife records to be "correct" the more these are used by others in understanding or making crucial decisions about biodiversity*' (NBN, 2011).

The project taught secondary students to use GIS to create maps of species distribution and gave them a full understanding of the different stages involved in a biological survey; survey

design, biological recording, digital data input and presentation of results. The educational outcome was exceptional as schoolchildren that participated became knowledgeable about the species in the region and they also became spatially aware of the habitats present within 500m of their home. Since this survey the LIFE+ team has been asked back to some schools to give more talks and presentations about their local environment. Also students who took part in the nature detective project have been in contact and got involved in other ways for the project.

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Appendix 1. Printable Questionnaire

About this questionnaire

Dear Principal/teacher,

Between 2012 and 2013, IRD Duhallow through the DuhallowLIFE project, visited all national schools in Duhallow and invited the school children to partake in a wildlife recording exercise in their neighbourhood (i.e., to become a nature detective).

The results of this programme are now plotted on an online map at www.duhallowLIFE.com. We are carrying out an evaluation of the exercise and would be grateful if you could take time to fill this short questionnaire and return to the LIFE project, IRD Duhallow, James O'Keeffe Institute, Newmarket, Co Cork. If you have any queries, please don't hesitate to contact us at 029-60633. Thank you for your assistance with this project initiative.

Feedback on the Species Recording/Nature Detective Survey

School Name: _____

1. Did the schoolchildren appear enthusiastic prior to being a Species/Nature Detective?
 Yes
 No
 Not sure
2. Did the presentation from the LIFE + team alert the schoolchildren on nature and wildlife in Duhallow?
 Yes
 No
 Not sure
3. On a scale from 1 to 5 did the children enjoy being a Nature Detective;
 1 = Not Enjoyable
 2
 3 = Neutral
 4
 5 = Enjoyable
4. When carrying out the survey did the children have problems (e.g. mapping, identifying species)?
 1 = Extremely Difficult/problems raised

- 2
- 3 = Neutral
- 4
- 5 = Extremely Easy/no problems raised

If there were problems, please state them:

5. Were the children more aware of other species in their area after finishing the survey?
 - Yes
 - No
 - Not sure

6. After the Nature Detective Survey did the schoolchildren show a greater interest in nature?
 - Yes
 - No
 - Not sure

7. After the Nature Detective Survey did the school experience any feedback from parents.
 - Positive
 - Negative
 - None

8. Did the exercise inspire the school to carryout extra nature activities with the children (outdoor field trips, planting, green school, bird feeders)?
 - Yes
 - No

If yes, please state the active/activities:

9. Would the school like the life team to redo the nature detective survey?

Yes

No

10. Do you have recommendations to improve the nature detective survey?
