

The Otters of Blackpool

Citizen Science Project 2016-2017

Cork Nature Network



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Abstract

The River Bride in Blackpool, Cork City was identified as an important location for Eurasian otters (*Lutra lutra*) in White *et al.* (2003). Cork Nature Network conducted a Citizen Science Survey in 2016-2017 to assess the presence of otters over a decade later. In 2018, this was followed up with an invertebrate survey of the River Bride which included observations of fish, birds and mammals. The results of these surveys confirm the presence of otters in the River Bride as recently as 2018. As this is a busy urban area, this is evidence that otters are well adapted to exist in our city and are an important urban species for Cork city. However, they are also at risk of disturbance from any habitat destruction and fragmentation in the local area. The findings of this report suggest that the River Bride should be protected to ensure it is a suitable habitat for Cork's otters.

Introduction

Urban areas are becoming more common as cities expand to accommodate the increase in human population. Urbanisation refers to the process by which humans convert natural landscapes to human settlements, and it is characterised by dense human habituation and infrastructure (Bradley and Altizer, 2007; Bateman and Fleming, 2012). Cities across the planet show many similar features, such as impermeable surfaces, fragmentation, and increase in temperature, noise pollution and air pollution (Pauchard *et al.*, 2006; Johnson and Munshi-South, 2017; Thompson *et al.*, 2018).

Despite this, many species are known to succeed in urban areas (Ditchkoff *et al.*, 2006; Johnson and Munshi-South, 2017). Collectively known as 'urban exploiters', these species actively migrate into urban areas to take advantage of the opportunities they provide. Common urban exploiters include rock doves, starlings, house sparrows, rats and mice, which are found in cities across the globe (McKinney, 2002). Mesocarnivores, such as the red fox (*Vulpes vulpes*), coyote (*Canis latrans*) and raccoon (*Procyon lotor*) have adapted to exploit anthropogenic food sources and shelter. Larger carnivores can also benefit from urban areas, with bears, wolves and hyena all being known to take advantage of living near urban areas (Bateman and Fleming, 2012). These species are capable of adapting to landscapes that contain urbanised areas (McKinney, 2002). In some situations, carnivores can reach higher population densities in urban habitats, due to better foraging opportunities (Beckmann and Berger, 2006). In an increasingly urban world,

gaining an understanding of species that thrive in and adapt to urban areas could aid future management and conservation (McDonnell and Pickett, 1990; Patterson *et al.*, 2003).

However, most urban wildlife research focuses on terrestrial species. Aquatic features are often an important factor in urban landscapes. The otter is a semi-aquatic generalist carnivore which is suited to exploiting this habitat. Okes (2017) found that the Cape clawless otter (*Aonyx capensis*), like many other meso-carnivores, is capable of adapting to the urban environment in South Africa by consuming a variety of prey. Several wildlife groups in the United Kingdom have also reported sightings of otters in highly urbanized waterways, namely in Edinburgh, London and Birmingham.

The Eurasian otter (*Lutra lutra*) exists in many aquatic habitats all over Ireland, including freshwater rivers and streams, estuaries and coastal areas (Chapman and Chapman, 1982). In Ireland, otters are protected under the Wildlife Act (1976) and Wildlife (Amendment) Act 2000, Annex II and IV of the Habitats Directive 92/43/EEC, Berne Convention Annex II and CITES Appendix I. This means that it is a criminal offense to deliberately kill, injure or capture an otter, or to destroy their breeding habitats or areas of refuge. Eurasian otters are classed as “Near Threatened” on the IUCN Red List. In Ireland, the National Parks and Wildlife Service Threat Response Plan (2009) describes several major threats to the species:

- Loss of habitat such as canalisation and culverting of rivers and removal of bankside vegetation;
- Pollution, particularly with herbicides and heavy metals;
- Disturbances, such as recreation;
- Drainage of rivers and wetlands;
- Accidental deaths from road traffic and drowning in fish traps.

Other noted threats include the presence of American mink (*Mustela vison*), forestry, hunting and aquaculture.

Several studies have confirmed the presence of otters in Cork city along the River Lee and its catchment area (Sleeman and Moore, 2005; White *et al.*, 2013; Walsh, 2018). Otters in the city are thought to feed on frogs (*Rana temporaria*), trout (*Salmo trutta*), salmon (*Salmo salar*), eels (*Anguilla anguilla*), pike (*Esox lucius*), grey mullet (*Crenimugil labrosus*), common rat (*Rattus norvegicus*), flatfish and sticklebacks (Sleeman and Moore, 2005). In 2013, it was found that there are at least 11 otters living in five study sites in Cork city, including 6 males and 5 females (White

et al., 2013). This study noted the River Bride in Blackpool as being an important location for Cork's otters. In 2018, this site was assessed via a camera trap survey and it was confirmed that otters are still present in the area (Walsh, 2018). These otters are living in very close contact with the local urban community in Blackpool, with one important site being located very near a McDonalds restaurant. This suggests that these otters are well-adapted to the urban environment of Cork city.

The Citizen Science Survey 2016-2017

Citizen science is known to be a useful way of assessing otter populations (White *et al.*, 2013; Okes *et al.*, 2019). During the 2013 survey, trained members of the public were used to monitor Cork's otter population. A total of 199 sample spraints were collected by these citizen scientists. Of those samples, 187 were confirmed to be from otters. This proves that trained individuals can have a high level of accuracy when identifying otter spraints. Similarly, citizen science can increase education, conservation awareness and enthusiasm about local biodiversity.

Field Surveys

During 2016 and 2017, Cork Nature Network carried out an assessment of otters within the Cork city area called the "Cork Otters project". The project aimed to estimate the number of otters in Cork and assess their general distribution within the River Bride. Cork Nature Network conducted a citizen science survey around the River Bride in Blackpool. This site was chosen as it is a known location for otters in Cork city (White *et al.*, 2013). Citizen scientists and volunteers were trained to study the otters in the local area. During the assessment, trained individuals recorded otter spraints, tracks and trails.

Local Awareness

As part of the Cork Otters project, promotional material was produced to encourage the local community to learn about the otters in the city. This included social media posts and public events. A promotion board was placed in the local Blackpool shopping centre and three volunteers handed out leaflets containing information about the otters. It was found that this greatly increased public interest and enthusiasm towards the otters. A 'Cork Otters Trail' was also created in the city where otters are frequently seen. In Blackpool, a public event was held in the local library to teach the public about otters and talks were also given in local schools.



Figure 1. Cork Nature Network's Karen Loxton speaking to the public in Blackpool library (source. G Weyman)

Invertebrate Survey

Following the Cork Otters project, an invertebrate survey was conducted in the River Bride in 2018 by Cork Nature Network volunteers to gain a more comprehensive understanding of the ecosystem. The study was conducted during March 2018 with additional sampling on the 1st of October 2018. Sampling methods included a walkover survey, freshwater macroinvertebrate sampling and camera trapping.



Figure 2. Cork Nature Network's Donna Weiner sampling the river bed for invertebrates (Source C. Moody)

Methodology

Study Site

Cork City is located on the edge of Cork Harbour with an urban area incorporating roughly 37km². The River Lee, with various channels and tributaries, flows through the city. Blackpool is a suburb located to the north of Cork city. The River Bride travels southwards through Blackpool and joins the River Lee.

Citizen Science Survey

As part of these citizen science surveys, Cork Nature Network volunteers surveyed the banks of a 4km section of the River Bride and documented various signs of Otter. Otter spraints were collected over a number of days to ensure the freshest spraint was identified and retained for future DNA analysis. These surveys coincided with promotions on the Cork Nature Network website and social media platforms in order to spread awareness about the Otters of Blackpool. In addition, a workshop was held by Cork Nature Network in Blackpool library to recruit citizen scientists and to explain the methodology. Two conferences were also attended by the project officer of Cork Nature Network and presentations given of the work.

Otter Observations

Locations where otters exist were identified through spoor surveys. The common identification signs of otter presence are strategically placed by the otters on rocks and ledges along river banks. Spoor included:

Prints – Otters have 5 toes, although footprints may only show 4. Footprints will typically be above 5cm in size and if the mud is soft, you'll be able to see the webbing between their toes.

Trails and Slides – Trails in the bankside vegetation leading down to the river. Otters will use these to move from river to river, in search of mates or new feeding opportunities. Slides are well worn riverside banks which are used to enter the water.

Spraints – Otters mark their territory with droppings called spraints. These are commonly placed under bridges and on rocks near the river. Otter spraints will often be filled with fish bones and scales and will have a uniquely pleasant scent.



Figure 3. Otter prints identified in mud along the river bank

Invertebrate Survey

An invertebrate study, completed by Cork Nature Network Volunteer Donna Weiner, assessed the benthic invertebrates between March and October 2018. During this survey, several ad-libitum observations were made of other species in the area, such as fish, birds and mammals.

Table 1. Study sites in the River Bride.

Site	Date	Time	GPS
Site 1 (SS1)	21/9/2018	10:30-12:00	51°54'51"N 8°28'27"W
Site 2 (SS2)	1/10/2018	10:30-12:00	51°55'14.7"N 8°29'03.1"W.

Prior to assessing SS1, there had been a paint pollution event in the local area on 21/8/2018. The effects of this were not visible on the day of the survey. However, it was noted that the site is used for littering, as plastic packaging, glass, and drink cans were observed in the area. There is also a 900mm drainage pipe in the vicinity and the site is surrounded by several roads and buildings

which may be sources of pollution. Site SS2 showed light littering with metal sheeting. There are also numerous drains and high walls along the south side of the River.

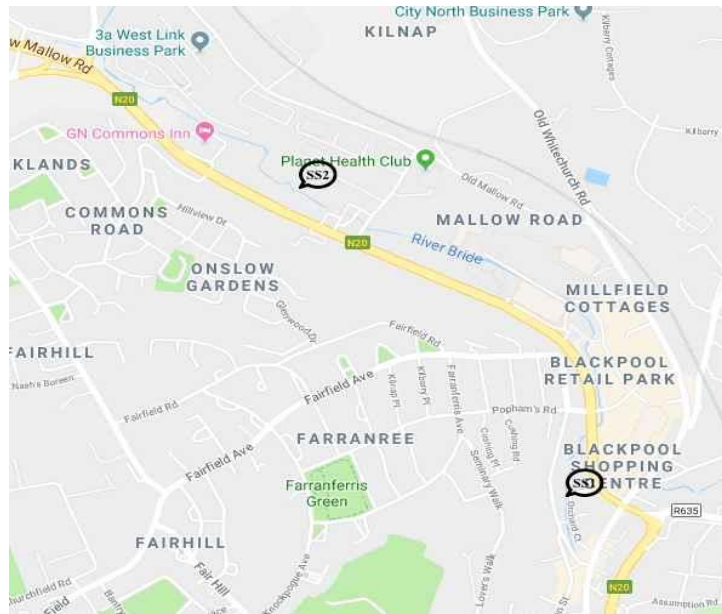


Figure 4. A map of the study area with the two study sites marked as SS1 and SS2. (Source Google Maps)

A variety of survey methods were used to ensure invertebrate species from a variety of habitats and water depths were surveyed. These include:

Kick Survey

A 1mm net was placed in the water ensuring that the base was flush with the river bed. The river bed and rocks in front of the net were then disturbed to dislodge any invertebrates and collect them in the net. These were then moved to a white basin for observation and recording.

Stone Wash Survey

Stones were collected and brushed over a white basin to remove any invertebrates that were attached to them. This was repeated with multiple samples.

Trawl Net Survey

A net was placed in the water for a 3-minute sampling period to collect any species in the water column.



Figure 5. Cork Nature Network's Donna Weiner sampling for freshwater invertebrates in the River Bride, Blackpool. (Source. C.Moody)

Results

Otter Survey 2016-2017

During the 2016-2017 otter citizen science survey, there were 107 otter observations by citizen scientists and Cork Nature Network volunteers. This included 3 track sightings, 1 trail observation and 103 spraints. Of these, 20 were recorded as being visibly fresh spraints. There were also two mink tracks sighted during the survey.



Figure 6. A satellite image of the River Bride denoting the locations of observations recorded during the survey. Two areas were highlighted as having the highest activity. (Source. L.Myers)

Invertebrates Survey 2018

During the survey of river invertebrates, Cork Nature Network volunteers identified a wide variety of species from many different taxa (Table 2). The two sites were similar in total number of species, with SS1 having 16 and SS2 having 15, although the composition of species was different. A total of 26 species were identified through the survey.

Table 2. Invertebrate species identified during the survey.

Common Name	Scientific Name	SS1	SS2
Freshwater Louse	<i>Asellus aquaticus</i>	No	Yes
Pond Skater	<i>Gerris lacustris</i>	Yes	Yes
Hawthorn Shield Bug	<i>Acanthosoma haemorrhoidale</i>	Yes	No
Leech	<i>Glossiphinia spp.</i>	Yes	No
Mayfly Nymph	<i>Baetis spp</i>	Yes	Yes
Mayfly Nymph	<i>Leptophlebia and Paraleptophlebia spp</i>	No	Yes
Mayfly Nymph	<i>Ecdyolurus spp.</i>	No	Yes
Freshwater Shrimp	<i>Gammarus spp</i>	Yes	Yes
Caddis Fly Nymph	<i>Polycentropus spp</i>	Yes	Yes
Riffle Beetle larvae	<i>Limnius spp</i>	No	Yes
Freshwater bivalve shell	<i>Sphaerium Pisidium spp?</i>	No	Yes
Diving Beetle	<i>Dytiscus spp</i>	No	Yes
Midge Larvae and Pupa	<i>Chironomous plumosus</i>	Yes	Yes
Lady Bird Pupae	<i>Harlequin spp.</i>	Yes	No
7 spot ladybird	<i>Coccinella septempunctata</i>	Yes	No
Fly Larva	<i>Ephydra spp.</i>	No	Yes
Stonefly Nymph	<i>Loroperla spp.</i>	Yes	No
Pond snails	<i>Lymnaea spp.</i>	Yes	Yes
Mud snail	<i>Potamopyrgus antipodarum</i>	No	Yes
Alder Fly	<i>Sialis lutaria</i>	Yes	No
Harlequin ladybird adults	<i>Harmonia axyridis</i>	Yes	No
Wood Lice	<i>Oniscus asellus</i>	Yes	No
Marbled Beauty Moth	<i>Cryphia perla</i>	Yes	No
Common Wasp	<i>Vespula vulgaris</i>	Yes	No
Sedge Fly Nymph	<i>Rhyacophila spp.</i>	No	Yes
Total: 26		Total: 16	Total: 15

Other Species

Ad-libitum sampling of other species was also done during the invertebrate survey. This identified a variety of fish, mammals and bird species (Table 3). Following on from the 2016-2017 citizen survey, it is important to note the presence of otters and American mink in 2018.

Table 3. Other species identified during the survey, including fish, mammals and birds. Several were identified in the area by Chris Moody and Tom Mason but the site location was not recorded.

Common Name	Scientific Name	Site	Identified By
<i>FISH</i>			
Brown Trout	<i>Salmo trutta</i>	NA	Chris Moody
Minnow	<i>Phoxinus phoxinus</i>	SS2	CNN Volunteers
<i>MAMMALS</i>			
Eurasian Otter	<i>Lutra lutra</i>	NA	Chris Moody
Fox	<i>Vulpes vulpes</i>	NA	Chris Moody
Rat	<i>Rattus Norvegicus</i>	NA	Chris Moody
American Mink	<i>Mustela vison</i>	NA	Tom Mason
<i>BIRDS</i>			
Dipper	<i>Cinclus cinclus</i>	NA	Chris Moody
Mallards	<i>Anas platyrhynchos</i>	SS1	CNN Volunteers
Grey Heron	<i>Ardea cinerea</i>	SS1	CNN Volunteers
Grey Wagtail	<i>Motacilla cinerea</i>	SS2	CNN Volunteers
Rock Dove	<i>Columba livia</i>	SS1	CNN Volunteers
Wood pigeon	<i>Columbia palumbus</i>	SS1	CNN Volunteers
Rook	<i>Corvus monedula</i>	SS2	CNN Volunteers

Discussion

The citizen science survey was successful in combining data collection with increasing awareness and education. This data follows on from that of White *et al.* (2013) and showed that otters were still present in the River Bride. From Figure 12, we can also see that this data confirms previous findings that otters are very active primarily in two sections of the River Bride (Walsh, 2018).

The invertebrate survey in 2018 shows that the habitat is still suitable for sustaining otters. Several species were recorded which are known to be prey for otters in Cork city, including brown trout (*Salmo trutta*) and rats (*Rattus norvegicus*) (O'Leary *et al.* 2006). It is likely that the invertebrates found in the survey support this population of prey and are a vital part of this ecosystem.

Both the citizen science survey in 2016-2017 and the invertebrate survey in 2018 recorded the presence of American mink in the River Bride. This is an important observation as the NPWS (2009) states that the presence of Mink is a threat to otters in Ireland.

Citizen Science

This study proved that citizen science is an effective way to assess otter presence in urban areas. Trained citizen scientists can be used to collect a large quantity of data over a short time period. This can then be used to confirm the presence or absence of various species. The citizen science aspect of this survey also benefited the local community by increasing awareness of the otters in the River Bride and Cork city through workshops and public events. Cork Nature Network has found that the Cork Otters trail, which was created as part of the larger Cork Otters project, has been very successful at encouraging people to become engaged with Cork's local wildlife. Community-based conservation is crucial for protecting this species and further efforts to conserve Cork's otters should aim to involve local people in any way possible.

Limitations and Further Research

This study found a wide variety of species in the River Bride but this data is also limited due to the short time frame of the survey. It is likely that a long-term survey may find that there are many other species frequenting the River Bride. The Office of Public Works (2018) conducted an Environmental Impact Survey in relation to a proposed drainage scheme on the River Bride and states that several bat species use the River Bride for foraging, however it is unclear on how frequently bats use the area and where these bats are roosting. Bats are an important protected

species and a future survey could use bat detectors to uncover which species are using the area and how often they are present. Similarly, otter holts were not found in this study and so a future study could focus on assessing where the otters are resting and breeding. The presence of American mink could also be assessed to ascertain whether they are a threat to survival of the local otters.

The Future of River Bride's Otters

The area in which this study was conducted has been identified by the Office of Public Works for the construction of a future flood relief scheme. As a part of this proposed scheme, an Environmental Impact Assessment was conducted which states that there will be a "Permanent, Very Significant Negative Impact" to the otters in the area (OPW, 2018). This will involve disturbances related to loss of habitat, fragmentation of range, loss of feeding areas and prey and also the effects of lighting, noise and human activity during construction. Despite the protected status of otters in Ireland, as of April 2021 the Public Expenditure Minister Michael McGrath has given formal consent for the OPW €20.5 million flood defense scheme to begin construction in mid-2021. In this study, it was shown that otters are very active in the River Bride, as well as many other species which could be affected by the proposed flood relief scheme. Pedroso *et al.* (2014) found that otter numbers decrease during deforestation and construction of flood prevention structures however they do note that otters can recolonise previously disturbed areas, although not to the same numbers that existed before the disturbance. Another study found that otters in highly modified river systems must rely on lower quality food, such as amphibians and birds, due to poor fish resources. The same study highlighted the importance of maintaining resting and breeding sites for otters in rivers with flood relief systems. It was also found that ensuring good connectivity with surrounding rivers is key for conserving otters in these areas (Kloskowski *et al.*, 2013).

Conclusions

Otters are an important semi-aquatic urban species. The survey found considerable activity of otters in the River Bride and it is clear this is an important habitat for Cork city's otters. The invertebrate survey confirmed that the River Bride contains suitable prey species to sustain the otter's living in the river. The overall project was also very successful in spreading awareness of the local otter's and their importance.

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