

THE MAMMAL FAUNA OF THE ROYAL CANAL



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&
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1. Introduction

Canals originated from the need to distribute goods throughout the island. Thus, they are a consequence of increasing industrialisation and commerce. Ironically, what began as a mechanism of infrastructural advance to meet consumerist needs is now a wildlife corridor in suburban and urban sprawl.

Canals provide a very easily accessible cross-section of a number of habitats forged into one linear site. In some areas, a canal serves as a river while at most points it replicates a pond or lake. Hedgerow and scrub along towpaths (especially along disused canals) replicate woodland edge.

Bridges and stone walls associated with the canals provide roost sites and breeding sites for wildlife including birds such as the grey wagtail and wren, mammals such as several bat species, marking sites for otters and mink.

Trees may be of great benefit to birds, bats and squirrels. Hedgerow and banks may provide breeding and resting places for badgers, foxes, otters and other mammals.

Canals serve as a mechanism by which a number of green areas may be connected even in urban and suburban areas and it is this link that is the greatest benefit to the overall biodiversity of an area. While many surviving green areas on their own may not be enough to sustain mammal fauna, the area may be increased by the interconnection of a number of such sites along a canal.

In this report, an examination of the mammal fauna of the Royal Canal is considered within a specific year, 2004. Any other data from former years is included where this expands the knowledge of the mammal fauna.

Measures that may assist in supporting biodiversity are included at the end of this report.

2. Surveying the Royal Canal for Mammals

2.1 Means Of Assessing Bat Fauna

A bat survey may be grouped into two basic classes: a daytime assessment and a bat detector assessment.

A daytime assessment involves the examination of a site for likely bat roosts, bat feeding habitat and specific cues such as staining, bat droppings, bats themselves or sounds associated with roosting bats (squeaks). It may also include where relevant, questioning of inhabitants or local people who may spend time in the area in question. This may often uncover anecdotes of bat encounters (e.g. bats seen emerging from a bridge or tree).

A bat detector assessment involves the use of ultrasonic receivers that allow an experienced observer to identify very often to species level a flying bat. An inventory of bat fauna can therefore be compiled without the requirement to capture and handle bats and the consequent stress to bats and additional workload to the researcher. A bat detector evaluation of a site on its own may run the risk of overlooking species with very quiet ultrasonic signals such as brown long-eared bat, lesser horseshoe bat (in western counties), (Bechstein's bat throughout the rest of Europe) and occasionally Natterer's bat.

It also allows for identification of the bat fauna over a large area, as there is no need to erect nets in definite locations and a comparable level of study over several kilometres.

Bat detectors are broadly divided into two major categories in the European context: heterodyne and time-expansion systems.

Heterodyne bat detectors convert bat ultrasonic emissions to audible signals that may be read from the dial on the detector. The signal retains the pattern and frequencies of the original signal although in a converted format. The resultant signal cannot be analysed for differential signal strengths, duration of individual calls or any short-scale differences between the signals of different species.

Time expansion detectors, on the other hand, retain the original features of the bat signal by recording the signal and converting it to a slower version of the incoming signal. This signal retains all of the original nuances of a bat's echolocation or social signal and can be analysed on a sound analysis program of a computer. Thus, minute differences in the signals of bats, discernible to the species concerned may be detected. Species that may not be easily separated by heterodyne signal assessment may therefore be discovered by further examination on a time-expansion recording.

The bat fauna was investigated along the Royal Canal in July through to October 2004. This required three nights of examination along the route, concentrating emergence studies (sunset onwards) at sites that can be easily accessed from public or private transport.

2.2 Means Of Assessing The Non-Volant Mammal Fauna

The Royal Canal was surveyed on December 4th 2004 for any evidence of mammal burrows, feeding sites, faeces or marking sites. This was principally done by examining banks, bridges, hedgerow and soil banks for any of the typical signs of these mammals. These included the abodes of the various mammals (setts, earths, warrens and holts) and their faeces (droppings, dung, scats, spraints of the respective mammals), footprints, digging, carcasses.

Vegetation such as bramble has begun to retreat in December and the underlying soil is easier to examine for animal digging. Trees and bridges could also be examined for evidence of bats during this phase of the survey.

Local residents, walkers encountered along the towpath and fishermen were questioned about any sightings of bats, badgers, otters etc. along the Canal. This allows for additional records from other periods of the year. Such reports must also be carefully evaluated to discern the veracity of identification.

The Royal Canal was walked from Leixlip to Ashtown to cover all areas of the Canal within the Fingal area (which commences at Lucan).

In some areas vegetation was still quite dense and it was impossible to fully investigate some sites (e.g. Porter's Gate, Clonsilla). Other areas of ground cover were in areas that were not easily accessible and the slope of the site rendered it difficult. For example, in the section of Royal Canal between Porter's Gate and Coolmine, the northern bank of the Canal is sloping towards the water and is unsafe. This area lies behind new apartments but is well vegetated.

Some other stretches of the canal banks on the opposite side of the water (along the railway) offer better cover for mammals but are inaccessible.

3. Results Bat Study

The following bat species were found along the Royal Canal:

Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Common pipistrelle	<i>P. pipistrellus</i>
Leisler's bat	<i>Nyctalus leisleri</i>
Daubenton's bat	<i>Myotis daubentoni</i>
Brown long-eared bat	<i>Plecotus auritus</i>
Whiskered/ Brandt's bat	<i>Myotis mystacinus/ brandti</i>

3.1 Soprano pipistrelle

The most commonly encountered bat species was the soprano pipistrelle. Soprano pipistrelles were noted from Ashtown up to beyond the Fingal boundary (the former Lucan North railway station up towards Leixlip). This species has been shown to favour roost sites close to water and it is unsurprising that the Canal provides a good feeding site for this species.

The greatest number of soprano pipistrelles noted (or of any bat species along the Royal Canal) was 29 individuals at the Lock House approximately halfway between the Ashtown Railway Station and the M50. Two soprano pipistrelles were also noted to the east of this Lock House towards the Ashtown terminus of the study area. One soprano pipistrelle was noted in the amphitheatre formed by the M50 roundabout. This may have been from the Lock House bat population noted emerging prior to this. In the stretch of Canal between Clonsilla Railway Station and Laurel Lodge Railway Station, Castleknock, a total of six soprano pipistrelles were noted. Most of the activity was concentrated in the area immediately west of Laurel Lodge station. Indeed, three of the six bats fed here and were present here for over ten minutes of observation.

Bats have been reported to roost in the buildings of St. Joseph's Hospital, Clonsilla (Helen Kane former staff member, *pers. comm.*). This is most likely to be a soprano pipistrelle roost.

3.2 Common pipistrelle

Common pipistrelles were less common than soprano pipistrelles. This species often selects unimproved grassland and areas around water. In the section of Canal between Clonsilla and Laurel Lodge, two common pipistrelles were noted.

Both of these bats were in the same area to the west of Laurel Lodge Railway Station as the main soprano pipistrelle group. In the section of Canal between Ashtown and Blanchardstown, only one common pipistrelle was noted.

Thus, a minimum of thirty-seven soprano pipistrelles was encountered between Ashtown and Clonsilla compared to three common pipistrelles. Surprisingly, there were very few bats recorded at the Clonsilla end despite the availability of farmland, estates and demesnes from this point westwards.

Common pipistrelles are capable of exploiting feeding areas away from water and even within towns or housing estates, gardens, car parks and areas generally unsuitable for many bat species. Common pipistrelles were noted for example, feeding around the Church of Ireland in Clonsilla. This species may therefore be more widespread in the built-up areas away from the waterways.

Both common and soprano pipistrelle bats have been recorded from the Luttrellstown demesne in 2002. Other examinations of the Royal Canal at Castleknock and Blanchardstown carried out by the author in 2003 and 2004 provided evidence of low levels of pipistrelle bat activity between Laurel Lodge Railway Station and Talbot Bridge. One Leisler's bat was also heard briefly, passing over the Canal.

3.3 Leisler's bat

Leisler's bats were noted on two of the nights of study along the Royal Canal. Two bats were seen and heard along the Canal between Porterstown and Coolmine: one above the stretch of water from Porter's Gate to Coolmine. One bat was seen flying higher than the road bridge east of the Porter's Gate access. Hence, it was only indirectly benefiting from insects along the Royal Canal. Leisler's bats have been noted by the author previously in the stretch of Canal level with the Westmanstown Sports Club early in the night (i.e. at around the time of first emergence from the roost).

Leisler's bats have also been noted by the author feeding and also at mating roosts in the Luttrellstown Estate. One of the largest roosts of Leisler's bats reported from the Dublin area was recorded in a former farmhouse in Castleknock by Brian Keeley and Donna Mullen. 110 bats emerged from this roost in the summer of 1991. The bats have been excluded from the attic since then. However, it does indicate that this species is present throughout the area. As it travels over a wide area to feed, it may only be present for a short period and may be overlooked if surveying does not coincide with its emergence.

3.4 Daubenton's bat

Daubenton's bats are very much associated with water. Slow moving, unbroken water such as the typical surface of a canal is an ideal feeding site for this species. It is surprising, therefore, that a total of two Daubenton's bats were noted feeding along the Royal Canal between Ashtown and Leixlip. This species feeds low over slow-moving water and scoops up insects (and sometimes fish) with its especially large feet from the water surface or catches insects in flight.

Daubenton's bat activity was heard briefly from Clonsilla to Coolmine. Previous observations along the Tolka in 2003 provided records of the presence of this bat from Ashtown to Clonee and night roosts for this species were discovered in Luttrellstown in 2002. A Daubenton's bat tree roost was discovered along the River Liffey in Lucan in 2003. Thus, the species is present in the Clonsilla area, the Castleknock and Ashtown area and the Lucan area wherever feeding is suitable. It would be expected therefore that there would be greater evidence of this species along the Royal Canal.

The section of canal between Clonsilla and Lucan was examined on a colder night than the section from Ashtown to Clonsilla. This may explain the scarcity of bat activity along the former section but it does not explain why only two Daubenton's bats were noted between Ashtown and Clonsilla.

3.5 Brown long-eared bat

A single record of brown long-eared bat was noted along the Royal Canal. This was made by Donna Mullen at the lock house. This species is difficult to hear due to its very weak navigation signal and is often under-recorded. Evidence that this species roosted formerly in the Church of Ireland, Clonsilla was noted by the author in 1989. One other species of bat was noted along the Royal Canal. One whiskered/ Brandt's bat was seen and heard flying close to the Lock House between Ashtown and the M50. The signals for the two species (whiskered and Brandt's bats) are so similar that it is extremely difficult to separate the two based on ultrasonic signals. In fact, it is even difficult to separate the species based on the morphological features when examined in the hand.

3.6 Whiskered bat

Whiskered bats feed in dark areas such as country lanes, woodland edge, and parkland close to tree lines or hedges. Brandt's bats appear to have a greater association with boreal woodland. Brandt's bats are extremely rare in Ireland. Whiskered bats are uncommon.

Whiskered bats have been identified in the hand or at rest in a roost in Blanchardstown, Phoenix Park and Luttrellstown. Whiskered/ Brandt's bat signals have also been noted in Lucan. The species is clearly uncommon in the Fingal area and indeed in the overall Dublin area.

3.7 Evaluation of the Bat Fauna of the Royal Canal

Six species of bat feed along the Royal Canal. This is out of a total bat fauna of the island of ten species. The Dublin area is known to be host to seven species and an eighth species is a possibility (Brandt's bat). Thus, only one species was not recorded along the Royal Canal, Natterer's bat. As this is a species that can be more difficult to detect than all of the bat species reported (except the brown long-eared bat), it might be that the species is present in low numbers in the area. Natterer's bats were noted in Phoenix Park, Dublin and also in Luttrellstown by the author in 2002.

The presence of six species is a good diversity of bat fauna for a site that is surrounded by some rapidly developing suburbs. Ashtown, for example, is currently experiencing enormous changes that have seen much of the surrounding agricultural land disappear, even along the Royal Canal itself. Ashtown was the area where the greatest number of bats was noted. This is probably attributable to the presence of suitable roost sites such as the old mill building, stables, lock house and mature beech trees.

While the diversity of bats is unquestionable, there were clearly few bats recorded of bats along the length of the Canal of all species other than soprano pipistrelles. Daubenton's bat is particularly notable by its sparsity. This species was recorded along the entire length of the River Tolka within Fingal, from Clonee to Ashtown. As has been mentioned earlier, a night roost of this species was noted in 2002 in Luttrellstown and a roost was found in a beech tree in St. Catherine's Park, Lucan. None of these sites are far from the Royal Canal and yet they would appear to offer better feeding opportunities for Daubenton's bats. The absence of Daubenton's bats would suggest that the water of the Royal Canal is not providing adequate insect fauna for this species to collect through gaffing from the surface.

Discussions with a fisherman along the stretch between Lucan and Clonsilla uncovered a concern that fish levels were greatly reduced. Similar queries of young anglers at Ashtown provided the contrary opinion on fish abundance.

Lighting along public stretches may have a negative impact on the light intolerant bat species and encourage specific feeding sites for species such as the pipistrelles and Leisler's bat. Mercury vapour lights particularly attract insects.

3.8 Survey and monitoring along the Royal Canal for bats

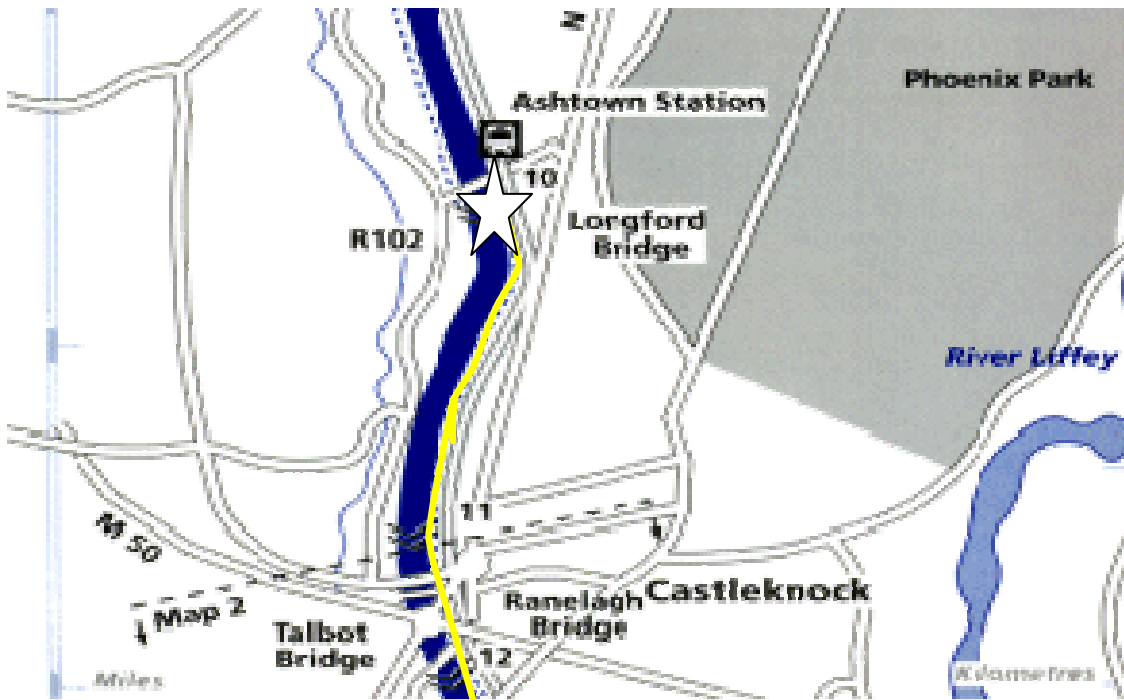
To ensure that bat monitoring may be carried out along the Royal Canal, it is important that an easily accessible section be examined regularly. Most areas of the Royal Canal are easy to access. Some sections allow the use of public transport to survey in one direction following the Royal Canal for a long stretch and returning to the start without the need to retrace one's steps.

One section of the Canal, Ashtown to Blanchardstown, provides an interesting cross-section of dark apparently rural surroundings (including a marshy section) mature beech trees (some with cavities), good roost potential (a mill, more than one stables, lock house, factories, the beech trees, an old bridge) and illuminated highly modified areas (the M50 roundabout). This section could be used as one transect of the Royal Canal to monitor bat activity. In this assessment, this was treated as a separate transect and this could be an easily repeated survey route.

Route 1: If the survey commenced at Ashtown Railway Station and terminated at "The Twelfth Lock" bar and barge dock, this would provide a good indicator of all bat species in this stretch in a walk that would be one hour in duration.

The survey should commence half an hour after sunset at Ashtown Railway Station and would end one hour later at "The Twelfth Lock".

Figure 1: Survey route along the Royal Canal to examine bat fauna annually.



Route 1. Ashtown to Blanchardstown. (map courtesy of Waterways Ireland)

The survey could incorporate commuting/ emergence activity and feeding activity **if the route was re-traced**. This may then allow for an examination for Daubenton's bats in a more thorough manner. This species emerges later than most and this may lead to it being missed if the survey only deals with early emergence.

In total, this would necessitate a survey time of approximately 90 to 100 minutes if the walking speed were approximately 5 kilometres per hour.

Route 2: The second route that may be of interest is the section from Clonsilla Railway Station to Pakenham Bridge (or alternatively Collins Bridge). This section passes formerly reported bat roosts (church, hospital and close to Luttrellstown) and has less lighting, traffic and a more rural setting than Route 1. This may be interesting for the comparison between the two sections. This initial survey along the section from Clonsilla to Lucan has yielded little evidence of bat activity. This may be attributable to cold weather as there would appear to be suitable vegetation in the surrounding area, the water quality of the Canal is unlikely to differ greatly between the two sites and there are roost opportunities by way of houses and trees.

Figure 2: Survey route along the Royal Canal to examine bat fauna annually.



Route 2. Clonsilla to Lucan. (map courtesy of Waterways Ireland)

4. Other mammal species

Brown rat	<i>Rattus norvegicus</i>
Grey squirrel	<i>Sciurus carolinensis</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Fox	<i>Vulpes vulpes</i>
Badger	<i>Meles meles</i>
Otter?	<i>Lutra lutra</i>

The most commonly recorded sign was of the brown rat. This is unsurprising given the strong connection between this mammal and watercourses, drains (including sewers) and human activities. Rat burrows were seen in the bank of the Canal as well as in the field drains along the opposite side of the towpath. The most obvious rat burrow was seen at the Ranelagh Bridge (see photograph) but burrows were noted at all pints along the Canal.

Mice are clearly abundant along the Canal but there were no obvious signs of either wood mice or house mice noted.

A grey squirrel was observed on the ground and later in trees close to the Westmanstown area, close to Pakenham Bridge. This species was abundant in an examination of the Lucan area in 2003, is abundant in Clonsilla (Luttrellstown) and in the Phoenix Park.

Rabbits are present in some banks along the Canal but are not especially abundant.

Foxes are present along the Canal but no earths were noted within the land adjoining it. Evidence of foxes was clearest from the area around St. Joseph's Hospital Clonsilla and along the towpath at Ashtown. One person questioned who is a regular walker of the towpath mentioned that he often saw a fox at the Porter's Gate area of the Canal.

Badgers were less in evidence than would have been expected. No clear evidence of badgers was found in a survey moving eastwards along the Canal from the Lucan side until the area surrounding St. Joseph's Hospital, Clonsilla. Digging and tracks were evident here and appeared to lead towards the Hospital grounds.

Badger signs including digging and a latrine were also noted level with the Porter's Gate housing estate. No evidence of badgers was gathered in the Blanchardstown area despite the presence of several badger setts along the River Tolka very close to the Royal Canal and on the perimeter of Blanchardstown Hospital. A number of setts were also noted in St. Catherine's Park, Lucan. These would be easily within the typical commuting distance of a badger during night feeding.

Otter activity was not noted along the section of Royal Canal examined. No otter spraints were discovered at any of the bridges. Nor were there footprints in mud or holts evident. Some mammal tracks at Westmanstown were seen leading into an adjoining field drain but no paw prints leading through were available to confirm species.

Only one individual questioned claimed to have seen an otter in the Royal Canal. This identification is open to question as the otter was stated to have been black and yet the size of a dog. This is contradictory as otters are brown in colour and mink are most often black.

Otter activity is certainly much less in evidence along the Royal Canal than along the River Liffey, the River Tolka and even the Broadmeadow and Ward Rivers in Swords (see other reports on these waterways by the author for Fingal County Council).

5. RECOMMENDATIONS

The following recommendations are aimed at maintaining and enhancing the suitability of the Royal Canal for mammals.

5.1 Provision of Vegetation Along All Sections of the Royal Canal

A continuous line of vegetation should be ensured along the entire canal section from Lucan to Ashtown. The area where vegetation is clearly most in absence is the section crossing over the M50 motorway. This area is entirely devoid of any cover. While it is understood that the safety of traffic on the motorway underneath is paramount, there must be a means as used in “Green bridges” by which vegetation can be grown and managed without any endangerment to cars.

Plants in heavy concrete pots would provide some cover.

5.2 Encouragement of Climbing Plants such as honeysuckle and *Clematis* to increase insect abundance

Insect diversity and abundance can be encouraged by planting of climbers that may avail of fences or trees along the Canal. *Lonicera periclymenum* and *Clematis* both provide nectar for nocturnal insects. This also benefits bats that may feed on the increased insect prey.

5.3 Retention of well-developed scrub such as bramble along the edge of the towpath

Bramble, blackthorn and hawthorn in vegetation along the towpath provide cover and feeding sites for most mammals. Bats travel along such cover and can feed on insects supported by it. Badgers, foxes etc. will excavate burrows underneath good cover and will also eat berries in late summer/ autumn.

5.4 Regular monitoring of water quality

Deterioration of the water quality of the Royal Canal would lead to a huge decline in the insect fauna dependent upon the Canal. The bat fauna would seek alternative feeding areas (such as the Rivers Tolka and Liffey and ponds or lakes).

Reduced water quality would also reduce the number of fish supported by the Canal through a decline in insects or internal metabolic pressures (toxins, increased parasitic load).

5.5 Bat boxes on mature trees or bridges

Bat boxes should be erected on mature trees and bridges along the Royal Canal to provide roost potential for bats. Developments on all sides of the Canal will lead to a diminution in the availability of natural roosts and old buildings and it is important that in areas where nature can be accommodated that measures are put in place to lessen the impact of continuing urbanisation.

Schwegler boxes and timber boxes should be attached at a height in excess of three metres on mature trees such as beech. Boxes should be clustered in groups of three, one box facing southeast, one southwest and the third in any remaining direction.

5.6 Continued absence of lighting

Lighting can be detrimental to the movement of bats as it deters light intolerant bat species such as Natterer's bat and brown long-eared bat. It may provide additional feeding sites for pipistrelles and Leisler's bats but this is not an overall benefit as it attracts insects from dark areas and thus reduces the number of insect prey for the light intolerant and less common bat species.

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Figure 3: Mammal signs and mammal sites along the Royal Canal, Fingal.

- (a) Rat burrow on bank of canal. Blanchardstown to Ashtown.
- (b) badger latrine along towpath. (c), (d) badger digging at Porter's Gate, Clonsilla.
- (e) Site of most badger activity along the Royal Canal at Porter's Gate, Clonsilla.
- (f) Good quality feeding site for bats and good vegetation for otters, Ashtown.

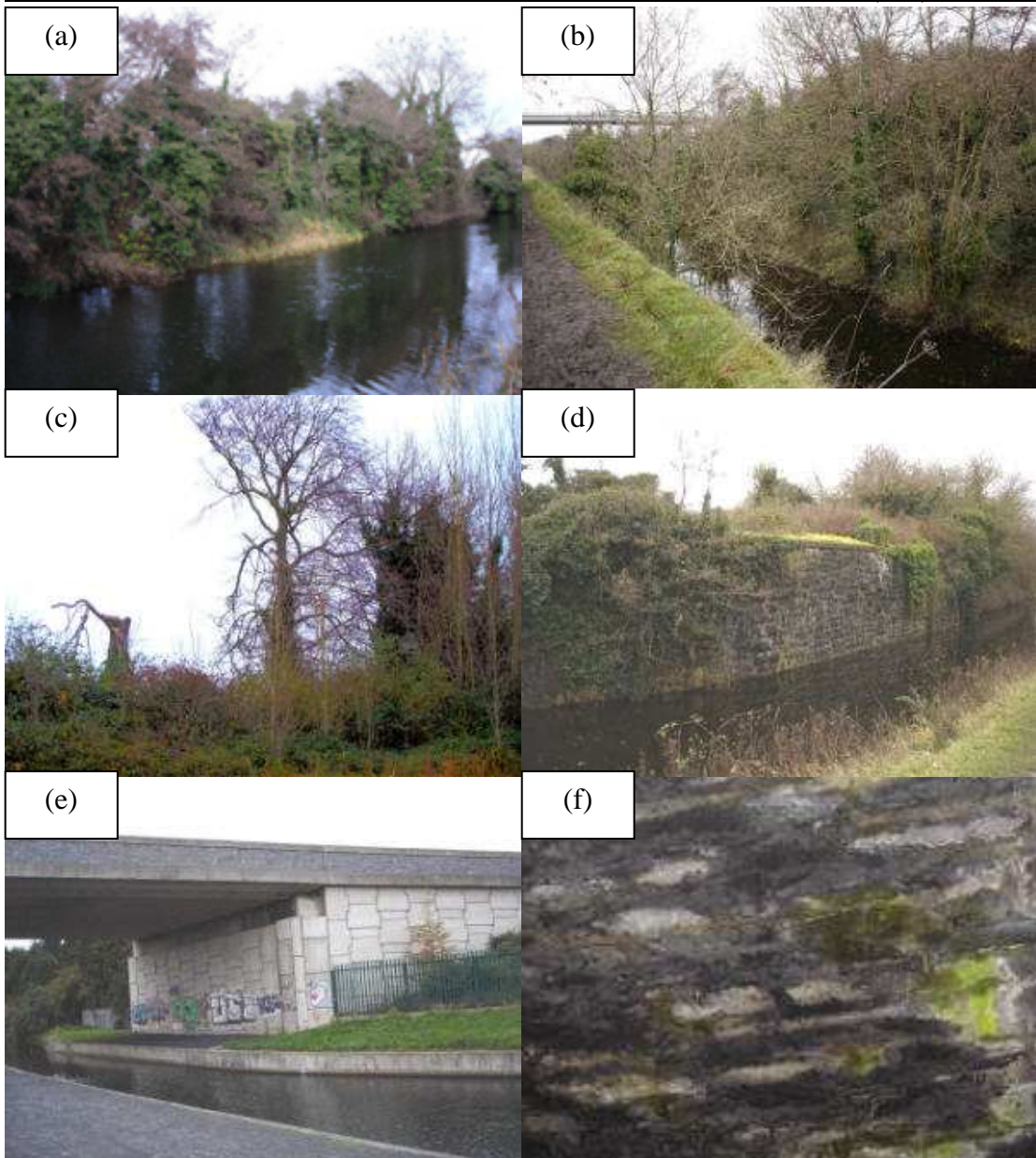


Figure 4: Mammal signs and mammal sites along the Royal Canal, Fingal.

(a), (b) Good area for bat activity at Castleknock.

(c) Trees with bat roost potential at Ashtown. (d) Ivy-covered walls near Clonsilla with roost opportunities.

(e) New bridge facing and old bridge stonework with roost potential for bats.



Figure 5: Mammal signs and mammal sites along the Royal Canal, Fingal.

(a) to (c) Structures with roost potential for bats

(a) Mill building at Ashtown (b) Old building at Porter's Gate, Clonsilla. (c) Bridge at Blanchardstown/ Castleknock.

(d) The changes along the banks of the Royal Canal at Ashtown are rapid and enormous and are likely to reduce suitable habitat for some mammals of the area.