MONITORING OF ECOLOGICAL IMPACTS OF OUTDOOR CONCERTS IN 2016

MARLAY PARK, CO. DUBLIN.

EXECUTIVE SUMMARY

DUN LAOGHAIRE-RATHDOWN COUNTY COUNCIL

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This Executive Summary has been prepared for Dun Laoghaire Rathdown County Council by Scott Cawley Ltd. It provides a summary of the surveys carried out at Marlay Park in summer 2016 which monitored the behaviour of wildlife in the park before, during and after a series of outdoor concerts. Scott Cawley Ltd also provided advisory and supervisory services during the setup, operational and decommissioning stages of the concerts in the context of the protection of fauna in the Park.

The main report includes all technical data including activity logs, photographs and statistical analyses. This summary distils the key findings of the report using non-technical language capable of being interpreted by a wide audience.

Introduction

Scott Cawley, Ecological Consultants were contracted by Dun Laoghaire-Rathdown County Council to regarding the protection of fauna in Marlay Park during the set-up and operation of outdoor concerts over two weekends in July in 2016 and to monitor the response of fauna to the set-up and operational phases of these concerts and the longer terms effects on bat distribution over the summer of 2016.

This is the second year of monitoring of the impacts of similar events in 2015. However the current Report covers two weekends of events, as opposed to just one in 2015. The surveys in 2016 also employed standardised survey techniques to measure bat activity before, during and after the events.

The scope of the surveys covered impacts on breeding birds, bats, badger and otter activity. The National Parks and Wildlife Service were fully consulted during the scoping and undertaking of the surveys and were continually updated on their results.

Breeding Birds

Surveys for breeding birds identified waterfowl using the lake and surrounding trees for breeding and roosting. Species including Mallard, Moorhen, Coot and Little Grebe were recorded breeding successfully during the summer of 2016 whilst Tufted Duck and Mute Swan were noted to be present but not breeding

Plate 1: Pair of Tufted Ducks seen on the main lake.

Prior to the events on 8th and 9th July and the installation of any infrastructure, Little Grebe, Mallard and Moorhen were noted to be sitting on eggs in nests in the main lake. A juvenile Little Grebe on the main lake indicated that a breeding attempt had already been successful. The installation of the pontoon on 5th

July 2016 was supervised by an ecologist (following checks for nests in the vicinity of the pontoon locations) and whilst a juvenile Moorhen was present in the area of the pontoon, no disturbance or distress to this individual or other birds was observed. Birds were seen to use the bankside and even dive under the pontoon on occasions to reach the other side.

During the concerts on 8th and 9th July, the Little Grebe eggs had hatched and nestlings were seen on the water and in the nest seemingly unaffected by the concerts. Moorhen were also noted breeding nearby. It was noted that birds did not swim close to the pontoons and that most birds congregated at the eastern end of the lake. The nests were also located in this area. During the concerts on 15th-17th July 2016, the same species were noted in the same locations. The Coot that was seen prior to the event was seen with fledglings on the water on 17th July. Its nest was not found but was not thought to be near the pontoon locations as this area was thoroughly searched.

The large rookery in the Park to the south of the main lake was monitored before, during and after the events. During sound checks on the 7th July 2016, little disturbance of the rookery was noted but on the night of the concerts themselves the flock was noted being disturbed and settling in the same locations or slightly to the east or south. No nestlings were seen prior to the events and it is not thought that the disturbance would have affected breeding activity.

Kingfisher were regularly recorded in the main and lower lakes all the way north to the wetlands at the northern edge of the Park. Kingfisher were recorded before the events on either of the lakes and were recorded hunting on Bushnell HD cameras within the lower lake on two occasions in August 2016. This species is listed on Annex I of the EC Birds Directive.

Plate 2: Single Kingfisher perched on branch in middle of picture. Dating from 14th August 2016.

Plate 3: Kingfisher diving for fish (left foreground of picture) on 14th August 2016.

Other notable species using the woodland area included Sparrowhawk, Grey Heron, Woodcock, Treecreeper, Jay and a range of typical woodland birds commonly found in the surrounding suburban landscape.

Bats

Building upon last year's surveys of bat activity before, during and after the events, studies of bats using Marlay Park were more comprehensive and standardised to allow more robust scientific analyses. The following survey types were undertaken:

1. Surveys of bridges, trees and structures to determine if bats were using them as roosts.
2. Surveys of bat activity in three fixed positions from 15th June to 28th July 2016.
3. Surveys of bat activity along four fixed walking routes around the events area before, during and after the events.

Surveys were undertaken at a range of structures and trees in the Park to determine if bats were using them as roosts. Leisler's bats were recorded in a tree cavity in 2015 and several tree cavities were examined in 2016 but no roost sites were confirmed.

Bridges that cross the two watercourses that flow through the Park were examined where safely accessible. Several bridges were also surveyed at night to determine if bats were using them. Some were in a state of disrepair with gaps in mortar and missing stones offered good potential for bats but no bats were found *in situ* and no evidence for use by bats was confirmed. Nevertheless, some of the stone bridges were highlighted as offering the best roosting opportunities for bat alongside trees in the Park. Since several of the bridges will require repair works by the Council, the main report includes a recommended protocol to be followed by the Council when scheduling such repairs to ensure that potential impacts on Bats are addressed.

Plate 4: Bridge with crevices suitable for bats.

Surveys of buildings deemed suitable for bats were undertaken in early summer 2016. Particular attention was paid to buildings close to the area of the outdoor events such as the Laurelmere Cottage and Farm Yard. The Marlay House and courtyard were also re-surveyed after surveys in 2015 did not record bats using the structures. The Farm Yard buildings and Laurelmere Cottage were deemed to be highly suitable for bats but strong security floodlighting may deter bats from using these structures despite being recorded nearby.

Plate 5: Security Lighting at Farm Yard buildings

Plate 6: Security Lighting at Farm Yard buildings.

Two different types of surveys were undertaken to record the diversity of bat species using the Park and to record their foraging and flight activities. These comprised use of unattended static bat detectors and walked transects. The locations of the surveys are shown overleaf in Figure 1.


West Woods
East Woods
East Woods
Lakeside
Car Park
Control
Figure 1: Survey Area
Marlay Park Concerts
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scott cawley
Legend
Static Detector
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Marlay Park
N

Static Bat Detectors

Three static monitoring locations were used to record bat activity each night from 15th June to 28th July 2016. Two of these were placed in areas within the zone of influence of the outdoor events, near the edge of the main lake and in the woods near a crossing point used during the Longtitude festival. The third static monitoring location was in the woodland area near the stream to the south of the event area near the "Fairy tree".

These detectors monitored bat activity each night from prior to the setting up of the event infrastructure during the concerts themselves and then until the end of July after all the event infrastructure had been removed.

Bat activity was measured as a bat activity index or "passes" per hour. This does not relate to numbers of individual bats.

Bat species recorded by this survey method included Common and Soprano Pipistrelle bats, Leisler's bats, Brown Long-eared bats, Daubenton's bats, Natterer's bats and unidentified bats of the Myotis genus- which are known to be difficult to distinguish.

The full results of the static bat detector surveys are presented in the main report and are summarised below.

- Over 3400 recordings of bats using the three recording locations were made and analysed as part of the studies.

- The bat activity during the entire period was higher at the "east woods" location than the south woods (control) and was dominated by Pipistrelle bats and Leisler's bats.

- Bat activity at the "lakeside" location was low over the entire survey period although the habitat was deemed to be suitable for foraging. The low level of usage by bats was corroborated by direct observation made during the walked surveys as very few bats were noted in this location.

- At the "east woods" location, the mean bat activity index prior to the events was 4.88 passes/hour which fell to 3.95 over the period of the events and then rose to 12.22 passes/hour. After analysing the patterns during this period it was determined that there was no statistically significant levels of variation noted over the period. However there no activity recorded at this location during the Longtitude festival. Whilst the second of the two weekends of events included lighting and pedestrians in this location, bats were still recorded in this area during the walked transects suggesting that the detector may have not accurately recorded all activity in the general area or that signals of bats were masked from the microphone.

- At the "lakeside" location, mean activity levels were much lower with 0.96 passes/hour which then fell to zero calls over the concert period and then back to 0.45 passes/hour. Similarly, the analyses of the activity determined that there was no statistically significant levels of variation noted over the period.

- At the "south woods" or "control" location – where it was assumed that there would be no perceptible change in light or noise environment as a result of the events, the mean activity levels prior to the events was 0.9 passes/hour which reduced to 0.6 passes/hour during the events and then increased to 1.14 passes/hour after the events. No comparisons of pre, during and post event activity were deemed to be statistically significant.

Figure 1 – Bat activity before (1), during (2), and after (3), concerts at the East Woods Static Detector. Average values are marked in red.

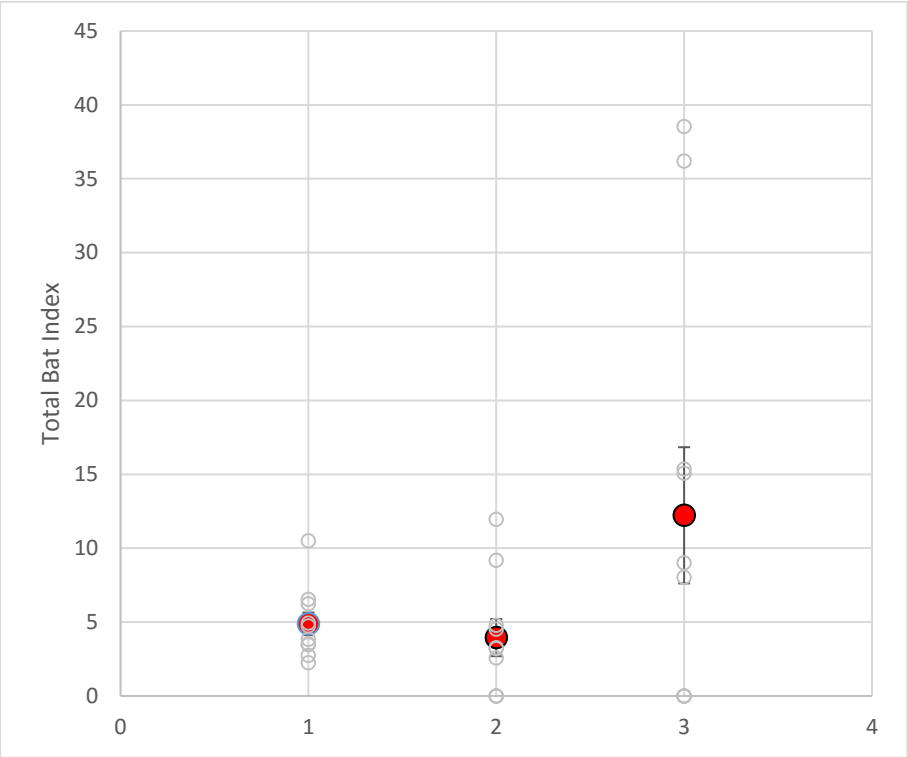


Figure 2 - Bat activity levels before (1), during (2), and after (3), concerts at the Lakeside Static Detector. Average values are marked in red

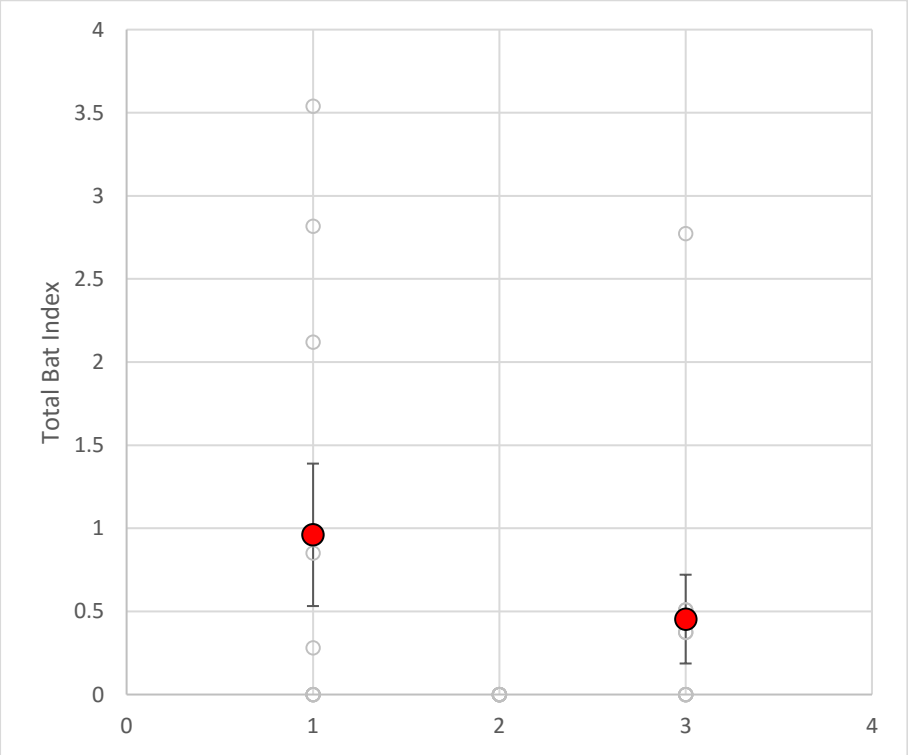
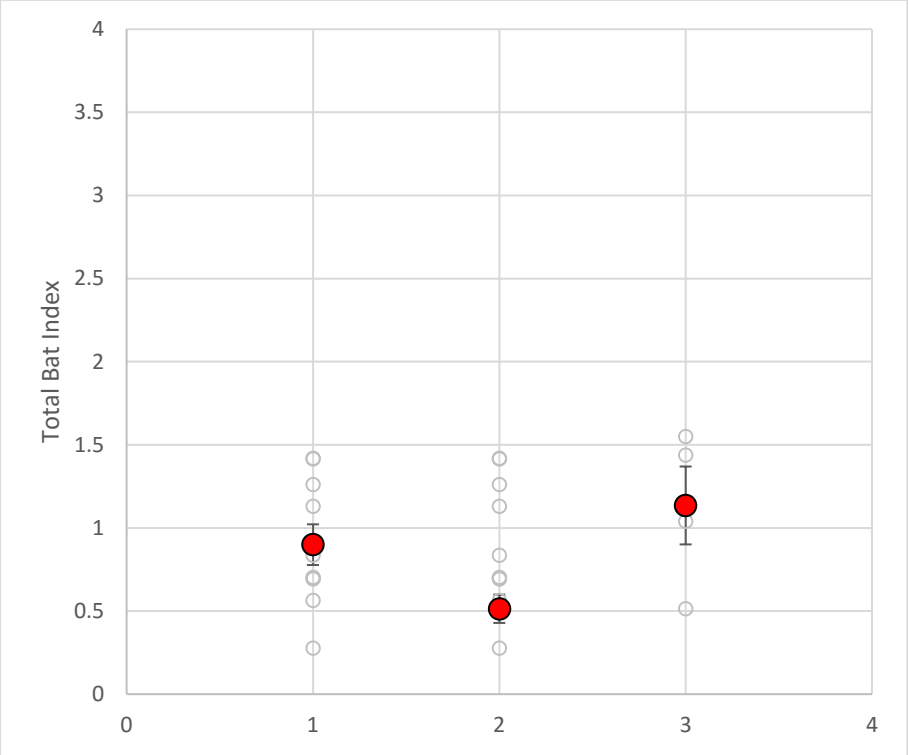


Figure 3 - Bat activity levels before (1), during (2), and after (3), concerts at the South Woods Static Detector. Average values are marked in red.



These results would suggest that whilst there was a depreciation in bat activity levels during the concert period (7th-17thJuly) not only was this not statistically significant but there was a noticeable increase in bat activity in late July.

Walking transects

The static detectors recorded bat activity within a relatively small[1] monitoring area over a long period of time. It was also important to employ a methodology that could record foraging bats across larger areas of the Park in a systematic manner.

Manual bat activity surveys were carried out along three fixed walking routes (transects) using a standardised approach that traversed the perimeter of the event site and the car parking areas. By recording and comparing bat activity along these same routes before, during and after the events it was possible to draw conclusions as to the evidence for any changes attributable to the events.

Maps showing the density of bat calls at a location are illustrated for the transect surveys in Figures 5-8.

The three transects recorded the same six species as the fixed monitoring locations. The two Pipistrelle bat species and Leisler's bats were recorded widespread along each of the transects. Daubenton's bats were recorded on the lower lake and the Main Lake whilst Brown long-eared and Natterer's bats were recorded close to the Main Lake. The results of the transects are summarised below:

- The results of the transects along the "eastwoods" route prior to the events in early July 2016 recorded Soprano Pipistrelle bat and Brown Long Eared bats species with a total of 7 bat passes on 5th July. No bat passes were recorded on the night before- demonstrating the variability of usage of this area. During the events on the 8th and 9th July, species recorded included Soprano and Common Pipistrelle bat, Leisler's bats and Daubenton's bats with a total of 15 passes on the 8th and 36 passes on the 9th July. During the Longtitude festival events on the 15, 16th and 17th July species included the same five species as on the previous weekend species but a much higher level of bat passes recorded over the transect period (108, 33 and 18 passes on each night respectively). The post-event transects undertaken after the events on 28th July 2016 recorded included Common Pipistrelle Leisler's bats, Daubenton's bats, Natterer's bats and Brown Long eared bats with a total of 43 bat passes. The final transect undertaken on this route on 1st September recorded Common and Soprano Pipistrelle, Leisler's bats and Daubenton's bats. Bats were recorded on all of the nights when events were being held and there was no evidence of bats being displaced from areas where they had been recorded previously.

- The results of the transects along the "westwoods" route prior to the events in early July 2016 recorded Soprano Pipistrelle bat, Leisler's bats and Daubenton's bats species with a total of 17 bat passes on 4th July and similar patterns on the following night. During the events on the 8th and 9th July, the same species were recorded at similar levels of activity. Slightly lower levels of bat activity were recorded over the Longtitude festival but species included Soprano and Common Pipistrelle bat, Leisler's bats and Daubenton's bats. The post-event transects undertaken after the events on 28th July and 1st September were higher (34 and 42 passes respectively) and included Common Pipistrelle Leisler's bats, Daubenton's bats and Brown long-eared bats. Bats were recorded on all of the nights when events were being held and there was no evidence of bats being displaced from areas where they had been recorded previously.

- The results of the transects along the "car park" route prior to the events in early July 2016 recorded Soprano and Common Pipistrelle bats, Leisler's bats, Daubenton's bats and Natterer's with a total of 9 bat passes on each of the two pre-event surveys. During the events on the 8th and 9th July, species recorded included Soprano and Common Pipistrelle bat and Leisler's bats with a

[1] The detection range varies with species: 50m for Leisler's bats down to 10m for Brown long-eared bats.

total of 12 passes on the 8th and 65 passes on the 9th July. During the Longtitude festival events on the 15, 16th and 17th July species included the Soprano and Common Pipistrelle bats, Leisler's bats, Daubenton's bats and Natterer's bats (65, 17 and 18 passes on each night respectively). The post-event transects undertaken after the events on 28th July 2016 recorded included Common and Soprano Pipistrelle and Leisler's bats with a total of 38 bat passes. The final transect undertaken on this route on 1st September recorded Common Pipistrelle bats.

Figure 4: Pre-event Bat activity.

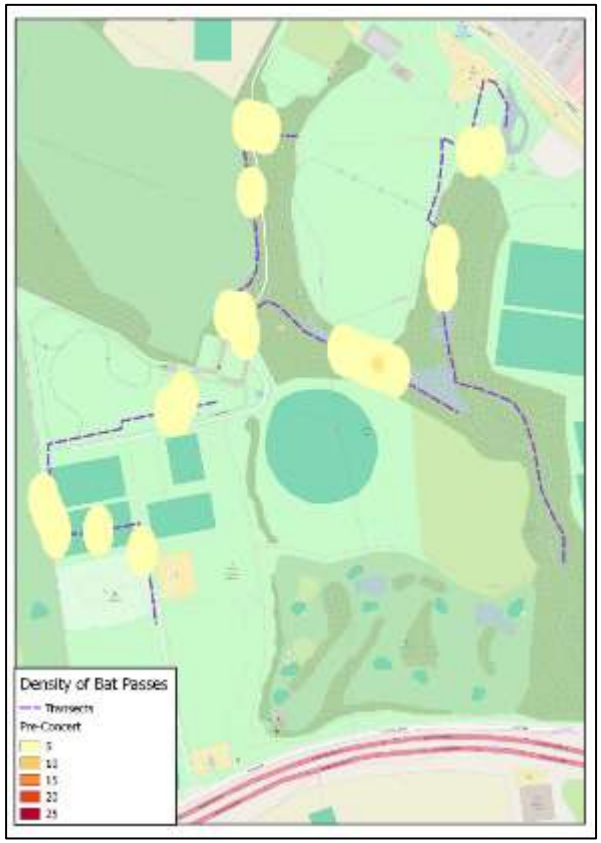


Figure 5: Bat Activity 8-9th July Events

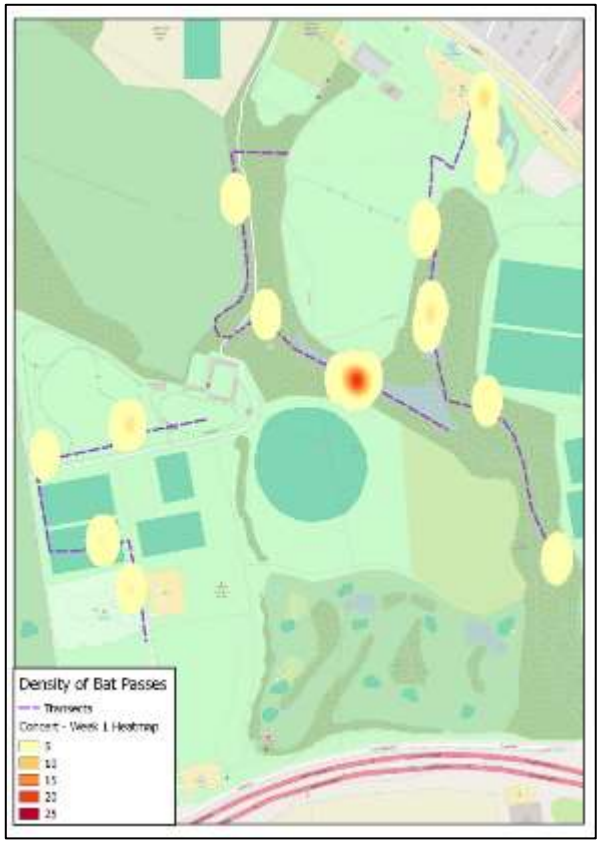


Figure 6: B Bat Activity 15th-17th July Events

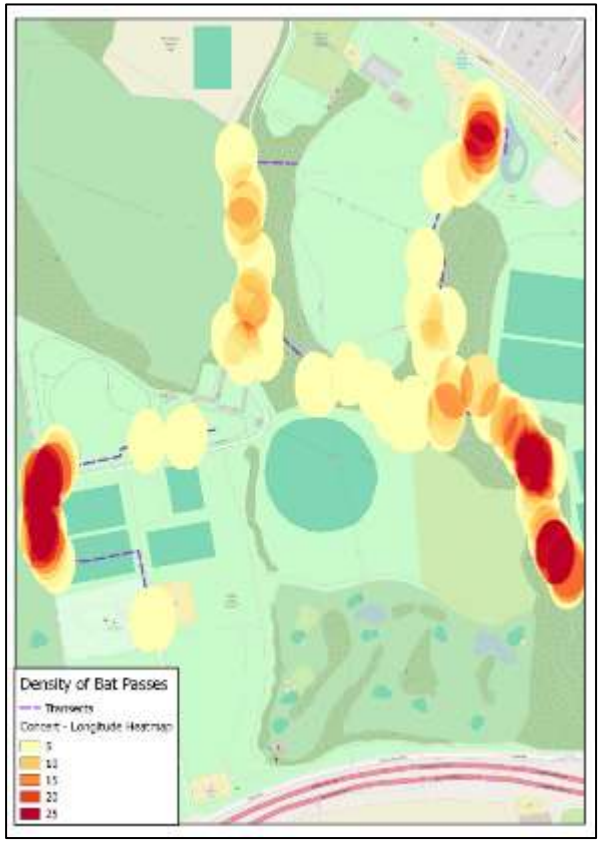
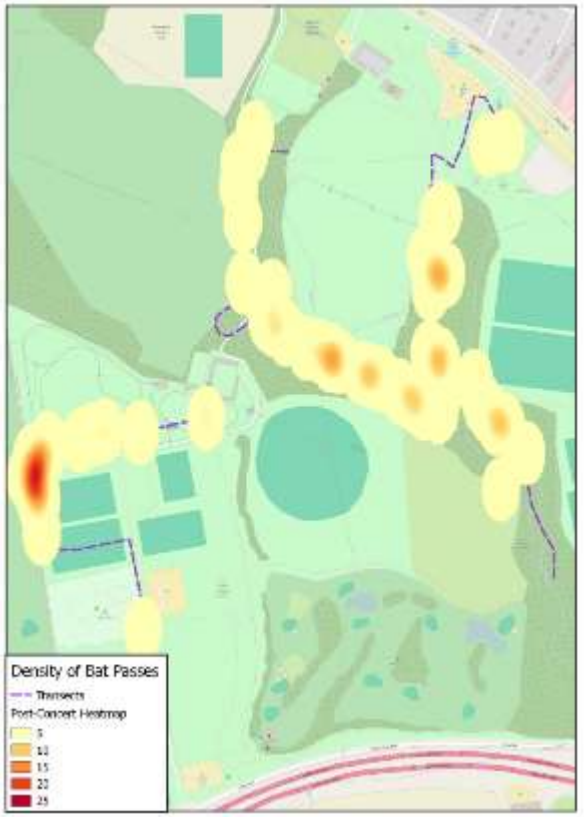


Figure 7: B Bat Activity post-event



Visual observation of bats during the events was important data to collect, as "bat passes" is not an indication of numbers of bats or what they are doing. In the case of the "eastwoods" transect it was repeatedly noted that small numbers (1-2) of Pipistrelle bats were consistently found around the pond closest to the Grange Road whilst Daubenton's bats and Brown Long eared bats were recorded on several nights crossing the path flying toward the lower lake. At the "westwoods" transect, Daubenton's Bat activity was consistently recorded along the main lake east of the boathouse and in the case of the "Car Parks" transect a hotspot for Pipistrelle activity was located along the hedgerow separating Marlay Park from the Grange Golf Club. The latter hotspot generally consisted of two to three Pipistrelle (both Common and Soprano) foraging parallel to the hedgerow. Bat passes in this specific area were relatively high but do not reflect higher densities of bats.

On the night of the 9th July 2016, Daubenton's bats using the main pond were recorded using infra-red illumination and a Sony DVR video camera using Nightshot function. This footage can be found on youtube using the link https://youtu.be/ZigBfL-bLqE . Echolocation calls from Daubenton's bats can be clearly heard and bats can be seen flying within up to 10m from the pontoon despite large crowds passing over the bridge. The camera was positioned approx 20m from the pontoon. All footage was taken under photography licence from the National Parks and Wildlife Service permitting the use of non-intrusive infra-red illumination. Other bats including Leisler's and Pipistrelle bats can be heard on the detector near the end.

After the events finished on the nights of 8th and 9th July, a small number of Leisler's bats were noted feeding above the main stage canopy, presumably on the insects attracted by the lighting.

It was concluded from the results of the detector surveys and based on statistical testing of data that the events were not resulting in any perceptible displacement of bats from suitable foraging habitats within the park. This is supported by findings from the transect surveys where there was no clear reduction in bat activity on the nights of the concerts.

Plate 7: Area of illumination from Pontoon

The final set of surveys for bats were carried out in late August-early September and aimed to record the post-event activity using detectors but also to sample the local bat population to determine the age, sex and species of bats using the Park. Two nights of sampling using mist net and harp trap (under licence from the National Parks and Wildlife Service) took place and recorded adult and juvenile Common and Soprano Pipistrelle bats, Leisler's bats, Daubenton's bats and a single Whiskered bat. The latter species has not been recorded in the Park before and brings the tally of species using the Park to seven out of the nine Irish

resident species. The only two species that have not been recorded are the Lesser horseshoe bat (found only in the west of Ireland) and the Nathusius' Pipistrelle bat, which has not been recorded in the locality but has been found occasionally in Co. Dublin.

Plate 7: Whiskered bat

Supervision prior to and during installation of infrastructure

Ecologists were also involved in monitoring the set-up of the event and advised on the adjustment of lighting to minimise light spill that could affect bat foraging patterns. Prior to the installation of the event infrastructure at the end of June, two dead trees that were in proximity to the event area were felled under supervision and after checks for bats in accordance with a derogation licence (DER BAT 2016-34) to deal with the unforeseen presence of bats. No bats were encountered and the trees were felled without incident.

Scott Cawley ecologists monitored the installation of the pontoons to ensure that any known nests and young birds were not harmed by these works. The response of birds to the events was also monitored by direct observation.

Plate 7: Adjustment of lighting at pontoon.

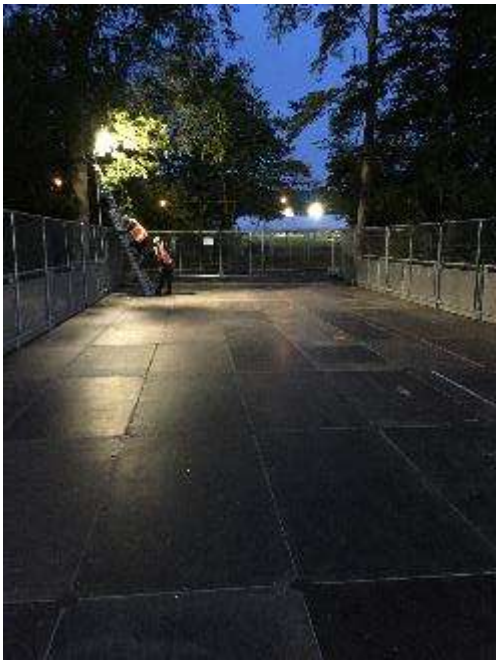


Plate 8: Monitoring of installation of Pontoon

There was no evidence that birds were adversely affected by the events in 2016. Indicators such as successful breeding, sustained use of nesting sites and maintenance of diversity of species were upheld during and after the events. It is likely that the breeding population are habituated to human disturbance and able to tolerate short periods of disturbance. The timing of the events late in the breeding season of most birds is also likely to be factor in the avoidance of adverse impacts at a population scale.

Otters and Badgers

The surveys of the bridges in the Park noted field signs of otters in several locations mainly in the north-eastern quarter. Subsequent discussion with the National Parks and Wildlife Service following the bridge surveys led to dedicated otter and badger surveys being undertaken in mid-June 2016.

Camera traps were deployed at two locations within the park where otter spraints were observed during pre-concert ecological surveys. The locations were:

1. Under concrete bridge approximately 50m east of the East Woods static detector; and,
2. Under a bridge separating the upper and lower lakes.

Cameras were deployed from 28th June and were collected on 15th August 2016. Footage from cameras was reviewed by an ecologist for activity, and results tabulated.

Otters were recorded on motion-activated cameras on eight occasions. Only one sighting was recorded on 4th July prior to the events and the remainder was concentrated between 25th July and 10th August 2016, with otters recorded twice on 1st August and 9th August. Otter appeared to visit the camera location to mark territory. No otter holts were recorded in the area although the presence of a holt in the dense vegetation in inaccessible areas of the park in the south east quarter cannot be ruled out.

Plate 9: Still of otter entering water after sprainting (scent marking) stone in centre of picture.

Plate 10: Otter Spraint

Badger setts were found located in three locations although only one sett showed any evidence of recent activity. The locations of the setts are not being disclosed in this Report to protect them from disturbance. Badgers and their setts are legally protected under the Wildlife Act 1976 as amended. None of the setts were regarded to be within the disturbance zone of the proposed works and the main sett was noted to be in excess of 80m from the event area and not subject to disturbance.

Plate 11: Badger sett entrance

Conclusions

These studies have again shown that Marlay Park is used by several protected fauna and flora some of which are not commonly recorded in the surrounding area. None of the surveys that were carried out presented results to suggest a significant impact to any of these species of note at the level of the local population. Breeding waterfowl and foraging bats in particular showed remarkable tolerance to noise and lighting and increased human presence during the events. Whilst there may be impacts at the individual scale (e.g. bats moving to other darker locations for feeding, waterfowl moving further away from pontoons) during the events, these impacts are of short duration and highly localised. The diversity of species using the Park would also suggest that there are unlikely to be long-term impacts although the absence of long-term scientific data means that conclusions on the long-term impacts cannot be made with any confidence.

Recommendations for future events in the Park have been provided based on the last two years of monitoring. Measures including supervision/monitoring during set up and removal of the infrastructure, lighting checks and monitoring breeding success of waterfowl and use of key areas by foraging bats are all recommended.

The surveys have helped to prepare a series of management practices and enhancements to the semi-natural features in the Park. These have included carrying out routine checks of trees for bats and breeding birds prior to pruning and felling works. Monitoring of bat boxes erected in 2016 will continue into 2017. The lakes in the Park require significant intervention to improve their aesthetic and ecological value and other ecological specialists have carried out surveys of the lakes and recommended actions to address this.