



Avifauna of bridges in Co. Wicklow

Executive Summary 2012

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1. Introduction

This project aims to assess the importance of bridges as nesting sites for Irish Dipper (*Cinclus cinclus hibernicus*) and other birds at a selection of sites (bridges) in Co. Wicklow. Dippers occurring in Ireland are of the Irish subspecies (one of only four bird species with an endemic Irish race). It has been well documented that bridges are very important for Dippers, both for breeding in the summer and roosting in the winter, as well as for other wildlife (Smiddy & O'Halloran, 2004), especially bats (Smiddy, 1991; Shiel, 1999; Keeley, 2007) and birds (Perry & Agnew, 1993; Smiddy & O'Halloran, 1998; O'Halloran et al., 1999; Copland, 2007a; Copland, 2007b). Of the birds, two species use bridges regularly: Dipper and Grey Wagtail (*Motacilla cinerea*). Grey Wagtail are found at a variety of water edge habitat, but Dippers are unique in their dependence upon well-oxygenated (and unpolluted) watercourses which their main food source (stream-bed invertebrates) require (Perry, 1986; Snow & Perrins, 1998).

Dippers build dome-type nests (similar to that of the Wren *Troglodytes troglodytes*) usually with the entrance above running water. Natural sites include crevices in rock faces, waterfalls, amongst tree roots or overhanging vegetation or built into river banks (Tyler & Ormerod, 1994). However, many Dippers exploit artificial sites for nest building, and bridges of the correct design and construction are widely used; indeed may be better than natural sites for successful breeding (Tyler & Ormerod, 1994).

The actual construction of a Dipper nest varies depending upon where it is located. If there are small holes in the bridge, with little room for additional nest material, then a small nest cup may be all that is present. However, where the nest is built on a flat platform, the structure can be considerable. Common nest locations include cavities in the bridge structure (Figure 1.1), on ledges or pipes (Figure 1.2), on stones jutting out from the bridge (Figure 1.3) or in Ivy (Figure 1.4).



Fig 1.1 Dipper nest in bridge cavity (pipe)
230 Old Bridge (Lough Dan),
Upper Avonmore



Fig 1.2 Dipper nest on pipe
324 Sheeanabeg Bridge, Ballycreen



Fig 1.3 Dipper nest on protruding stone
222 Meetings Bridge, Avonbeg



Fig 1.4 Dipper nest in Ivy
299 Ballinglen Bridge, Moyne

2. Methods

Within time and resource constraints of this project, it was not possible to survey all bridges within Co. Wicklow. A sampling strategy was therefore adopted. It was considered that approximately 100 bridges could be visited in county, and that bridge selection should be based on sampling entire watercourses. This approach allows a bridges over varying river habitat types, from narrow, fast-flowing (eroding) upland streams to wider, slower-flowing (depositing) lowland rivers.

A selection of watercourses were selected for survey. These were the Vartry River (from source to sea including tributaries) and the Avonbeg/Avonmore/Avoca River systems (all of which are interconnected, and include many tributaries). In addition, a small number of bridges around Arklow were included and surveyed, but many of these proved difficult to access (principally due to the construction of the new N11 Arklow by-pass); further reference to these bridges has been omitted from this summary.

Maps of the rivers with bridges (listed in the Wicklow County Council Record) marked on were provided by the Wicklow Heritage Officer, along with a database description of each bridge. Additional bridges were located by referencing Ordnance Survey Ireland *Discover Series* maps and from surveys in the field (although only a single bridge was added from this method). In total, 109 bridges were considered for survey work.

Fieldwork involved at least one early- and one late-season visit. Early visits were conducted in April and May; late visits were undertaken in June and July. An assessment of the suitability of the river and bridge at each site for breeding Dippers was carried out, and short notes on the bridge structure were also made. Bridges were thoroughly inspected for bird breeding activity, including under arches or spans, abutments and parapets. Records were also made of target bird species (Dipper and Grey Wagtail) in the vicinity of the bridge, along with any other bird species demonstrating behaviour that might suggest breeding or nesting at the bridge site. The presence of any old or inactive nests was also recorded. All bridges were photographed (from upstream and downstream), and any interesting features were also recorded.

3. Results

For ease of analysis, the bridges were allocated to bridge groups (see Table 3.1). These groupings were made of bridges in the same geographical area that were linked together (i.e. were on the same watercourse, or tributary of a larger river). A full description of the location of each bridge grouping is provided in Section 3.2.

Table 3.1 Bridges allocated to each bridge group (bridges are listed from furthest upstream in the group to furthest downstream in the group)

Group	Bridge ID numbers
Upper Vartry	89, 90, 366, 88, 91, 298, 296, 381
Lower Vartry	201, 202, 232, 321, 29, 183, 348
Upper Avonmore	297, 230, 229, 399, 320, 318, 319, 97, 370, 369, 84, 228, (+1)
Lower Avonmore	329, 397, 240, 237, 93, 350, 351, 187, 175, 416, 227, 371, 226
Avonbeg	209, 208, 332, 221, 327, 220, 222
Avoca	223, 365, 224, 11, 50, 225
Ow River	200, 308, 199, 198, 334, 403, 335, 239, 197, 309, 207, 56, 160
Moyne River	310, 401, 212, 165, 301, 300, 400, 117, 118, 119, 299
Derry Water	168, 263, 169, 120, 60, 210, 262, 261, 322, 260, 177, 196
Ballycreen	337, 402, 336, 326, 325, 324, 161, 390, 379, 380
Aughrim River	323, 159, 420, 421, 395, 206, 205, 57, 392

NOTE: Wicklow County Council Bridge ID numbers are used throughout for ease and consistency; See Annex I for a list of all bridge names and 6-figure grid reference sorted by Bridge ID number

3.1 Overview of bird survey results

The occurrence of birds at the survey sites is summarised in Table 3.2. Of the 109 bridges surveyed, Dipper nests were recorded at 25. Four other bird species, Grey Wagtail, Pied Wagtail, Wren and Swallow, were recorded in the vicinity of the bridges, although not all these records refer to confirmed nesting attempts (nests for these species can be difficult to locate).

Table 3.2 Bird species recorded at survey bridges

Group	No. Bridges	Dipper	Grey Wagtail	Pied Wagtail	Wren	Swallow
Upper Vartry	8	0	0	0	0	0
Lower Vartry	7	3	0	0	1	0
Upper Avonmore	13	2	1	2	1	0
Lower Avonmore	13	2	1	0	3	0
Avonbeg	7	2	0	0	1	0
Avoca	6	0	0	0	0	0
Ow River	13	2	1	0	1	0
Moyne River	11	4	0	0	2	1
Derry Water	12	5	0	0	2	0
Ballycreen	10	3	2	0	0	1
Aughrim River	9	2	1	0	0	0
Total	109	25	6	2	11	2

The suitability of the bridges for nesting Dippers is given in Table 3.3, along with the level of occupancy of suitable sites by Dippers, and the potential requirements for Dipper nesting boxes. Of the 109 bridges surveyed, 91 sites were suitable for Dipper, but only 41 (45%) were suitable for nesting Dippers. Of these 41 suitable nesting sites, 25 (61%) had been used by Dippers for nesting.

Table 3.3 Suitability and occupancy of bridges by nesting Dippers

Group	No. Bridges	Suitable habitat	Suitable bridge and habitat	No. with Dipper nests	Suitable site occupancy	Boxes Required
Upper Vartry	8	8	1	0	0%	0
Lower Vartry	7	5	3	3	100%	2
Upper Avonmore	13	9	3	2	67%	5
Lower Avonmore	13	12	3	2	67%	8
Avonbeg	7	7	2	2	100%	5
Avoca	6	3	1	0	0%	2
Ow River	13	10	5	2	40%	8
Moyne River	11	11	6	4	67%	7
Derry Water	12	11	5	5	100%	8
Ballycreen	10	8	6	3	50%	4
Aughrim River	9	7	6	2	33%	5
Total	109	91	41	25	61%	54

NOTE: **Suitable habitat** notes whether the structure of the site (watercourse, immediate habitat of the bridge and overall bridge structure) is suitable for Dipper; **Suitable bridge and habitat** includes sites where all features (river, bridge and surrounding habitat, are suitable for *nesting* Dipper.

3.2 *Assessment of bridge suitability for Dippers*

A fully detailed listing for each individual bridge is included in the full report, along with photographs of each bridge and any interesting features relevant to birds present at the bridge or site. However, an assessment of the suitability of each bridge for Dipper is summarised below. Bridges are arranged according to bridge group - these groupings make more sense when analysing the data from an ecological viewpoint. A full list of all bridges surveyed (arranged according to Bridge ID number) is included in Annex I.

Upper Vartry Bridge Group

A total of eight bridges upstream of Vartry Reservoir. Bridge construction was principally masonry arches (6), with one concrete span and one 8' piped culvert. All watercourses looked suitable for Dippers, but only one bridge (091) appeared to be suitable for nesting, with stone ledges present under the arch. However no Dippers or any signs of Dippers were observed during fieldwork at this or any other bridge.

The lack of any Dipper signs may be due to the limited number of nesting sites, but may also be linked to unsuitability of the river systems. There are substantial areas of conifer plantation forestry in the catchment for this group. Although not obvious, it is possible that acidification of the water may lead to low densities of invertebrate prey in these rivers. As a result, the provision of nest boxes for Dippers on these bridges is considered to be of a low priority as there appears to be a limited source population within the watercourses to take up the additional nesting opportunities. Nevertheless, if sufficient nest boxes are available, putting one or two up on suitable bridges may be of interest to see if Dippers are present in the area. If these are occupied, additional boxes on the remaining sites would be recommended.

No other bird species were recorded using any of the bridges

Lower Vartry Bridge Group

Seven bridges downstream of Vartry Reservoir. Bridge construction was principally masonry arches (5), with the remaining two being concrete spans. Two bridges (202 and 029) were over watercourses that were not considered suitable for Dippers. Of the remaining five bridges, two (201 and 321) were not considered to offer suitable nesting opportunities for Dippers. The other three bridges were all suitable for nesting Dippers, and all showed evidence of breeding, with one active nest (bridge 183), one recent nest (bridge 348) and one bridge showing signs of previous occupation along with birds on the river in the vicinity of the bridge (bridge 232).

With all bridges with Dipper nesting opportunities over suitable watercourses in this group, the two bridges (201 and 321) that are over suitable watercourses but do not offer nesting opportunities for Dippers would be a priority for the provision of nest boxes for Dippers.

The only other bird species recorded was a Wren nest at bridge 321.

Upper Avonmore Bridge Group

This group covers 13 bridges upstream of the confluence of the Avonmore and Glendasan Rivers. One bridge surveyed does not have a county ID number (an old road bridge immediately upstream from bridge 319 that should be recorded by the road section (although it is no longer used)). There is a mix of construction types (five masonry arches, three concrete spans, two masonry arch bridges with concrete culverts added, two masonry-slab spans and an 8' diameter pipe).

Three Dipper nests were recorded (an active nest at bridge 230, an old nest at the unidentified bridge at Laragh East, and a third on a bridge immediately downstream of bridge 369). Of the remaining eleven bridges, six were not considered suitable for Dippers due to their structure (concreted culverts on bridges 318 and 320), lack of vertical faces above watercourses (bridge 97) being too small (bridges 297 and 399) or being immediately adjacent to another, suitable bridge (bridges 319 and 369). The five remaining bridges were all considered to be appropriate for nesting Dippers, apart from a lack of nesting sites – nest boxes would therefore be recommended for these five bridges (84, 228, 229, 297 and 370).

Grey Wagtail was recorded in the vicinity of bridge 229, although no nest was located. At this bridge a Pied Wagtail was also observed, but again no nest was found. A Pied Wagtail carrying food was also noted at

bridge 369, but again no nest was located. An old Wren nest was present at the un-named bridge just upstream of bridge 319.

Lower Avonmore Bridge Group

The 13 bridges in this group are located on the Avonmore River between where the Glendasan joins it downstream to the Meeting of the Waters (where the Avonmore River joins the Avonbeg River to become the Avoca River). The majority of bridges are masonry arches (9) with one concrete arch, concrete span, masonry-slab span and stone culvert comprising the remainder.

Two Dipper nests were recorded (recent/active nests at bridges 93 and 227). Of the remaining eleven bridges, one (bridge 416) was not considered to offer nesting habitat for Dipper as it was a small stone culvert carrying a small stream. Of the remaining ten bridges, three were not recommended for the provision of Dipper nesting boxes due to being too large to offer a suitable location for a Dipper nest box (bridge 226), too close to another, more suitable bridge (bridge 329), or already offering suitable nesting sites for Dipper (bridge 329). The seven remaining bridges (175, 187, 237, 240, 351, 371 and 397) are all considered suitable for the provision of nesting boxes to encourage breeding Dippers. In addition, although bridge 93 is being used by nesting Dippers, the provision of a nesting box is recommended to improve the nesting location, which is currently exposed and may be at risk from severe weather.

A probable old wagtail nest was present at bridge 329, along with an old Wren nest. Wren nests were also present at bridges 187 and 227.

Avonbeg Bridge Group

There are seven bridges in this group on the Avonbeg River and tributaries. All seven bridges are of masonry arch construction.

Two bridges had Dipper nests recorded at them – bridge 222 had an active nest (along with an old nest) and bridge 221 had an old nest present. Of the remaining five bridges (208, 209, 220, 327 and 332), all would be suitable for Dipper nesting, and the provision of Dipper nest boxes at all five would be recommended.

The only other bird species recorded was a Wren nest at bridge 207.

Avoca Bridge Group

There are six bridges in this group on the Avoca River between the Meeting of the Waters and the sea, including one on a tributary. Two of the bridges are masonry arches, three are concrete spans, and one is a multiple concrete arch/masonry arch.

Only three of the six bridges surveyed were considered to be potentially suitable for Dippers, and no Dipper nests were located on the other three bridges (although a Dipper was observed just downstream of bridge 223). Of the sites considered unsuitable for Dippers, one (225) was over a tidal stretch of the river and two (011 and 050) were over a stretch of the river that was probably too slow-flowing and deep for Dippers. Of the potentially suitable sites, only one bridge (224) appeared to offer Dipper nesting opportunities. The provision of Dipper nesting boxes at the other two sites (223 and 365) are therefore suggested to offer Dipper nesting sites on these otherwise apparently suitable bridges.

No other bird species were recorded using any of the bridges

Ow River Bridge Group

There are thirteen bridges in this group on the Ow River and tributaries. The majority of the bridges are masonry arches (10) with two concrete spans and one steel and concrete span.

Occupation by Dippers was recorded at two bridges, one with a recent nest (197) and one with a probably old nest (160). Rivers at three of the bridges (334, 335 and 403) were probably too small or enclosed in vegetation to be suitable for Dippers. Three (199, 207 and 239) of the other bridges appeared to offer any

suitable nesting opportunities (although even these were rather limited in certain cases), with five bridges (56, 198, 200, 308 and 309) offering no nesting opportunities at all. Due to the limited or absence of Dipper nesting opportunities, the provision of Dipper nest boxes is suggested for eight bridges (56, 160, 198, 199, 200, 207, 308 and 309) to improve the likelihood of Dippers nesting at these bridges.

A Grey Wagtail nest was located at bridge 200, and a Wren nest was present at bridge 207. In addition, recently erected Bat Boxes were recorded on bridges 309 and 334.

Moyne Bridge Group

This group covers eleven bridges around the village of Moyne, whose watercourses flow into the Derry Water just downstream of the village of Ballinglen (note that this group does not include any bridges on the Derry Water itself). The bridges in the group are a mixture of masonry arches (5) and concrete spans (five), with a single bridge where the masonry arch had been fitted with a pipe, and filled in with concrete.

Active Dipper nests were recorded at four bridges (119, 299, 300 and 310). The rivers at the other seven bridges were all suitable for Dippers, but only two (400 and 401) had potentially suitable ledges for nesting Dippers. Nevertheless, the provision of nesting boxes at all seven of these bridges (117, 118, 165, 212, 301, 400 and 401) would be recommended to increase the availability of suitable nesting sites for Dippers.

An active Wren nest was present on bridge 310. Bridge 401 had an active Swallow nest and an old Wren nest at the time of the survey.

Derry Water Bridge Group

There are twelve bridges in this group on the Derry Water, Tomnaskela River and minor tributaries upstream of Aghrim (but excluding the rivers in the Ow River and Moyne groups listed above). The bridges in the group are mostly masonry arches (9) one of which has been widened with concrete spans, two concrete spans and a single 8' corrugated pipe culvert.

Dipper nests were recorded at five bridges; one (261) with an active nest, one (196) with a recent nest and three (169, 177 and 210) with old nests (of which there were two at bridge 169). Dippers were observed at bridge 263, and signs of Dippers (droppings) were recorded at two further bridges (260 and 262), but none of the bridges offered any nesting sites for Dippers. The watercourse at one bridge (120) was probably too small for Dippers, and the bridge unlikely to offer any nesting opportunities or be suitable for the provision of a Dipper nest box. The other three sites (60, 168 and 322) all looked suitable for Dipper, but the bridges had no ledges or crevices to locate a nest. The provision of Dipper nest boxes is recommended for all bridges without Dipper nests but that otherwise appear to be suitable (60, 168, 260, 262, 263 and 322), and also for bridges 169 and 177 which, although they have old Dipper nests present, the provision of nest boxes would increase the suitability of the bridges for this species.

The only other birds using at these sites were two old Wren nests at bridges 168 and 262.

Ballycreen Bridge Group

This group covers ten bridges crossing a number of small watercourses north of Aghrim – Ballycreen Brook is the only named watercourse on the OS Discovery Series map in this area. The majority of the bridges are either masonry arches (5) concrete spans (3) or a combination of both (1), with the final bridge being two concrete pipes carrying the watercourse.

Active Dipper nests were recorded at three of the bridges in this group (324, 325 and 380). Incredibly, the nest at bridge 380 was in a Dipper box, although no detail have yet come forward as to who put up the box. Nevertheless, proof that Dipper boxes will be occupied and do work! Of the other seven bridges in this group, only one (402) was considered not to be potentially suitable for Dipper as the bridge was too low to allow Dippers to even nest on the parapet (the watercourse being carried through two concrete pipes). Two bridges (161 and 379) were considered to be too prone to disturbance to be attractive to nesting Dippers. Two (336 and 390) bridges appeared to offer suitable nesting habitat for Dipper (although bridge 336 might be too small), but were unoccupied and showed no signs of previous use. The remaining three

bridges, however, are recommended as being suitable for the provision of a Dipper nest box to increase nesting opportunities. In addition, the Dipper nest on bridge 324 was very low and potentially at risk from flooding; provision of a Dipper nest box at this site is also recommended to improve the chances of successful nesting by Dippers at this site.

An old wagtail nest and an active Swallow nest were recorded at bridge 336, and a Grey Wagtail was in the vicinity of bridge 380, although no nest was located.

Aughrim River Bridge Group

This group covers nine bridges on the Aughrim River from where the Derry Water joins the Ow River (to become the Aughrim River) to where the Aughrim River meets the Avoca River at Woodenbridge. The bridges in the group are mostly masonry arches (6), with one concrete span, one small stone culvert and one bridge comprising a masonry arch and masonry-slab span.

One active nest was recorded during the survey (at bridge 159), with a possible old nest on bridge 57 (Dippers were observed near this bridge, although no active nest was located). One site (392) was not considered suitable for Dippers, as it consisted of a small piped culvert carrying a small stream, whilst the bridge at another site (395) was also considered too small for locating a Dipper nest. Of the remaining five bridges, four (205, 206, 323 and 421) were considered to offer potential Dipper nesting sites (there were lots of Dipper droppings around bridge 206), whilst one (420) had no ledges or crevices that Dipper could exploit for nesting. The provision of Dipper nest boxes is recommended for five bridges (159, 205, 206, 420 and 421) to increase the likelihood of occupation of these bridges by nesting Dippers.

One Grey Wagtail was recorded in the vicinity of bridge 323, but no nest was located.

4. Discussion

The majority of bridges surveyed within Co. Wicklow appear to have been structurally well maintained, with much evidence of recent repairs on the bridges such as guniting of arches and pointing of stonework in addition to some examples of larger engineering works. As a result, the number of bridges offering suitable nesting opportunities for Dippers appears to be quite low (45%). This compares to 61% in Co. Offaly (Copland, 2007a) and 65% in bridges in Co. Laois (Copland, 2007b). The provision of suitable nesting sites for Dippers, therefore, is likely to have a positive impact on the numbers of Dippers using bridges in this area.

The overall level of occupancy of suitable bridges, at 61%, is what might be expected based on other surveys (57% in Co. Offaly and 77% in Co. Laois). Clearly, however, there are substantial differences in the different bridge groups. Three bridge groups (the Lower Vartry, Avonbeg and Derry Water) have all suitable bridges showing signs of Dippers nesting, whilst the Upper Vartry and Avoca groups have no Dippers using any of the bridges.

The lack of any signs of Dippers in the Upper Vartry may indicate the watercourses in this area are not suitable for Dipper for many reasons. With only one suitable bridge in the group, there may be a lack of suitable nesting sites to allow a sustaining population to establish. This may be particularly relevant following the recent cold winters which may have driven Dippers to lower stretches of the river. The reservoir and dam are likely to offer a barrier to these upper stretches of the Vartry catchment being subsequently recolonised, although if the population on the lower Vartry is healthy, and the winter weather remains mild, dispersal upstream and into these watercourses may happen over the coming years.

The lack of Dippers using bridges on the Avoca River is likely linked to the unsuitability of the lower reaches of the river, as well as the typically large bridges crossing the river. Dippers tend to prefer to nest within a few metres of the watercourse, with nests more than 5m high quite unusual (pers. obs.). This is reinforced by the fact that Dippers were observed on the Avoca River during survey.

5. Conclusions and Recommendations

The data from this survey is very restricted in area. Nevertheless, within the survey area, there are many bridges that are important for breeding birds. However, the main function of bridges is not to provide bird nesting habitats, but to provide infrastructure. This primary role of bridges, coupled with increasing demands on Ireland's infrastructure, will often mean that wildlife conservation is a minor consideration (if it is considered at all) when bridge assessments are carried out. Clearly, the functional maintenance of bridges is essential. However, modifying, repairing or replacing bridges can be undertaken with little impact on wildlife depending upon the nature of the work. It is therefore recommended that those working on bridges within the county are provided with training in identifying Dipper nests, and also in appropriate measures to safeguard existing sites.

The timing of bridge maintenance work outside the bird breeding season (for Dipper, this would be March to August) will limit any impacts on breeding populations. Furthermore, where bridges have been used as nesting sites, the simple replacement of nesting ledges or boxes can easily be incorporated into any maintenance work. Identification of Dipper nests is relatively easy, since they are big, obvious structures (see Figs 1.1 – 1.4).

As well as maintaining the suitability of bridges for existing nesting sites, there is also the opportunity to increase the number of suitable bridges for nesting Dippers. Where habitat requirements meet those of the Dipper (in terms of river quality and bridge structure) the simple addition of nesting ledges or boxes could increase the Dipper population in the area. Prior to the erection of nesting boxes it is important to ensure that the bridge(s) identified are not protected or listed structures, which the installation of a nesting box would damage.

Rivers where all suitable bridges are occupied, but where there are additional bridges that could be modified to benefit Dipper can be targeted in a first phase of bridge improvements for Dipper (see Table 5.1). Similar priority for a first phase of improvement is also to be afforded to unsuitable bridges occurring on a river system where bridges both upstream and downstream are being used. A second phase of work could then target the remaining bridges identified in this survey that could be improved for breeding Dippers. Even if Dippers do not use such ledges for nesting, they may be used in winter by roosting birds, or be of benefit to other species such as Grey Wagtail. Dipper nesting boxes are available for purchase (e.g. from BirdWatch Ireland's Wings Gift Shop). However, they can also be made quite easily - Annex 2 contains details for the provision of nesting boxes and ledges for Dippers. This could easily be adapted and circulated to all those involved in bridge maintenance throughout the county.

In order to improve future nest box targeting at bridges, a night-time roost survey of the bridges surveyed here would be very valuable in further identifying suitable bridges and/or river systems where Dippers occur. The requirements of a winter roosting site for Dippers is substantially less than the requirements for a nesting site – the Dippers only need a small ledge, crevice or even nail protruding on the bridge to perch on to roost. However, there are substantial dangers involved in night-time work, particularly if it involves entering rivers and even more so during the winter when watercourses can be swollen with additional rainwater, making the rivers deeper and current stronger. Such activity must be undertaken by appropriately trained and experienced individuals, working together in a team.

If a nest box programme can be started, it would be very important to try and develop local interest in monitoring the use and uptake of the boxes (in addition to studying the species at sites where they already occur). The local BirdWatch Ireland branch may offer an excellent source for a potential study group for this type of work.

Table 5.1 Priority list of bridges for provision of Dipper nest box

ID	GridRef	Bridge Name	Bridge Group
056	T093815	Ballymanus Bridge	Ow River
060	T075750	Drummin Bridge	Derry Water
165	T034797	Rathcot Bridge	Moyne
168	T081725	Toberpatrick Bridge	Derry Water
169	T068742	Killaveny Bridge	Derry Water
177	T110775	Killballyowen Bridge	Derry Water
201	T221992	Annagolan Bridge	Lower Vartry
208	T105908	Drumgoff Bridge	Avonbeg
209	T108911	Coolalingo Bridge	Avonbeg
212	T031803	Moyne Bridge	Moyne
220	T172850	Ballinaclash Bridge	Avonbeg
229	T173993	Annamoe Bridge	Upper Avonmore
260	T115770	Kilpipe Bridge (1822)	Derry Water
262	T101748	Gilbert's Bridge (1837)	Derry Water
263	T075730	Coolalug Bridge	Derry Water
301	T037793	Sandy Ford Bridge	Moyne
321	T245978	Ballycullen Bridge	Lower Vartry
322	T126760	Coolbawn Bridge	Derry Water
327	T153873	Greenane More Bridge	Avonbeg
332	T107908	Glenmalure Bridge	Avonbeg

References

- Copland, A.S. (2007a) *Avifauna of Bridges in Co. Offaly*. Unpublished Report to Offaly County Council.
- Copland, A.S. (2007b) *Avifauna of Bridges in Co. Laois*. Unpublished Report to Laois County Council.
- Keeley, B. (2007) *Bats and Bridges: An Evaluation of Selected Bridges in Laois and Offaly*. Unpublished report to Laois County Council and Offaly County Council.
- O'Halloran, J., Smiddy, P., O'Mahony, B., Taylor, A.J. and O'Donoghue, P.D. (1999) Aspects of the population biology of the Dipper in south west Ireland. *Irish Birds* 6: 359-364
- Perry, K.W. (1986) *The Irish Dipper*. Published privately by the author.
- Perry, K.W. and Agnew, P. (1993) Breeding Dipper populations in north-west Ireland, 1972-1992. *Irish Birds* 5: 45-48
- Shiel, C. (1999) *Bridge Usage by Bats in County Leitrim and County Sligo*. The Heritage Council, Kilkenny.
- Smiddy, P. (1991) Bats and Bridges. *Irish Naturalists Journal* 23: 425-426
- Smiddy, P. and O'Halloran, J. (1998) Breeding biology of the Grey Wagtail *Motacilla cinerea* in southwest Ireland. *Bird Study* 45: 331-336
- Smiddy, P. and O'Halloran, J. (2004) The Ecology of River Bridges: Their Use by Birds and Mammals. In Davenport, J. and Davenport, J.L. eds (2004) *The Effects of Human Transport on Ecosystems: Cars and Planes, Boats and Trains*. Royal Irish Academy, Dublin.
- Snow, D.W. & Perrins, C.M. (1998) *The Birds of the Western Palearctic: Concise Edition*. Oxford University Press, Oxford.
- Tyler, S.J. & Ormerod, S.J. (1994) *The Dippers*. T & AD Poyser, London

ANNEX I: List of all bridges with ID numbers, six-figure OSI grid reference, bridge name, bridge group, bridge and habitat suitability for Dipper, presence of dipper nest and suitability for provision of a Dipper nest box (see footnote for description of figures in last four columns)

ID	GridRef	Bridge Name	Bridge Group	Habitat	Bridge & Habitat	Dipper	Box
011	T230742	Avoca Viaduct West	Avoca	0	0	0	0
029	T270974	Ashford Mill Race	Lower Vartry	0	0	0	0
050	T230742	Avoca Viaduct East	Avoca	0	0	0	0
056	T093815	Ballymanus Bridge	Ow River	1	0	0	1
057	T190770	Aughrim River/Woodenbridge	Aughrim River	1	1	1	0
060	T075750	Drummin Bridge	Derry Water	1	0	0	1
084	T142958	Bookeys Bridge (1838)	Upper Avonmore	1	0	0	1
088	O219075	Ballinastoe Bridge (Vartry River)	Upper Vartry	1	0	0	0
089	O204092	Glassnamullen Bridge	Upper Vartry	1	0	0	0
090	O199086	Bloomfield Bridge	Upper Vartry	1	0	0	0
091	O190069	Stoneypass Bridge	Upper Vartry	1	1	0	0
093	T169921	Clara Bridge	Lower Avonmore	1	1	1	1
097	T143967	Laragh Bridge	Upper Avonmore	1	0	0	0
117	T063802	Askanagap Bridge	Moyne	1	0	0	1
118	T062797	Slievemweel Bridge	Moyne	1	0	0	1
119	T057767	Carrigroe Bridge	Moyne	1	1	1	0
120	T055745	Garryhoe Bridge	Derry Water	0	0	0	0
159	T149789	Coates Bridge	Aughrim River	1	1	1	1
160	T117791	Roddenagh Bridge	Ow River	1	1	1	1
161	T125822	Macreddin Bridge	Ballycreen Brook	0	0	0	0
165	T034797	Rathcot Bridge	Moyne	1	0	0	1
168	T081725	Toberpatrick Bridge	Derry Water	1	0	0	1
169	T068742	Killaveny Bridge	Derry Water	1	1	1	1
175	T179909	Ballyhad Bridge	Lower Avonmore	1	0	0	1
177	T110775	Killballyowen Bridge	Derry Water	1	1	1	1
183	T270974	Ashford Bridge	Lower Vartry	1	1	1	0
187	T201930	Garryduff Bridge	Lower Avonmore	1	0	0	1
196	T108078	Annacurragh railway Bridge	Derry Water	1	1	1	0
197	T077837	Ballyteige Bridge Lower	Ow River	1	1	1	0
198	T072848	Ballyteige Bridge Upper	Ow River	1	0	0	1
199	T065862	Aughavannagh Bridge (Masonry Arch)	Ow River	1	1	0	1
200	T055861	Aughavannagh Bridge (Ow River)	Ow River	1	0	0	1
201	T221992	Annagolan Bridge	Lower Vartry	1	0	0	1
202	O227000	Boleynass Bridge	Lower Vartry	0	0	0	0
205	T189768	Coolgarrow Bridge	Aughrim River	1	1	0	1
206	T181755	Clonwilliam Bridge	Aughrim River	1	1	0	1
207	T074829	Ballycurragh Bridge	Ow River	1	0	0	1
208	T105908	Drumgoff Bridge	Avonbeg	1	0	0	1

ID	GridRef	Bridge Name	Bridge Group	Habitat	Bridge & Habitat	Dipper	Box
209	T108911	Coolalingo Bridge	Avonbeg	1	0	0	1
210	T077771	Preban Bridge	Derry Water	1	1	1	0
212	T031803	Moyne Bridge	Moyne	1	0	0	1
220	T172850	Ballinaclash Bridge	Avonbeg	1	0	0	1
221	T146874	Greenane Bridge	Avonbeg	1	1	1	0
222	T189830	Meetings Bridge	Avonbeg	1	1	1	0
223	T198821	White Bridge	Avoca	1	0	0	1
224	T203799	Avoca Bridge	Avoca	1	1	0	0
225	T247736	Arklow Bridge	Avoca	0	0	0	0
226	T193833	Lions Arch Bridge	Lower Avonmore	1	0	0	0
227	T192888	Rathdrum Bridge	Lower Avonmore	1	1	1	0
228	T145956	Ballard Bridge	Upper Avonmore	1	0	0	1
229	T173993	Annamoe Bridge	Upper Avonmore	1	0	0	1
230	T161018	Old Bridge (Lough Dan)	Upper Avonmore	1	1	1	0
232	T257978	Nuns Cross Bridge	Lower Vartry	1	1	1	0
237	T167933	Ballylug Bridge	Lower Avonmore	1	0	0	1
239	T085839	Rosahane Bridge	Ow River	1	1	0	0
240	T150936	Furnace Bridge	Lower Avonmore	1	0	0	1
260	T115770	Kilpipe Bridge (1822)	Derry Water	1	0	0	1
261	T091757	Mucklagh Bridge	Derry Water	1	1	1	0
262	T101748	Gilbert's Bridge (1837)	Derry Water	1	0	0	1
263	T075730	Coolalug Bridge	Derry Water	1	0	0	1
296	O193040	Mullinaveige Upper Bridge	Upper Vartry	1	0	0	0
297	T150030	Carrigeen Bridge	Upper Avonmore	1	0	0	1
298	O204065	Sally's Bridge	Upper Vartry	1	0	0	0
299	T066759	Ballinglen Bridge	Moyne	1	1	1	0
300	T050772	Ballycumber Bridge	Moyne	1	1	1	0
301	T037793	Sandy Ford Bridge	Moyne	1	0	0	1
308	T055856	Ballygobban Bridge	Ow River	1	0	0	1
309	T071837	Ballyteige Bridge (Askanagap Road)	Ow River	1	0	0	1
310	T038812	Ballymaghroe Bridge	Moyne	1	1	1	0
318	T177987	Castle Kevin Bridge	Upper Avonmore	0	0	0	0
319	T163987	Laragh East Bridge	Upper Avonmore	0	0	0	0
320	T193983	Moneystown Bridge	Upper Avonmore	0	0	0	0
321	T245978	Ballycullen Bridge	Lower Vartry	1	0	0	1
322	T126760	Coolbawn Bridge	Derry Water	1	0	0	1
323	T126795	Aughrim Bridge	Aughrim River	1	1	0	0
324	T120826	Sheeanabeg Bridge	Ballycreen Brook	1	1	1	1
325	T116832	Sheeanamore Bridge	Ballycreen Brook	1	1	1	0
326	T112839	Ballycreen Bridge	Ballycreen Brook	1	0	0	1
327	T153873	Greenane More Bridge	Avonbeg	1	0	0	1
329	T133947	Derrybawn River Bridge	Lower Avonmore	1	1	0	0
332	T107908	Glenmalure Bridge	Avonbeg	1	0	0	1

ID	GridRef	Bridge Name	Bridge Group	Habitat	Bridge & Habitat	Dipper	Box
334	T091857	Mucklagh Bridge (Brown Mountain Road)	Ow River	0	0	0	0
335	T095853	Ballinagappoge Bridge	Ow River	0	0	0	0
336	T110854	Ballycreen Upper Bridge	Ballycreen Brook	0	1	0	0
337	T113855	Moneymeen Bridge	Ballycreen Brook	1	0	0	1
348	T286967	Newrath Bridge	Lower Vartry	1	1	1	0
350	T204934	Parkroe Bridge Upper	Lower Avonmore	1	0	0	0
351	T204933	Parkroe Bridge Lower	Lower Avonmore	1	0	0	1
365	T206804	Cherrymount Bridge (Avoca)	Avoca	1	0	0	1
366	O213083	Ballinastoe Bridge (R755)	Upper Vartry	1	0	0	0
369	T124962	Glendalough Bridge	Upper Avonmore	1	1	0	0
370	T110964	Upper Lake Bridge (Glendalough)	Upper Avonmore	1	0	0	1
371	T206870	Mountlusk Bridge	Lower Avonmore	1	0	0	1
379	T133797	Tinnakilly Bridge (New)	Ballycreen Brook	1	1	0	1
380	T133797	Tinnakilly Bridge (Old)	Ballycreen Brook	1	1	1	0
381	O193039	Mullinaveige Lr. Bridge	Upper Vartry	1	0	0	0
390	T143812	Three Wells Bridge	Ballycreen Brook	1	1	0	0
392	T196767	Kilcarra West Bridge	Aughrim River	0	0	0	0
395	T179745	Knockmiller Bridge	Aughrim River	0	0	0	0
397	T143946	Derrybawn Lower Bridge	Lower Avonmore	1	0	0	1
399	T192981	Lickeen Bridge	Upper Avonmore	0	0	0	0
400	T070812	Asknagap Village Bridge	Moyne	1	1	0	1
401	T026816	Ballinasiloge Bridge	Moyne	1	1	0	1
402	T117847	Greens Bridge	Ballycreen Brook	1	0	0	0
403	T084855	Mucklagh Bridge Lower	Ow River	0	1	0	0
416	T183897	Ballygannon Culvert	Lower Avonmore	0	0	0	0
420	T157800	Blacks Bridge	Aughrim River	1	0	0	1
421	T157791	Ballymorris Bridge	Aughrim River	1	1	0	1
???	T163987	"Old Laragh East Bridge"	Upper Avonmore	1	1	1	0
Total		109 Bridges		91	41	25	54

NOTE: **Habitat:** 0/1 means site (river, bridge size, etc.) not-suitable/suitable for Dipper. **Bridge & Habitat:** 0/1 means bridge and habitat not-suitable/suitable for Dipper nesting. **Dipper:** 0 – no nesting Dippers present at bridge; 1 – Dipper nest present at bridge (no comment on whether nest is active or not). **Box:** 0/1 means nest box not-recommended/recommended for installation at bridge.

ANNEX II: Design of Dipper nest box and Dipper platform

Two designs for providing nesting sites for Dipper are illustrated below. Both designs can be made from exterior grade (marine) plywood or from timber planks 225mm (9") wide and 25mm (1") thick (if timber is used, it should be treated with a non-toxic wood preservative (such as *Sadolin*)).

Artificial nest sites should be located above running water, and high enough above the water so that there is no risk of it getting washed away by high river levels. Such sites will often be used during winter by roosting birds, so winter water level should also be a consideration. They should also be positioned away from ledges where predators, such as Otter, Mink or Rat cannot get access to the nest.

Both designs require sturdy fixings to the structure of the bridge. In all cases, positioning should be carefully considered so as not to damage the bridge structure. Holes in brackets or back-boards should be lined up with appropriate fixing points on the bridge (such as gaps in stonework with solid, stable mortar) and fixed in place using screws with masonry plugs before attaching them to the box/platform.

1: Nest Box

This open-fronted nestbox (Fig 1) can be used where there is no cover above the proposed site (e.g. on the outside of a bridge parapet or where the bridge deck may be open). For ease of fitting, a back can be added to the box, made from a sheet of plywood or hardboard, or small metal brackets can be positioned as appropriate. A lip, no more than 50mm (2") high, can be added to the front of the box.

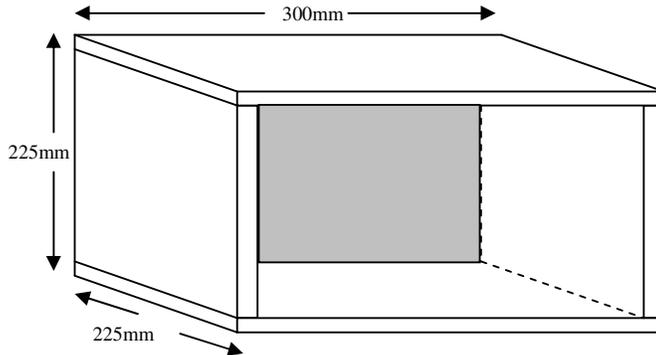


Figure 1: Dipper nesting box

2: Nest Platform

The platform (Fig 2) is designed for use under bridges where it will be sheltered from the weather. Its shape allows it to be fitted to vertical pillars or abutments, the underside of horizontal spans, or anywhere along the curves of an arch (Fig 3). The boards should all be the same shape and size. Depending upon the location, fixing can either be with a timber backboard (as illustrated) or with metal brackets (also illustrated – dotted lines). Similarly, the addition of brackets may be needed to support the boards depending upon position of fixing.

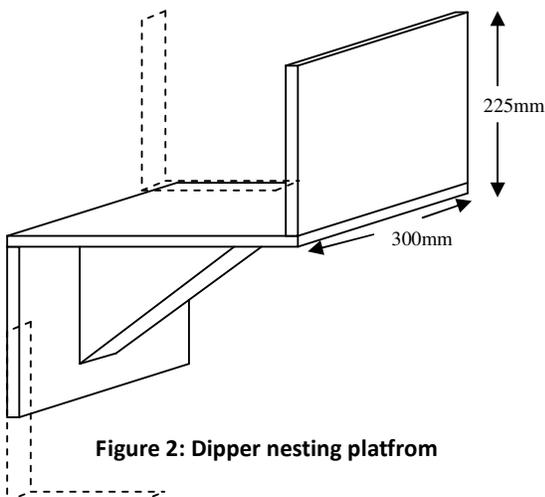


Figure 2: Dipper nesting platform

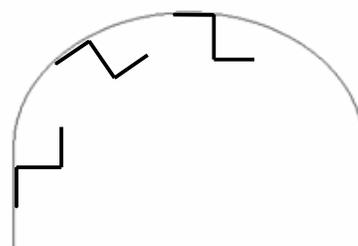


Figure 3: Siting of platforms under arch