

Amphibians in Drains Project 2014

Perth & Kinross Ranger Service
and Tayside Biodiversity Partnership

FINAL REPORT



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Perth and Kinross Ranger Service
and Tayside Biodiversity Partnership
Pullar House Kinnoull St Perth PH1 5GD



TayARG



Tayside Biodiversity Partnership



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Tayside Amphibian and Reptile Group (TayARG), TBP, c/o Pullar House, 35 Kinnoull Street, Perth. PH1 5GD

www.taysidebiodiversity.co.uk/ Facebook: Tayside Biodiversity/ Tayside Amphibians & Reptiles

Tayside Biodiversity Co-ordinator- Catherine Lloyd: caglloyd@pkc.gov.uk

TBP Assistant and Amphibians in Drains Project Assistant – Andrew Law: anlaw@pkc.gov.uk

Project Officer – Daniele Muir: dmuir@pkc.gov.uk

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Executive Summary

The Amphibians in Drains Project started in 2010 after observations found that a significant number of roadside gullypots contained amphibians and small mammals. Three sites were chosen in Perthshire and surveyed for three years. With the installation of wildlife kerbs into one of the sites, further monitoring was required. The project restarted in 2014 and this report shows that the new kerbs appear to work with far fewer animals found trapped.

Earlier, in the Netherlands, an innovative project installing amphibian ladders into drains proved very successful. During 2014 the Friends of Angus Herpetofauna worked with Angus Council to trial the first Scottish amphibian ladders. Made of steel and, at first, hemp, the Netherlands project discovered a plastic product, Enkamat, proved more robust. A second year of Angus trials is now underway and one of the Perthshire gullypot sites will also trial them.

Tayside is at the cutting edge of finding a solution to the decline of amphibian numbers affected by gullypots. In the future, a combination of amphibian ladders and wildlife kerbs installed in key amphibian migration zones will hopefully safeguard not just the Common Toad (a UK Priority Species), but other animals as well. Sharing good practice across Scotland - and the UK - will help find sustainable solutions, mainstream modified gullypots and manufactured amphibian ladders, and bring down the cost of the wildlife kerbs as the need for them increases.

The Scottish Background to the Importance of Amphibians

Amphibians play an important part in the ecology of our ecosystems; they regulate the number of invertebrates and also sustain many species of bird including herons and several species of raptor. They play an important part in the local ecosystem web. The Common Toad (*bufo bufo*) is a UK Priority Species and is included in the Scottish Biodiversity List. The list is incorporated into the Scottish Government's Biodiversity Strategy: "The 2020 Challenge for Scotland's Biodiversity".

The Nature Conservation (Scotland) Act 2004 places a duty on every public body to further the conservation of biodiversity and it is therefore important planning authorities and highways engineers ensure Common Toads and other amphibians are protected from adverse effects of development and highway maintenance. A useful document is ARCs "Common Toads and Roads: Guidance for Planners and Highway Engineers (<http://www.arc-trust.org/Resources/Arc%20Trust/Documents/common-toads-and-roads.pdf>). There is also the "Standards for Highways" Manual: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol10/section4/ha9801.pdf>.

The Species Champion initiative is coordinated by Scottish Environment LINK's Wildlife Forum and some 75 MSPs are now championing species which are currently facing significant threats. Such is the importance of amphibians, the Common Toad, Great Crested Newt and Common Frog each have their own Species Champions – Drew Smith, MSP, is the Common Toad Champion.

In the Scottish Planning Policy Sections 126 and 147 it states that "the presence or potential presence of a legally protected species is an important consideration in decisions on planning applications. If there is evidence to suggest that a protected species is present on site or may be affected by a proposed development, steps must be taken to establish whether it is present, the requirements of the species must be factored into the planning and design of the development and any likely impact on the species must be fully considered prior to the determination of the application".

Local authorities are increasingly seeking to increase habitat connections within greenspace, undertake habitat 'opportunity mapping' and link with community projects or citizen science initiatives. Many opportunities exist within road maintenance planning and building development proposals to incorporate positive measures to enhance biodiversity. This project hopes to provide the baseline information to assist decision-making where gullypots and Sustainable Urban Drainage are concerned.

Introduction to the Amphibians in Drains Project

The project was started in Perth and Kinross in 2010 after observations made by Countryside Rangers and Tayside Contracts gully maintenance staff found that a significant number of roadside gullypots contained amphibians and small mammals. Roadside gullypots are essential for road drainage but can act as pitfall traps when animals fall through the grid at road level and, once trapped, it is unlikely the animals will be able to survive for any length of time. It was identified that a more robust study to ascertain the scale of the problem was required. 2012 was the final year of the study by the Ranger Service.

Throughout these three years of surveys large numbers of amphibians were found within gullypots. Amphibians including Common Toads (*Bufo bufo*), Common Frogs (*Rana temporaria*), Palmate Newts (*Lissotriton helveticus*) and Smooth Newts (*Lissotriton vulgaris*) were found. With over 1565 gullypots checked, 67% of these contained amphibians and a total of 3007 were found. This is a significant number and is based over a spread of eastern Perthshire from Bankfoot to Glenshee. To further the research in Perthshire, external funding was sourced from the SITA Tayside Biodiversity Action Fund in 2012 to purchase and install a series of Wildlife Kerbs in Elm Drive, Blairgowrie.

In 2013 a pilot project was carried out just within Elm Drive to find the effectiveness of the wildlife kerbs installed previously. Wildlife kerbs contain a recess which allows wildlife to follow the lower edge of the kerb and safely bypass the gullypot (picture 3). During 2013 there were 29 kerbed gullypots checked 18 times from March to October amounting to 522 gullypots checked. During the surveying year, 107 animals were found with an average of 0.2 per drain. Compared with the previous years where the average was 0.9 per drain in 2011 and 1.6 per drain in 2012, the kerbs were shown to have a significant, favourable effect on the reduction of trapped amphibians.

Surveying was started again in March 2014 by the Tayside Biodiversity Partnership to find out if the wildlife kerbs implemented earlier (picture 1) were still making a significant difference.

The Perthshire sites surveyed:

- Site with wildlife kerbs - Elm Drive, Blairgowrie – 29 Gullypots
- Site without wildlife kerbs - Kinclaven Road, Murthly – 29 Gullypots
- Site without wildlife kerbs - Lethendy Road, near Kirkton of Lethendy – 20 Gullypots

The Murthly site acts as a control for the Blairgowrie site as they are both located close to Sustainable Urban Drainage (SUDS) ponds. This allows a direct comparison to be made with the expected migration paths through the nearby housing estates which are also present at both sites. The larger sites (Elm Drive and Murthly) act as comparators to the Lethendy Road site which will be one of the new Perthshire Amphibian Ladders Trial Areas during 2015.

A Dutch study (Diepenbeek, 2012), with amphibian ladders made from Enkamat synthetic matting, found that the problem is found all over Europe but can be combated relatively inexpensively with the use of these ladders which do not affect the integrity of the drainage system. The study tests were such a success that more than 75% of all the amphibians (toads, frogs and newts) found in the drains were able to escape the test constructions (shown picture 2).

The amphibian ladders have already been trialed by the Friends of Angus Herpetofauna during 2014 in two Angus sites and Angus Council has just confirmed its permission to repeat these during 2015. The 2014 Angus Report will be published mid-2015 and will be added to the TayARG section of www.taysidebiodiversity.co.uk.



Picture 1 © D Muir



Picture 2 © RAVON



Picture 3 © D Muir

Project Aims and Reporting Back

- To discover whether preventative mechanisms previously put in place work. These are the wildlife kerbs placed through Elm Drive in Blairgowrie.
- To record species and numbers of all amphibians and mammals affected.
- To create, install and monitor amphibian ladders to help safeguard the local amphibian populations.
- To publicise the Tayside projects across Scotland and beyond to raise awareness of the serious gullypot issues occurring throughout Europe and to find a sustainable solution.

The project is being monitored via the UK Biodiversity Action Reporting System (UKBARS) which ensures information is available both nationally and internationally. It is reported regularly to the Tayside Biodiversity Partnership's Water & Wetland Working Group. Volunteers of TayARG and FAH (Friends of Angus Herpetofauna) are also carrying out surveying in different areas to add to an overall perspective and these will be utilised in the project in the future.

Methodology

Gullypots were checked once each week from March 2014 onwards by the Tayside Biodiversity Partnership Assistant. This involved a quick visual check if there was animal activity on the surface of the water, followed by a search in the water with a long handled net. It is likely the number of dead animals is vastly under-recorded in this study as the corpses sink to the bottom of the gullypot after a number of days.

Amphibian ladders (Pictures 4, 5, 6 and 7) have been made based on the Dutch study design and changed to purpose by Trevor Rose of Friends of Angus Herpetofauna and Andrew Law. Lengths of stainless steel are measured to each specific gullypot with hemp or enkamat attached from just above the waterline to the top, providing purchase for amphibians to climb up and escape the gullypots. Ladders were unavailable for use within the 2014 Perthshire survey, but have been made and installed ahead of the 2015 survey. The Angus Amphibian Ladder Trials are set to continue during 2015 in the original two sites north of Dundee. A new site at the Angus Council Headquarters, Orchardbank, Forfar, has also been added for 2015.



Picture 4 (Top Left), 5 (Top Right), 6 (Bottom Left) and 7 (Bottom Right)
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Results (Numbers and Species)

Between 25th March and 11th November 2014 the three sites were checked once a week. This totaled more than 2600 gullypots being checked. Wildlife was found in 362 of the gullypots. Toads were the most commonly found species, followed by frogs, palmate newts, small mammals and birds.

Table 1 - Summary of Total Wildlife Numbers found in site gullypots surveyed between 25/03/14 and 11/11/14:

Number of gullypots checked from 25 th May – 11 th November 2014	2652	
Number containing amphibians/ mammals	362	14%
Total number of amphibians found (alive):	574	
Number of toads	443	77.1%
Number of frogs	83	14.5%
Number of newts	48	8.4%
Total number of amphibians found (dead):	69	
Number of toads	53	76.8%
Number of frogs	14	20.3%
Number of newts	2	2.9%
Number of mammals found (alive)	0	
Number of mammals found (dead):	19	
Number of birds found (dead):	3	

Table 2 - Summary of Wildlife Numbers found in Elm Drive, Blairgowrie gullypots surveyed between 25/03/14 and 11/11/14:

Number of gullypots checked from 25 th May – 11 th November 2014	986	
Number containing amphibians/ mammals	67	6.8%
Total number of amphibians found (alive):	105	
Number of toads	81	78.1 %
Number of frogs	15	13.3%
Number of newts	9	8.6%
Total number of amphibians found (dead):	14	
Number of toads	11	78.6%
Number of frogs	3	21.4%
Number of newts	0	0%
Number of mammals found (alive)	0	
Number of mammals found (dead):	1	
Number of birds found (dead):	0	

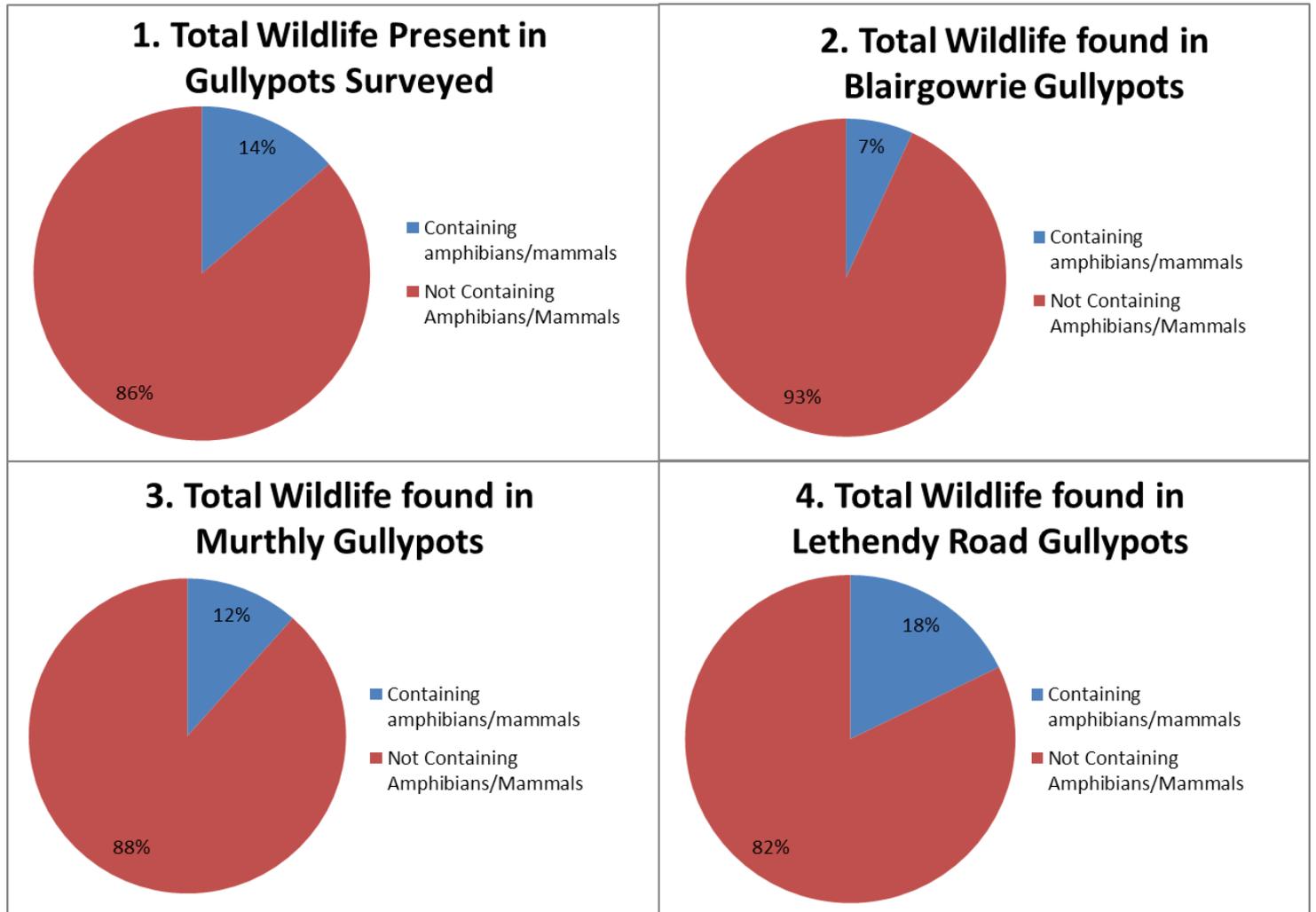
Table 3 - Summary of Wildlife Numbers found in Murthly gullypots surveyed between 25/03/14 and 11/11/14:

Number of gullypots checked from 25 th May – 11 th November 2014	986	
Number containing amphibians/ mammals	114	11.6%
Total number of amphibians found (alive):	173	
Number of toads	135	77.0%
Number of frogs	25	14.4%
Number of newts	15	8.6%
Total number of amphibians found (dead):	24	
Number of toads	18	75.0%
Number of frogs	5	20.8%
Number of newts	1	4.2%
Number of mammals found (alive)	0	
Number of mammals found (dead):	4	
Number of birds found (dead):	0	

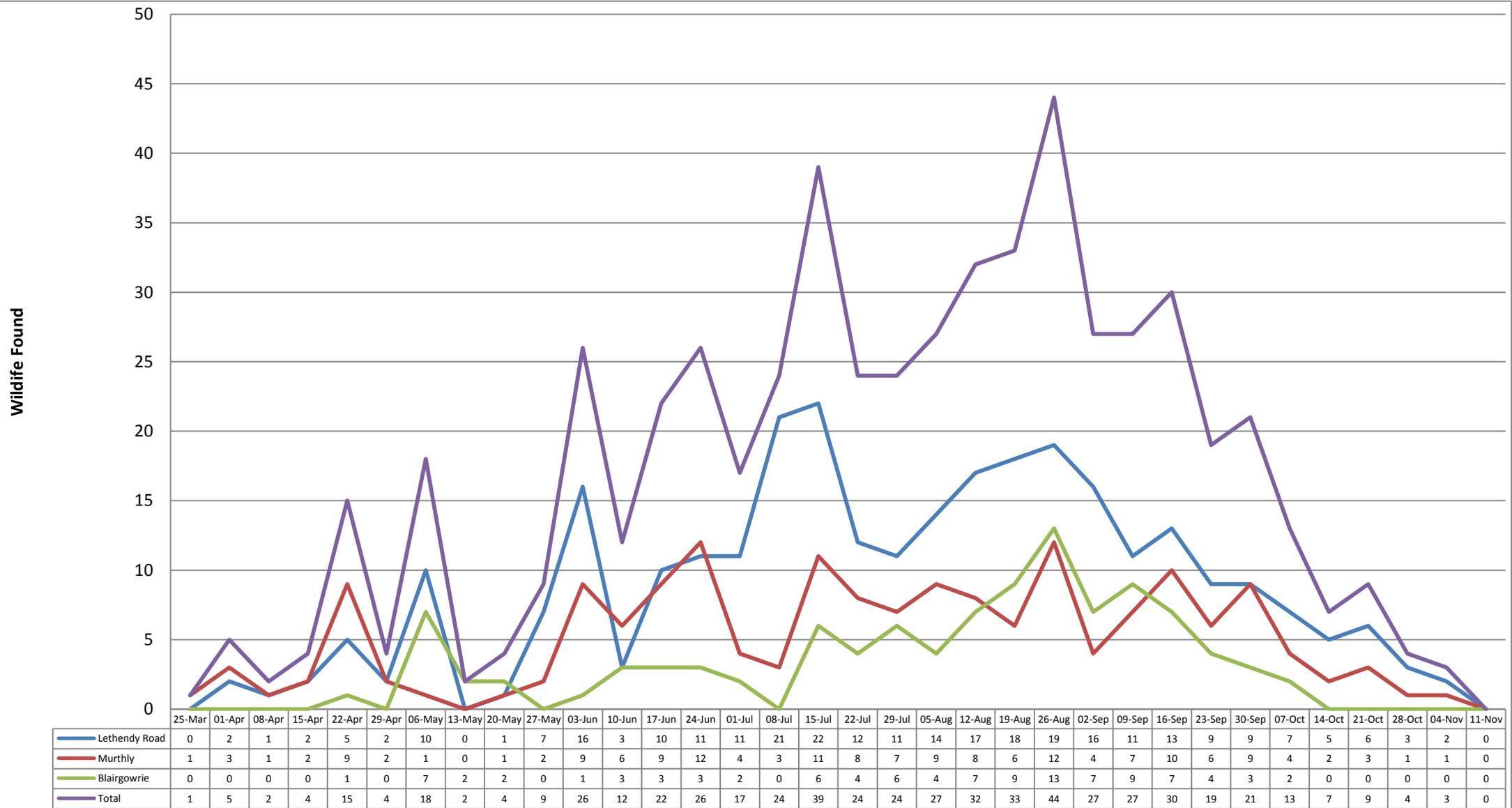
Table 4 - Summary of Wildlife Numbers found in Lethendy Road gullypots surveyed between 25/03/14 and 11/11/14:

Number of gullypots checked from 25 th May – 11 th November 2014	680	
Number containing amphibians/ mammals	121	17.8%
Total number of amphibians found (alive):	296	
Number of toads	228	77.0%
Number of frogs	43	14.5%
Number of newts	25	8.5%
Total number of amphibians found (dead):	31	
Number of toads	24	77.4%
Number of frogs	6	19.4%
Number of newts	1	3.2%
Number of mammals found (alive)	0	
Number of mammals found (dead):	15	
Number of birds found (dead):	2	

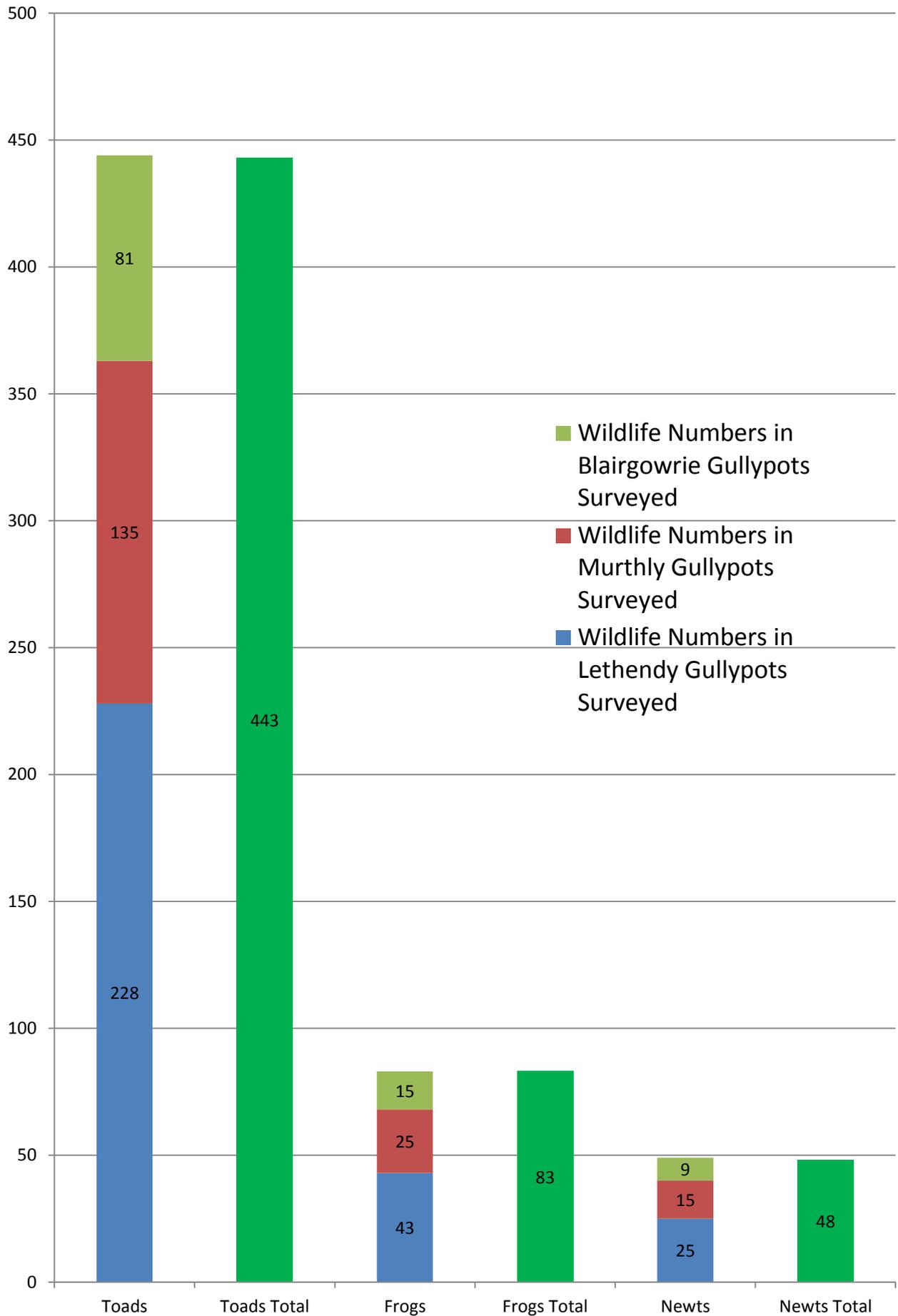
Graphs 1, 2, 3 and 4 - Presence of Wildlife in Gullypots surveyed:



Graph 5 – Wildlife found in gullypots in 2014; breakdown by week.



Wildlife found in gullypots in 2014 - breakdown by species



Interpretation

Fewer than expected of the gullypots surveyed contained wildlife in comparison to previous surveys. However, what was noticeable was the large difference in entrapment between the three sites - Elm Drive, Lethendy Road and Kinclaven Road - which shows how much of a difference surrounding habitats can make as well as the difference good preventative measures can have, such as the wildlife kerbs, which certainly appear to be working. The results show that although a relatively small number of the gullypots studied during 2014 had trapped animals, those gullypots that did had an overwhelming tendency to harbour more than a single animal.

As has been seen in the three years of previous surveying (2010-2012), the number of animals found within the gullypots is trending towards the norm - increasing through June where numbers are still fairly low, through July where numbers start to increase and into August where there is a significant jump from July and also the peak, before declining again slightly during September and at a much faster pace through October and November.

It is considered that the large difference between the numbers of animals found in the 2012 survey was due to the high rainfall experienced that year. This may have increased the number of spawning and migrating young, coupled with prolonged periods of heavy rain that washed a large number of animals into the gullypots.

Pete Minting, an expert on Natterjack Toads and an authority on other amphibians has reported:

“At this stage young toads move out into the landscape and often seem to just keep going. Quite why they do this we do not know for sure but there are various theories. One of the most popular is that the toadlet stage is a dispersal stage which allows the species to find new habitat (such as new ponds, or good hibernation sites). When adults, some toads will migrate back to their natal pond to breed when others will stay at the new habitat they have found. This is probably why amphibians are so good at finding new ponds or colonising areas of suitable habitat that have been created recently. They are also much more mobile after June and will head off several hundred meters in any direction from June to October. The most likely explanation is to find food, as foraging is their main focus when the breeding season is over. When it's very hot, amphibians may disappear altogether, or seek out any remaining damp places. This might result in an increase in drain captures as they will be able to 'smell' water. Dehydration is an amphibian's worst 'fear', so they are probably more likely to jump down a drain to avoid dehydration than to stay above ground and risk drying out. In nature, there aren't many holes as difficult to climb out of as a drain, so amphibians aren't going to expect that they won't be able to climb out.”

Also to be noted is the abundance of toads caught within the gullypots over the numbers of frogs and newts. This is likely to be because of a larger overall population of toads. This has been shown in previous studies. Habitat also has a large part to play in the current study. Previously, grasslands and suburban habitats made up a large portion of the study and this is the case again at the Blairgowrie and Murthly sites. There is also a large portion of farmland that makes up the last site at Lethendy Road. This road, as can be seen from the graphs and tables, although having the lowest number of gullypots, has the highest number of toads by a large margin and a relatively high number of frogs being trapped.

Part of this project's aim was to find out more about the migration pattern of amphibians with the installation of an Amphibian Trail Camera to compare the animals' behaviour around gullypots with and without the wildlife kerbs. However, as of the end of this current project we are still encountering difficulties with the camera. It is planned that during the 2015 study we will further our understanding of amphibian migration patterns and behavior with the use of trail cameras, to further prevent further trappings of amphibians in gullypots.

Costings and Mainstreaming

Costs of new kerbs are relatively high in comparison to normal kerbs, costing some £40 per Wildlife Kerb. Although these are expensive when bought in small amounts, this is due to their 'specialist' nature and that, so far, they are only being supplied by a single manufacturer. It is hoped that once there is a high and regular demand for Wildlife Kerbs across Scotland the price will drop drastically.

In fitting these kerbs it is also far more cost-effective to install them during new or maintenance works to the road, rather than retro-fitting. Liaising with the Roads Department at the beginning of their maintenance year will ensure that bulk orders can be planned ahead to reduce actual costs, and for installation work to be planned at the outset. This should also be the case when kerbs are being installed at a new build development site. This will drastically cut the cost of installation.

Parallel to this 'Amphibians in Drains' study, the Tayside Biodiversity Partnership is working with Perth & Kinross Council to check its Sustainable Urban Drainage audit, highlighting any known amphibian migration routes and considering which of the SUDS can be managed with biodiversity in mind. Coupled with the amphibian ladder and wildlife kerb options, SUDS ponds will be next focus and here there may be opportunities to involve local communities and nearby schools.

Conclusions and Further Action

The results of this study demonstrate a resounding success of the current preventative measures employed in Blairgowrie in comparison to Murthly - its direct control. The results show that the Wildlife Kerbs cut the number of animals trapped in the gullypots by more than half.

The results of this study have shown an effective comparison has been made. However no final assumptions can be made other than there is a quantifiable difference. Further assessment can only be made after many more years of observation and surveying. However at this stage, it is clear the kerbs go some way to decreasing the number of animals trapped, and therefore killed. The data found by this and subsequent studies will be used by the UK-wide Amphibian and Reptile Conservation for statistical analysis, and be reported back regularly by the Tayside Biodiversity Partnership to the UK Biodiversity Action Recording System (UKBARS).

Although there is no control for the Lethendy Road site, it is clear it has been more affected over this survey period than the other two sites by the amount of animals found within the gullypots. The installation of the new amphibian ladders ahead of the 2015 survey will hopefully go a long way to reduce the deaths of so many amphibians.

Acknowledgements

During 2014 there were three opportunities to report directly on this project, namely at the ARC Symposium in Edinburgh, at a TBP sharing good practice workshop hosted by Perth & Kinross Council, and at the Scottish Local Biodiversity Officers' Network meeting in North Lanarkshire.

Thanks go to Catherine Lloyd for her advice and input, Daniele Muir for her assistance and advice and Pete Minting for his professional opinion and input, all of which is greatly appreciated. Thanks also go to Karis Fairfield of TayARG and Clare McInroy of FAH for sharing progress of their Angus projects. Special thanks are due to Trevor Rose of FAH for his encouragement and training in making the amphibian ladders.



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*Report prepared by Andrew Law,
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Appendix 1 - Maps

© Google Maps Data

Map of the Perth and Kinross area where surveying is taking place as well as labelled maps of the sites within Murthly, Lethendy Road and Blairgowrie with points and numbers denoting gullypots.

