

IWT National Smooth Newt Survey 2013 report



Author: Seán Thomas Meehan
Smooth Newt Survey Coordinator 2013, IWT



Contents

1.0	Introduction.....	1
1.1	Recording of smooth newt in Ireland.....	1
1.2	Why survey for smooth newt.....	3
1.3	Life cycle of <i>Lissotriton vulgaris</i>	4
2.0	Survey overview.....	4
2.1	Selection of targeted survey areas.....	5
2.2	Training workshop overview.....	5
2.3	Survey protocol	6
2.4	Site selection.....	6
2.5	Survey techniques.....	7
2.6	Data return.....	8
2.7	Data management	8
3.0	Results.....	9
4.0	Discussion.....	13
5.0	Acknowledgements.....	15
	References.....	16



Smooth newt *Lissotriton vulgaris*

This report should be read in conjunction with the 2010, 2011 & 2012 IWT smooth newt survey reports. Available to download from www.iwt.ie

1.0 Introduction

The smooth newt *Lissotriton vulgaris*, formerly *Triturus vulgaris*, is the sole native newt species found in Ireland. One of only three amphibian species considered native to Ireland, the other two being the common frog *Rana temporaria* and the natterjack toad *Bufo calamita*; it is the species most likely to best qualify for native status in Ireland (Wilson, 1986). This paucity regarding Ireland's amphibians is believed to be a consequence of the country's glacial history and subsequent isolation from mainland Europe (Britain has three native species of newt, two frog species and two toad species in comparison). The smooth newt belongs to the order Caudata, otherwise known as Urodela. This order, the tailed amphibians, includes the newts, salamanders and true salamanders. The smooth newt is the sole representative of the order Caudata in Ireland; common frog and natterjack toad belong to the Anura or tailless amphibians.

Despite the fact that there are only three species of amphibian considered native to Ireland, until recently they have remained a relatively understudied faunal group. Over the last four decades in particular, a clearer picture of their range, distribution and ecology has emerged as a result of more dedicated surveying and nationwide projects carried out by organisations and individuals such as Ní Lamhna (1970s), Marnell (1990s), the Irish Wildlife Trust (IWT), the Irish Peatland Conservation Council (annual frog survey), NPWS (2011 national frog survey) and the NPWS' ongoing monitoring and relocation of natterjack toads.

In 2013, IWT and the National Biodiversity Datacentre (NBDC) worked together to ensure that all records of smooth newt were validated and processed onto live data maps. Such cooperation is important and sets a precedent to ensure that all biological records are managed in an orderly fashion and more importantly are made available to the greater community. Biological records are useless if left in a surveyor's field notebook or hidden away on some government department's database; for conservation and planning to be effective, biological records need to be current, up to date and accessible if conservation goals are to be realised.

1.1 Recording of smooth newt in Ireland

There appears to be an opinion that the smooth newt was and is widespread in Ireland, although more precise knowledge of its occurrence at a localised level is relatively poor. The first significant attempt to map the species was carried out in the 1979 by Ní Lamhna who produced a map showing a widespread but patchy distribution across Ireland (Figure 1). In the 1990's Marnell carried out a survey of breeding ponds across Ireland (Figure 2). As can be seen from both maps, obvious gaps in distribution occur. It should be noted that this does not imply that these blank areas do not support newts; lack of recording effort, limited survey resources, incorrect survey timing etc. should be taken into account.

In addition to both Ní Lamhna's and Marnell's records, NPWS also own a database containing 187 smooth newt records (It should be noted however that this database includes the records collected by Ní Lamhna and Marnell, Figure 3). It was due to the lack of a nationwide spread of smooth newt records that the IWT undertook four newt surveys between 2010 and 2013 in an attempt to help 'fill' in the gaps and produce more precise distribution maps.

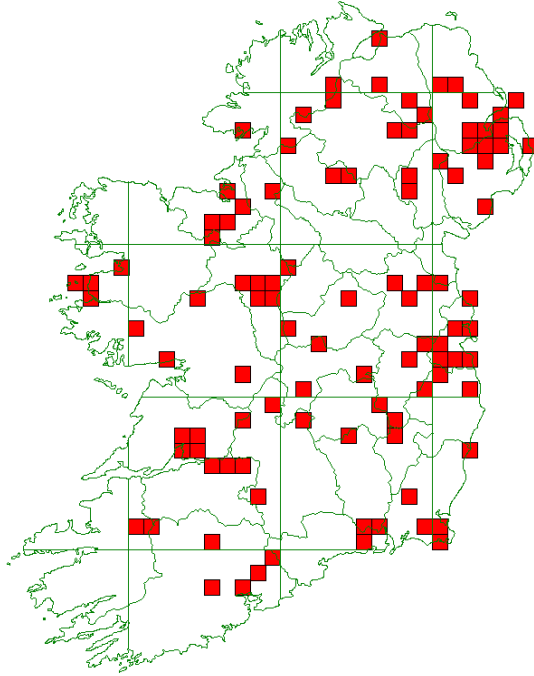


Figure 1. Smooth newt distribution across Ireland (Ní Lamhna, 1979). Each red square represents a hectad (10 square kilometres) returning one or more newt records.

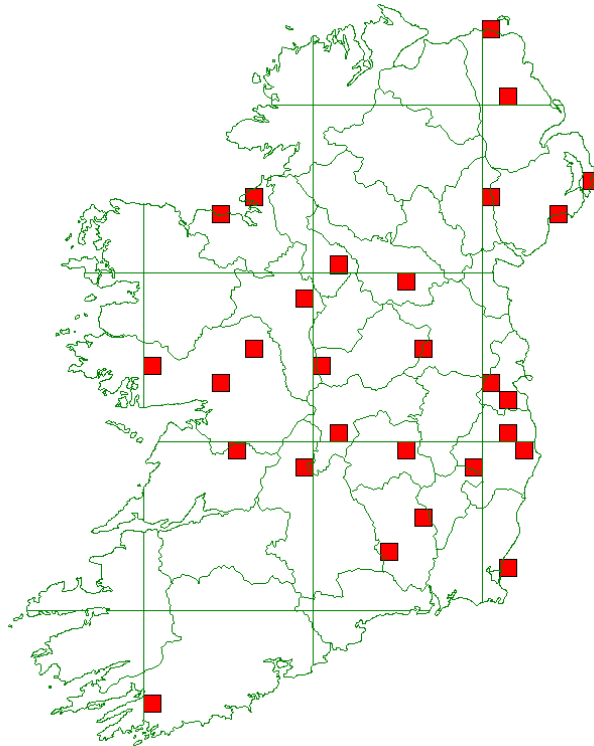


Figure 2. Smooth newt distribution across Ireland (Marnell, 1998). Each red square represents a hectad (10 square kilometres) returning one or more newt records.

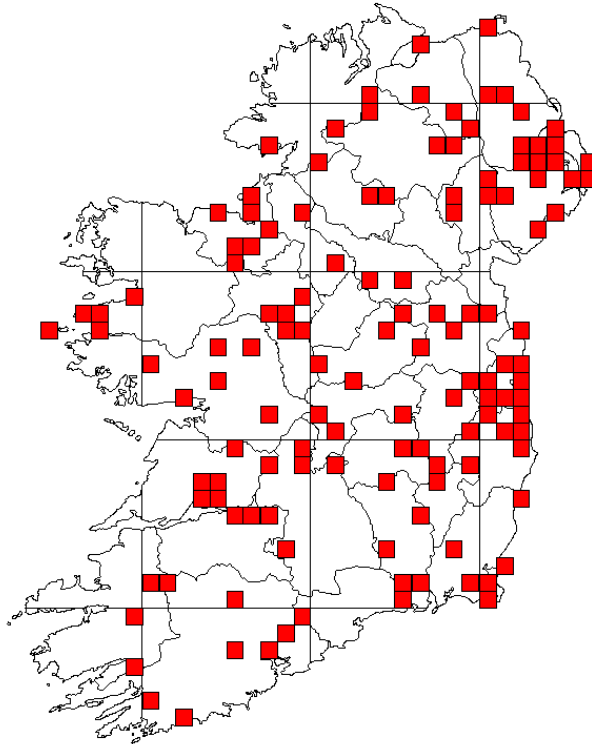


Figure 3. Map showing all hectads with records of smooth newt held by NPWS (including the records compiled by Ní Lamhna and Marnell)

1.2 Why survey for smooth newt?

As smooth newt is one of only three amphibian species considered native to Ireland, any loss or decline in these amphibian species would represent a serious blow to Irish biodiversity, considering how relatively species poor the island is. Amphibians require both a terrestrial and aquatic component to their lifestyle and are therefore more vulnerable to environmental degradation such as land drainage, application of agri-chemicals, hedgerow and scrub removal and pond / wetland loss.

Between 1990 and 2006 it is estimated that there has been a 10% decrease in land area covered by wetland in Ireland (CORINE). This decline corresponds to a period of unprecedented economic growth in Ireland and considering that the building frenzy reached its height in 2007, it is likely that this 10% figure may be underestimated. It is this vulnerability to environmental change that allows amphibians, in this instance, smooth newt, to act as a 'flagship species' or an 'ecological indicator'. It is hoped that long term monitoring of the changes in distribution of the species may correlate to landscape changes, thus indicating areas where conservation of wetland habitats has failed or is needed. Smooth newt is currently listed as 'Least concern' in the Irish Red Data Book for amphibians, reptiles and freshwater fish (King *et al.*, 2011). However, due to their dependence on wetland habitats and susceptibility to environmental change, amphibians require long term monitoring.

1.3 Life cycle of *Lissotriton vulgaris*

In late winter adults rouse themselves from their winter torpor and make their way to the water to breed. This occurs mostly in February and March but smooth newts have been recorded moving to ponds as early as January (Marnell, 1996) or December (Griffiths, 1996). It has been observed that the timing of these earliest breeders seems to be shifting with climate change as winter temperatures increase (Griffiths, 1996).

At the pond the male conducts an elaborate courtship dance. If he manages to impress the female with his dance they will mate and the female then lays up to 300 eggs. Unlike frogs and toads, that produce clumps and strings of floating spawn, the female newt lays each egg individually attaching it to aquatic vegetation or wrapping it in the leaf of an aquatic plant. The egg then develops into a tadpole within about 10 – 20 days, depending on temperature. The newt tadpole is sometimes referred to as an “eft”. Newt tadpoles are different from frog tadpoles in that they develop their front legs first and are carnivorous. They have feathery external gills that are used for obtaining oxygen underwater.

Over the summer, newt tadpoles develop into adult form by growing their back legs and losing the external gills replacing them gradually with lungs. Around September the juveniles leave the water and will spend two to three years on land until they become sexually mature and return once more to the water to breed. Smooth newts have an average life span of 7 years in the wild.

2.0 Survey overview

The primary aim of this survey was to gather quality verifiable records of smooth newts through engagement with the general public. The survey techniques were designed with the volunteer in mind, ensuring that they were executable by people with little previous survey experience. The techniques for this survey were finalised after consultation with Amphibian and Reptile Conservation UK (ARC) and National Parks and Wildlife Service (NPWS). The support of the NBDC was also sought regarding the design of the data recording and data management protocol. The survey was a presence/absence survey focused on surveying potential smooth newt breeding waterbodies during the newt reproductive season and larval development period, which is March to September. Surveying was carried out twice throughout this period.

Surveying is a necessary tool to assess the current state of a particular species or habitat. However without repeatability and comparison, little meaningful information is obtained if surveys are executed as one off events. Another aim of the IWT smooth newt survey was to compare data collected between 2010 and 2013 with the historic data held by NPWS (including Ní Lamhna and Marnell’s records). To enable this to be carried out, volunteers were encouraged to select an additional hectad that contained a historic smooth newt record and to revisit these hectads to determine if newts were still present. The locations of the sites for historic records were passed onto the surveyors to ensure the correct waterbody was re-visited and re-surveyed. It is hoped that this comparison between current data and the historic data brings an element of long-term monitoring to the project.

2.1 Selection of targeted survey areas

During February 2013 the records from the previous three IWT smooth newt surveys were analysed in order for areas in Ireland that still lacked recent or adequate numbers of newt records to be identified. These areas lacking recent records were loosely correlated with counties as an aid in defining geographical areas that required surveying. Nine counties were selected; Sligo, Mayo, Galway, Roscommon, Meath, Tipperary, Kerry, Kilkenny and Offaly. Although not initially selected, Wicklow was later chosen as a substitute for Mayo where a lack of public interest resulted in the cancellation of a training day in Castlebar. It should be noted that some of these selected counties had hosted a training workshop in previous surveys and in the case of Mayo, in both 2011 and 2012. The reason Mayo was initially chosen again was that despite hosting two well attended survey training days resulting in respectable attendances and newt records being generated, the large area of the county and surrounding environs still required more targeted local surveying.

2.2 Training workshop overview

Training days were advertised through local media, print and radio, and also extensively on social networking sites such as Facebook and Twitter. Surveyors who participated in previous surveys were also contacted. Retention of previous surveyors is important as they bring experience and know how to do subsequent surveys and help increase the overall standards of surveying and collected data. Training days were held in venues that were easily accessible and had adequate facilities such as presentation equipment, lighting, bathrooms, catering and convenience to a nearby water body to survey for newts (Figure 4).



Figure 4. Pond containing smooth newt at Lavistown House, Co.Kilkenny, venue for the Kilkenny training workshop

A typical training day consisted of three parts, the first part being a presentation/lecture on amphibians in Ireland and newt ecology, the second part being an explanation and demonstration on what the survey protocol consisted of and the final part involved a visit to a water body to survey for newts. Workshops started at 10 am and finish by 3pm. All people who attended received a workshop handout containing information on newts and the survey in general. Participants who expressed an interest in carrying out a dedicated survey in their locality were registered and allocated a hectad, usually of their choice, but occasionally their choice was not available due to it already being selected by another surveyor or having been surveyed in one of our previous surveys. When this happened the project coordinator would help select an alternative hectad. As already mentioned, in addition to selecting a hectad, surveyors were encouraged to re-survey a site from which a historic record was made.

2.3 Survey protocol

Surveyors followed the protocol detailed below;

- Select a suitable survey site
- Gain access to site from land owners or managers
- Carry out daytime analysis of the site for health and safety assessment
- Conduct basic habitat survey of site
- Carry out presence / absence survey of site 2 times between March and August 31st. The first survey must be carried out in March or April.
- Use torching techniques to determine newt presence or absence
- Fill in survey forms and submit to Irish Wildlife Trust

2.4 Site selection

Smooth newts are known to use a variety of waterbody types such as garden ponds, natural pools, drainage ditches and quarry ponds. Once a survey hectad was selected surveyors then identified sites suitable for smooth newt reproduction. Table 1 lists the criteria that decide whether a waterbody is likely to be suitable or not for smooth newt. During the workshop training days, the project coordinator and individual surveyors discussed issues such as distance from the surveyor's home, safety and land access issues. A standard letter requesting access to land was also made available to any volunteer surveyor who needed it to show to any landowners. The letter did not give access permission but clarified the purpose of the access request and feedback regarding the letter's usefulness has been positive.

Table 1. Criteria for determining potential newt breeding waterbodies

Criteria	Condition
Water-flow	Very slow-moving or still water (essential)
Vegetation	Some aquatic vegetation present
Fish	Very few or no fish present
Age	Sites over five years in age
Size	Sites of a manageable size (essential - no lakes)

2.5 Survey techniques

An observation of the smooth newt at any stage of its life cycle was recorded as positive for newt presence. Techniques of visual inspection were used with no trapping activity involved. These methods are designed to be executable by volunteers without previous amphibian surveying expertise and also without the need of a National Parks and Wildlife Service handling license. All volunteers were instructed in fieldwork health and safety and discouraged from lone working during night time surveying. Before newt surveying was carried out each survey site was visited to conduct a risk assessment and a basic habitat survey. During the daytime risk assessment, surveyors familiarised themselves with the site as well as the access route in and out of the site and noted any potential risks such as; uneven ground, livestock, wire fencing or construction work.

The habitat survey involved an assessment of the waterbody to record aquatic and bank side vegetation, bank form (steepness of bank at the water edge) and water body size. The habitat of the immediate area, surrounding land use and the presence of potential terrestrial refugia were also noted. Terrestrial refugia are places free from frost and predators that newts use for overwintering. Examples include; outhouses, large stones and old rotten branches.

The newt surveying techniques used were;

1) Visual daytime searching - This involved visiting the survey site during the day and moving around the perimeter of the water body, as far as it is safe to do so, stopping every 2 meters to examine the water for newts of all life cycle stages.

2) Egg searching – optional. A smooth newt egg consists of a gelatinous ball with a cream coloured embryo in the centre and are 3mm in size, including the gelatinous coating (Figure 6). Unlike frogs, newts deposit eggs individually, attaching each egg to moss or to the leaves of a water plant often folding the leaf over to cover the egg. Due to the small size of newt eggs and the dangers posed by surveying near water, egg searching was not encouraged (a small number of experienced surveyors did attempt egg searches).



Figure 6. Photo of a smooth newt egg identified in the 2010 survey (copyright: Andrew Malcom)

3) Torching – Torching is the most successful method of newt surveying after trapping. To carry out a torch survey the site was visited at night shortly after sunset, as this is when smooth newts are most active. Torching involved moving around the waterbody perimeter and stopping every 2 meters to torch. Torching is carried out by shining a high-powered torch into the water from the bank outward and examining the water for newts, paying particular attention to examine amongst vegetation and on the pond floor as newts are more difficult to see there. Surveyors ensure not to shine the beam further up the bank as this may disturb newts in areas not yet surveyed. A high-powered torch was used for torching, desirably 500,000 candle-watts in power. Surveyors were careful not to leave the torch beam shining on detected newts for too long for risk of damaging their eyes. IWT were able to supply suitable torches to surveyors if required.

2.6 Data return

All survey results were recorded on specially designed recording forms provided to volunteer surveyors as digital files and on hard copy. A link to download additional recording forms was also provided on the main IWT website. These forms were then returned to the IWT by post or email. Communication with all registered surveyors was frequent throughout the survey period and all surveyors were notified twice to ensure prompt return of completed survey forms.

2.7 Data management

Records received (both surveyor and general public records) were recorded in an electronic database and digitized using Dmap software (vers. 7.3). The database of smooth newt records was created to use in producing the species distribution maps and forwarded to the NBDC periodically throughout the survey.

3.0 Results

The 2013 survey was enthusiastically embraced by the media and the general public alike with nine county workshops being attended by 82 people. Table 2 lists the breakdown of attendees per county workshop. The 2013 campaign resulted in 142 records (general public and registered surveyor records) being submitted from 31 counties (Table 3). Adding this 2013 survey batch of records to the numbers collected in the three previous surveys gives an overall total of 287 smooth newt records collected from 151 hectads to date. The 2013 survey returned smooth newt sightings from all counties of Ireland except Co. Carlow. However, Carlow did produce a record during the 2012 survey. All counties of Ireland have now returned at least one positive newt record. Nine records were submitted by members of the public from Northern Ireland, which is important as surveys such as this should be done on an all island basis.

Table 2. List of IWT newt training workshops and numbers of attendees in 2013

County	Venue	Date	Number of attendees
Kerry	Tralee Bay Wetlands Centre	09/03/2013	11
Tipperary	Cabragh Wetlands Centre	10/03/2013	6
Roscommon	Lecarrow Comm. Centre	23/03/2013	5
Offaly	Clara Bog Reserve	24/03/2013	12
Meath	Sonairte Ecology Centre	06/04/2013	11
Kilkenny	Lavistown House	07/04/2013	6
Galway	Brigit's Garden	14/04/2013	17
Sligo/Roscommon	Ardcarne Garden Centre	21/04/2013	10
Wicklow	Roundwood Comm. Centre	28/04/2013	4
			<u>Total: 82</u>

Table 3. Breakdown of 2013 newt records per county

County	Surveyor records	General public records
Antrim	0	1
Down	0	2
Derry	0	3
Fermanagh	0	1
Tyrone	0	1
Armagh	0	1
Monaghan	0	2
Cavan	0	1
Donegal	0	6
Sligo	1	4
Leitrim	1	1
Mayo	1	14
Roscommon	0	6
Galway	1	7
Longford	0	1
Westmeath	0	2
Meath	1	7
Louth	0	4
Dublin	1	5
Kildare	0	2
Wicklow	1	2
Offaly	1	6
Laois	0	2
Wexford	0	2
Waterford	0	4
Kilkenny	2	5
Cork	0	7
Tipperary	1	12
Kerry	3	10
Limerick	0	2
Clare	0	5
Sub-total	14	128

Overall records total for 2013: 142

Of particular interest in 2013 are the records from Tipperary and Louth, two counties where IWT didn't receive any newt records during the previous three surveys. This apparent 'absence' of newts in these two counties was widely reported by the media and it would appear that this prompted local enthusiasts to undertake searching out of a sense of county pride! This highlights the importance of the media when promoting citizen science projects such as the IWT smooth newt survey.

Of the 142 records collected in 2013, 44 are from hectads where no previous records were collected during the three previous IWT surveys. In 2013, registered surveyors selected 42 hectads with 14 returning positive newt records. This result represents a success rate of 33% and is on par with the previous IWT smooth newt surveys. Adding these 44 hectads to the number of hectads generated by the 2010, 2011 & 2012 surveys brings the total to 151 hectads (Figure 7). The uptake for re-surveying historic hectads this year was poor with just one hectad being visited, T04 in Co. Wexford. The surveyor re-visited three sites within this hectad that Marnell visited in the 1990's but was unable to locate any of the sites. It is not clear whether this is as a result of surveyor error or genuine habitat loss. In total, 27 hectads now contain both historic and IWT records. Combining the NPWS database records (that include Ní Lamhna and Marnell) and the IWT records results in a total of 474 records from 239 hectads collected up to the end of 2013. Figure 8 shows the nationwide spread of these 239 hectads.

Of the 142 smooth newt records submitted in 2013, 69 (48.5%) were of newts observed in an aquatic setting. Figure 9 shows the breakdown of the waterbody types where these 69 records were made. The remaining 73 records were of newts sighted in a terrestrial setting that included polytunnels, gardens and front porches!

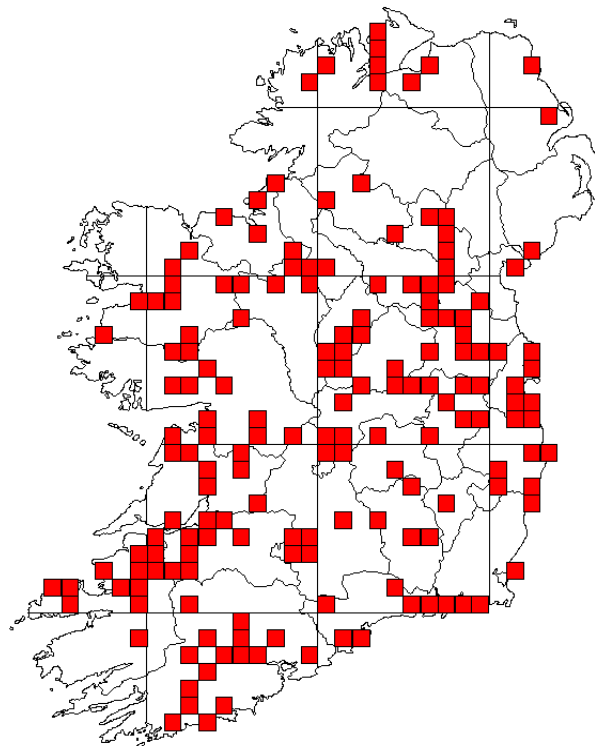


Figure 7. Map showing all 151 hectads that have returned smooth newt records from the four IWT smooth newt surveys to date. Note that individual hectads may contain multiple records from different sites.

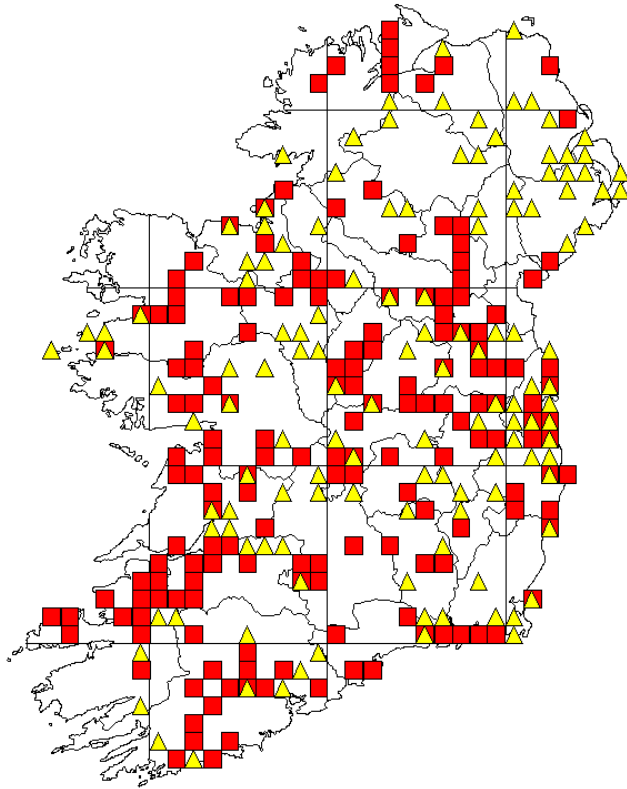


Figure 8. Map showing combined IWT and NPWS records of smooth newt in Ireland. Red squares indicate hectads from which IWT collected records. Yellow triangles are hectads containing historic records held on the NPWS database.

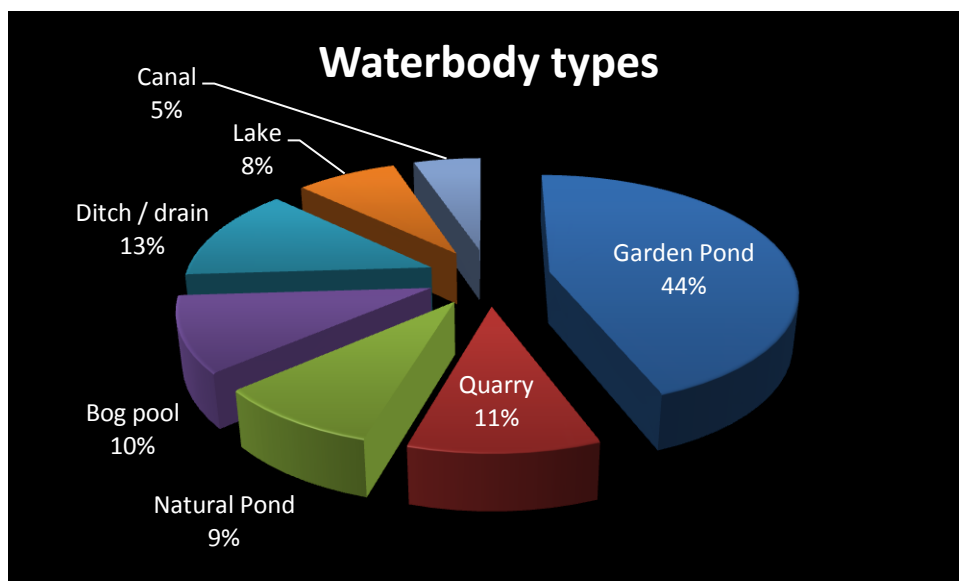


Figure 9. Breakdown of waterbody types associated with smooth newts recorded during the 2013 survey

4.0 Discussion

2013 proved to be another successful year for the IWT newt survey with forty four new hectads in Ireland containing smooth newt being added to the totals from the previous three IWT surveys. The IWT smooth newt surveys between 2010 and 2013 have contributed enormously to the understanding of the distribution and ecology of the species in Ireland today with 287 smooth records collected from 151 hectads. Based on the results of the four IWT smooth newt surveys to date, the species would appear to be widespread across Ireland although 'gaps' in distribution are still evident. This is without doubt due to lack of recording effort highlighting the importance of future surveys. It is also important to note that a hectad, being a 10km x 10km square area, is a considerable size and individual hectads would benefit from more detailed surveying effort to ensure potential habitats and newt populations are not overlooked.

The role of social media in publicising the surveys over the four year period was very significant, no doubt contributing to the large numbers of 'ad-hoc' records submitted by members of the public. These records were often accompanied by photographs which enabled prompt validation. An additional feature of this year's survey was the provision of an online record submission form accessible via the IWT website. This feature, provided by the NBDC, enabled the public to upload details and photos of their records quickly and simply. These records were then examined by the IWT before final submission to the NBDC, where they appear on the live maps system.

Social media platforms enabled the IWT to reach a large target audience and this helped to rapidly spread awareness about the survey and enabled instant communication between the IWT and interested members of the public and also in dealing with any queries from the registered site surveyors. In conjunction with the nationwide interest expressed by the media, tens of thousands of people were made aware of the survey, smooth newt ecology and Irish biodiversity in general. The involvement of the public is increasingly being utilised by conservation bodies in order to help cover large geographical areas, thus maximising value for often scarce funds. The IWT have proven that so called citizen science initiatives do work and that once correct training, mentoring and good communication is in place, survey results are of a high standard. This allows the scope of projects to be increased, thus maximising return for invested money and resources.

After running for four consecutive years, the IWT has decided to divert funding to other wildlife and conservation projects in order to avoid over exposure of one particular species which can result in 'surveyor fatigue' setting in amongst the general public. Ireland, being a country with a small population, has a limited pool of interested members of the public willing to get involved in citizen science projects so by temporarily ceasing the smooth newt survey in 2014, it provides an opportunity for public interest and momentum to refresh in preparation for future newt survey campaigns.

The presence of a non-native species of newt, alpine newt *Ichtyosaura alpestris* also came to the fore with a number of individuals being recorded at a site in Co. Galway. Research is currently being carried out by NUI Galway to investigate the distribution of this species, believed to have been deliberately introduced into the wild in Ireland. It is unknown if this species poses any threat to the smooth newt, although evidence from Britain, where the species is a long established non-native,

has not indicated any negative impacts on native newt species (Beebee & Griffiths 2000). In addition, the danger of ranavirus to Irish amphibians has also been highlighted as a result of the IWT smooth newt survey campaign with participating surveyors made aware of the disease and its symptoms. No cases or suspected cases of ranavirus in smooth newts or frogs came to IWT's attention during the 2013 survey.

Smooth newts have been recorded from an array of habitat types across Ireland and do not appear to display habitat fidelity to the same extent as other British and European species. It is assumed that smooth newts in Ireland tend to avoid boglands due to unsuitable pH related factors (Cooke & Frazer, 1976; Yalden, 1986; Denton, 1991) and Marnell's findings concur with this assumption (Marnell, 1998). In Britain the palmate newt *Lissotriton helveticus* is considered more suited to acidic conditions and the notable presence of smooth newts on Irish boglands gives rise to speculation that the smooth newt occupies this habitat niche in the absence of the palmate newt.

The four IWT surveys to date produced 17 records of smooth newt from bogland pools and drains, with some sites sustaining several individuals. The suitability of Irish boglands for smooth newt requires further investigation as the numbers of such bogland records, collected to date by IWT, do not offer enough evidence to agree or disagree with the 'bogland avoidance' theory.

The role of anthropogenic features such as garden ponds and disused quarries in providing smooth newt habitat is significant. With the loss of wetlands as a result of agricultural drainage and urbanisation, these features are increasingly important as refugia for newts and indeed other species. Future smooth newt campaigns will emphasise the importance of creating and maintaining wildlife friendly ponds and their importance in sustaining newts and general biodiversity.

With four annual surveys completed to date, great progress has been made in attempting to produce up to date distribution maps for smooth newt in Ireland. Based on returned survey forms to date it would appear that the smooth newt's choice of waterbody is extremely variable. Surveyors were asked to document waterbody characteristics but to date no definite pattern of similarities between waterbodies has emerged. It would appear that the smooth newt is a very catholic species and will use a wide variety of waterbodies, ranging from garden ponds to canals. Although this is beneficial to the smooth newt that it can utilise a range of different waterbodies, it creates difficulties for conservation efforts if precise waterbody types cannot be easily identified. An interesting finding is the presence of newts in lakes, often of considerable size, despite beliefs that they generally avoided waterbodies that contain fish (lakes would generally be expected to contain fish). One theory is that dense vegetation growth, such as reed canary-grass *Phalaris arundinacea* and Bulrush *Typha latifolia* around the perimeter of these lakes act as a refuge and afford newts protection along the lake margins, away from predating fish.

This filling in of 'gaps' in the known distribution of the species by our surveys over the last four years suggests that the distribution of the smooth newt may not be as patchy as previously thought. Records have now been obtained for every county and the current distribution maps show a widespread coverage. The smooth newt is an elusive creature but the high newt detection rate in the IWT surveys has shown that with adequate training and techniques, detection of this creature through volunteer-based monitoring is possible.

Although there is no nationwide IWT newt survey being run in 2014, records will undoubtedly continue to be submitted by the general public, thanks to the increased awareness generated by the high levels of interest by the media.

5.0 Acknowledgements

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