The Big Spawn Count

Now it's time for Big Spawn Count 2015 – but what happened last year in 2014?

Here's some of the things you said:

"It is completely and utterly alive with hundreds of frogs and they are VERY noisy when they are mating!!!"
LouBrownDesians

"Fish feed on tadpoles when hatched but I always get plenty of frogs returning year after year".
ScottysPond (and the number of clumps reported was 50 – a good total)

"This is a well-established pond: we have had this number of frogs (70 clumps in this pond) for approx 15 years"

At the height of the mating season we counted 50 frogs in the pond. The surface was a covered in them and the croaking made the most wonderful sound when we went outside.

Only 1 large fish and 2 small - there used to be over 20 but I think herons picked them off. The fish ate all the tadpoles, and since the fish population decreased, the tadpoles are now surviving.
f.french

Lots of newts, so most years the frogspawn gets eaten... Toads seem happy though!
tony.gillie

The spawning was very late this year - surprising as it was a relatively warm year.
pete.johnston

Frogs were observed coming along the road (a bus route) in front of our house and making their way about 30 metres to the pond, but most arrive from an allotment between the back of our garden and the main railway line
norman.webber

The Big Spawn Count 2014

The Big Spawn Count is primarily about garden ponds. In 2014 around 600 people sent information on the frogs spawning in their gardens. A few people also sent in information about ponds in other parts of the countryside and in parks – if you've got information from these areas we'd encourage you either to join in with NARRS – the National Amphibian and Reptile Survey run by Amphibian and Reptile Conservation or join PondNet (see below).

So what were the high points of Big Spawn Count 2014?

Spawning peaked earlier than in the very cold 2013. Encouragingly, the spawn timings shown by Big Spawn Count are very similar to those collected in the Woodland Trust's Nature's Calendar project.

As in previous years, most people recorded up to 20 spawn clumps but a lucky few hit the jackpot with a lot more than this – in a handful of ponds more than 100 clumps. This pattern looks pretty consistent between years.

It's not very surprising to find that if you have a small pond (1 m x 1 m) you don't get very large amounts of spawn. But you don't need a huge pond to substantially increase the number of frogs coming to spawn; there's a suggestion that once your pond is what we called 'medium sized' – up to 5 m x 5 m – it doesn't make much difference to the amount of spawn deposited even if you make the pond substantially bigger.

Big Spawn Count also gives us some insights into the vexed question of fish. On small and medium sized ponds, frogs do not seem to be deterred from spawning by the presence of fish. Of course the tadpoles may not fare very well, but quite a few people do have frogs coming back to ponds that also have fish. So unless these fish ponds are entirely populated by young frogs colonising from different ponds, it looks as though tadpoles are surviving with fish at least some of the time. But it's clear that if you want a lot of frog spawn, you're more likely to succeed without fish: of the 20 ponds that were recorded which had 50 or more clumps of spawn, three quarters had no fish.

Join in with PondNet our big new survey for countryside ponds

In 2015 we're rolling out our big new national pond monitoring project, PondNet, supported by the Heritage Lottery Fund.

Three years in development, with trials in Hampshire, Cheshire, Sussex and Yorkshire, PondNet is for the ponds **outside gardens**. So if you would like to get your countryside, field centre or park pond on the map, join in with PondNet. There will be lots more information about the survey later in the spring.

But Big Spawn Count is continuing and we've got plans to make it better, and the information more useful. So keep sending in the results!

The Big Spawn Count 2014: the results

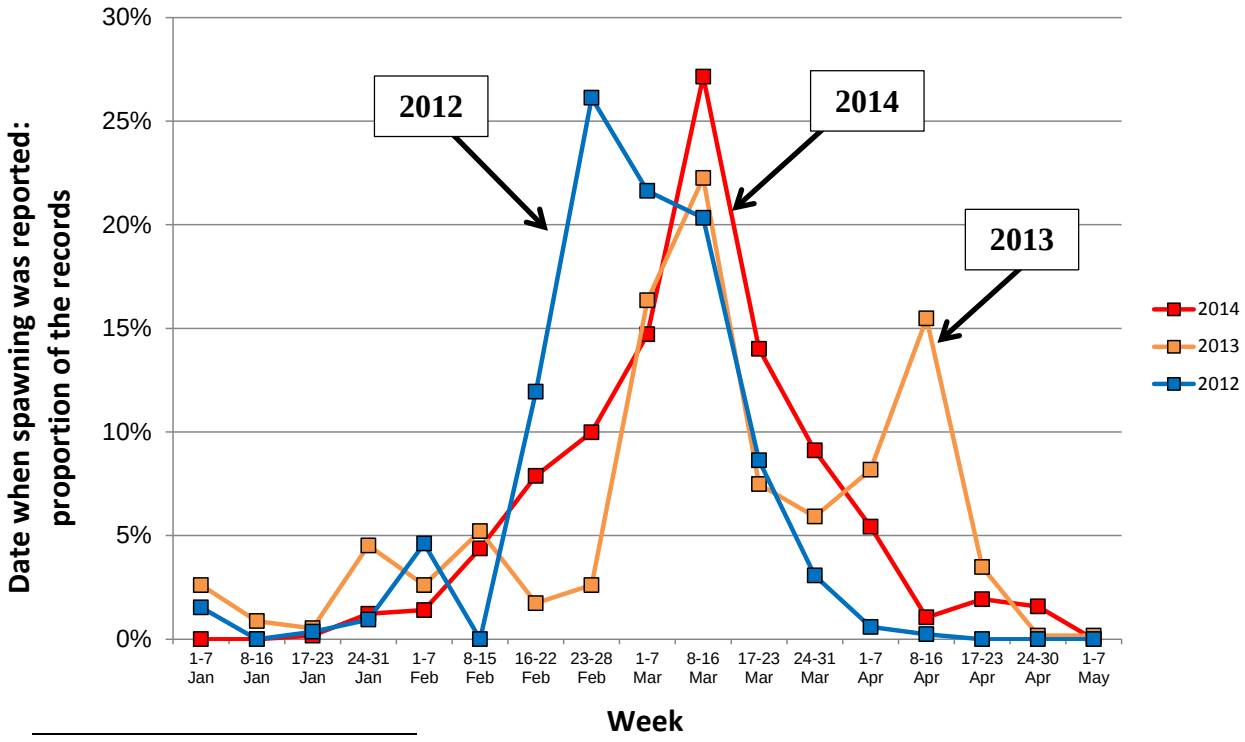
2014 – a warm and wet spring

2014 was the UK's equal-second warmest spring since 1910, matching 2007 and with only spring 2011 warmer. It was also exceptionally wet: part of the wettest winter on record with the news dominated by floods as water spilled out onto the floodplain of the Thames and filled the wetlands of the Somerset Levels.

Despite the warm and wet weather, the peak of frog spawning did not seem to be particularly early. In 2012, which had a particularly warm February, records peaked nearly two weeks earlier. We don't know why there was this difference but the pattern can also be seen in the Woodland Trust's Nature's Calendar first frog spawn records, which were also noticeably earlier in 2012 than in 2014 (but see the small print in Footnote 1[1]!).

The timing of frog spawning is partly (but not only) influenced by the spring temperatures. So although our timings do match the weather to some degree this is not the only factor.

Graph 1. The date when spawning was reported: 2012, 2013 and 2014



[1] We do have to be a little careful in interpretations of the results of the Big Spawn Count. This is because the results are from a 'self-selected' survey – with participants choosing whether to submit records or not, rather than locations being chosen as part of a carefully designed statistical strategy (as we are doing in PondNet, for example). Because we can't assume at the moment that the locations of the ponds are representative of all garden ponds (we need what is known as a stratified random sample for this) we have to be careful in making generalisations from the results. It's a complicated business designing this kind of survey work!

- In 2012 the spring (March – May) average temperature was 8.2 C. This was 0.5°C above the long-term (1981-2010) average[2].
- In 2013 the spring average temperature was substantially lower at 6.0°C, with the coldest March since 1962 and temperatures 1.7°C below the 30 year average. Spawning was noticeably later than usual and had a second peak in April.
- In 2014 the spring returned to the 'new normal' warmer pattern with the March-May average being 9.0°C, 1.3°C above the 30 year average. There was a single peak of spawning which was closer to the peak of the 2012.

It is interesting to see that the patterns in the Big Spawn Count match those in the Woodland Trust's Nature's Calendar survey – which has a similar number of respondents. Because there is a slight difference in the dates reported - Nature's Calendar focuses on the first date of spawning, whereas Big Spawn Count is concerned with the total amount of spawn – Big Spawn Count dates are always a little later, but the overall patterns in the spawning periods are very similar.

Table 1. A comparison of spawning dates recorded in the Big Spawn Count and the Woodland Trust's Nature's Calendar project

Year	Date when most records submitted to the Big Spawn Count	Nature's Calendar: most common first spawning date
2012	1st March 2012	28th February 2012
2013	Two peaks: mid-March and mid-April	Two peaks: mid-March and mid-April
2014	13th March 2014	8th Mar 2014

How much spawn?

Most people report relatively small amounts of spawn in their ponds – with eight out of 10 recording up to 20 clumps – equivalent to a female population of 20 animals, one clump for each animal. The patterns in the last two years have been pretty similar (Graph 1). To put this figure of 20 clumps into context, the largest count of all was 250 clumps in a field pond in the Lake District. Larger counts than this seem these days to be rare.

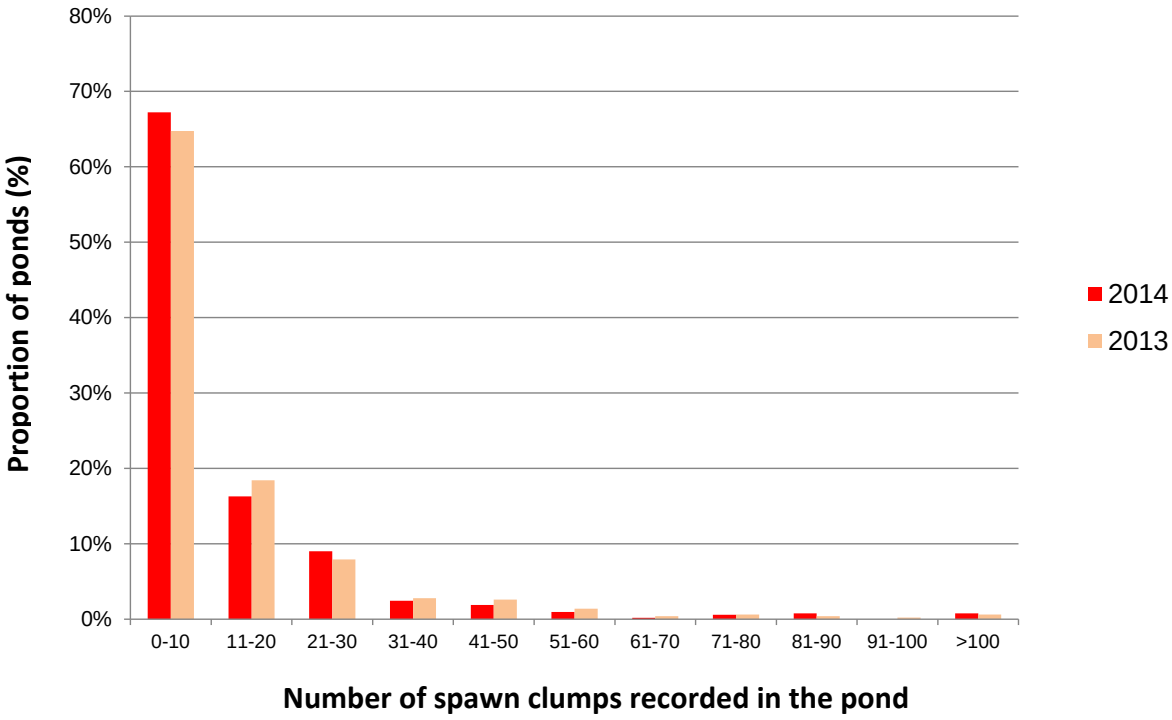
But you don't have to just grin and bear a relatively small amount of spawn! There were four ponds in gardens in 2014 that reported over 100 clumps of spawn, and in my own garden, which is in a quite ordinary suburban environment, two ponds have had more than 50 clumps each year regularly for the last 5 years.

Jeremy Biggs' ponds are quite shallow by 'normal' garden pond standards and he has paid exceptional attention to preventing pollution – and even though common frogs are not

[2] All the climate information here comes from the Met Office web site at: http://www.metoffice.gov.uk/climate/uk/summaries

usually thought to be very sensitive to water pollution, we can't help thinking that this might be part of the explanation.

Graph 2. The maximum amount of spawn recorded in each pond in 2013 and 2014. Most people had a fairly small amount of spawn: up to 20 clumps, but it shouldn't be too difficult to a make a pond that will attract more (but don't forget the terrestrial habitat)



Although most people had a fairly small population of frogs breeding in their gardens and using their ponds a fortunate 5% of the total found 40 clumps or more. Three very lucky folk had over 100 clumps – one person with a medium-sized pond of up to 5 m diameter and two with bigger ponds.

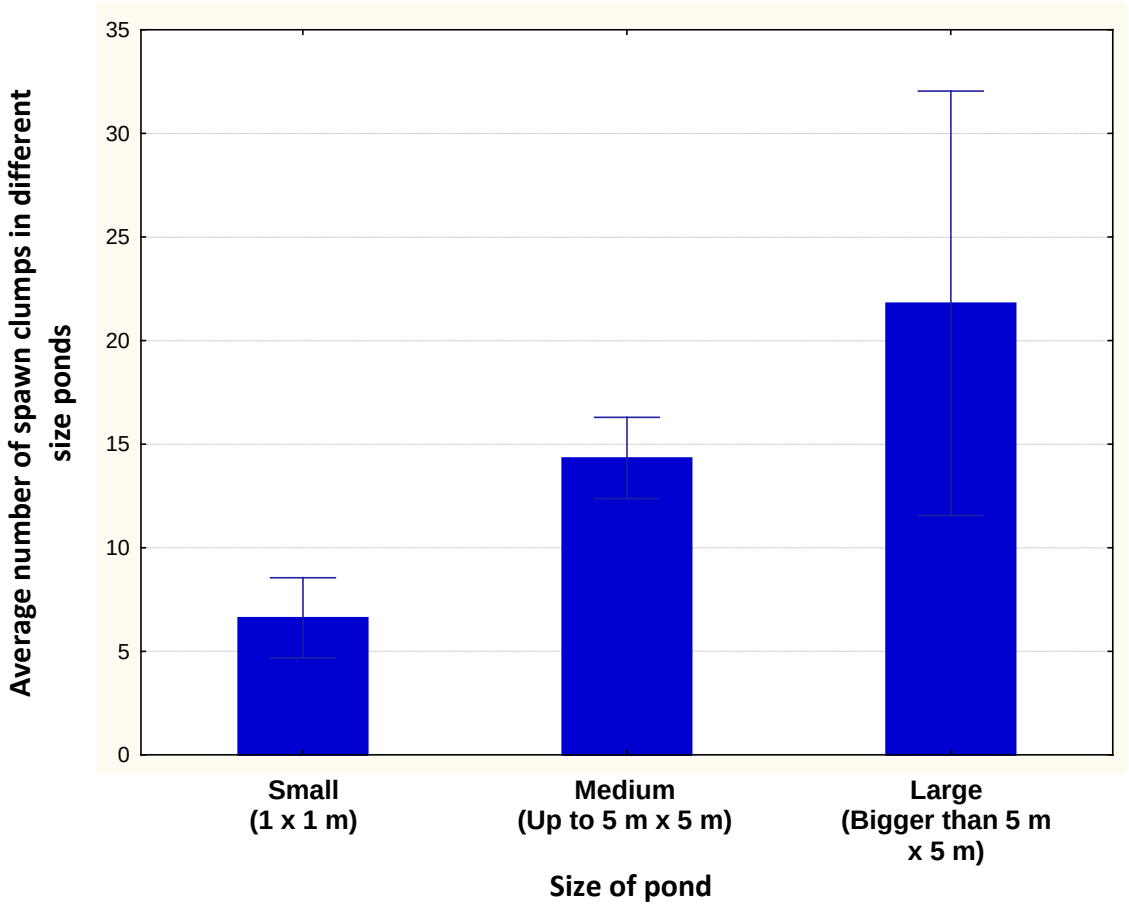
If you want more frog spawn (and more frogs locally), it looks as though it helps to have a medium or large sized pond (Graph 3, over page) although the land habitat is important too. To get more advice about the terrestrial habitat requirements have a look at the Amphibian and Reptile Conservation habitat management guide. As a rule of thumb, it probably pays to make your garden as much like a natural habitat – woodland, old grassland - as possible.

If you want a lot of frogs it's probably not worth going to the trouble of a really big pond – much better to make 20 smaller shallow grassy ponds, than one socking great lake (this is a pretty much a general rule of pond making).

If you want to do really well with frogs you will have a better chance of success if you forgo the fish – or keep them in a separate pond (see next section).

Pond size and the amount of spawn

Graph 3. Bigger ponds – those we called medium and large – on average had more spawn laid in them than small 1 m x 1m ponds. Although the graph makes it look as though large ponds had more spawn on average than medium ponds, in fact this difference is not statistically significant. This might be a reflection of the rather small number of large ponds in the survey. A bigger sample might show this result to be 'real'.



But you don't have to have a big pond to get a lot of frogs spawning. Two ponds in Jeremy Biggs's garden which are shallow (maximum depth 25-30 cm), 2-3 m diameter (so not really very big), with scrupulously unpolluted water and packed with water plants, have been a magnet for spawning frogs. These ponds – see Picture 1 – had 50-70 clumps of spawn laid in the last two years.

Picture 1. One of two ponds in Jeremy Biggs's garden which were packed with spawn each year in 2012 - 2014, despite the visible liner! The pond had 50-70 clumps of spawn in each year. The pond is very shallow - maximum depth 25 cm - has a water area of only 2 square metres most of the year, and is packed with submerged water plants. The pond is in full sun. He actually removed most of the spawn from this pond because the tadpoles would probably destroy the aquatic plants if he let them!

We don't really know enough yet to say why these ponds are so good or that this is the perfect design, but these shallow ponds have amongst the very highest spawn counts seen in Big Spawn Count when you look at Graph 2. Although surrounding terrestrial habitat is also important for frogs it doesn't look as though this is an important factor for the pond above as they are located in really very ordinary suburban gardens that do not have an unusually large amount of wild ground around them.

Frogs and fish

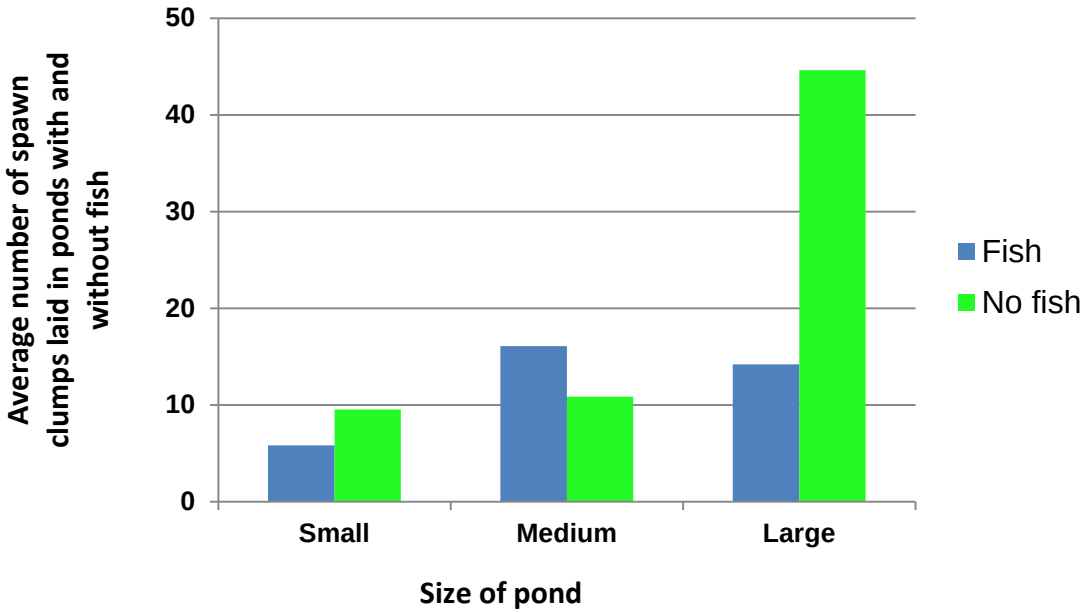
Finally – another interesting observation from Big Spawn Count 2014 is the connection between fish and the number of frogs coming to spawn.

The standard advice is that if you want to have frogs, don't have fish. The Big Spawn Count has shown consistently that the picture isn't quite a straightforward as this, at least as far as Common Frogs are concerned.

We've extracted two graphs from the results which cast some interesting light on this issue. The results summarised in Graph 3 suggest that – in 2014 - in small and medium ponds, the presence of fish didn't make much difference to the average number of frogs coming to spawn in the ponds.

But there's a much more noticeable difference in large ponds: if you want a lot of frog spawn (and presumably a lot of frogs), it pays to keep out the fish. As Graph 3 shows, on average there was four times as much spawn laid in big fishless ponds than those which had fish. Of course, in the end it's really a matter of how many young frogs emerge from a pond. But measuring that is a good deal more difficult.

Graph 3. The average number of clumps of spawn laid in ponds with and without fish. In small and medium sized ponds, on average, there's not much difference whether the pond has fish or not. In the large ponds, however, there's a big difference: on average four times as much spawn is laid in fishless than fishy ponds.

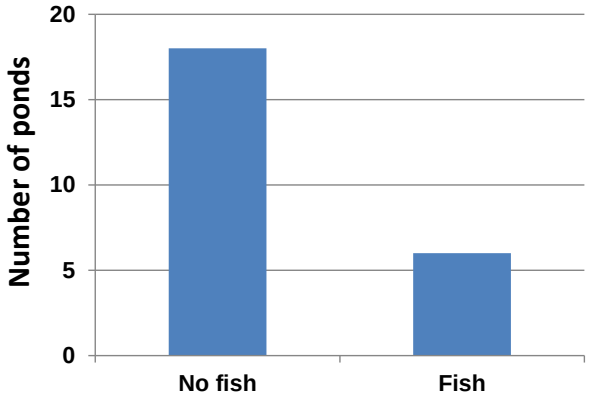


Digging a little deeper into the results also suggests something else useful for garden pond management.

In Graph 4 we've separated out all the garden ponds in the survey which had 50 or more clumps of spawn, irrespective of size. There were in total 24. Of these, three quarters lacked fish.

So if you want a lot of frogs in the garden, the chances are considerably better if you keep the fish out of those ponds. But sometimes –in about a quarter of the cases, in fact – you can still get a lot of frogs spawning and keep the fish.

Graph 4. Ponds with a lot of spawn (50 or more clumps) with, and without, fish. Only a quarter of the ponds with a large amount of spawn also had fish.



The question is why; there a number of fairly obvious possibilities but it needs more detailed information than the Big Spawn Count is able to give us to answer those questions.