

# The Big Pond Thaw survey 2010



Photo: Roger Naylor

Pond   
Conservation  
*For Life in Fresh Waters*

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[www.pondconservation.org.uk](http://www.pondconservation.org.uk)

## Summary

The winter of 2009/10 was the hardest for 30 years in the United Kingdom.

Because of this, many ponds froze for longer than usual, with ice cover for a month or more in many places. As the ice melted Pond Conservation received many reports of dead amphibians, mainly frogs that had been overwintering in the ponds.

We already had evidence that the usual advice given to protect wildlife in garden ponds in cold weather – making a hole in the ice – would have little effect so we took the opportunity to quickly ask Pond Conservation's supporters, and other pond lovers, to tell us more about their ponds during the freezing weather – the Big Pond Thaw survey. Did they make holes in the ice? Did they clear the snow? Did they run a pump? And, of course, had they suffered amphibian mortalities?

Here's the results.....

Most people who reported back had found a small number of dead frogs – usually less than ten – but a few people had found very large numbers of dead animals: the worst mortality was 300 individual frogs in a single medium-sized garden pond.

Making a hole in the ice didn't make any difference to the likelihood of mortalities: in ponds where holes were made amphibian mortalities were as frequent as those where no hole was made. 63% of ponds where a hole was made suffered mortalities, and 64% where no hole was made.

The situation was the same for fish: the proportion of ponds in which fish died was very similar, around half, whether or not a hole was made in the ice.

Detailed studies of one of our garden ponds showed that a blanket of snow can seriously reduce oxygen levels, and snow clearance can reverse this. However, in the survey, clearing snow did not affect the likelihood of mortalities. This may be because only a small number of people cleared snow – so there is little information to work with! But it may be that snow clearance only works where ponds have lots of plants under the ice to produce oxygen.

Running a pump *did* seem to reduce the likelihood of amphibian mortalities, although there were only a small number of ponds with pumps so the result should be treated with caution.

Looking more generally at what the survey suggests about possible causes of amphibian mortalities there is a hint that mortalities were more frequent in deeper ponds and in ponds where the snow lay for longer. Fewer amphibians were found dead where a pump was run and where there was a greater variety of wetland plant types.

Overall the results suggest that many mortalities in garden ponds may be associated with lack of oxygen in the water, although at this stage we can't rule out build-up of toxic gases as a contributory factor.

Finally, the Big Pond Thaw survey doesn't tell us what proportion of ponds suffered amphibian mortalities overall because, of course, people who found dead amphibians were more likely to reply than those with no problems. However, detailed surveys of a much more representative set of ponds in the town of Abingdon, part of a special Pond Conservation research project, suggests that amphibian mortalities occurred in about a quarter of garden ponds.

What are the practical implications of the survey for management of garden ponds?

There are several suggestions we can make from the findings so far:

1. Ponds shouldn't be too deep for their area: shallow ponds – less than 30 cm (1 foot) probably have higher oxygen levels in the water. It looks as though a good shape is a pond that's wide compared to its depth – a saucer rather than a tank. This is the exact opposite of most standard advice - which says that ponds 'should be deep to protect them from freezing solid'. In fact, we know most ponds didn't have more than a few centimeters of ice, even in this very cold winter – so freezing solid isn't the problem.
2. Large build-up of leaves and sediment on the pond bottom is not good – almost certainly because they de-oxygenate water – this is especially a problem in ponds which are small and deep.
3. Having plenty of plants in the pond in winter is good for oxygenation: underwater plants, including mosses (which don't die-back in winter) are ideal, although it's worth remembering that algae, both filamentous and unicellular (the sort that colour the water pea-green) also produce oxygen.
5. There isn't any evidence that making holes in the ice, or breaking the ice, can prevent amphibian deaths under ice. This is not surprising. Most amphibians hibernate at the bottom of ponds. Oxygen diffuses very slowly into still water – about 2 millimeters a day! – so it takes over 6 months for surface oxygen to reach the bottom of a 50 cm deep pond.
4. If you have a pump, and you think the pond might have relatively low oxygen levels, it *is* worth making a surface hole and keeping the pump running so that the water is stirred up – this can move oxygen from the surface to deeper waters. However, a shallow pond with lots of underwater plants won't need a pump.
6. If the pond freezes and then snow falls, clearing some snow from the ice to make a 'sunlight-hole' can help. But it is only likely to work if your pond has lots of underwater plants (or algae) to oxygenate the water.

And finally, we know that there's still a lot to discover about ice, snow and pond wildlife. Here are some of the questions we'd still love to answer:

- what pond area:depth ratio do we need to make sure the water stays well-oxygenated?
- how can we help small deep ponds retain more oxygen?
- are toxic gases (ammonia, methane, carbon dioxide) involved in amphibian mortalities?

Clearly, to protect properly the very wide variety of freshwater plants and animals using these habitats we have much still to learn.

# ***The Big Pond Thaw survey 2010***

## **Thankyou**

We would like to thank everyone who sent in results to the Big Pond Thaw survey – it's one of a range of surveys

which help us to understand more about ponds so that we can better protect their wildlife.

## **Introduction**

The winter of 2009/2010 saw some of the coldest weather in Britain for 30 years<sup>1</sup> with snow lying continuously for several weeks in southern England and for considerably longer in the north and Scotland. As the 'big freeze' continued people began to worry about their ponds - and were seeking advice from Pond Conservation about what they should do.

Prior to winter 2009/10, Pond Conservation had started looking more closely at the wildlife and environment of garden ponds, something about which remarkably little is known, despite the popularity and abundance of such ponds. As well as investigating the plants and animals found in the ponds, in the previous winter of 2008/9, we began making measurements of garden pond oxygen levels during freezing weather. We were surprised to find oxygen concentrations *rising* strongly under the ice in the garden pond of Pond Conservation's director Jeremy Biggs. This was quite contrary to what was normally expected to happen.

A search of the scientific literature revealed that this phenomenon had previously been reported in lakes in the United States

(Phillips and Fawley 2002), though there were apparently no other published references to the phenomenon. In contrast, very low winter oxygen levels, leading to 'winterkill' of fish are well-known, particularly in association with snow cover. Extreme fluctuations in oxygen concentrations during summer are also widely recognised by fish keepers as a problem, when plants or algae can cause severe swings in oxygen concentrations, sometimes causing fish mortalities.

Following winter 2008/9 and the rising oxygen concentrations seen in Jeremy Biggs' pond we started to look more closely at the advice being given about managing ponds in cold weather. It quickly became clear that there was little factual basis to this advice and as a result of this Pond Conservation issued new advice in January 2010 about looking after ponds in cold weather (Appendix 1).

In early February 2010 as the snow and ice finally melted we began to receive a large number of reports from distressed pond owners who were finding large numbers of dead frogs, some dead newts and toads, and also dead fish, in their ponds.

As the problem was obviously widespread we took the opportunity to quickly launch a new survey, a special subset of the Big Pond Dip, to get as much information about the ponds where the mortalities were occurring, although we could not, of course, go back and actually measure oxygen levels in the ponds, or the presence of other potential causes of mortality, such as toxic gases.

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<sup>1</sup>The Met Office has reported that 'Provisional figures from the Met Office show that the UK winter has been the coldest since 1978/79.'. Source: Met Office website, <http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20100301.html>, downloaded 2 March 2010.

The aim of the survey therefore was to find out more about the characteristics of the ponds where mortalities had, and had

not occurred, and also whether people had tried to counter the effects of the weather by keeping holes open, breaking the ice or running pumps.

### The 'Big Pond Thaw' survey

We asked people to complete the survey online and received just over 150

replies. A copy of the survey form is shown in below.

**The Big Pond Thaw 2010**

How big is your pond? (Tick one box below)

Small	1 m x 1 m or less	<input type="checkbox"/>
Medium	Up to 5 x 5 m	<input type="checkbox"/>
Large	Bigger than this	<input type="checkbox"/>

**Ice cover**

Roughly for how long did ice cover the pond (tick one box)

1 week	2 weeks	3 weeks	4 weeks	Longer
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did you make a hole in the ice? Yes  No

Did you break the ice? Yes  No

If yes, how often? \_\_\_\_\_

**Snow cover**

Was the pond covered by snow? Yes  No

Did you clear the snow from your pond? Yes  No

Roughly for how long did snow cover the pond (tick one box)

1 week	2 weeks	3 weeks	4 weeks	Longer
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How deep is your pond? (Tick one box below)

Shallow	Nowhere more than 30 cm (1 foot) deep	<input type="checkbox"/>
Medium	Up to 60 cm deep (2 feet)	<input type="checkbox"/>
Deep	Deeper than this	<input type="checkbox"/>

**In the pond do you have:** (Tick boxes that apply below)

Edge plants (include grass)	<input type="checkbox"/>
Floating-leaved plants	<input type="checkbox"/>
Plants completely underwater	<input type="checkbox"/>

Is the pond filled by:

Rainwater only	<input type="checkbox"/>
Mixture of tapwater and rainwater	<input type="checkbox"/>
Stream	<input type="checkbox"/>

Roughly what depth of leaf litter and sediment is there in the bottom of your pond (tick one box)?

Very little / none: less than 3 cm (1inch)	<input type="checkbox"/>
Moderate: between 3 cm (1 inch) and 15 cm (6 inches)	<input type="checkbox"/>
Deep: more than 15 cm (6 inches)	<input type="checkbox"/>

Did you run a pump, fountain, heater or other device to keep pond open during the freeze (tick each item of equipment you ran)

Pump	<input type="checkbox"/>
Fountain	<input type="checkbox"/>
Heater	<input type="checkbox"/>
Other (list _____)	<input type="checkbox"/>

**Wildlife**

Do have fish (tick Yes or No)? Yes  No

What sort are they? \_\_\_\_\_

Did any of your fish die during or straight after the freeze (tick Yes or No)? Yes  No

Which, if any, fish died? \_\_\_\_\_

Do have amphibians (tick Yes or No)? What sort are they? Yes  No

\_\_\_\_\_

Did you see any dead amphibians after the ice melted? Tick box if yes, and add number

Common Frog	<input type="checkbox"/>	_____
Common Toad	<input type="checkbox"/>	_____
Smooth Newt	<input type="checkbox"/>	_____
Palmate Newt	<input type="checkbox"/>	_____
Great Crested Newt	<input type="checkbox"/>	_____

Did you see any dead smaller animals (e.g. mayflies, water beetles, dragonflies) after the ice melted? Tick yes or no, and give brief details

Yes  Details \_\_\_\_\_

No  \_\_\_\_\_

**Now what?** Go online and tell us what you found by entering your data on the Big Pond Thaw webform. We will report back the results over the next couple of months. [www.pondconservation.org.uk/bigpondslip/bigpondthawformonline](http://www.pondconservation.org.uk/bigpondslip/bigpondthawformonline)

Figure 1. The Big Pond Thaw survey forms

It should be noted that people returning the form were a self-selecting sample so some caution has to be exercised in interpreting the results. Most people sending back forms had experienced mortalities so we know much less about ponds where there were no mortalities.

For this reason we also took the opportunity to re-visit ponds in Abingdon that are the subject of the first detailed study of garden pond wildlife. The Abingdon ponds are a much more

representative sample of ponds and can be used to get some indication of the overall effect of the cold weather on pond amphibians and fish. Although Abingdon is in the south of England, being in the centre of the country it experienced very cold weather with Benson in Oxfordshire, 10 miles from Abingdon, experiencing the lowest January temperatures recorded in England during winter 2009/10, -16.7 °C, on the 7<sup>th</sup> January 2010.

## **Results**

### **What were the ponds like?**

*Pond size:* Most ponds (77%) were 'medium sized': up to 5 m x 5 m. 15% were 'small' (less than 1 m x 1 m) and remaining 7% 'large': bigger than 5 m x 5 m.

*Pond depth:* Half the ponds (51%) were of medium depth – that is up to 60 cm deep, with most of the remainder described as 'deep' – more than 60 cm. Just 7% of ponds were shallow (less than 30 cm).

*Water source:* Just over half the ponds were filled by rainwater. The remainder were filled by a mixture of rain and tap-water. One was fed by a stream.

*Sediment depth:* About half the ponds had a moderate depth of sediment: between 3 cm (1 inch) and 15 cm (6 inches) (58%). About one-third of ponds had very little or no sediment (i.e. less than 3 cm or 1 inch) (36%) and a small proportion (7%) had thick sediment more than 15 cm (6 inches) deep.

*Plants:* Virtually all ponds had some plants: 94% had either marginal, floating-leaved or submerged plants. Submerged plants, which could be an important source of oxygen during cold weather, occurred in nearly three-quarters of ponds (71%). Marginal and floating-leaved plants occurred in a similar proportion of ponds, respectively, 77% and 68%.

### **How did people manage their icy ponds?**

We asked people whether they made a hole in the ice, broke the ice, cleared snow from their ponds or ran equipment (pumps, filters) that could add water to the pond.

Amongst the people who responded there was an almost equal split between those who made holes in the ice, and those who did not: 48% made holes and 52% left the

ice untouched. 30% of people also broke the ice.

90% of the ponds were covered by snow, most for between 1 and 2 weeks. Just over 10% of people cleared the snow.

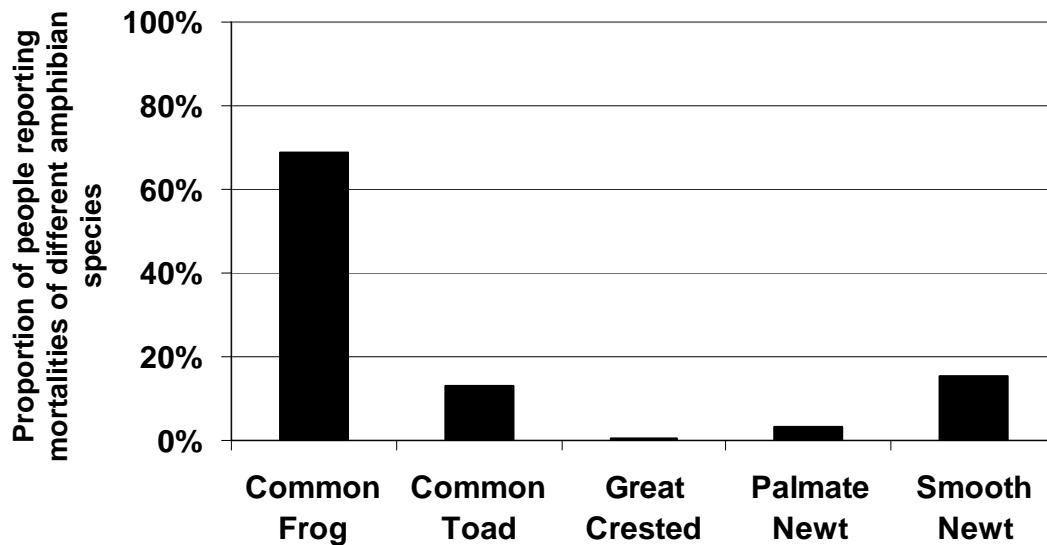
A few people, just over 5%, ran a pump, and two people ran pond heaters.

## How did ice and snow affect amphibians and fish?

### What died in the freeze?

The most widely reported mortalities were of frogs which two-thirds of people returning from ponds found dead. We assumed that these were nearly always *Rana temporaria* as we did not ask people to distinguish between this frog and the non-native Marsh and Edible Frogs (*Pelophylax ridibundus* and *Pelophylax esculentus*) which are found in some parts of southern of England.

The next most frequent reports of mortalities were for Smooth Newt (16% of reports) and Common Toad (13% of reports), with a very small number of Palmate Newts (3%) and one Great Crested Newt mortality (Figure 2).

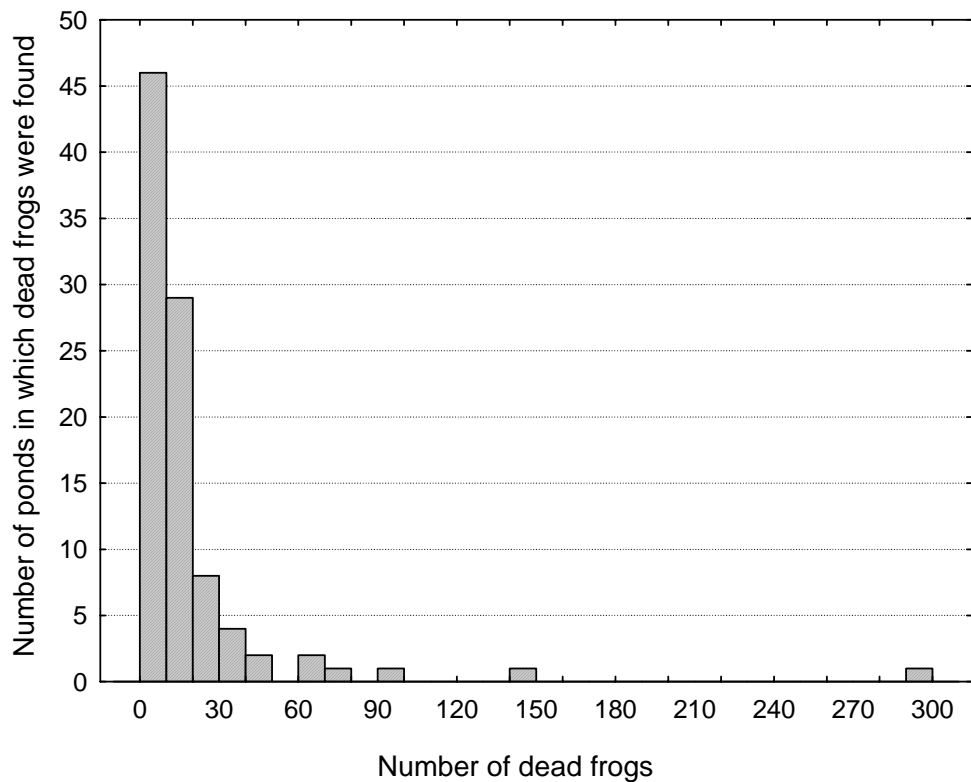


**Figure 2. Which amphibians were most commonly found dead? Proportion of people reporting mortalities of different amphibian species.**

Most ponds owners reported just a small number of mortalities with up to 10 dead animals found. However, some ponds experienced much larger mortalities with up to 300 individual animals found dead (Figures 3 and 4).

About 40% of the ponds for which data were available had fish.

Of these ponds, half had fish mortalities reported (Figure 5).



**Figure 3. The number of dead frogs found in each pond: in most ponds between 1 and 10 frogs were found dead**

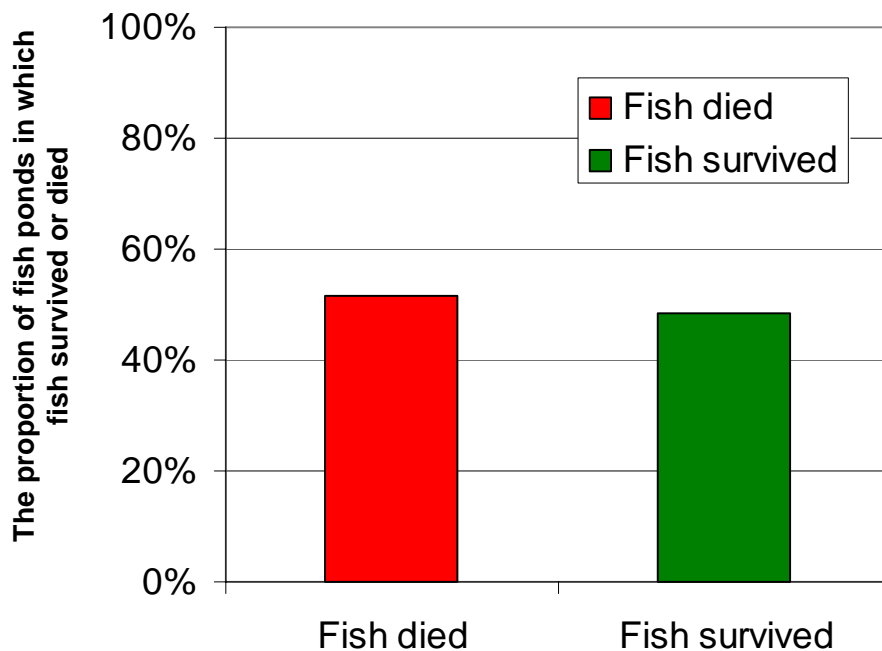


**At least 150 dead frogs were found in this pond in the Derbyshire Peak District**



**300 dead frogs were reported from this pond in Llandrindod Wells, the highest single mortality recorded**

**Figure 4. The two ponds with the largest frog mortalities in the Big Pond Thaw survey**



**Figure 5. The proportion of ponds with fish where fish deaths were reported.**

### How many ponds were affected?

The Big Pond Thaw information cannot tell us what proportion of ponds suffered animal deaths because it was a 'self-selecting' sample. So it was much more likely that people with dead fish and amphibians would be motivated to send in a form than those where there were no dead animals seen.

However, we can get some indication of the proportion of ponds that were affected from the Abingdon detailed survey of garden ponds which Pond Conservation is currently undertaking.

This sample, though relatively small (30 ponds), is more likely to be representative of garden ponds because they are a random selection, not self-selected. These ponds also represent the full range of ponds seen in gardens (i.e. large and small, with and without fish, planted-up and naturally colonized,

intensively maintained and more-or-less neglected). Following winter 2009/10, all pond owners in the survey were asked whether they saw amphibian or fish mortalities. All the ponds were also re-visited by Pond Conservation shortly after the cold weather ended.

Amphibian mortalities were seen in about a quarter of the Abingdon ponds (27%). Three-quarters of ponds (73%) did not have mortalities. Information collected in 2009 indicated that amphibians had been using all of the ponds suggesting that the relatively low apparent mortality rate was not simply due to an absence of amphibians.

One third of the ponds in the Abingdon survey had fish. Of the ponds with fish, at least 40% experienced mortalities over the winter, usually of one or two fish.

## How effective are winter pond management techniques at protecting fish and amphibians?

We asked people how they managed their ponds during the cold weather.

The survey therefore gives us an indication of the effectiveness of different methods of pond management for protecting amphibians and fish during freezing weather.

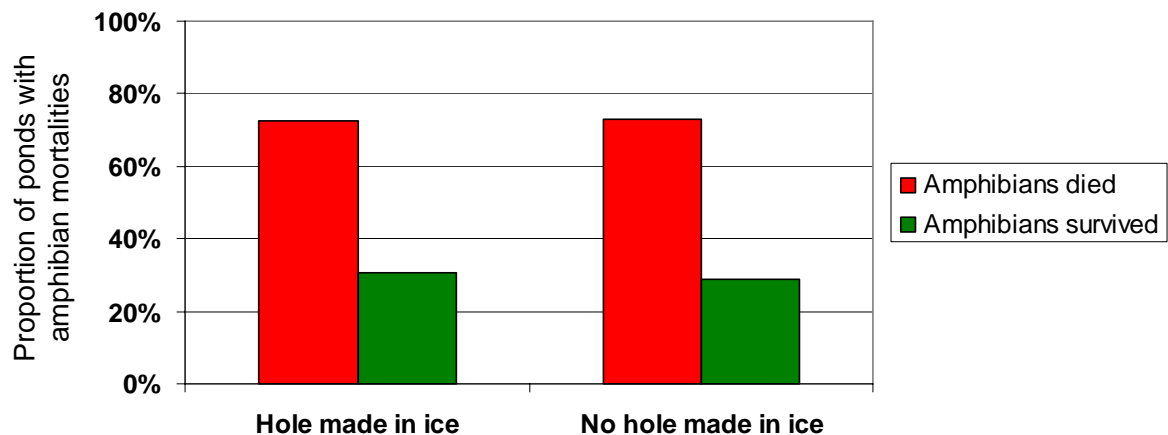
The four measures we had information about were:

- Making a hole in the ice
- Breaking the ice
- Running a pump, fountain or heater
- Clearing snow from the ice

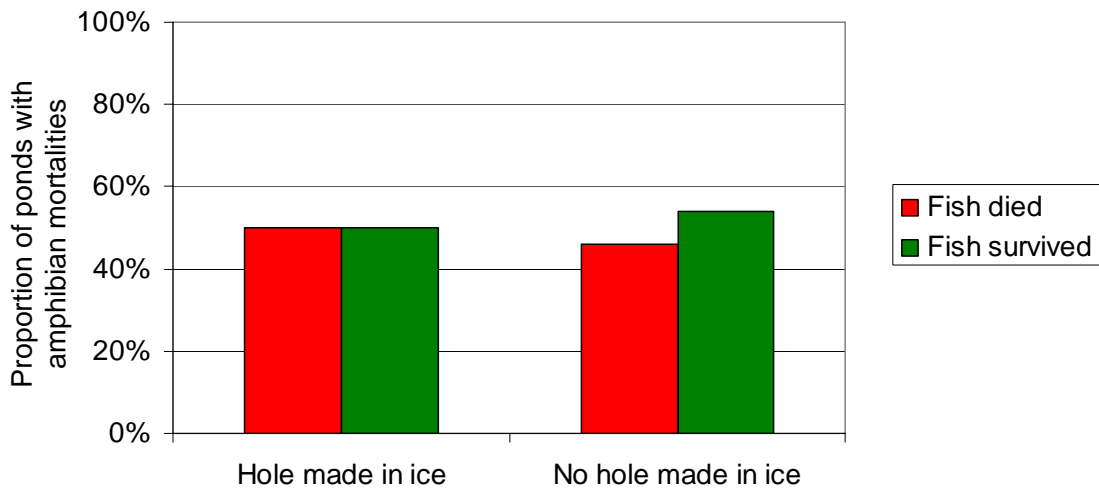
*Making a hole in the ice:* Making a hole in the ice did not seem to reduce the likelihood of amphibian mortalities (Figure 6). In the ponds where people made a hole, 63% still suffered amphibian mortalities. This was almost exactly the same as the ponds where people did *not* make a hole, where two thirds (64%) had amphibian mortalities.

A similar pattern was seen with fish ponds (Figure 7): where a hole was made, half (50%) still experienced fish mortalities. Where no hole was made virtually the same proportion (46%) suffered mortalities.

Overall, amphibians and fish were as likely to be found dead in ponds where a hole was made as where no hole was made.



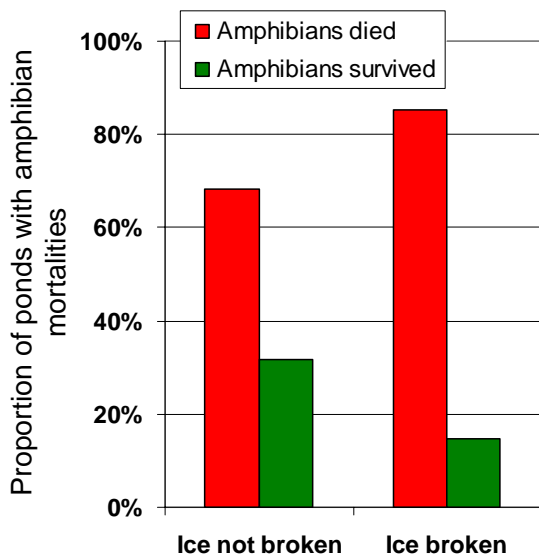
**Figure 6. Effect of making a hole in the ice proportion of ponds with amphibian mortalities**



**Figure 7. The effect of making a hole in the ice on fish mortality**

*Breaking the ice*

People who broke the ice also suffered slightly higher levels of amphibian mortality, with 82% experiencing mortalities, compared to 67% where ice was not broken (Figure 8).

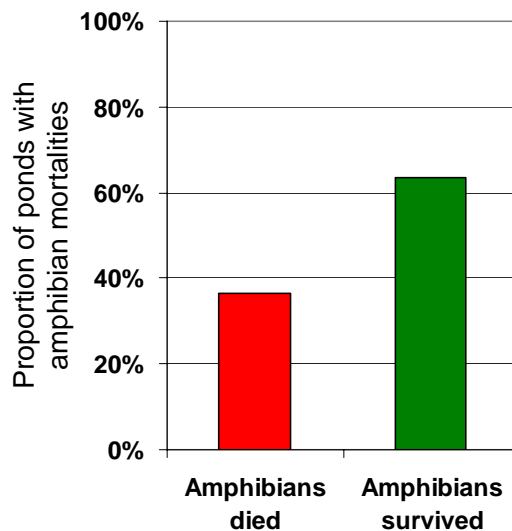


**Figure 8. The proportion of ponds with amphibian mortalities where ice was, and was not, broken.**

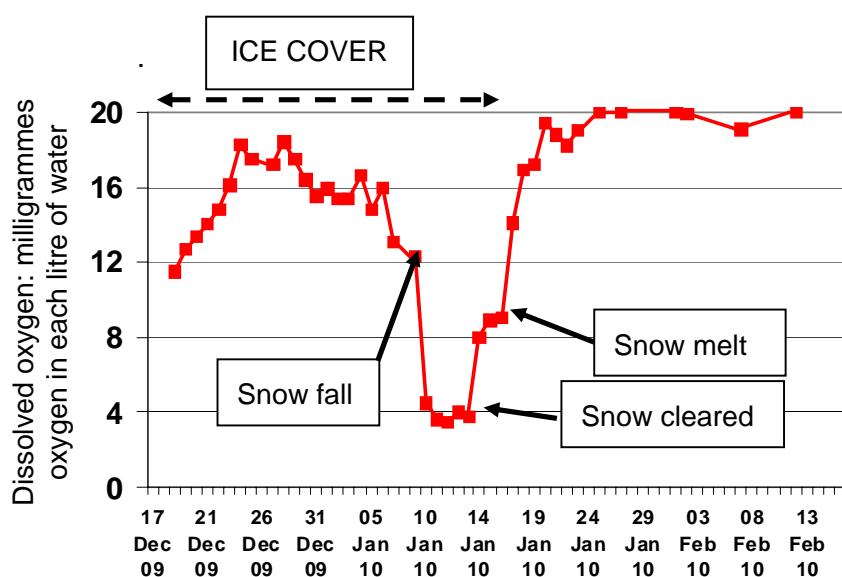
*Running a pump*

Only 11 respondents, less than 10% of the total, reported running a pump during the cold weather. All had amphibians present in their ponds.

Although the sample is very small there is a suggestion that oxygenation protected the amphibians as amphibian mortalities were only seen in one third of these ponds (Figure 9).



**Figure 9. Ponds with pumps: the proportion with amphibian mortalities.**



**Figure 10. Dissolved oxygen levels in Jeremy Biggs' pond in winter 2009/10 before, during and after snow cover.**

It should be noted that we have no way of knowing whether amphibians would have survived in these ponds anyway, irrespective of whether a pump was used. However, this result does suggest that further investigation of oxygenating as a way of protecting amphibians in garden ponds in cold weather may be worthwhile.

*Clearing snow from the ice*

Snow cover is well-known to stop light entering lakes and reduce or stop oxygen production by photosynthesis.

However, there are no measurements of this effect on *ponds*. For this reason we measured the influence of snow cover on Jeremy Biggs' garden pond during January (Figure 10). The pond surface had frozen in mid December 2009, and after freezing, oxygen levels went up in the pond – almost certainly because oxygen produced by plants in the water was trapped under the ice.

On 9<sup>th</sup> January 2010 snow fell heavily in southern England and the icy pond was covered by more than 10 cm of snow preventing light reaching the water. This

was followed by a rapid drop in oxygen levels from moderately high levels (around 12 milligrammes of oxygen in each litre of water) to quite low levels (around 4 milligrammes per litre).

After 4 days the snow was cleared from the pond and there was an immediate rise over the following day, back up to 8 milligrammes of oxygen in each litre of water. At this point the snow began to melt naturally as temperatures rose, and oxygen levels continued to rise.

What these results show is that in a shallow pond (30 cm deep) with lots of winter-green aquatic plants (mostly aquatic mosses):

- a) ice cover can lead to *higher* oxygen levels in the water
- b) snow cover can result in rapid drops in oxygen levels
- c) clearing snow can increase oxygen levels again

In the Big Pond Thaw survey a small number of people (17, about one in ten of the respondents) cleared the snow from their ponds. All of the ponds were

reported to have amphibians before the winter.

Ponds where snow was cleared experienced a similar level of mortalities to those where snow was not cleared.

So we know that clearing snow is not always effective as a pond management measure.

Almost certainly other factors also need to be favorable for snow clearance to work. For example, clearing snow from ponds is unlikely to be effective in ponds with few underwater plants, or ponds which already are very low in oxygen in their bottom waters because of accumulated sediment.

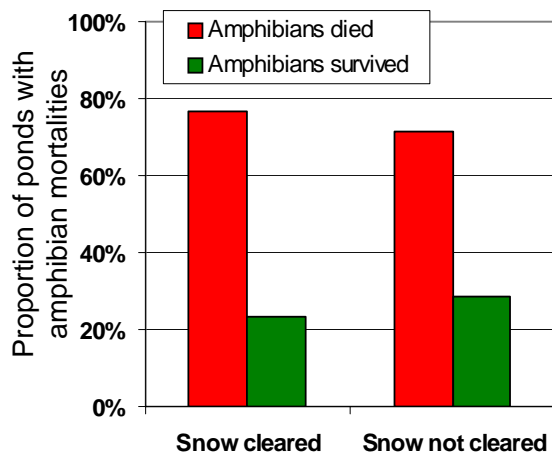


Figure 11. Snow cover and the proportion of ponds with amphibian mortalities.

### Can the survey tell us anything about what caused the mortalities?

To assess whether the survey could tell us anything about the *causes* of mortalities, we looked for correlations between amphibian deaths and the environmental factors: pond area and depth, the length of snow and ice cover, whether a hole was made in the ice or the ice was broken, whether snow cleared and whether a pump used. We compared the environmental variables with the simple occurrence of dead amphibians (yes or no), and the total number of dead animals found.

The results showed that more dead amphibians were found in deeper ponds and where snow lay for longer. There

was no correlations between amphibian deaths and making a hole in the ice.

In contrast, fewer amphibians were found dead in ponds where ice was frozen for longer, where a pump was run and where there was a greater variety of wetland plants.

The correlations seen between amphibian mortalities and environmental factors are consistent with the idea that lack of oxygen led to amphibian mortalities: deeper ponds are quite likely to have lower oxygen levels at the bottom of the pond, and snow cover clearly can reduce oxygen production in ponds. The presence of a pump is likely to increase oxygen levels.

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**Table 1. The relationship between amphibian mortality and environment factors**

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<b>Correlations assessed</b>	<b>n</b>	<b>Spearman rank correlation</b>	<b>p</b>
Number of dead amphibians seen & duration of ice cover	135	-0.189	0.028
Number of dead amphibians seen & pond depth	135	0.176	0.041
Number of dead amphibians seen & duration of snow cover	135	0.168	0.051
Occurrence of dead amphibians & duration of ice cover	135	-0.179	0.037
Occurrence of dead amphibians & use of pumps, fountains, filters	125	-0.183	0.041
Occurrence of dead amphibians & ice broken (Yes)	132	0.159	0.069
Occurrence of dead common frogs & plant diversity	136	-0.174	0.043
Occurrence of dead common frogs & duration of ice cover	135	-0.170	0.049

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## References

Phillips KA and Fawley MW (2002). Winter phytoplankton blooms under ice associated with elevated oxygen levels. *Journal of Phycology*, 38:1068–1073.

## ***Appendix 1. Pond Conservation's advice on how to manage your pond in winter issued in January 2010***

### ***PRESS RELEASE 8 January 2010: Should I break the ice on my pond to protect its wildlife?***

UPDATED: Keep up to date with the discussion about freezing ponds on [Jeremy Biggs' garden pond blog](#).

Many of Britain's 3 million garden pond owners will be wondering whether they should break the ice on their ponds to protect wildlife.

Standard advice has always been that, to safeguard garden pond wildlife during freezing weather, you need to make a hole in the ice to 'allow oxygen into the pond'.

But new research undertaken by Pond Conservation suggests that most garden ponds are unlikely to benefit from making an ice hole. And most surprising of all, if ponds have clear water and plenty of pond weeds, oxygen levels can actually go up during the freeze – the exact opposite of what is traditionally believed.

Why does this happen? Even under ice, plants continue to photosynthesis, producing oxygen. With a covering of ice the oxygen is trapped in the pond and, if the ice cover lasts for long enough, oxygen levels will rise.

So if garden ponds have lots of underwater plants or algae, oxygen levels can nearly double in the coldest weather.

So what should people do to look after their ponds?

- Don't worry too much. Your pond is unlikely to freeze solid, so most animals like dragonflies and caddis flies will survive
- Don't bother to make a hole in the ice: there's little evidence this makes any difference to the amount of oxygen in the pond. This is because oxygen diffuses so slowly into still water – about 2 millimetres a day! – so it takes over 6 months for oxygen to diffuse to the bottom of a 50 cm deep pond.
- If there is lots of sediment or leaves in the bottom of the pond - and you also have fish - you do need to get oxygen into the pond. To do this you need to stir the water in some way so that de-oxygenated water is constantly brought into contact with the air. Running a pump or fountain, if you have one, should do the trick.
- If the pond is covered with snow, brush as much snow off as possible. Snow blocks the light and will stop underwater plants from producing oxygen. In these conditions, oxygen levels can go down a lot. BUT SAFTY FIRST - TAKE GREAT CARE NOT TO STEP ONTO THE POND ICE IN CASE YOU BREAK THROUGH.

Dr Jeremy Biggs of Pond Conservation said: “In the longer term – if you want to make a pond that will naturally maintain high oxygen levels in winter, make sure that the pond has plenty of underwater plants (even algae will do), and is shallow (around 20-30 cm maximum depth is good). Shallow ponds are better lit than deep dark ponds so can produce more oxygen for their volume. Ideally, also keep the pond water as clean and unpolluted as you can to help the submerged plants flourish”.

**Notes to editors:**

1. [Pond Conservation](#) is the national charity dedicated to protecting the wildlife of ponds, lakes and rivers. We run a wide range of survey, research and practical projects, lobby policy makers to increase the protection for freshwaters and help the public and others to make and manage ponds.

2. Ponds are important freshwater habitats: there are roughly 500,000 ponds in Britain and they support more endangered freshwater plants and animals than either rivers or lakes.

3. There are at least 3 million garden ponds in Britain. Although putting in a pond is often said to be the best thing you can do for wildlife in the garden, so little is known about what actually lives in garden ponds that much of the advice given to people about their ponds is misleading or wrong. Pond Conservation is currently running a range of projects to help people improve the design of wildlife garden ponds.

4. Ponds are amongst our most threatened habitats: government data show that 80% of ponds in England and Wales are in poor or very poor condition. At present, ponds enjoy much less protection than other freshwaters, despite their importance.