

The Big Pond Thaw survey 2010

SUMMARY



Photo: Roger Naylor

Pond 
Conservation
For Life in Fresh Waters

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www.pondconservation.org.uk

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

Because of this, many ponds froze for much longer than we have been used to, with ice cover persisting for a month or more in many places. As the ice melted, Pond Conservation started to receive reports from distressed pond owners about dead amphibians, mainly frogs, that had been overwintering in their ponds.

We already had evidence that the usual advice given to protect wildlife in garden ponds in cold weather – ‘make a hole in the ice’ – was having little effect. So we asked Pond Conservation’s supporters, and other pond lovers, to tell us more about their ponds during the freezing weather. We wanted to find out if the things people did to protect their pond wildlife were having an effect - for example: Did they make holes in the ice? Did they clear the snow? Did they run a pump? and, of course, Had they suffered amphibian or fish deaths?

So a very big “thank-you” to all of you who contributed to the Big Pond Thaw Survey – it’s provided some unique information.

And here’s the results....

What did you find?

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

Holes in the ice?

The results showed that making a hole in the ice didn’t make any difference to the likelihood of mortalities. In ponds where holes were made amphibian deaths were as common as those where no hole was made (63% of ponds where a hole was made suffered deaths compared with 64% where no hole was made).

The picture 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.

Clearing snow?

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, across the survey as a whole, clearing snow did not appear to affect the likelihood of amphibian deaths. This may be because only a small number of people cleared snow – so there is little information to work with! But it’s perhaps more likely that snow clearance only works where ponds have lots of plants under the ice to produce oxygen when the snow is cleared back.

Running a pump?

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

Oxygen levels in the water – A Good Thing!

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

Overall these results suggest that many deaths in garden ponds are probably 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 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 can we do to reduce amphibian deaths during cold spells?

What are the practical implications of the survey for creating and managing garden ponds so their inhabitants can survive in the cold winter months?

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

1. Ponds shouldn't be too deep for their area. Shallow ponds – less than 30 cm (1 foot) are more likely to have higher oxygen levels in the water which helps amphibians, so a good pond shape is wide and shallow – a saucer rather than a tank.

This is the exact opposite of much of the standard advice, which says that ponds 'should be deep to protect them from freezing solid'. In fact, we know that most ponds didn't have more than a few centimeters of ice, even during the very coldest days of the 2009-10 winter – so 'freezing solid' isn't the problem.
2. A large build-up of leaves and sediment on the pond bottom is probably not good news – almost certainly because this de-oxygenates water. This is especially a problem in ponds which are small and deep.
3. Having plenty of plants in the pond throughout the winter is a good way of improving 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.
4. There isn't any evidence that making holes in the ice, or breaking the ice, can prevent amphibian deaths. This is not surprising, as most amphibians hibernate at the bottom of ponds. Oxygen diffuses very slowly into still water, at about 2 millimeters a day! So it takes over 6 months for surface oxygen to reach the bottom of a 50 cm deep pond.
5. BUT - If you have a pump, and you think the pond might have 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. A shallow pond with lots of underwater plants won't need a pump.
6. If the pond freezes and then snow falls on top of the ice, clearing some snow off the ice to make a 'sunlight-hole' can help. But this is only likely to work if your pond has lots of underwater plants (or algae) which can then oxygenate the water.

And finally....

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

- What sort of pond area:depth ratio do we need to make sure that the water stays well-oxygenated under ice?
- How can we help small deep ponds retain more oxygen – would adding plants like aquatic mosses work?
- Are toxic gases (ammonia, methane, carbon dioxide) involved in amphibian mortalities – or is oxygen the only thing that matters?
- Do other aquatic animals, like dragonflies and mayflies, suffer from winter ice and snow de-oxygenation?

Clearly, if we want to protect the very wide variety of plants and animals using our ponds we still have much to learn. This gives us some things to think about next winter.....

***If you'd like to know more: you can find a full report of the results from the Big Pond Thaw Survey on Pond Conservation's Website:
www.pondconservation.org.uk***

And again, many thanks to everybody who contributed to the survey!