

Swanland Pond - Opal Pond Survey Results 2010 – 2015

Survey Date	Weather	Water Colour (Visual)	Water Clarity No. Opal Logo's Seen ₁		pH ₂	Opal Health Score ₃	Pond Life Recorded
			East	West			
05/09/10	Sunny	Green	0	0	6.0	17	Caseless caddisfly larvae, Water bugs, Water slaters, Worm-like animals, Water flea.
24/10/11	Sunny	Brown	0	0	6.5	32	Caseless caddisfly larvae, Mayfly larvae, Water beetles, Water bugs, Water shrimps, Water slaters, Worm-like animals, Water flea.
12/09/12	Sunny	Brown	4	7	5.5	32	Alderfly larvae, Caseless caddisfly larvae, Water bugs, Water shrimps, Water snails, Worm like animals, Water flea, Water mite.
14/09/13	Cloudy	Brown/ Grey	3	3	5 - 5.5	38	Dragonfly larvae, Damselfly larvae, Water beetles, Water bugs, Water shrimps, Water snails, Water slaters, Worm-like animals, Water flea, Water mite, Common duckweed.
28/09/14	Sunny	Brown	2	2	6.5 – 7.0	18	Mayfly larvae, Water bugs (lesser water boatman & backswimmer), Water shrimps, Water snails, Water slaters, Worm-like animals, Water flea, Common duckweed.
04/10/15	Sunny	Brown/ Green	0	0	7.0	7	Water bug (lesser boatman), Water slaters, Worm-like animals, Water Flea.

Notes:

1. Opal Survey Scale from 0 - 12. 0 = Poor, 12 = Very Good.
2. Water Acidity/Alkalinity. Based on a Scale of 4 – 9; < 7 = Acidic; 7 = Neutral; > 7 = Alkali.
3. Opal Pond Health Score based on the pond life recorded on the survey date:
Score 0 – 5: Pond could be improved; 6 – 30: Pond is quite healthy; > 31: Pond is very healthy.

Opal Pond Survey

The Open Air Laboratories (OPAL) network is a UK-wide science initiative that allows people to get hands-on with nature, whatever their age, background or level of ability. It is a lottery funded project led by Imperial College London which provides information and support materials that allow members of the public to carry out mini pond surveys in their locality. The scientific methods adopted do not require prior scientific knowledge and give a good ‘snap shot’ of the health of the pond on the survey date. These glimpses into the health of the pond can be compared from one year to the next to show general trends in water quality and pond health. These results coupled with other observations throughout the year regarding wildlife, fish populations, water clarity etc. help to build a more complete picture on how the water quality may be improving or deteriorating and how this is influencing life in and around the pond.

Pond Health 2015

Aquatic Invertebrates

The pond health score is 7 this year which places the pond in the “quite healthy” range. This is the lowest score recorded over the last six years and reflects the absence of mayflies and water shrimps in the samples taken. The water bug, (lesser boatman), was found but in far fewer numbers compared to previous years. The water flea, Daphnia was found in abundance together with worm-like animals such as midge, fly larvae and leaches. These species are more tolerant of poor water quality but they are an important source of food for fish and other carnivorous larvae and it was encouraging to observe them in large numbers.

Whilst these results are disappointing they are not at all surprising considering the loss of water that occurred in the spring when the pond had to be partially drained for repairs to the pond wall. Apart from the physical loss of water which would have included many invertebrates, the reduction in available habitat would have had an impact by increasing the levels of predation on remaining organisms and also increasing competition for the remaining food and other resources. The shallower water would also be more susceptible to silt disturbance, toxin release, low oxygen levels, temperature fluctuations, and algal blooms.

There was a gradual, visible deterioration in water quality after the pond was drained which culminated in a significant and prolonged algal bloom from the mid-summer months until October. All of these factors would have a significant impact on the species that survived the draining process.

Water Quality

pH.

The pH value was 7 (neutral) and confirms a trend towards more alkaline conditions when compared to previous years. This reflects increases in the algal population as algal blooms produce more alkaline conditions. The water was brown/green at the time of sampling confirming large numbers of algae suspended in the water column. Although a pH rise of 1 -2 units does not sound like much it is a logarithmic scale and as a result, each whole pH value below 7 is ten times more acidic than the next higher value. For example, pH 4 is ten times more acidic than pH 5 and 100 times more acidic than pH 6. With regard to Swanland pond a more acidic pH, between 5 and 6, is desirable both in terms of water quality and species diversity.

It should be noted that the pH of the water is also influenced by many other factors so we should expect some variation between surveys. Whilst most aquatic organisms should be able to survive within a pH range of 5 – 9, they can become stressed or die when exposed to pH extremes or when pH changes rapidly, even if the change occurs within a pH range that is normally tolerated. Algae cause pH fluctuations in the water during the day and night. Large numbers of algae are likely to cause more frequent, wider fluctuations, which highlights the importance of controlling algal growth.

Water Clarity.

The water clarity score of “0” was lower than the past 3 years and supports general observations of poorer clarity throughout the year. Low water levels increase silt disturbance from the bottom of pond and there is less water to “dilute” pollutants from the road and other sources. This combined with the algal bloom observed during sampling will have contributed to the low score.

Water clarity will also vary from week to week in the pond and is influenced by many factors including weather conditions, pollution, algal growth and duck/fish activity.

Algae.

A number of algal blooms were observed during the year with an extended bloom from mid-summer to October.

Algae are an important part of a ponds ecosystem and food chain but they also have a major influence on the water quality, mainly by affecting the balance among dissolved oxygen, pH, carbon dioxide and nutrients. During photosynthesis, algae produce oxygen, remove nutrients and take up respired carbon dioxide from the aquatic invertebrates, fish and the algae itself. At night, all three of these populations consume oxygen from, and exhale carbon dioxide into the system which depletes oxygen reserves and causes pH fluctuations.

When the pond was partially drained the sonic device became grounded in the silt and its efficiency and range would have been reduced. As water levels recover the sonic device will be positioned higher in the water and will be able to operate at optimal levels, reaching the full width of the pond. This will help to control and stabilise the algal components in the silt and water column which should improve both water quality and oxygen levels.

Weather

We had another dry summer this year but with fewer heavy rain storms than in 2014. We also experienced more windy weather over the summer period. Dry and windy conditions provide the ideal conditions for algal blooms particularly in shallow water as the wind churns up silt, nutrients and algal spores from the bottom of the pond. However, whilst high winds can help trigger algal blooms they also have the beneficial effect of “topping up” oxygen levels through water disturbance. Although the increases may be small they are of benefit to all aquatic organisms when oxygen levels are low.

Ducks.

The duck population and there large numbers continues to have a negative impact on the water quality as their activities churn up the silt and their by-products create toxic sludge's and increased nutrient loadings which “feed” algal populations. We have not seen many ducklings born this year which may have been partly due to the disturbance caused by the repair work. The higher percentage of male to female ducks may also have had an impact. Whilst it’s always pleasant to see young ducklings on the pond, in terms of water quality, it’s good that duck numbers have not increased significantly this year.

Amphibians

Although no amphibians were found during the survey, frog spawn and tadpoles have been noted in both the marshy area and the main body of the pond. A toad and smooth newt were found within the collapsed east wall during repair work which suggests these species are present in the vicinity of the pond, taking advantage of the available habitat even if they don’t appear to breed successfully within it.

Fish

Observations of the fish population are not included in this survey and are the subject of a separate report by Graeme Simpkin (Fish Survey 2015). It's worth mentioning however, that fish deaths did occur after the pond was partially drained and water quality deteriorated. It's encouraging and perhaps surprising that we did not lose more of the large fish during the prolonged algal bloom. It's possible that the high winds during this period prevented oxygen levels dipping to critical levels and prevented mass mortalities.

Summary

The results show that the pond remains quite healthy, although there has been an observed decline in water quality and species diversity when compared to previous years. Whilst this could have been caused by a number of complex interacting factors, I believe this is largely due to the significant water loss when the pond was partially drained in the spring. Very low water levels coupled with a dry summer introduced additional problems which impacted water quality and the aquatic ecosystem within the pond.

The SPP are hopeful that the aquatic life and water quality will improve as the ponds water level, habitat and wildlife recover from the disruption caused by the wall repair. The ponds ecosystem needs time to settle and re-balance itself. The speed of recovery is difficult to predict however, as there are so many interacting factors which influence both water chemistry and wildlife.

The wall repair work was the first step in trying to reduce unnecessary water loss from the pond. If this project is a success, higher water levels should speed up the recovery process. The established planting is resilient and has largely survived the impact of mechanical damage and low water levels. We know that the reeds remove pollutants and large quantities of nutrients from the pond which has contributed to significant improvements in water quality over the years. The reeds also provide a valuable habitat for aquatic invertebrates and other wildlife in and around the pond and are key to improving species diversity in the future. The use of the sonic device is another positive factor which should reduce algal populations and hopefully prevent significant algal blooms.

All of these positive factors need to be combined with a management strategy that continues to address problems associated with pollution, nutrient enrichment and a large duck population. With the continued support of the village community the SPP remain optimistic that the water quality and species diversity of the pond will improve once again.

Alyson Ell (November 2015)