



How healthy is the creek?

Water quality testing – Sydney North Region Scouts

Answers

Please contact RC Environment: Kathy.jones@nsw.scouts.com.au if you have further questions

These answers are here as an example and guide only. Do not just copy these results onto your worksheets as your fieldwork data is unique and will have different meaning.

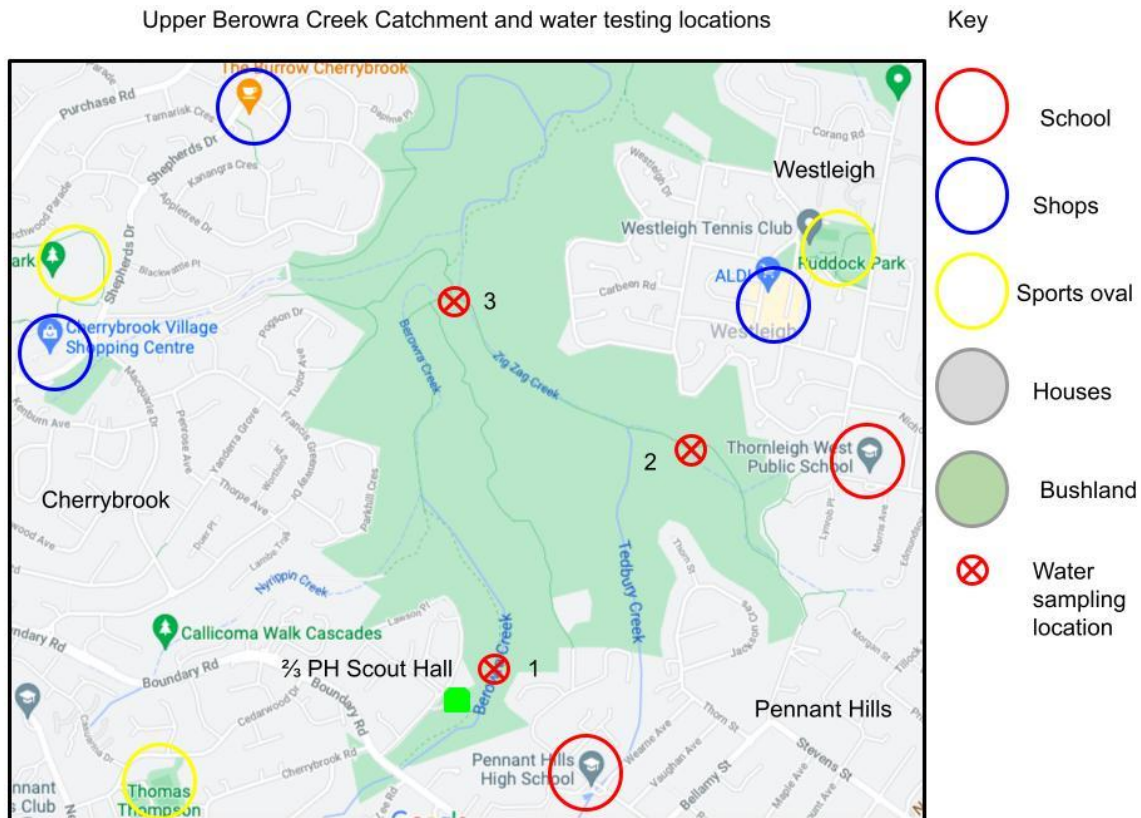
Describe your location: Two freshwater creeks that flow into one. Bushland area between Pennant Hills, Cherrybrook and Westleigh. Testing will be done at three locations as marked on map.

What is the name of the creek? Or the creek that it flows into?

Upper Berowra Creek (locations 1 & 3) and Zig Zag Creek (location 2).

Below, draw a sketch plan of your creek and some of the local features around it like houses, school, shops etc. or take a screen shot of a map and insert below.

Upper Berowra Creek Catchment and water testing locations



Human impacts on an urban catchment can result from the surrounding land use. The table below identifies examples of urban land uses in a catchment, their potential contamination to the creek and results of this contamination to creek health.

Urban land use	Potential contamination	Impact on creek health
Playing field/ parkland	Fertiliser/ excess water/ pesticides/ grass cuttings/ dog poo	Excess nutrients algal bloom Increased runoff and flow leads to creek erosion. Chemicals kill creek animals Grass seeds, weed infestation. Dog poo has bacteria and increases nutrients in creeks.
School	Litter/ fertiliser and pesticide on playing field/ excess runoff from hard surfaces	Excess nutrients algal bloom Increased runoff and flow leads to creek erosion. Chemicals kill creek animals. Litter can harm animals in creek if they get caught in it, also microplastics.
Houses/ residential	Detergents from car washing/ Fertiliser and pesticides/ grass cuttings/ exposed soil/ dog poo	Detergents harm aquatic animals. Excess nutrients algal bloom Increased runoff and flow leads to creek erosion. Chemicals kill creek animals. Dog poo has bacteria and increases nutrients in creeks.
Shops/ commercial	Litter/ excess runoff from hard surfaces/ oil from cars in carparks.	Litter can harm animals in creek if they get caught in it, also microplastics. Increased runoff and flow leads to creek erosion and concreted areas makes runoff more alkaline. Oil floats on surface.
Industrial	Chemicals/ excess runoff from hard surfaces/ oil from cars or machinery	Chemicals and oil kill creek animals. Increased runoff and flow leads to creek erosion. Concrete makes runoff more alkaline.
Roads	Rubber from tyres/ oil from cars/ excess runoff from hard surfaces	Rubber turns creek water black after rain. Oil floats on surface. Increased runoff and flow leads to creek erosion. Concrete gutters and drains makes runoff more alkaline.
Mountain bike track	Soil erosion/ litter	Water becomes murky from soil, plants in creek can't grow as well due to lack of sunlight. Fine particles in murky water can clog the gills of creek animals. Litter can harm animals in creek if they get caught in it, also microplastics.

Below is an example of testing results. Remember, there are no right and wrong answers when collecting your data, just make sure you are as accurate as possible when using the testing equipment and recording it on your data sheet.

First we will test the pH of the natural soil and also a sample of tap water

Date:	Soil	Tap Water
pH	5.5	7
Soil Observation such as colour and texture	White and yellow sand with some small brown bits (remember to test the light coloured sand/soil that has weathered from the sandstone bedrock)	

Also record any visual observations such as litter or smell that could indicate pollution

pH test results

Date: 14/10/21	Water – Location 1
pH	7.5
Observation	Any litter? Smell, murky, bubbles, oil? Creek was flowing and water was brown and murky. It had rained overnight. There was no bad smell or oil on water. There were some plastic drink bottles, chip packets and a tennis ball. I collected these to dispose of correctly.

Date: 21/10/21	Water – Location 1
pH	7
Observation	Creek was not flowing, there were some large pools of water and a frog calling. The water was clear with a slight smell of rotting plants. There was no more rubbish. It had not rained in a while.

Date: 28/10/21	Water – Location 1
pH	8.0
Observation	Creek was flowing fast and water was black and murky. It was raining. There was no bad smell or oil on water. There were some plastic drink bottles, a plastic bag and a school hat. I collected these to dispose of correctly.

These questions have been answered based on the above data set. Use them as a guide. Do not just copy them onto your worksheets as your data will be different and your results will have different meaning.

Questions:

1. How would you describe the pH of the soil and the water? (acid or base?)

The soil that came from the sandstone was light in colour and sandy. The pH was 5.5, this is acidic. The creek water was between pH 8 and 7. This is slightly alkaline and neutral (7).

2. Was there a difference in the pH of the soil and the creek water? Did it change over time?

There was a difference between the pH of the soil and creek water. The soil was more acidic than the water. Natural sandstone soils in the Sydney area are acidic. We would expect the creek water to be the same pH as the soil because pH is water soluble. This means the water takes on the pH of the soil as it flows through it, downhill to the creek. Our results show there is a change from the soil pH to the water pH.

3. What could be affecting the change?

Something is causing a change in the water pH from the soil pH of 5.5. The water entering the creek has come from an urban area. Excess nutrients in the creek from fertilisers or grass cuttings can make the water more neutral. Concrete, which is alkaline, can also make the creek water pH more alkaline. This was seen in the results after rain as the run off could have been flowing over concrete in the urban areas.

4. How could changing the pH of the creek impact the organisms living in the creek?

Animals living in the creek are adapted to living in the natural environment with water pH of 5.5. If the creek water pH changes they might not be able to survive in a more alkaline environment.

5. Did you see any other pollution that could be affecting the animals and the health of the creek?

Animals in the creek might die from pesticides, detergents, oils and other chemicals for various reasons. Added nutrients from fertilisers and dog poo can lead to algal blooms which take a lot of oxygen out of the water (eutrophication) and aquatic animals can't breathe. Excess runoff can increase creek flow and erode the banks of a creek, reducing habitat for animals to live. Grass cuttings with seeds introduce the spread of weeds, changing the creek habitat. Animals can get caught in litter and as it breaks down they can ingest microplastics. Dog poo can introduce harmful bacteria into the creek.

6. How could we and others look after this creek better?

We can pick up the litter, try and trace it back to its source such as a school and recommend an education program on cleaning up the playground better. Contact Local Council about environmental initiatives such as drain stencilling 'The drain is just for rain'. Educate your family about washing your car on the grass so detergents don't go down the drain to the creek and not blowing grass clippings down the drain. Always pick up your dog's poo and dispose of in a bin. Don't build illegal mountain bike tracks that erode the landscape and allow soil to enter creeks.