

Midge Monitoring

The Cities of Wanneroo and Joondalup, in conjunction with the Department of Biodiversity, Conservation and Attractions (DBCA) conduct monitoring of Lake Joondalup and Lake Goollelal to determine the level of nuisance midge at the lake. The monitoring season commences when the water level starts to rise around July/August and continues fortnightly until the lake has dried at the majority of monitoring sites.

Midge appear in dense swarms and are one of the more obvious environmental issues associated with urban wetlands in Perth. Midges, which belong to the insect family Chironomidae, are often a nuisance in residential areas near wetlands because they are strongly attracted to lights. Some species are so small that they can pass through flyscreens. Unlike mosquitoes, they do not bite, and so are not vectors of disease.



Midge Life Cycle

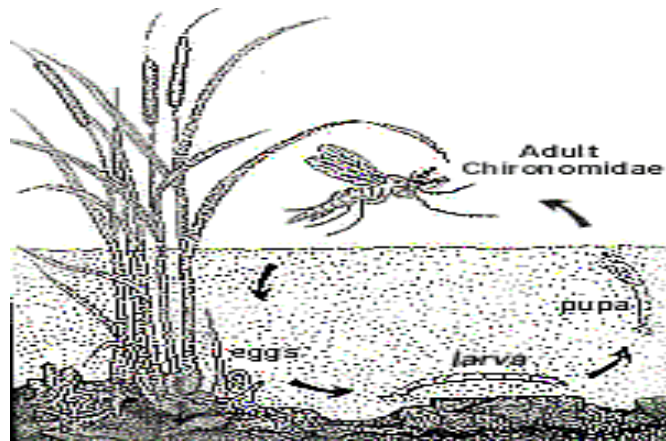
Midges have four main stages in their life cycle

1. Egg
2. Larva
3. Pupae
4. Adult, only this stage is terrestrial.

Female midge lay their eggs in a wide range of aquatic habitats including wetlands, lakes and streams. Each female lays only one egg capsule, which may contain thousands of eggs. The eggs hatch into aquatic larvae known as bloodworms, which live in the sediment and feed on organic debris. The larvae grow and develop into pupae, which then rise to the surface of the water and hatch into winged adult midges. Under optimum conditions (warm temperatures and abundance of food) the whole life cycle may be completed in as little as 3 weeks.

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Diagram
outlining the
midge lifecycle



Factors Promoting Nuisance Midges

Wetlands such as Lake Joondalup and Lake Goollelal usually have high nutrient levels. This is due in part to the removal of natural fringing vegetation, which acts as a filter and removes much of the nutrients in surface water runoff and groundwater before they reach the wetlands. Nutrients come from a number of sources including septic tank leachate, fertilisers and detergents. Nuisance midges are generally found in large numbers in wetlands with elevated nutrient levels. The high availability of nutrients fuels the growth of algae, which often form blooms in spring and summer. After a period of time these blooms will collapse and the algae will sink to the bed of the wetland where they provide a rich food source for the larval midges living in the sediments. As midges have a short life cycle they can take advantage of the algal blooms and quickly build up to very large numbers. During such blooms natural predation on midge larvae decreases as many predatory species rely on sight and dense algal blooms limit visibility. Other factors contributing to low predator density include the effects of pollutants, low oxygen levels and reduced habitat diversity associated with the loss of aquatic vegetation.

Recent studies have also shown that drying of the lakes resulted in warmer water the following season (due to the shallowness) also stimulating midge growth.

Midge Monitoring and Research at Lake Joondalup and Lake Goollelal

During the warmer months, adult midge numbers may be seen in high numbers, causing a nuisance problem to the local community. The Cities of Wanneroo and Joondalup, along with the DBCA, have been working with Edith Cowan University (ECU) to investigate midge at Lake Joondalup in an attempt to reduce the number of midge in an ecologically sustainable manner, without the use of chemicals. As the research being carried out by ECU investigates long term solutions, there are times when short term solutions, such as applying a chemical pesticide, may be utilised as a last resort to reduce the numbers of midge. The use of pesticide application as a nuisance reduction strategy although not ideal, is currently the only option available to reduce midge numbers within a short period of time. The decision to treat must be evidence based to verify the severity of the nuisance and eliminate any subjective influences. The Cities of Wanneroo and Joondalup are limited to no more than two treatments per season (one treatment contains two applications of chemical).

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The Cities of Wanneroo and Joondalup, along with the DBCA are trialling a more cost effective way to undertake hot spot treatments with S-Methoprene pellets. Officers can undertake treatments soon after monitoring, treating hot spots as they are detected.

S-methoprene behaves like an important hormone in insects and works as a growth regulator, interferes with an insect's life cycle and prevents it from reaching maturity or reproducing. It is safer to apply than other chemicals and there are no unreasonable adverse effects on the environment when applied at recommended rates. It shows little toxicity to birds does not persist in soil or contaminate ground water.

There are 22 monitoring sites at Lake Joondalup and 16 sites from Lake Goollelal, with access to the sites being obtained either by boat or hovercraft. Core samples are taken to determine the number and type of midge larvae present in the lake. Water temperature, pH, conductivity and water depth are also measured.

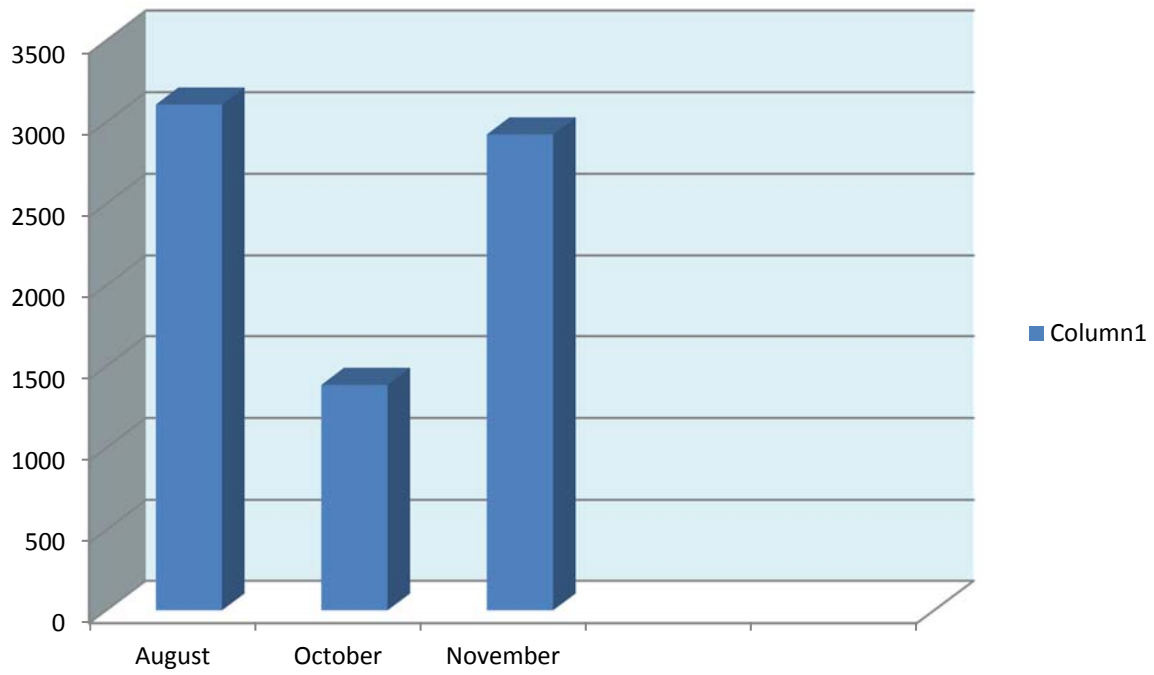
Previous research suggests that Beenyup Swamp (south of Lake Joondalup) is the major source of phosphorus entering Lake Joondalup. As phosphorus supports the growth of algae, it also indirectly supports nuisance midges. Ultimately, to reduce the levels of nuisance midge and to protect water quality in Lake Joondalup, it is necessary to reduce inputs of phosphorus. The Cities of Wanneroo and Joondalup, in conjunction with the Department of Biodiversity, Conservation and Attractions, have been working with Associate Professor Mark Lund and Dr Clint McCullough at Mine Water and Environment Research Group at the School of Natural Sciences at Edith Cowan University to investigate these issues.

In 2008, after a review of what was known about Lake Joondalup, they examined firstly the sediments of Beenyup Swamp to determine whether it was the source of nutrients. Results from this study clearly showed that the sediments of the Swamp to be high in phosphorus. The second study examined whether these nutrients were moving from the sediments into the water. Interestingly, the research found that although the sediments contained large quantities of nutrients, there was not a mechanism for them to be released into the water. Therefore, they were believed not to be the source.

The midge steering group is continuing to monitor the lake to measure the nutrients and water entering and leaving Beenyup Swamp. This will help researchers determine whether the nutrients entering Lake Joondalup are coming from Beenyup Swamp or Wallubuenup Swamp.

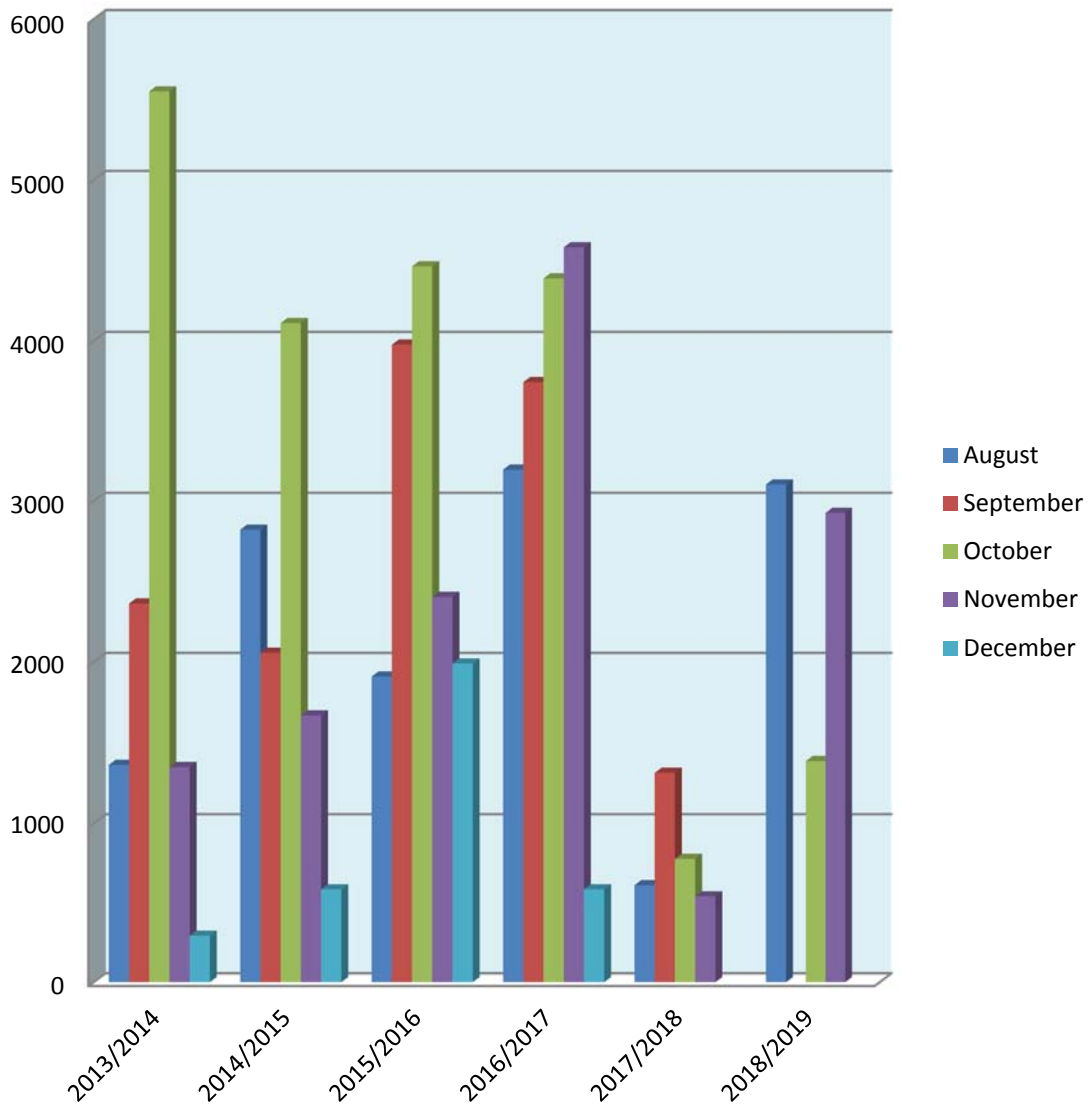
Current Midge Monitoring Data

Average Midge Larvae Number Per Square Metre 2018/2019 Season - Lake Joondalup



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AVERAGE MIDGE LARVAE NUMBERS M² OVER 6 YEARS - LAKE JOONDALUP



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Advice for residents

The City would like to remind residents that midge play an important part of the Yellagonga wetlands ecosystem and occasionally environmental conditions can result in midge numbers increasing rapidly in these wetlands.

Residents wishing to assist the City with the management of midge and reduce the effect of midge in and around their homes can do so by taking the following steps:

1. Reduce the amount of outside lighting around the house, particularly around doorways.
2. Washing cars on the front lawn rather than the driveway or street
3. Using slow-release fertilisers on lawns and gardens and prevent any fertiliser spilling onto the road.
4. Disposing of household waste appropriately, not down stormwater drains.
5. Connect domestic wastewater plumbing systems onto the main sewer.
6. Decommission unused septic tank and effluent disposal systems.
7. Please contact the City's Environmental Health Officers regarding any proposed septic tank and effluent disposal decommissioning.
8. Ensure matter likely to leach nutrients into the soil is removed such as picking up and disposing of animal faeces appropriately.
9. Place sticky midge traps around the outside of the home.
10. The use of an insect zapper may give some relief however care should be taken to clean and maintain the zapper in accordance with the manufacturer's instructions.

Should you require any further information regarding this matter, please contact the City of Wanneroo's Health Services on 9405 5000

Some of the methods that can be used to treat the lakes



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