

## The midges of Bolivar

Differences in food, water quality and temperature favour different species of midges. Here at Bolivar, the conditions suit three species in particular.

The larvae of *Polypedilum nubifer* and *Chironomus cloacalis* are the classic bright red 'bloodworms', and feed on algae and bacteria films in the silt. The third, *Procladius paludicola*, are a sandy brown colour and look and move just like tiny snakes. Unusually, *Procladius paludicola* is predatory, but sadly it prefers to eat tiny worms and only dines on other midges as a last resort!

## What you can do to manage midges

As we are continuing to work on long-term solutions to Bolivar's midge problem, there are a number of measures householders can take to reduce midge fly numbers on their properties:

- Reduce the number of outside lights and move them away from doorways
- Use sensor security lights instead of having outside lights on all the time
- Replace large (100watt) incandescent bulbs with smaller (25 or 40watt) bulbs, preferably yellow
- At night, keep curtains and blinds closed to screen indoor lights
- Use hedges, shrubs and light shades to screen outdoor lights
- Seal all gaps around doors, windows and skylights and install a fine fly-mesh (at least 16 mesh) on windows and screen doors
- Install light traps (or bug zappers) with high UV light which attracts insects to an electrified grid and kills them. Locate these away from the house
- Use citronella candles or flares when entertaining outdoors
- Pyrethroid insecticide has been found to be useful. It is purchased in sachets which are mixed with water and then sprayed on the walls and under the eaves. Test this product on a small area first as it leaves a white residue. Contact your local council or pesticide supplier for information about other insecticides

## Community action

We would like to thank those of you who took part in our recent market research to find out more about how midges are affecting the local community.

Almost half of the 400 people and businesses interviewed said they would like to receive more information about our midge control program and help us out with our midge watch program.

The names of people surveyed were chosen by random to take part in the research. We appreciate feedback from the local community and look forward to working with you during the coming months as we continue to explore long term ways of battling Bolivar's midges.

If you wish to register a midge fly problem in your area, please call  
**(08) 8381 0300**

### Contacts

For more information about SA Water or United Water, visit the websites below

[www.uwi.com.au](http://www.uwi.com.au)  
[www.sawater.com.au](http://www.sawater.com.au)

# Bolivar Bulletin

November 2005 Issue

## A newsletter for neighbours of the Bolivar wastewater treatment plant



## Health, environment key focus for plant

Collecting and treating wastewater from homes and businesses is vital for protecting public health and reducing pollution on the land and in our waterways and seas.

The solids produced from the treatment process are known as biosolids and these are reused as soil conditioner and fertiliser in agriculture, bringing economic benefits to broadacre farmers.

Thanks to the Bolivar wastewater treatment plant, about 155 million litres per day of wastewater from about 700,000 people - from Gawler to Mitcham - is treated and, where possible, beneficially reused.

The Bolivar wastewater treatment plant is owned by the State Government, through SA Water, and is managed, maintained and operated by United Water in accordance with international environmental standards.

So, where does the wastewater go once it gets to Bolivar? Wastewater arriving at Bolivar is about 99.8 per cent water, with the remainder made up of dissolved material or suspended solids. It makes sense to reuse as much of this as possible.

Each year, about 28% of the treated wastewater becomes high quality recycled water used for growing crops in the Virginia region. The new Mawson Lakes recycled water system is also using highly treated 'Class A' wastewater for irrigation and toilet flushing.

But that's not all. The methane gas produced during the treatment process is used to drive a gas turbine that can produce about 8000 Megawatt hours per year of energy - which is about 25% of the plant's energy requirements.



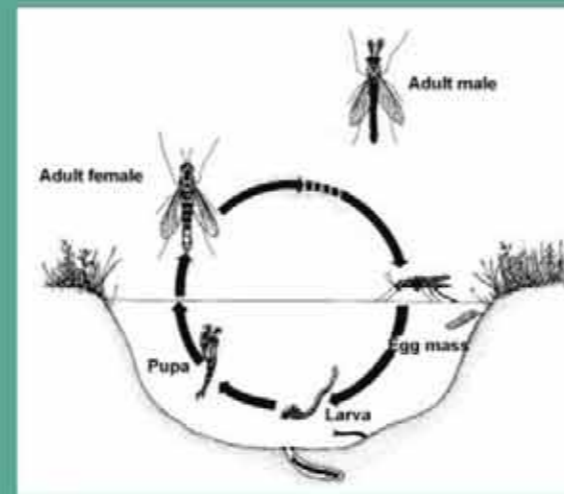
Some of the wildlife seen at Bolivar

## Midge fact file

While midges have a nuisance factor, they're also an important part of the ecosystem. That's why we work to control the midge numbers and not totally eradicate them.

There are four stages in the aquatic midge life cycle:

- **The eggs** are laid on water in clutches of over 500
- **The larvae** typically live in small tubes in the mud. The most common are the 'bloodworms'; their blood contains the red pigment haemoglobin which allows them to live in very low oxygen conditions
- **The pupae** stay in their tubes until the transformation to the adult form is almost complete. Then they swim to the surface and the adults emerge a few hours later
- **The adults** can drink nectar but usually don't, as they only live long enough to swarm, mate and lay their eggs



Life cycle graphic supplied courtesy of Dr. Phil Koehler at the University of Florida

## Environmental improvements

The recently completed \$100 million Bolivar Environment Improvement Program (EIP) is one of the largest capital works projects undertaken in the State and is a significant investment in the environment for the future benefit of all South Australians.

The first stage of the program involved the construction of a \$30 million Dissolved Air Flotation Filtration plant to provide high quality 'Class A' recycled water for use in irrigation.

The second stage included replacing biological filters with a new treatment process to significantly reduce nitrogen and - much to the delight of nearby residents - odour levels from the plant.

A \$97.5 million EIP has also been undertaken for the Port Adelaide wastewater treatment plant, which has been replaced with a new high salinity wastewater treatment plant at Bolivar.

Below: covers used at Bolivar as part of the plant's odour management



Crops at Virginia

## Recycled water systems lead the way

Our Bolivar wastewater treatment plant plays a crucial role in supporting the State's horticultural industry and easing the pressures on our precious water and groundwater supplies.

Bolivar's high quality recycled water is used for irrigation of Virginia's crops and to supply the Mawson Lakes community. In 2004-05, almost 28% of the plant outflow was reused.

The Virginia Pipeline Scheme - the first and largest recycled water scheme of its type in Australia - now has more than 240 contracts using more than 15,000 megalitres (that's 15,000,000,000 litres!) of recycled water for irrigation each year.

The \$16 million Mawson Lakes recycled water system delivers a mixture of highly treated wastewater from Bolivar and stormwater harvested from Salisbury wetlands to the Mawson Lakes community for all outdoor purposes and toilet flushing.

The use of recycled water helps the environment by reducing the draw on the River Murray and groundwater supplies and reducing the discharge of treated wastewater to Gulf St Vincent.

Thanks to Bolivar and other SA treatment plants, our State leads the nation in the use of recycled water.

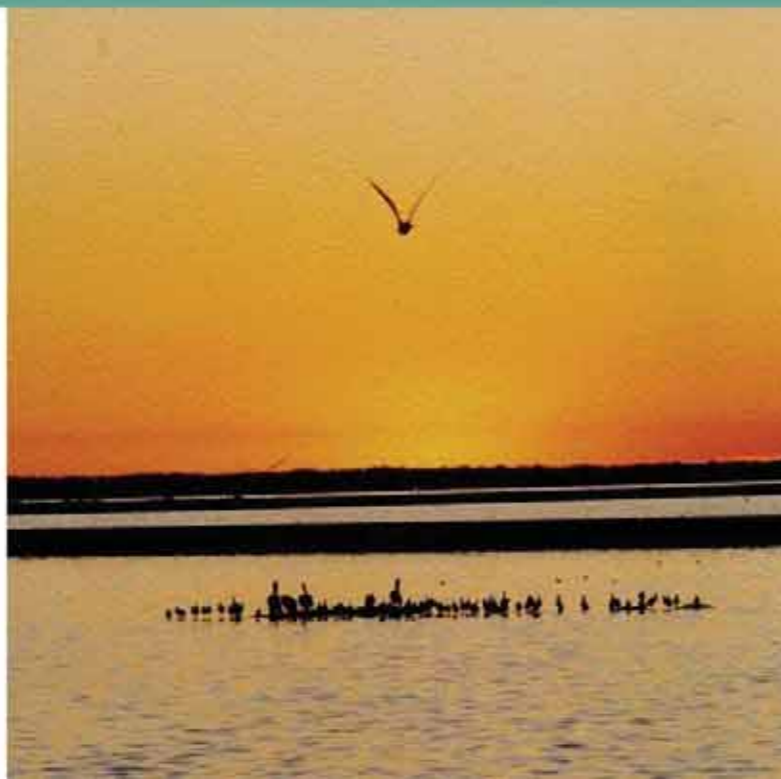
## Plant attracts creatures large and small

Midges aren't the only species to populate the Bolivar environment. More than 100 species of birds have been recorded around the site, including ducks, grebes, swans, gulls and waders. Long-neck tortoises are seen occasionally in the lagoons.

Lagoon sediments support a diversity of macroinvertebrates - these are visible to the human eye without the aid of magnification.

As well as the midge flies, there are the larvae of moth flies, hover flies and crane flies, there are segmented worms, roundworms and flatworms, water boatmen and backswimmers, various aquatic beetles, the larvae of moth-like caddisflies, and aquatic snails. Branching colonies of pipemoss are attached to the lagoon walls.

And a closer look will reveal microscopic animals such as water fleas, copepods, seed shrimps and rotifers.



## Midge control project - 2005 update

Midges have been present at Bolivar ever since the plant was commissioned in 1966, causing a nuisance from time to time.

Numbers remained relatively low through the 1990s but, following upgrades in the operation of the plant, midge numbers started to rise again in early 2001.

A larval monitoring program began in July 2001 and this showed the increase was not a one-off event but was going to continue. In an effort to minimise the nuisance to residents, every summer since then SA Water and United Water have implemented a control program.

Midges are a problem all over the world and overseas experiences have shown the most effective control programs vary from location to location.

Each summer for the past four years we have used different chemical control agents, learning more about our particular system and improving the way we do things. The chemicals, Temephos, *Bti* and Methoprene, were chosen because they could be used with minimal impact to the wider environment.

As an added precaution, we sought the advice of the Environment Protection Authority and the Department of Health before implementing any control measures.

### A multi-pronged attack

Our action plan for the coming summer is designed to not only reduce the midge nuisance now, but also to lay the groundwork for future control programs to be both more effective and more environmentally friendly.

In phase one, we will implement a number of ongoing control measures. These include reducing the area available for midge larvae to grow by 140 hectares, dosing the remaining midge habitat with chemical control agents and manipulating the water level in the outfall channel to kill the eggs laid there by midges.

In phase two, we will trial a range of alternative control measures for use in future seasons. These include constructing illuminated physical barriers treated with insecticide, and using water sprays and temporary ponds to encourage egg laying to take place away from the lagoons.

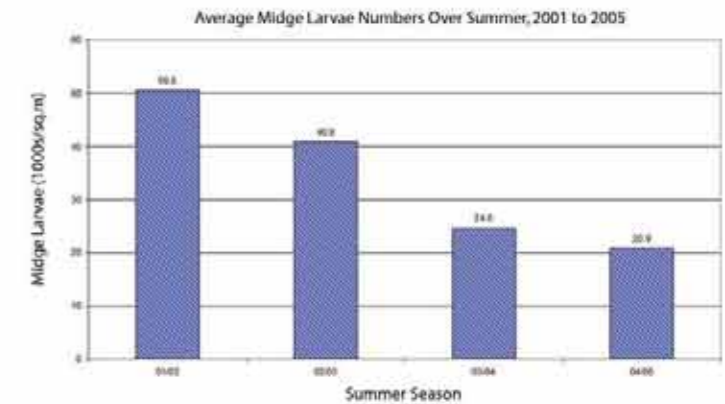
## Midge trivia

Did you know ...

- The largest native land animal in Antarctica is the wingless midge *Belgica antarctica*, with a body around 13mm long
- Midges have been found trapped in amber dating back 125 million years
- In some countries swarms of adult midges are caught, compressed into oily cakes and then roasted for food
- A recently discovered species of midge was named *Dicortendipes thanatogratus* after the rock group The Grateful Dead!

In phase three, to help us fine-tune our control measures, we are supporting research by the University of Adelaide and the University of South Australia into a range of issues relating to the biology of midges.

As can be seen from the chart below, some progress has been made. Each year, average midge numbers have dropped, with numbers in the summer of 2004-05 down to 40% of what they were in 2001-02.



We recognise the numbers are still too high and we are now looking at a broad range of measures targeting all the different stages of the midge life cycle. SA Water and United Water staff from technical, operational and community relations areas are working on the midge control project and a dedicated biologist, Dr Harry Roberts, is leading the scientific charge against the midges.



Above: SA Water's midge biologist Dr Harry Roberts: "Through our monitoring program we are improving our ability to predict outbreaks. This means we can increase the effectiveness of our control program while also reducing its impact on the environment."