City of Salisbury

Mosquito Management Plan

The health and wellbeing of our community is a priority

CITY OF Salisbury

PREPARATION DETAILS

Division	Environmental Health
Responsible Officer	John Darzanos Manager Environmental Health and Community Compliance
Responsible General Manager	Michelle English General Manager City Development
Review Date	July 2022

CORPORATE ALIGNMENT

The City of Salisbury has endorsed the following vision and organisational values:

VISION:

Council's vision is for Salisbury to be a progressive, sustainable and connected community.

Corporate and Legislative Alignment

The following are the Corporate Directions and Objectives associated with the Mosquito Management Plan

KEY DIRECTIONS	OBJECTIVES
Key Direction : A Sustainable City Includes protecting and conserving our diverse natural environment to support biodiversity, reducing Council's environmental footprint, ensuring we make the most of our resources and enabling our community, environment and infrastructure to be resilient to a changing climate.	Salisbury has a balance of green spaces and natural environments that support Biodiversity Our community, environment and infrastructure are adaptive to a changing climate
Key Direction: A welcoming and liveable City Encompasses issues that affect the liveability of the City and the health and wellbeing of its people, including safety, social connections, the look and feel of our neighbourhoods, and the facilities and programs available to support our community's aspirations.	The health and wellbeing of our community is a priority Our community is resilient and adaptive to change
Key Direction: Innovation and Business Development Outlines how Council will work to provide exceptional experiences, deliver quality outcomes and be recognised as a great place to work	We deliver quality outcomes that meet the needs of our community We plan effectively to address community needs and identify new opportunities We engage meaningfully and our community is aware of Council initiatives

The following is the legislative alignment with the SA Public Health Act 2011

Legislative Alignment	
Council's legislative responsibilities under the Public Health Act 2011 are specified in Section 37 which states the following:	**37—Functions of councils** (1) A council is the local public health authority for its area. (2) In connection with subsection (1), the following functions are conferred on a council by this Act: (a) to take action to preserve, protect and promote public health within its area; (b) to cooperate with other authorities involved in the administration of this Act; (c) to ensure that adequate sanitation measures are in place in its area; (d) insofar as is reasonably practicable, to have adequate measures in place within its area to ensure that activities do not adversely affect public health; (e) to identify risks to public health within its area; (f) as necessary, to ensure that remedial action is taken to reduce or eliminate adverse impacts or risks to public health; (g) to assess activities and development, or proposed activities or development, within its area in order to determine and respond to public health impacts (or potential public health impacts); (h) to provide, or support the provision of, educational information about public health and to provide or support activities within its area to preserve, protect or promote public health; (i) such other functions assigned to the council by this Act.

Mosquito Management Plan

The City of Salisbury recognises that undertaking a mosquito control program including the surveillance and control of mosquitoes, is a key strategy to manage and minimise the public health effects and nuisance issues associated with mosquitoes.

Mosquito Control was traditionally focussed on the coastal environments of St Kilda and Globe Derby Park. These environments are adjacent to an extensive region of both mangrove and samphire swamps. This area provides an important environmental habitat, however also provides for significant mosquito breeding activity. The habitats for mosquitoes include samphire swamp and intertidal zones which provide pools of water suited to mosquito breeding. In addition Globe Derby Park is a low lying area and environmental factors provide ideal breeding grounds mosquitoes

The Globe Derby suburb has a community of approximately 140 households and a significant horse racing and training industry that is in close proximity to the coastal mosquito breeding habitats. Mosquito breeding within the residential area can contribute to the total number of mosquitoes in the area, providing breeding habitats for numerous nuisance species in locations such as water tanks, containers, tyres, septic tank and effluent disposal systems.

St Kilda has a small population however boasts a large influx of visitors for activities such as fishing, use of the boat ramp, RV friendly zone, bird watchers and the St Kilda Adventure Play-space. The large population increase over the warmer months during peak mosquito activity is why mosquito control is important to this region.

Aedes camptorhynchus and Aedes vigilax are the predominate species affecting the area. Both species are known for their biting activity and are most likely responsible for the majority of nuisance biting in the area.

The Aedes camptorhynchus species are abundant throughout spring and early summer with a peak in November to December. The high peak numbers are associated with lower temperatures, higher rainfall and increasing day length. These salt march mosquitoes breed in both freshwater and brackish habitats.

The Aedes vigilax species are abundant in summer and autumn between January and April, with the peak abundance in February and March. These peak numbers are associated with higher temperatures and decreasing day length. The effect of the king tidal water pools provides the majority of breading habitat that allows the adult mosquitoes to quickly emerge before the next tidal inundation.

The mangrove and samphire swamp areas to the west of Globe Derby is Crown Land and this area provides for a significant mosquito breeding habitat. SA Health manages the mosquito monitoring and treatment in this large area with a dedicated annual program.

The City of Salisbury provides an annual mosquito control program on land under its care and control in high risk areas of Globe Derby Park and St Kilda and this has expanded to other adjoining suburbs in recent years based on identified activity and breeding. The other localities include water catchments and storm water drains in Mawson Lakes, Cavan, Dry Creek, Greenfields, Parafield Gardens and Pooraka.

Additional species have been identified as part of monitoring programs and it can be concluded that the other species are contributing to the nuisance impacts on the local community and also provide for the potential for disease risk within the City of Salisbury. The additional species idneitfied and of interest include:

- Aedes notoscriptus
- Annopheles annulipes
- Culex annulirostris
- Culex globocoxitus
- Culex quinquefasciatus

The additional areas along with the traditional high risk areas are monitored and treated for mosquito breeding activity with an ongoing control program undertaken by a contractor as per the Councils tender for Mosquito Control Services.

The City of Salisbury is committed to undertaking mosquito surveillance and control in the area in partnership with the SA Health and local residents.

The Environmental Health Services Mosquito Management Plan has been developed to provide a strategic approach to mosquito management that provides a responsible balance between community concerns and the environment and aims to improve Public Health and sustain quality of life.

The City of Salisbury's Mosquito Control Program will have the following objectives:

1. To identify and monitor mosquito breeding habitats within the City of Salisbury's high mosquito risk areas**.**

2. To treat and or eliminate mosquito breeding habitats to minimise and control the impact on public health from mosquitoes, whilst minimising the impact on the environment.

3. To monitor mosquito numbers and identify species of mosquitoes within the area, so as to enable effective control measures to be implemented and evaluated

4. To monitor and evaluate environmental conditions affecting mosquito breeding and adult mosquito numbers

5. To educate and inform the community on effective mosquito control and protection practices.

6. To regularly liaise with other agencies so as to provide an effective regional approach to mosquito control within the adjoining areas.

7. To review and evaluate current and alternative mosquito control measures

8. To investigate and respond to community concerns relating to mosquitoes

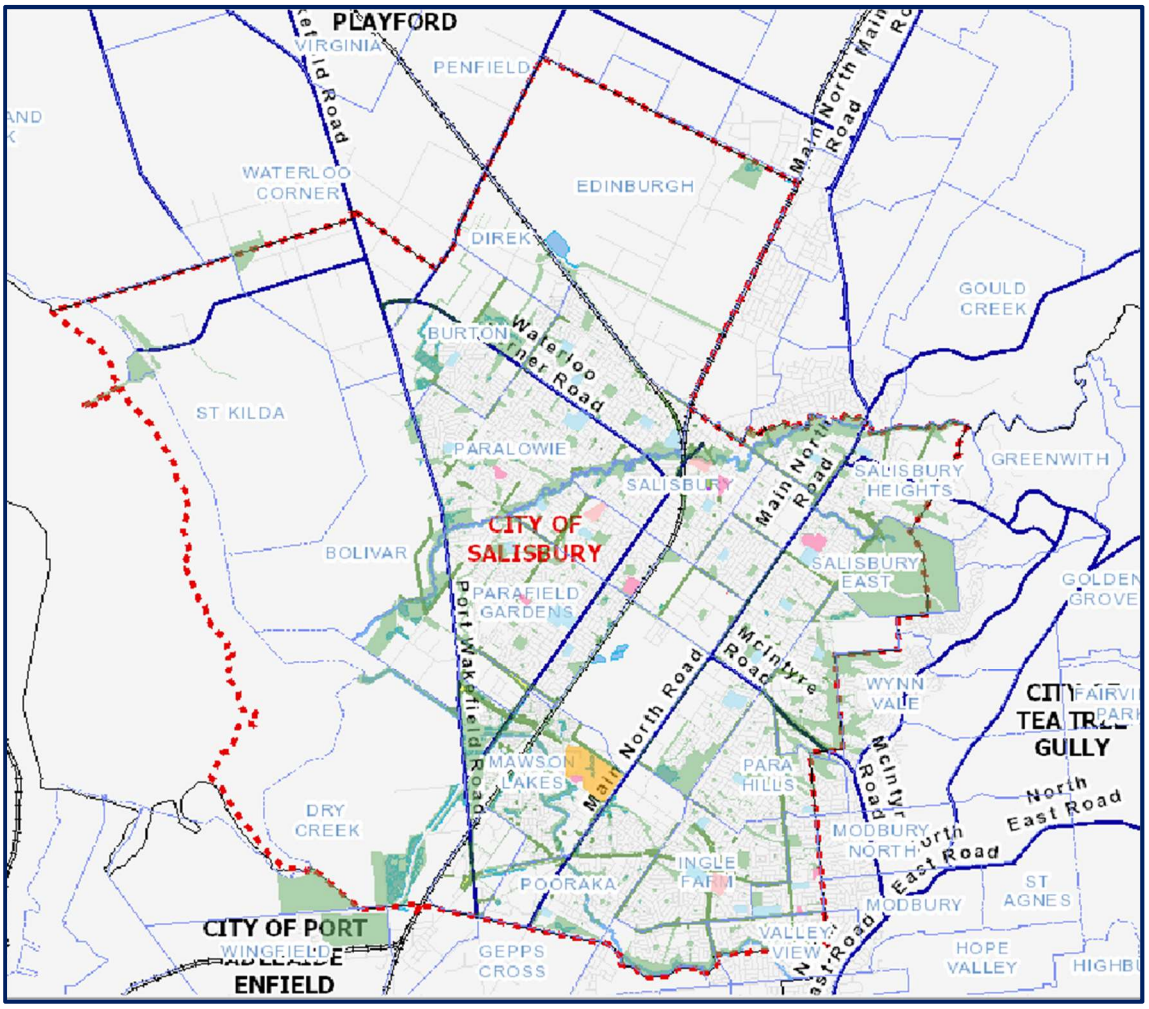
WORK PLAN

CITY PLAN ALLIGNMENT	OBJECTIVES	ACTIONS	WHEN	WHO
Deliver and support programs that promote active living, health and wellbeing throughout the community Design services, places and programs that are safe and welcoming for all Inform, connect and empower people and neighbourhoods to increase self-reliance Use data to inform decision-making and understand community needs and expectations	**1. Identify and Monitor Mosquito Breeding Habitats** To identify and monitor mosquito breeding habitats within the City of Salisbury's high mosquito risk areas.	1.1 Undertake fortnightly surveillance of high risk areas 1.2 Document identified breeding sites and record electronically with GPS coordinates. 1.3 Record mosquito activity and larval density.	Annually Sept to April	Mosquito Control Contractor as per Tender Documentation
As above	**2. Treat and or Eliminate Mosquito Breeding Habitats** To treat and or eliminate mosquito breeding habitats so as to minimise and control the impact on public health from mosquitoes, whilst minimising the impact on the environment..	2.1 Treat breeding sites with approved larvicides 2.2 Establish permanent larvicide stations and document and record electronically with GPS coordinates. 2.3 Review breeding site and cause of water pooling with a view of eliminating breeding site, or reducing breeding by site modification.	Annually Sept to April	Mosquito Control Contractor as per Tender Documentation Environmental Health Services
As above	**3. Monitor Mosquito Numbers and Identify Species** To monitor mosquito numbers and identify species of mosquitoes within the area, so as to enable effective control measures to be implemented and evaluated	3.1 Undertake adult trapping in high risk areas. 3.2 Document and record trapping locations 3.3 Document and record adult mosquito numbers and species as required.	Annually Sept to April	Mosquito Control Contractor as per Tender Documentation Environmental Health Services SA Health
Manage the impacts of increased heat, flooding, intense storms and bushfires Work with our community so they are better prepared for extreme weather events Encourage our	**4. Monitor and evaluate environmental conditions** To monitor and evaluate environmental conditions affecting mosquito breeding and adult mosquito numbers.	4.1 Monitor, record and evaluate environmental conditions, and their impact on mosquito breeding and nuisance	Annually Sept to April	Mosquito Control Contractor as per Tender Documentation Environmental Health Services SA Health

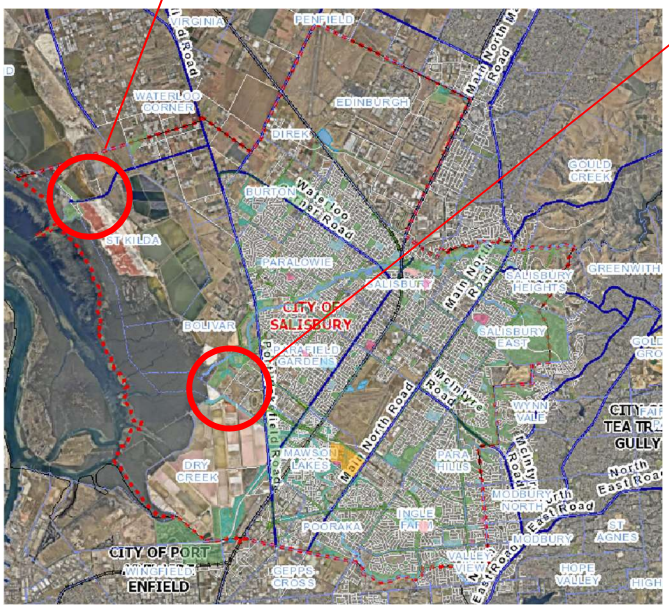
CITY PLAN ALLIGNMENT	OBJECTIVES	ACTIONS	WHEN	WHO
community to be actively involved in caring for our environment				
Manage the impacts of increased heat, flooding, intense storms and bushfires Work with our community so they are better prepared for extreme weather events Encourage our community to be actively involved in caring for our environment Place the needs of our community first Meaningfully engage with our community and stakeholders as we plan and make decisions Consider the long term when we plan and innovate	**5. Educate and Inform the Community** To educate and inform the community on effective mosquito control and protection practices.	5.1 Develop and promote local targeted education campaigns for high risk areas 5.2 Promote the SA Health Mosquito Control campaigns, e.g. Fight the Bite campaign *Campaigns can be a combination of direct mailouts, online information and social media campaigns.	September / October and January / February for high risk areas Annually	Environmental Health Services SA Health
Place the needs of our community first Meaningfully engage with our community and stakeholders as we plan and make decisions Consider the long term when we plan and innovate Use data to inform decision-making and understand community needs and expectations Seek partnerships to deliver facilities, services, programs and infrastructure to address community needs	**6. Liaise with Other Agencies** To regularly liaise with other agencies so as to provide an effective regional approach to mosquito control within the adjoining areas.	6.1 Provide relevant mosquito trapping and surveillance data to SA Health 6.2 Participate in mosquito control meeting involving SA Health and adjoining Councils as required 6.3 Liaise with adjoining Councils to share information and encourage a regional approach to mosquito control 6.4 Advocate mosquito control concerns and options to State Government and relevant agencies.	Ongoing Annually	Environmental Health Services SA Health Mosquito Control Contractor as per Tender Documentation

CITY PLAN ALLIGNMENT	OBJECTIVES	ACTIONS	WHEN	WHO
4.3 To deliver sustainable, creative and innovative solutions that enables the organization to achieve excellence.	**7. Evaluate Mosquito Control Measures** To review and evaluate current and alternative mosquito control measures	7.1 Review and evaluate effectiveness of current control measures by monitoring treated areas and breeding site modifications	September and January for high risk areas As identified	Mosquito Control Contractor as per Tender Documentation Environmental Health Services SA Health
4.4 To ensure informed and transparent decision making that is accountable and legally compliant 4.6 To provide our customers with excellent customer service that meets their needs.	**8. Investigate Concerns Relating To Mosquitoes** To investigate and respond to community concerns relating to mosquitoes	8.1 Investigate and respond to community concerns relating to mosquitoes, through either: • Trapping and identifying adult mosquitoes • Investigating potential breeding sites • Undertake relevant treatment of site if required • Eliminating breeding sites • Educating and informing community on mosquito control and bite prevention	As required	Environmental Health Services Mosquito Control Contractor as per Tender Documentation

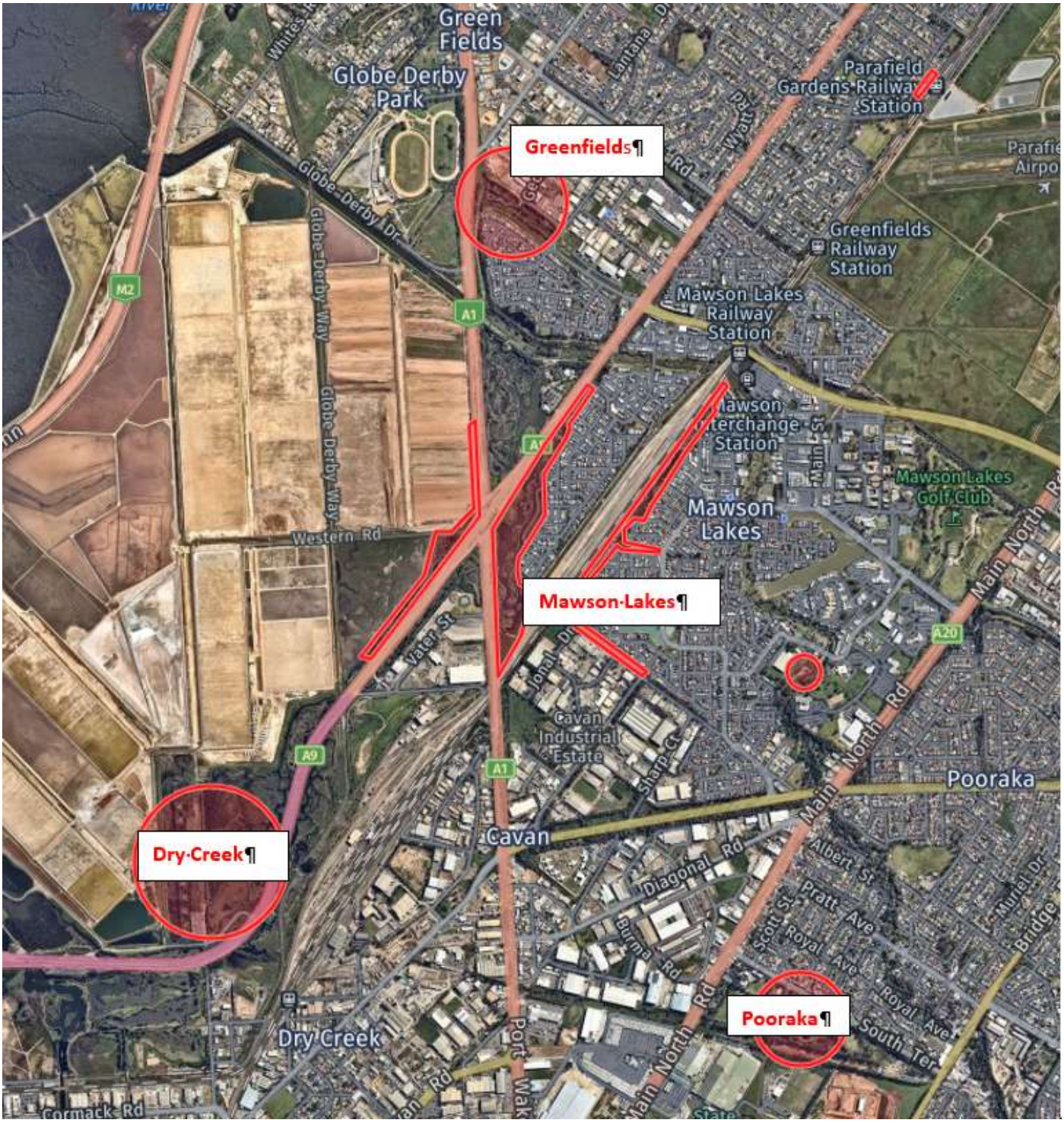
City of Salisbury Overview



High Risk Mosquito Areas - St Kilda and Globe Derby Park



Other localities subject to routine surveillance and treatment



The City of Salisbury is affected by 3 common genus of mosquitoes and each of which contains 100's of different species. These are the Aedes, the Culex and the Annopheles genus. Some of the common mosquitoes creating the most concern for our residents include the following.

Genus - Aedes

Species - Aedes Vigilax

Adult – rests parallel to surface 	Adult – distinct light and straight bands 
Larvae – short siphon, rests at a 45-60 degree angle 	Eggs – laid singularly in water or mud flats 

A mid-sized mosquito of dark appearance with banded legs; proboscis with pale scaling on the abdomen.

Commonly found along the coastal areas and breed in saline habitats on mudflats usually behind mangroves.

Active between January to April and a very aggressive biter of humans and animals.
Often described as a small dark mosquito

Common Mosquitoes in Salisbury

Species - Aedes Camptorhynchus

Adult – rests parallel to surface 	Adult – distinct light V shaped bands 
Larvae – short siphon, rests at a 45-60 degree angle 	Eggs – laid singularly in water or mud flats 

A medium sized mosquito of darkish appearance but with banded legs; proboscis extensively mottled, particularly on underside The adults have distinctive pale bands on the legs and triangular patterns on the dorsal surface of the abdomen.

Commonly found along the coastal areas and breed in coastal environments and brackish water and occurs in inland riverine areas with brackish influence.

Active between September to December and a very aggressive biter of humans and animals.

Often described as a large mosquito

Common Mosquitoes in Salisbury

Species Aedes Notoscriptus

Adult – rests parallel to surface 	Adult – distinct lyre pattern and fluorescent markings and bands 
Larvae – short siphon, rests at a 45-60 degree angle 	Eggs – laid singularly in water or mud flats 

A smallish to mid-sized dark species with conspicuous pale markings and banded legs; proboscis with median white band; and a conspicuous 'lyre' shaped pattern on the thorax.

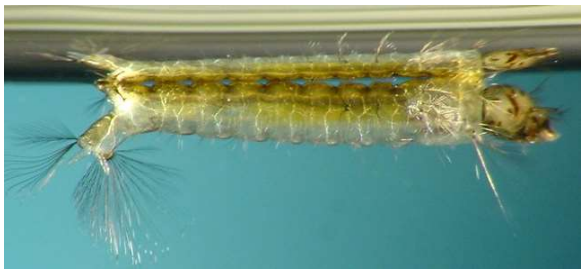
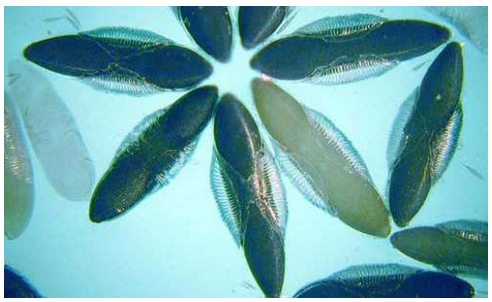
Adults readily attack humans by day in shaded areas but also feed during evening, night and early morning.

Common throughout spring and summer and a major domestic pest found in most gardens and breeds in fresh water and most likely the mosquito that most likely to get you during your evening BBQ.

Common Mosquitoes in Salisbury

Genus - Anopheles

Species Anopheles annulipes

Adult – distinct mottled and speckly appearance  	Adult – rests at a 45 degree angle with head down 
Larvae – short siphon, rests parallel to water surface 	Eggs – laid singularly in water and have floats on sides 

A medium sized mosquito of dark and speckly grey appearance; proboscis and mottled wing appearance.

Feed from humans and other animals , and bite predominantly at night.

The species is only rarely a pest even when relatively abundant as it does not preferentially attack humans.

Breeds in freshwater and commonly found in freshwater catchments with grassy environments.

Common Mosquitoes in Salisbury

Genus Culex

Adults of the Culex species are hard to differentiate and have lighter appearance and colour being described and brownish appearance. They are nuisance biters of animals, birds and humans.

Species Culex australicus

Adult – light brown in colour  	Adult – rests parallel to surface 
Larvae – long siphon, rests at a 45-60 degree angle 	Eggs – laid together as a raft and 

A medium sized mosquito of brownish appearance; proboscis dark scaled above with pale scaling underneath.

Adults are active from spring through autumn in many areas and throughout the year in some warmer zones; the species normally does not attack humans and appears to feed predominantly on rabbits and birds.

Breed in fresh and nutrient rich water including septic tanks, rain water tanks, pot plant dishes, drains and anything that can hold water.

Common Mosquitoes in Salisbury

Species Culex quinquefasciatus

Adult - light brown in colour,  	Adult - rests parallel to surface, distinct light bands 
Larvae – long siphon, rests on 45-60 degree angle 	Eggs – laid together as a raft and 

Medium-sized mosquito of brownish appearance; proboscis dark but often with some pale scaling midway on the underside; wings all dark scaled; hind legs with femur pale almost to the tip

Adults are generally active only during the warmer months; they usually attack humans towards the middle of the night indoors and outdoors, but are often more attracted to birds (e.g. poultry).

Commonly the mossie that you hear in the middle of the night while you're trying to sleep.

Breed in fresh and nutrient rich water including septic tanks, rain water tanks, pot plant dishes, drains and anything that can hold water.

Common Mosquitoes in Salisbury

Species Culex annulirostris

Adult - moderate-sized brown to dark brown mosquito 	Adult - single pale prominent broad band on the middle third of its proboscis, and similar bands on its legs. 
Larvae – long siphon, rests on 45-60 degree angle 	Eggs – laid together as a raft and 

Culex annulirostris, commonly known as the common banded mosquito and is native to Australia, and regarded as a serious pest species.
The female is a moderate-sized brown to dark brown mosquito, with a single pale prominent broad band on the middle third of its proboscis, and similar bands on its legs.

Breeding takes place anywhere there is standing water, from swamps and ponds to all kinds of man-made puddles—irrigation channels, tree stumps and the water can be clean or polluted, in sun or shade, and fresh or brackish.

Culex annulirostris mosquitoes are active between spring and late autumn. During this time they appear most commonly at dusk, though can also be active during the day and indoors. They can travel 5–10 km from their place of birth and feed on mammals and birds.[

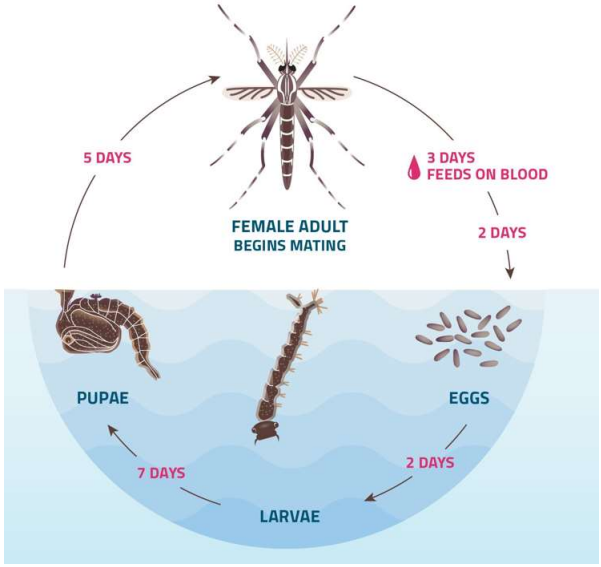
It is an important vector for a number of arboviruses, including Murray Valley encephalitis virus, Ross River virus, Barmah Forest virus, Kunjin virus and Japanese encephalitis, as well as dog heartworm and the roundworm.

Common Mosquitoes in Salisbury

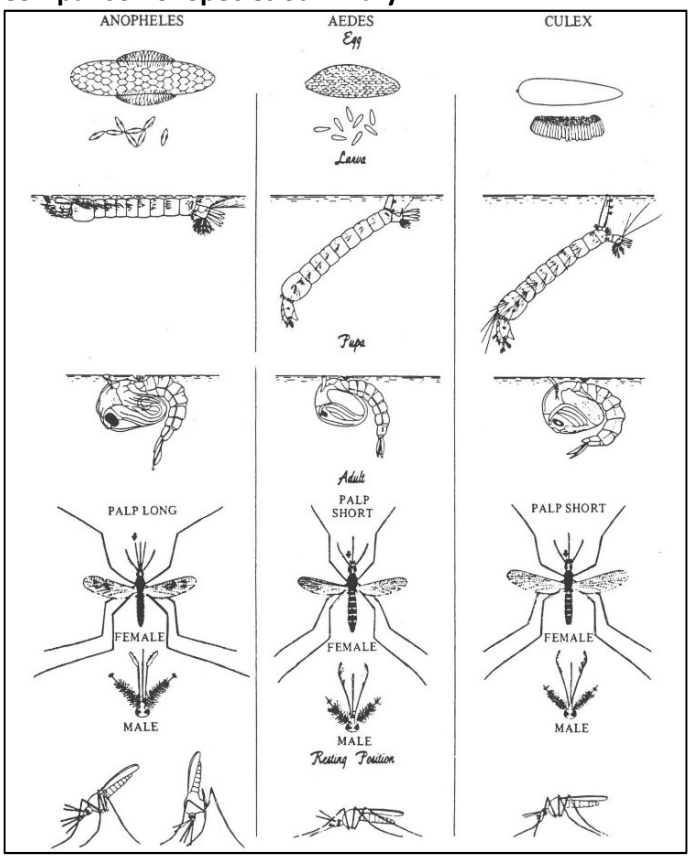
Mosquito Lifecycle

Lifecycle stages are average days. These vary dependant on species, weather and temperatures.
Only the female bites requiring blood meal to produce eggs

Mosquito Larvae in water - https://www.youtube.com/watch?v=j_51M8ewQWM
Mosquito life cycle - https://www.youtube.com/watch?v=wFfO7f8Vr9c



Comparison of Species Summary



Resource materials
https://medent.usyd.edu.au/arbovirus/index.html *(site no longer active)*

https://www.inaturalist.org/