MOSQUITO MANAGEMENT PLAN

Prepared by:
GRC Environment Health Officer
Community & Corporate Services
Version: 1-December 2022

Table of Contents

Abbreviations

GRC – Goondiwindi Regional Council

MMP – Mosquito Management Plan

EPA – Environmental Protection Act

RRV – Ross River Virus

BFV – Barmah Forest Virus

WNV – West Nile Virus

MVEV – Murray Valley Encephalitis Virus

JEV – Japanese Encephalitis Virus

CRM – Customer Service Requests

1. Introduction

Goondiwindi Regional Council (GRC) has developed a Mosquito Management Plan (MMP) that provides an integrated approach for the control and management of mosquitos within populated areas of our region to reduce the risk of mosquito-borne diseases. This MMP will allow Council to effectively manage a practical control program while satisfying legislative responsibilities.

Managing mosquitos are important for two reasons:

- Some mosquito species can be vectors of disease; and
- Some mosquito species are aggressive biters of humans and their pets, causing significant nuisance issues.

The Goondiwindi Regional has an estimated residential population of 10,817 and encompasses the towns of Goondiwindi, Inglewood, Texas, Yelarbon, Bungunya, Toobeah and Talwood. The region is located 345 kilometres southwest of Brisbane and covers an area of 19,248 square kilometres. The region has temperate subtropical climate and a rainfall average of 621 millimetres per annum. The region is located on multiple river systems and the region can be prone to flooding events.

Mosquito management within the Goondiwindi region is active throughout the year however is escalated during the summer season when increased rainfall and or flooding trigger a significant increase in mosquito numbers and disease risk are highest.

2. Program Objectives

The focus of the MMP is to characterise the distribution and ecology of key mosquito species in the region to determine the risk posed. To then identify the most appropriate vector management activities to be implemented. Such activities will lower the community's risk of contracting vector-transmitted diseases and reduce the nuisance value of the pests.

This MMP aims to reduce the number and impact of mosquitos to:

- Reduce the potential for transmission of mosquito born disease;
- Encourage residents to engage in an active and healthy lifestyle both indoors and outdoors; and
- Reduce the incidence of mosquito nuisance.

GRC is committed to the implementation of the MMP with considerations for best practice methods, legislation and the environmental amenity of the region.

3. Environmentally Sustainable Mosquito Management

Mosquitos are a natural and important part of the environment and ecosystem. It is not preferable or possible to eradicate mosquitos, as they are beneficial in ecosystems as both a pollinator and food source for native species.

Local climatic and environmental factors can result in large population abundance for some species and there are no 'natural' strategies to minimise these populations. Pathogens (arboviruses such as Ross River virus) that have the potential to cause illness among humans circulate naturally between mosquitos and native animals. To manage mosquito-borne disease risk, strategies are required that disrupt natural cycles or influence the activity of the community

to minimise their exposure to mosquitos. Strategies to reduce the risk of mosquito-borne disease and nuisance biting impacts can include:

- Plan urban development to reduce exposure of the community to mosquitos.
- Educating the community on the most effective personal protection strategies.
- Reducing the productivity of mosquito habitats through environmental modification.
- Reducing mosquito populations through the judicious use of control agents.

Mosquito management requires integrated strategies targeting specific factors that influence the risk of mosquito-borne diseases. A cost effective and sustainable approach to mosquito-borne disease management is necessary for future planning developments (location and water sensitive designs within them). The design of new residential/tourist developments and rehabilitated wetlands (for example: wastewater treatment) can incorporate strategies that minimise the risk of mosquitos.

Environmentally sustainable mosquito management should follow the principles of Integrated Pest Management (IPM). Managing public health and/or pest risks requires a multidisciplinary approach informed by reliable scientific data on local mosquito fauna. It is essential to understand the habitats of locally important mosquito species and their associations with disease-causing pathogens. Monitoring is vital to effective mosquito management but this alone will not reduce the risks of nuisance-biting and mosquito-borne disease.

It is important to educate the community on the risks of mosquito-borne diseases and protective measures.

Personal protection strategies are available that can greatly reduce the risks of mosquito exposure. Such strategies include:

- The removal of mosquito breeding sources within their properties.
- The use of personal insect repellents.
- Wear light coloured loose fitting long clothes.
- The installation of screening on dwellings.
- A change in behaviour to avoid mosquito habitats at time of greatest mosquito activity e.g. dawn and dusk.

4. Statutory Requirements

- *Public Health Act 2005*
- *Public Health Regulation 2018*
- *Environmental Protection Act 1994*
- *Environmental Protection Regulation 2019*
- *Environmental Protection (Water & Wetland Biodiversity) Policy 2019*
- *Biosecurity Act 2014*
- *Biosecurity Regulation 2016*
- *Planning Act 2016*
- *Planning Regulation 2017*
- *Fisheries Act 1994*
- *Fisheries (General) Regulation 2019*
- *Agriculture and Veterinary Chemicals (Queensland) Act 1994*
- *Agriculture Chemicals Distribution Control Regulation 2021*

- *Chemical Usage (Agricultural & Veterinary) Control Act 1988*
- *Chemical Usage (Agricultural & Veterinary) Regulation 2017*
- *Biological Control Act 1987*
- *Medicines & Poisons Act 2019*
- *Medicines & Poisons (Pest Management Activities) Regulations 2021*

5. Mosquito Disease Risk & Nuisance

Mosquitos are a public health concern due to their ability to act as a carrier and transmitter of diseases in humans and animals. There are over 220 species in Queensland. There are thirteen known local species of mosquitos, eight of which that are capable of transmitting various diseases such as Ross River Virus, Murray Valley Encephalitis, Malaria and Japanese encephalitis, among others.

While not endemic to Queensland, Dengue Fever outbreaks have increased in frequency and intensity over the last 10 years in the State. Other mosquito-borne diseases such as Ross River Virus (RRV), Barmah Forest Virus (BFV) and Murray Valley Encephalitis (MVEV) are endemic in Australia. Mosquitos that are able to transmit these diseases are present in the Goondiwindi Region. A recent upswing in the number of Japanese Encephalitis cases in Victoria, South Australia and Queensland is of significant concern with the main vector Culex annulirostris being present in this region.

RRV and BFV are the most common mosquito-borne diseases in Queensland. Although not life threatening, the symptoms presented like polyarthritis and lethargy can be debilitating and last for prolonged periods. Despite research, there is no specific cure or treatment for RRV, BFV and Dengue Fever.

Higher temperatures, increased rainfall and changing climate conditions may have an impact on mosquito breeding areas. It is important that GRC have an effective, sustainable mosquito management plan due to the level of existing endemic mosquito-borne diseases and outbreak history.

Mosquitos are not only a health concern – they can also be a considerable nuisance. Mosquitos can be aggressive biters, causing discomfort and pain to residents and influencing lifestyles.

6. Mosquitos

(a) Biology & Life-cycle

Mosquitos are small blood sucking insects that belong to the family of flies called *Culcidae* (Order *Diptera*). Each species of mosquito is associated with particular habitats and the biting nuisance and public health risks vary between species.

Mosquito species differ in their biology, required larval habitat, host feeding preferences, flight range and ability to transmit various pathogens.

Surveillance and control methodologies must be tailored to the biology and ecology of target species to maximise the interventions impact. Mosquitos can be described under two general classes: those that inhabit groundwater (including flooded pools and saltmarshes) and those that inhabit small containers in urban environments.

Where possible, the preferred method of control is to act upon larvae, before they emerge into flying adults and disperse.

Eggs are laid in rafts that float on the surface of the water or singly attached to soil or vegetation that then hatch when immersed in water depending on the species. Larvae hatch from the egg and grow through four different stages (instars) before becoming mature larva. This process can take four to ten days dependent on the species and environmental conditions. The larvae feed on microorganisms and other organic matter within the water.

Following the final instar the larva moults into a pupa for as little as 2 days. Pupae are still mobile in the water, but do not feed and are therefore unaffected by bacterial larvicides. Insect Growth Regulators such as S Methoprene provide a much broader window for control by inhibiting their ability to complete their lifecycle.

Newly emerged adults rest on the surface of the water for a short time to dry their wings before flying off to feed. Male mosquitos do not bite and usually stay close to the breeding site feeding on plant and flower juices. Females travel further and seek out a carbohydrate meal before mating. Females will seek blood after mating and embark on a cycle of feeding, resting, developing and laying eggs. Adult mosquitos live for approximately three weeks.

Currently the number of competent vectors within the Goondiwindi Regional Council are unknown. This MMP aims to ensure all required information is gathered so appropriate responses and actions can be taken.

Understanding the different species of mosquito in the Goondiwindi Region is necessary to implementing an effective mosquito management plan. Some species cause significant pest nuisance issues, some transmit disease and others do neither.

Different species breed in different habitats; an understanding of these differences can allow for targeted investigations and control. Adult mosquito trapping is therefore an important part of the process as it allows for more targeted control actions.

(b) The most common mosquito species in the Goondiwindi region are:

Aedes Alternans	
 Russel, R. (1999).	**Breeding Habitat:** temporary brackish pools and marshes; freshwater areas
	Active Season:
	Dispersal Capabilities: 5-8km
	Biting Habits: aggressive biters, attacks throughout day and night
	Vector: RRV in a laboratory setting – yet to be proven in nature

Aedes Notoscriptus	
 Walter Reed Biosystematics Unit. (2020).	**Breeding Habitat:** clean water within domestic environment (artificial containers i.e. buckets and tyres)
	Active Season: Year round/ summer months
	Dispersal Capabilities: 0.4km
	Biting Habits: Vicious, active dawn and dusk; occasionally at night and day, prefers shade
	Vector: RRV, MVEV and vector of dog heartworm

Aedes Vittiger	
 Russel, R., 1996.	**Breeding Habitat:** temporary pools of freshwater from floods, irrigation or rain. Sunlit and with emergent grass
	Active Season: most active from spring; abundant from early to mid-summer and after autumn floods
	Dispersal Capabilities: 5-8Km
	Biting Habits: readily attack humans and animals during the day, also at evening and night
	Vector: MVEV

Culex Annulirostris	
 Russel, R. (1996).	**Breeding Habitat:** permanent/semi-permanent freshwater bodies; prefers heavily vegetated sites
	Active Season: Year round/ summer to winter months
	Dispersal Capabilities: up to 10km
	Biting Habits: Active dawn, dusk and night
	Vector: MVEV, WNV, RRV and BFV; vector for myxomatosis and carrier of dog heartworm

Culex Quinquefasciatus	
 Russel, R. (1996).	**Breeding Habitat:** clean or polluted water in domestic environments and artificial containers; street drains around urban environments
	Active Season: Warmer months
	Dispersal Capabilities: unknown
	Biting Habits: Usually attack humans towards middle of the night (in- and out-doors); often more attracted to birds
	Vector: MVEV, RRV (dog heartworm and fowl pox vector)

A mosquito's ability to disperse away from their breeding site for a blood meal significantly effects the degree with which it can affect human lifestyle. Some species can only travel tens of metres, whereas others can travel up to and over 50 kilometres. This mosquito behaviour is critical to considerations of buffer zones between mosquito breeding areas and proposed developments.

7. Breeding Sites – Land Ownership & Responsibility

Goondiwindi Regional Council is responsible for the monitoring of and treatment of Council owned properties; this includes parks, gardens, roads, drainage systems and other Council facilities. However, due to the large geographical area of the Goondiwindi Region, cost and resources required, it would never be possible to control mosquito breeding or control adult populations throughout the entire region. Control programs will instead be focused on reducing mosquito populations in and around urban centres.

State Government owned properties and their potential/existing breeding sites are the responsibility of various State Agencies that are entrusted for their management.

The management of mosquitos on private property is the responsibility of owners and residents. Backyard breeding of mosquitos can contribute significantly to biting nuisance and disease risk in residential areas. GRC provides education via media releases and website content to encourage residents to clean up and help them identify potential backyard breeding sites. If necessary GRC can undertake enforcement action to require residents or owners to remove backyard breeding sites.

8. Environmental Considerations

The prevailing environmental conditions have a significant influence upon mosquito populations in the Goondiwindi region. It is to be expected that populations vary significantly between dry and wet periods, requiring that the management actions are fluid and able to respond accordingly.

Excessive control of mosquito populations may disrupt food chains in certain ecosystems. Mosquito larvae act as a food source for dragonfly nymphs, water fleas and a range of fish species while birds, bats, lizards, dragonflies, spiders and frogs feed on adult mosquitos (Russell, 1993). Mosquitos are also important plant pollinators (Centre for Disease Control and Prevention, 2001).

The choice of control methods also requires careful consideration.

To help inform the decision to undertake any control it is important to understand the type of mosquito present and the potential density of the population. The following methods are generally employed to inform decision-making:

(a) Larval Survey

Identified breeding sites are regularly monitored during the wet season or after a flooding event to determine larval activity. Larval surveys determine if there is a need for the application of larvicide to prevent the emergence of adult mosquitos.

(b) Adult Trapping

Adult mosquito traps monitor populations of adult mosquitos. Trapping is important to monitor mosquito abundance and identify problem species to target larval investigations and control actions.

(c) Complaints

GRC at times receives complaints from residents regarding mosquito nuisance. The number of complaints may not be directly related to actual mosquito populations but can provide information on areas where mosquito impacts are greatest.

9. Mosquito Control Methods

To manage mosquito-borne disease risk, strategies are required that either disrupt these natural cycles or influence the activity of the community to minimise their exposure to mosquitos. To be effective the MMP uses an integrated approach incorporating four methods of control - cultural, physical, biological and chemical.

(a) Cultural Control

Cultural methods involve influencing people in the community to take measures to protect themselves from mosquito bites and to remove or reduce mosquito activity on their own property. Promotion and education of key personal activities the community can take is the driver to cultural control.

Public education will begin towards the end of the dry season and will be active throughout the wet season. These promotion and education activities should first focus on the concept of residents protecting themselves against insect bites.

- Activities will be intensified when surveillance indicates that disease risk is high, due to high mosquito numbers detected in adult traps or larval dip samples.

Education materials may include the following:

- Social media and media releases
- Website updates
- Letter PO Box drops
- Local notice board posters
- Corflute signage
- Public notifications of planned chemical and physical mosquito control activities
- Displaying appropriate signage while in the field conducting monitoring or treatment.

Promotion and education initiatives have been prepared and align to the intervention levels that are proposed in this Management Plan.

Threat Level	Promotion and Education
Level 1	Self-protection messages (use quality repellent, avoid dawn/dusk, wear light coloured loose fitting long clothes, check your insect screens, tip out water from containers and check water tanks). These messages can be delivered through social media, print media and public place signage.
Level 2	Message to install at larvicide location on corflute sign "This area treated by GRC", etc.
Level 3	Messages for public place adulticiding Corflute sign - this area will be treated on __/ __ / __ by GRC. Use repellent. Social media messages re: self-protection, adult treatments not perfect. Beekeeper messages.
Level 4	Last resort treatment with extremely high mosquito numbers and risk of disease. Corflute's as per Level 3. Disaster related social media messages. Beekeeper messages.

(b) Physical Control

Physical control measures are taken to reduce the potential of mosquito breeding and harbourage by modifying the natural or built environment. Examples of physical control include:

- Maintenance of open stormwater drains to remove silt and weeds to ensure water is not held for more than 5 days.
- Reduction of emergent vegetation in known breeding sites.
- Filling in, or drainage of low-lying land to reduce pooling.
- Slashing of vegetation which provides harbourage for adult mosquitos.
- Cleaning up yards to remove containers which will collect water.
- Ensure septic tanks are sealed and vents are fitted with mosquito proof screens.
- Ensure roof guttering is clear of debris, operating effectively and connected to either a rainwater tank or stormwater system.
- Ensure septic tanks are sealed and vents fitted with mosquito proof screens.

Some physical controls, such as maintenance of drains are undertaken routinely. Yard clean-ups and sealing of septic tanks are the responsibility of residents and forms part of the education campaign.

(c) Biological Control

Biological control occurs naturally in many bodies of water, reducing the need for other control methods. The introduction of fish can also be an effective, long-term control for mosquito breeding in fabricated environments such as backyard ponds. It is important to keep the edges of ponds and dams well mowed to ensure that the fish have access to all areas. Fish however, are not a silver bullet solution to mosquito control in, dams, ponds and natural bodies of water, as they can become lazy feeders. Introducing fish to natural environments do not form part of this plan as it does not effectively address water policies common to the region and may have an environmental impact.

(d) Chemical Control

Chemical control of adult and larval mosquitos involves the application of minimal chemical substances that are toxic, physically damaging or hormonally disruptive to kill mosquitos or disrupt their development. Routine applications of chemicals with the same mode of action or over application of these chemicals can result in increased chemical resistance within the target mosquito population.

Some of these chemicals can also have undesired impacts on non-target populations. It is important to understand that although insecticides have a place in mosquito control, these chemicals should be used judicially to maximise their benefits while minimising any disadvantages.

i) Larvicides

Mosquito larvae are the most vulnerable stage of the mosquito lifecycle so it makes sense to target them with the use of Larvicides that kill mosquito larvae and/or prevent the emergence of adult mosquitos. Typically, they are used in known breeding areas located in close proximity to residential areas.

Advantages:

- Mosquitos are killed before they pose any health risk.
- Products can be target specific – easier management of environmental impacts.
- Controlled release formulations allow for residual control.
- Reducing populations at the larval stage limits ongoing breeding and makes control easier.

Disadvantages:

- Treatment can be limited by site access and size of area requiring treatment.
- Pupae and late 4th instar larvae are not affected by bacterial larvicides as they are not feeding, making the timing to treatment crucial.
- Insect Growth Regulators are effective against 4th Instar larvae and Pupae and there are now larvicides that combine bacteria and IGR's enabling complete control over the larval development stage.
- Not suitable for certain soil types (e.g. clay pan) where water pooling is extensive.
- Organophosphates are not suitable for use in aquatic environments as they kill non-target species such as fish and crustaceans.

The following larvicides are used:

Bacterial	• Bacillus thuringiensus israelensis • Bacillus sphaericus • Saacharopolyspora spinosa
Insect Growth Regulators Combined Bacterial & IGR	• Methoprene • VectoPrime
Organophosphate	• Temephos (Abate & ProVect)

ii) Adulticides

Adulticides are chemicals that kill mosquitos in their adult stage. Adulticides are the main chemical control option once flying adults have emerged.

Advantages:

- Fast knockdown of biting adults in times of high disease risk.
- Residual surface sprays are available and have long lasting effects.

Disadvantages:

- Only temporary control is achieved.
- Target specific formulations are not available – impacts bees, butterflies and other beneficial insects.
- Mosquitos can develop insecticide resistance through the overuse of adulticides.
- Highly toxic to fish and other aquatic organisms.

Application of adulticides using thermal fogging or ulv misting is usually only undertaken during times of high disease risk.

Treating mosquito harbourage sites with a residual insecticide where safe to do so can be used as a 'barrier' between residential and/or recreational areas and mosquito habitats.

10. Mosquito Management Process

Our mosquito management process begins with scheduled inspections of known mosquito breeding sites, collecting larval samples, checking trapping numbers and identifying species.

The management process will escalate dependent upon the threat level due to trigger conditions resulting in action. Table 1 below outlines the management process to be undertaken.

*Table 1: Mosquito Management Response Hier*archy

Threat Level	Trigger Conditions	Management Actions
Level 1 - Low	Customer requests and data determine there is no indication of a high-risk season. No additional surveillance or control measures are necessary to reduce the risk of human cases of infection.	- Review and update website information. - Review previous management actions and update management actions. - Maintain standard monitoring of larvae and adults.
Level 2 - Medium	Number of larval or adult mosquitos increasing New sites identified Customer requests increasing	- Public notices and communication to the community. Mosquito breeding areas to be identified and coordinated larviciding to commence at known breeding locations on Council controlled land. - Public notifications on larviciding areas to be posted and signage incorporated at areas.

Level 3 - High	Level 3 will be triggered where one of the following items is met: o There are more than 5 crm/month for Goondiwindi o There are more than 3 crm for other areas o Number of mosquitos caught in a single location in a single carbon dioxide baited trap exceeds 300 of a specific species over a normal sampling period (i.e. 12-18 hours) o Where a request is made by relevant Manager/ Director	- Public notices and communication to the community. Mosquito breeding areas to be identified and coordinated larviciding to commence at known breeding locations on Council controlled land. - Public notifications on larviciding areas to be posted and signage incorporated at areas. - Adulticide misting commencement at public spaces, known problem drainage areas and parklands by licensed pest technicians. - Public notification and signage at areas to be incorporated.
Level 4 - Natural Disaster Event	Level 4 will be triggered where one of the following items is met: o Natural Disaster Event o Public Health Emergency o Biosecurity Emergency o Incursion of an Exotic vector of Public Health and Agricultural significance o Notifiable disease outbreak (vector and disease must be present)	- Information displays, public notices and communication to the community. Mosquito breeding areas to be identified and coordinated larviciding to commence at known breeding locations on Council controlled land. Public notifications on larviciding areas to be posted and signage incorporated at areas. Adulticide misting commencement at waterways, public spaces, known problem drainage areas and parklands by licensed pest technicians. - Adulticide misting commencement in residential streets in all major urban centres - Adulticide residual spraying of public and residential infrastructure where deemed appropriate. Public notification and signage at areas to be incorporated. - Engage possible assistance from the Darling Downs Public Health Unit and other Local Government Mosquito Management teams.

(a) Priority Areas for Level 2- Larvicide

i) Inglewood, Texas and Yelarbon

Council acknowledges that further larval survey work needs to be undertaken to identify the breeding sites in Inglewood, Texas and Yelarbon and assess their suitability for larval treatments.

ii) Goondiwindi

- George street road verge in front of Water Treatment plant
- Rail crossing Riddle Street
- Sandhurst park drain
- Back of West street Depot
- Cunningham Highway road verge between Country Roads motel & McDonalds
- Boundary road drains

(b) Priority Areas for level 2 – Chemical Barrier Treatments

i) Inglewood

- Lions Park

ii) Texas

- None identified at this time

iii) Yelarbon

- Lagoon area

iv) Goondiwindi

- Town Park
- Sandhurst Park
- Redmond Park
- Riddle Oval Skatebowl
- Botanic Gardens

(c) Priority Areas for Level 3 – Public Place Adulticiding

Council acknowledges that there are a number of areas and events that are considered high risk e.g. daycare facilities, aged care facilities and events held where a significant number of the public will attend. Instances such as these will be subject to the process identified in the table above, then reviewed as per the risk to determine if adulticide or additional treatments are an option. Ideally, larvicide and barrier treatments are to be undertaken first to provide long term protection, where this is not possible adulticide may be considered. Private landholders are encouraged to discuss potential control with their preferred pest consultant.

11. Stakeholders & Public Education

(a) Internal Stakeholders

Local government has a responsibility for public health risks related to breeding grounds for mosquitos. GRC also has a responsibility for a number of areas that affect mosquito management; these include stormwater drains and vegetation management.

(b) External Stakeholders

To ensure the most successful surveillance, management and prevention of mosquitos occurs within the region, GRC works with a number of key stakeholders.

- Queensland Health: https://www.health.qld.gov.au/
- Department of Environment and Science: https://www.des.qld.gov.au/

(c) Public Education, Promotion & Collaboration

Ensuring people within the Goondiwindi Region are informed about mosquitos and how best to reduce impacts is very important for reducing the effects on individuals and the community. The education should be planned and complimentary of information, materials and activities undertaken by other stakeholders.

Public education will commence towards the end of the dry season and will be active throughout the wet season. These promotion and education initiatives will focus on measures that residents can do to protect themselves from being bitten by mosquitos.

Activities will be intensified when surveillance indicates that disease risk is high, due to high mosquito numbers detected in adult traps or larval samples.

12. Training

Personnel involved in the operational aspects of the MMP need to be suitably qualified, trained and/or supervised. More than one staff member should be trained in mosquito management. Skills required to effectively and safely carry out the MMP's requirements include:

- Basic mosquito ecology.
- Principles of integrated mosquito management.
- Surveillance/monitoring techniques.
- Collection, recording and identification of mosquito samples.
- Standard operating procedures for equipment.
- Safe storage, handling and application of chemicals/larvicides in accordance with product labelling and SDS.
- Use of appropriate PPE in accordance with product labelling, SDS and environmental conditions.
- Calibration techniques.
- Information technologies/geographical information systems.
- Budget management.

Mosquito management courses are conducted by Environmental Health Australia (QLD incorporated) and by Mosquito Control Association of Australia, which teach most of the required vector control skills and competencies.

13. Action Plan

A Council specific action plan to manage mosquitos based upon the information contained in this plan is outlined in Schedule 1. This action plan will be reviewed annually as conditions, resources and technologies change.

14. Annual Review & Report

The continuation of this plan and retention of knowledge within GRC requires good record keeping practices. The following list includes the minimum required records to be kept on Council's record management system:

- Customer Service Requests
- Arbovirus notifications and follow-up documentation
- Adult trapping results
- Larval survey results
- Chemical treatments used
- Vector control maps
- Chemical product labels and SDS
- Media releases

15. References

- Local Government Association of QLD 2014, Mosquito Management Code of Practice. https://ehp.qld.gov.au/assets/documents/regulation/pr-cp-mosquito-management.pdf
- Queensland Health 2015, Dengue Management Plan 2015 – 2020. https://www.health.qld.gov.au/__data/assets/pdf_file/0022/444433/dengue-mgt-plan.pdf
- Queensland Health 2011, Guidelines for Controlling Public Health Risks relating to Mosquitos, Flies and Black Flies in a Flood Event, https://www.health.qld.gov.au/__data/assets/pdf_file/0029/444557/cont-mosq-flies-flood.pdf
- Queensland Health 2015, Mozzie Borne Diseases – Public Information (Fact Sheet). https://www.health.qld.gov.au/__data/assets/pdf_file/0023/439034/mozzies-you.pdf

16. Schedule 1 – Mosquito Management Action Plan

Goondiwindi Regional Council Mosquito Management Action Plan			
Strategy Area	**Activity**	**Officer**	**Timeline**
Planning	Review Mosquito Management Action Plan.	EHO	Annually April
	Ensure resources are allocated in annual budget.	Director	Annually June
Mapping and identification of mosquito breeding areas.	Prepare map of known standing water spots on Council land.	EHO	28 February 2023
Develop a layer on Council's existing GIS system to plot known mosquito breeding areas and record treatment dates.	Liaise with GIS staff to create new mapping layer.	EHO	December 2023
Public education, promotion and collaboration.	Engage with Parks and Gardens teams to gather data on known standing water spots.	EHO	14 February 2023
	Develop a Communication Plan to communicate MMP.	Media / Director	May 23
	Prepare FAQ's or Fact Sheets using material from MMP.	Media	June 23
Recording significant rainfall events to build program knowledge base (Trigger events).	Recording resulting water ponding, larval & adult numbers.	EHO	As significant rainfall events occur
Treatment strategies	Larvicide pellet treatment to standing water at known breeding sites on Council land.	EHO	As required