

# VECTOR MANAGEMENT PLAN

2023 - 2027



# Acknowledgements

This plan was developed by Rockhampton Regional Council in collaboration and consultation with the Central Queensland Public Health Unit, Rockhampton.

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## Introduction

The Rockhampton Region is a hub for beef cattle, a tourist destination and is used as a central 'stopover' point for people and industry travelling up and down the Queensland coast. The Rockhampton Airport, located on the outskirts of Rockhampton, is a busy regional airport. The airport has international status and regularly accepts flights from the Singapore and America armies as their arrival point into Australia when undertaking training exercises in the Shoalwater Bay area.

The Region lies on the Fitzroy River, the largest river catchment flowing to the eastern coast of Australia, with a barrage located within Rockhampton City limits separating freshwater and tidal saltwater areas.

The Rockhampton Regional Council Vector Management Plan 2023-2027 provides a framework for Council and the community to manage vector agents and their impacts in the region.

The plan incorporates the eight principles of pest management (integration, public awareness, commitment, consultation and partnership, planning, prevention, best practice and improvement). The plan also takes into account environmental impact, sustainability and cost effectiveness.

Priority vector programs for the Rockhampton Regional Council, based on sustainable control, are also set out.

Vector Management incorporates three main areas mosquitoes, rats and mice and other pests. These animals are vectors of disease or impact on human health, lifestyle and amenity.







## Mosquitoes

Over 220 species of mosquitoes have been identified in Queensland with more than 36 common species being identified in the Rockhampton Region, several of which are capable of transmitting disease.

Mosquitoes are the deadliest animal in the world. Mosquito-borne diseases such as Malaria, Dengue Fever, Zika virus, Japanese Encephalitis (JE), West Nile virus (WNV) infection and Chikungunya (CHIKV) are causing major public health problems in many countries.

Increased international travel makes it easier for the introduction of these diseases into locations from which they have either been eradicated or in which they have never occurred. Australia and Queensland in particular, provide a suitable environment for incursions of these exotic diseases.

Vector-Borne diseases account for more than 17% of all infectious diseases, causing more than 700 000 deaths annually (World Health Organization March 2020). The main diseases that cause death include Malaria and Dengue Fever.

Malaria is transmitted by the Anopheline mosquitoes and causes an estimated 219 million cases globally and results in more than 400, 000 deaths (World Health Organization March 2020).

Dengue is transmitted by the Aedes Aegypti mosquito (and to a lesser extent the Aedes Albopictus) and is endemic in many neighbouring countries with an estimated half of the world's population at risk. It is estimated that there are 100-400 million infections each year, but 80% are considered mild or asymptomatic (World Health Organization January 2022)

While Dengue is not endemic in Queensland, Dengue outbreaks have been occurring as a result of viraemic international travellers.

An outbreak of Dengue occurred in Rockhampton in 2019 where 13 confirmed cases were identified.

Aedes aegypti is present in the Rockhampton Region.

Aedes aegypti, is also a vector of Zika virus. Between 2013 and 2015 there were large outbreaks of Zika virus infection in a number of Pacific countries. Local transmission is ongoing in this region. Since 2015 large outbreaks have been occurring in central and southern America and are continuing. Recent outbreaks in the Pacific and the Americas have raised concerns that Zika virus infection may cause birth defects such as microcephaly if a woman is infected while pregnant. An imported case of Zika virus was diagnosed in the Rockhampton Region in 2016.

Other mosquito-borne diseases such as Ross River virus (RRV) infection, Barmah Forest virus (BFV) infection, Kunjin virus infection and Murray Valley encephalitis (MVE) are also endemic in Australia. Mosquitoes that can transmit these diseases are present in the Rockhampton Region.

Australia has in 2022 experienced an outbreak of Japanese Encephalitis (JE). JE is transmitted by the Culex mosquitoes, the main vector present in our region is Culex Annulirostris. JE is mostly asymptomatic, but on rare occasions can result in severe disease and death (Australian Government April 2022)

RRV and BFV infection are the most common mosquito-borne diseases in Queensland. These infections are not life threatening, although symptoms such as polyarthritis and lethargy can be debilitating and last for prolonged periods of time. There is no specific treatment for, or vaccines to prevent RRV, BFV infection, Dengue and Zika despite continued research in this area.



## Breeding Sites/Habitats

The Rockhampton Region is characterised by the Fitzroy River incorporating low-lying tidal wetlands down river and within Rockhampton and with areas of permanent and semi-permanent freshwater in and around townships.

The tidal wetlands are inundated on a regular basis throughout the year and following significant rain. Both tidal and freshwater areas are capable of supporting extensive mosquito populations during the wet season and to a lesser extent in the drier winter months. Treatment of tidal wetlands is undertaken outside Council's local government area due to the health and nuisance impacts of Rockhampton Regional Council residents.

Infestations of certain aquatic plants can provide havens for mosquito breeding in freshwater including Salvinia, Water Hyacinth and Hymenachne.

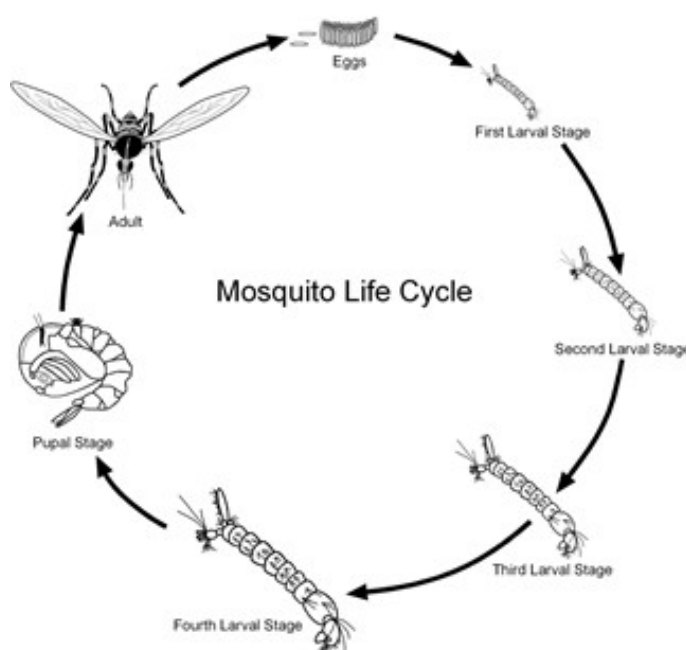
Some mosquito species will breed in artificial and natural containers eg pot plant saucers, tyres, birdbaths, bromeliads, discarded palm fronds and tree axils/holes. *Aedes aegypti*, the main vector for Dengue fever and Zika virus, is a container breeder that can breed in these items.

Mosquitoes breed in unmaintained swimming pools and rainwater tanks. Homeowners must conduct regular maintenance on pools and tanks to ensure that mosquitoes are unable to breed.

## Mosquito Lifecycle

The length of each stage of a mosquito lifecycle depends on both the temperature and the species. Warmer temperatures result in quicker progression through each stage of the lifecycle.

Understanding the lifecycle is important to ensure that treatment programs are effective in targeting the correct stage of the mosquito's lifecycle.





## Rats & Mice

The house mouse, roof rat (black rat) and brown rat (Norway rat) are commonly found vectors in the Rockhampton Region. These animals can spread disease, contaminate food and can be destructive and damage materials.

Rats and mice are prolific breeders, reaching maturity at a young age and then being able to birth multiple pups many times a year.

### Breeding Sites/Habitats

The house mouse and rats breed and harbour in areas where they are safe from being exposed to predators. They are well adapted to living and breeding in close association with humans. This includes in an accumulation of various types of materials eg branches, palm fronds, building materials, old electrical appliances, and furniture. Brown rats will also live in burrows and roof rats in roof voids and wall cavities. Breeding and harbourage is usually associated with materials stored in an untidy fashion, however they are occasionally found in areas where the materials are stored neatly.

Occasionally plague proportions of mice and rats affect the rural areas of our region, following cropping harvests. A significant increase in mice was experienced in late 2020 – early 2021. This was not a localised event with mass numbers occurring in western Queensland and western New South Wales during this time as well.







## Midges/Blackfly

Biting midges and the Dawson River Black Fly are the other predominate insect pests.

### Breeding Sites/Habitats

Biting midges breed in areas such as coastal lagoons, estuaries, mangrove swamps and tidal flats. The Dawson River Black Fly can be present in plague numbers when the river floods.

## Other

Councils Vector Management Team will undertake treatment of other nuisance insects on Council land and can provide advice to private landholders on methods of controlling other insect pests. Examples include;

- Ants
- Wasps
- Bees
- Grubs; and
- Flies.





## Purpose

The purpose of the Plan is to establish and promote the cooperative management of the impacts of vectors within the Rockhampton Region.

## Links to Council's Corporate Plan 2022-2027

Rockhampton Regional Council's Corporate Plan 2022-2027 sets the strategic direction and priorities for our organisation for the next five years.

Whilst vector management goals are not specifically outlined in the Corporate plan the actions undertaken in this area support the following commitments.

Goal 2.1 Our Community: Our places and spaces enhance livability and diversity of our communities.

Goal 4.3 Our Environment: Our public spaces add value to our Region and our communities

The Plan details the key issues of vector management and outlines operational activities to achieve Council's Corporate Plan objectives.

## Key Issues

This plan details six key issues for vector management and outlines the actions required to achieve Council's Corporate Plan objectives. The issues are:

1. Community awareness
2. Surveillance, prevention and control
3. Informed decision making
4. Effective management systems
5. Commitment and partnership
6. Education and training





## Vision

To protect the health, lifestyle and welfare of the Rockhampton Regional Council communities from the effects of vectors.

## Issues

Community awareness	Surveillance, prevention and control	Informed decision making	Effective management systems	Commitment and partnership	Education and training
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## Objectives

To provide accurate, accessible and timely information on vectors.	To maintain surveillance systems. To implement best practice treatment.	To collect, use and make available reliable data relevant to vector management.	To ensure integrated systems based on sound principles for successfully managing and minimising the impacts of vectors are developed and widely implemented through risk management and are regularly reviewed.	To establish and maintain long-term stakeholder commitment to and coordinated management of vectors.	To have an appropriately skilled and knowledgeable workforce, able to respond effectively to the public health risks posed by vectors.
To raise community awareness of vectors and their impacts and what they can do as members of the community to manage vectors.	To minimise the local establishment of new vectors and source reduction of existing vectors To minimise the risk of vector-borne diseases and nuisance value of vectors impact on the community	To further the understanding of the biology, ecology and impacts of vectors.		To effectively and adequately resource vector management programs.	
				To ensure compliance with vector management related legislation.	

## Outcomes

Information is provided in accessible manners.	Introduction, spread and establishment of vectors is prevented.	Reliable information is collected using modern technology	Effective and efficient integrated management systems are widely implemented.	All stakeholders are committed to and manage vectors.	Skilled and knowledgeable officers able to respond effectively to vector management issues.
Community awareness increases	Risk of vector related disease and pest value of vectors is minimised.	Accurate information is the basis for decision making.		Legislation is complied with	



## Benefits of Control

### Mosquitoes

Mosquito management programs will result in a reduction of mosquitoes which achieves the following benefits:

- Reduction in disease,
- Low level of disturbance in the evenings,
- Being able to spend time outside without being annoyed,
- Young children and the elderly are protected from mosquitoes,
- Reduction in allergies and infections associated with bites,
- Improved sleeping conditions,
- Improved living conditions,
- Improved outdoor working conditions,
- Improved possibilities for sport and leisure,
- Reduction in transmission of heartworm in dogs,
- Economic advantages for gastronomy and tourism,
- Potential increase in property values,
- Reduction in costs associated with vector borne disease such as medical and vet expenses and time off work.

Studies have indicated that aspects of personal wellbeing are most important for residents.



### Rats & Mice

Vermin management programs will result in a reduction of mice and rats which achieves the following benefits:

- Reduction in disease,
- Reduced chance of food contamination,
- Reduction in destruction and damage caused by gnawing to buildings, appliances, vehicles, food containers, etc,
- Reduction in the possibility of fires or electrical shock from gnawed wiring,
- Reduced damage to crops and stored foods,
- Reduction in musophobia (strong dislike of rats and mice),
- Impacts to native wildlife by:
  - Reducing direct predation of a native wildlife,
  - Reducing competition from rats for food and resources,
  - Reducing hyper-predation effects, whereby rats support high numbers of other introduced invasive predators, such as cats, which go on to kill the native wildlife.

### Other Insects

Vector management programs will result in a reduction of biting midges and Dawson River Black Fly which achieves similar benefits to mosquitoes and in addition:

- Reduction in allergies and infections associated with bites,
- Reduction in costs associated with allergies and infections from bites, such as medical and vet expenses and time off work,
- Reduction in impacts on livestock in the region

## Priority Vectors

In the preparation of this plan, Vector Management Officers undertook a prioritisation process for the management of species that are present in the region and legislated for management under the Act, or are deemed to pose a significant local threat.

The management of these species has been prioritised as high, medium or low priority. The priority given to the management of a species is based upon disease threat, pest status, distribution and density.

For high priority species, species-specific management programs will be prepared. The management of species identified as medium or low priority will be addressed in conjunction with the implementation of the management programs or as time and resources permit. The high priority vectors are:

- *Aedes aegypti*,
- *Aedes albopictus*,
- *Ochlerotatus vigilax*,
- *Culex annulirostris*,
- *Culicoides ornatus* (biting midge),
- *Austrosimulium pestilens* (black fly),
- *Rattus rattus* (roof rat),
- *Rattus norvegicus* (Norway rat/brown rat).

## Key Issue 1 – Community Awareness

Effective management of vectors relies on broad community knowledge of the problem and the management issues. Often people are not aware of the impacts that vectors have or that their own actions may be contributing to the problem. Many vector problems are increased through lack of community knowledge and awareness.

The level of education on vector surveillance, management and identification is increasing, but more targeted public education and a higher public profile are needed. The community requires further information to raise their awareness and their willingness to help manage vectors on their properties.

Council's website contains a significant amount of information on vector management and provides promotional material in several formats. Council also undertakes vector awareness programs at events such as shows.

Council will:

- Review the Vector Community Awareness Strategy
- Provide accurate, accessible and timely information material and undertake awareness programs
- Develop a vector management awareness program for local schools
- Develop mosquito awareness information for high risk premises
- Provide advice to reduce or remove the risk and impacts of vermin.



## Key Issue 2 - Surveillance, Prevention & Control

Surveillance and control programs are essential for detecting and identifying vector issues in an area, evaluating corresponding vector-borne disease risks and developing management plans to minimise the associated public health risk to communities. Prevention and early intervention is generally the most cost-effective management strategy. Once a vector species is introduced and becomes established, it is often very difficult or even impossible to eradicate and costly to control.

Control measures are applied to reduce the numbers of vectors to a level where humans are at minimal risk from vector-borne disease or the pest impact of vectors.

Vectors present different levels of risk. Council has undertaken a risk assessment to determine the level of risk from specific vectors. This process has been essential in defining priorities for prevention and control.

Council currently undertakes regular surveillance of mosquito breeding through light traps, Biogents (BG) traps for adult mosquitoes, ovi traps for larva and property inspection surveys of residential premises.

This surveillance informs when appropriate mosquito larvicide and adulticide programs are undertaken.

Council will:

- Maintain proactive and reactive mosquito population surveillance and control programs
- Undertake mosquito surveillance and control activities around the Rockhampton Airport before and after international arrivals
- Investigate freshwater mosquito breeding sites in the peri-urban and rural areas and the potential control activities for these sites
- Develop and implement a plan for monitoring high risk premises for container breeding mosquitoes
- Survey areas at high risk from incursions of exotic mosquitoes and new infestations
- Review and comment on relevant development applications
- Inspect the primary property for mosquito breeding and conduct property inspections surrounding the primary property for mosquito breeding.
- Inspect the primary property for vermin activity and/or harbourages and conduct property inspections surrounding the primary property for vermin activity and harbourages
- Assist residents in establishing effective baiting and trapping programs
- Review treatable thresholds (eg number per dip, trap numbers and number of complaints) on an annual basis
- Review the effectiveness and efficiency of control methods in meeting community needs on an annual basis and adjust preferred methods to reflect findings
- Continue to implement the Vulnerable Person Work Instruction that outlines when Council will assist with baiting on private premises.



## Key Issue 3 – Informed Decision Making

Reliable data is needed to ensure that vectors are managed holistically and for the long term.

An increasing amount of information is available on the distribution, abundance and impact of vectors.

Management practices are regularly reassessed and updated, based on the best information available, to enable the most effective and efficient application of the control options.

Council currently researches and utilises information and updates from legislation, State Government, mosquito research groups, vector management groups and industry to inform the program.

Council will:

- Investigate and acquire remote GIS hardware and software for data collection
- Enhance spatial data relating to mosquito breeding sites
- Maintain accurate surveillance and control records
- Use trends to implement and initiate appropriate control programs
- Use the developed SWARMMs system to record relevant data
- Distribute vector data to Queensland Health as requested



## Key Issue 4 – Effective Management Systems

It is widely accepted that integrated vector management systems are the most effective. That is, best practice for effective control of vector species often involves multiple control methods and must protect the environment while minimising impacts on the community.

Council's programs are based on balancing feasibility, cost-effectiveness, sustainability, humaneness, community perceptions, emergency needs and public safety. The control program relies on integrated biological, physical, chemical and behavioural control measures and is aimed at preventing new vector breeding sites, eliminating established breeding sites and reducing the contact between vectors and humans. A well balanced program will ensure maximum long-term control at lowest overall cost.

As vector population numbers tend to change from year to year, be affected by climatic conditions and the Rockhampton Airport receiving international flights, it is important to develop response plans to deal with vector problems that exist or are likely to arise in the region.

Council has undertaken a risk assessment to determine the level of risk from vectors to assist in setting priorities. The prioritisation is critical to ensuring resources are used as efficiently as possible.

Council will:

- Develop a prioritised, risk-based Vector Management Disaster Response Plan linked to Council's disaster plan
- Ensure we meet the requirements of the Framework for Risk Assessment and Response for Incursion of Exotic Mosquitoes into a New Location in Queensland
- Review and update Council's Dengue/Zika Management Plan
- Review treatment options effectiveness and efficiency on an annual basis and adjust preferred methods to reflect findings
- Continue to develop work instructions
- Review already established work instructions



## Key Issue 5 – Commitment & Partnership

Consultation and partnership arrangements between the community, State Government agencies and Council must be established to achieve a collaborative and coordinated approach to vector management. This is especially important in the case of an exotic incursion or a Dengue fever or Zika virus case notification.

Vector Management Officers are involved in the Mosquito Control Association Australia and the State Local Government Mosquito Advisory Group and have assisted organisations such as the Central Queensland University and Queensland Health in research projects.

The Public Health Act 2005 places responsibility on owners and occupiers to perform appropriate works and actions to prevent breeding of designated pests in areas under their control or responsibility.

The Public Health Regulation 2018 sets out a number of specific requirements for various people to manage the health risks posed by mosquitoes and designated pests including a responsibility on owners to proof relevant structures against rats and mice and the requirements for keeping rats or mice as pets.

The legislation is backed by suitable enforcement measures which are only used when other approaches have failed.

Council will:

- Build working partnerships between stakeholders to generate a holistic approach to vector management and a sense of community ownership of the problem
- Support research where appropriate
- Commit to resourcing vector management actions on a priority basis



- including funding, staff and equipment
- Participate in regional and State forums
- Review Council's Enforcement Strategy
- Facilitate compliance with and the consistent implementation of the Public Health Act 2005 and Public Health Regulation 2018 in accordance with Councils Enforcement Strategy
- Ensure compliance with legislative requirements placed on local government and Vector Management Officer's.
- In certain circumstances, treat vectors on Council land.

## Key Issue 6 – Education & Training

Vector management activities must be undertaken by knowledgeable, skilled, motivated and competent staff. Such officers increase the efficiency and effectiveness of vector management activities and the selection of appropriate control methodologies.

Continuing professional development will be provided to ensure staff deliver high quality and consistent management and control activities in accordance with established legislation, policies and procedures.

Council will:

- Ensure the provision of appropriately qualified and trained personnel
- Provide ongoing professional development.



## Implementation, Review & Performance Reporting

To monitor and measure the effectiveness of the implementation of this plan, Council will prepare and maintain an Action Delivery Plan incorporating operational requirements aimed at successfully progressing the responses.

The operational actions will be assigned appropriate indicators so that performance against the outcomes can be regularly assessed.

Appropriate reporting frameworks will be put in place to ensure management can monitor performance and adjust operational effort according to circumstances.

The Plan will be reviewed midway through the plan to ensure that it identifies and reflects changing priorities, operational capacity and the legislative framework and has been afforded adequate financial and staffing resources.





## Appendix 1

### References

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