



# Vector Management Plan 2017-2021



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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 City, is a busy regional airport. The airport has international status and regularly accepts flights from the Singapore and America airlines 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 system in Queensland, with a barrage located within Rockhampton City.

The Rockhampton Regional Council Vector Management Plan 2017 – 2021 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 two main areas, mosquitoes and other animals/insects that are vectors for disease or impact on human health, lifestyle and amenity.

## Mosquitoes

Over 220 species of mosquitoes have been identified in Queensland with more than 30 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.

Dengue is endemic in many neighbouring countries with an estimated 2.5 billion people globally at risk and 22,000 people, mainly children, dying annually as a result of complications from Dengue infection. While Dengue is not endemic in Queensland, Dengue outbreaks have been occurring with increasing frequency and intensity over the last 10 years as a result of increased numbers of viraemic international travellers. Recent Dengue outbreaks have occurred in Cairns and Townsville.

There are a number of different strains of Dengue. In past cases all strains have been experienced giving rise to the deadly Haemorrhagic Fever which occurs when a person who was previously infected with a Dengue strain and is then infected with a different strain.

*Aedes aegypti*, is the main vector of Dengue and is present in the Rockhampton Region. Imported cases of Dengue fever have been diagnosed 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.

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.

In 2005 *Aedes albopictus* was detected on many islands of the Torres Strait. The mosquito species is now established throughout the majority of Torres Strait outer islands and has been intercepted in Australian international seaports including Darwin, Cairns, Townsville, Brisbane, Sydney and Melbourne. Without timely detection on the mainland, *Aedes albopictus*

is expected to quickly colonise and establish itself through much of coastal Australia, thereby enhancing the potential risk of exotic disease outbreaks (eg. Dengue, Zika virus and Chikungunya viruses).

Changing climatic conditions, higher temperatures and higher rainfall may have an impact on the breeding areas of other mosquitoes and may cause the southwards expansion of tropical mosquito-borne diseases such as Malaria, Dengue Fever, Zika virus, Australian encephalitis, Japanese encephalitis and epidemic polyarthritis.

Due to the level of existing endemic mosquito-borne diseases and recent history of outbreaks of exotic diseases such as Malaria, Dengue Fever, Zika virus and Japanese encephalitis, it is important to have effective and sustainable mosquito management programs in place.

## Breeding sites/habitats

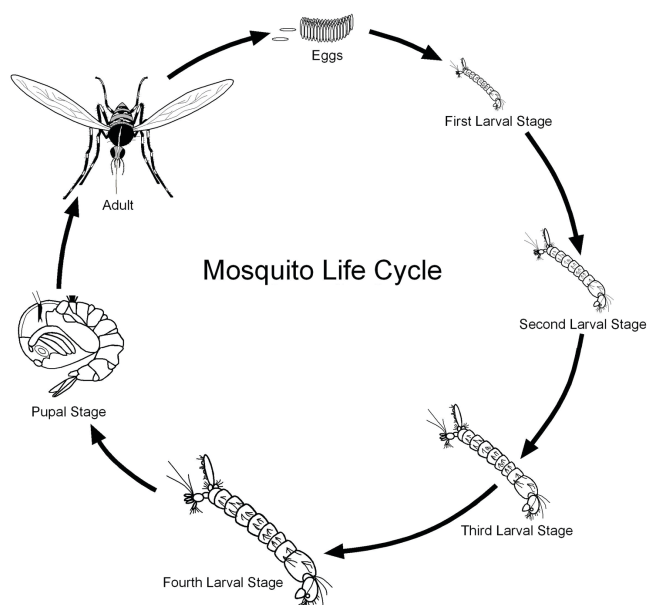
The Rockhampton Region is characterised by the Fitzroy River incorporating low-lying tidal wetlands downriver and within Rockhampton and with areas of permanent and semi-permanent freshwater in and around townships.

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 dryer 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 molesta*, *Eichhornia crassipes* (water hyacinth) and *Hymenachne amplexicaulis*.

Some mosquitoes 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.

## Mosquito Lifecycle



## Other vectors

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

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

## Breeding sites/habitats

The house mouse and rats breed and harbour in areas where they are safe from being exposed to predators. This includes 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.

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.



## 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 2017-2022

Rockhampton Regional Council's Corporate Plan 2017-2022 sets the strategic direction and priorities for our organisation for the next five financial years.

**Theme** – Community

**Goal** – A connected community that values a sense of belonging, where residents celebrate their diversity and have modern services available to support a safe, healthy and engaged lifestyle now and into the future

**Outcome** – Healthy living and active lifestyles



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
Objectives					
<p>To provide accurate, accessible and timely information on vectors.</p> <p>To raise community awareness of vectors and impacts and their capacity to identify and manage vectors.</p>	<p>To maintain surveillance systems.</p> <p>To implement best practice treatment.</p> <p>To minimise the local establishment of new vectors and source reduction of existing vectors.</p> <p>To minimise the risk of vector-borne diseases and nuisance value of vectors impact on the community.</p>	<p>To collect, use and make available reliable data relevant to vector management.</p> <p>To further the understanding of the biology, ecology and impacts of vectors.</p>	<p>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.</p>	<p>To establish and maintain long-term stakeholder commitment to and coordinated management of vectors.</p> <p>To effectively and adequately resource vector management programs.</p> <p>To ensure compliance with vector management related legislation.</p>	<p>To have an appropriately skilled and knowledgeable workforce, able to respond effectively to the public health risks posed by vectors.</p>
Outcomes					
Stakeholders are informed, knowledgeable and have ownership of vector management.	<p>Introduction, spread and establishment of vectors is prevented.</p> <p>Risk of vector related disease and pest value of vectors is minimised.</p>	Reliable information is the basis for decision making.	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.

## 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,
- 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.

### Vermin

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, insulation, wiring, food containers, etc,
- Reduced damage to crops and stored foods,
- Reduction in musophobia,
- 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.

### Biting midge and Dawson River Black Fly

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 notoscriptus*,
- *Ochlerotatus vigliax*,
- *Culex annulirostris*,
- *Ochlerotatus vittiger*,
- *Culicoides ornatus* (biting midge),
- *Austrosimulium pestilens* (black fly),
- *Rattus rattus* (roof rat),
- *Rattus norvegicus* (Norway rat/brown rat),
- *Mus musculus* (mouse).







## Key Issue 1 – Community awareness

Effective management of vectors relies on broad stakeholder 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 vectors 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 and control

Surveillance and control programs are essential for detecting and identifying vector problems 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 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 population surveillance and control programs
- Undertake surveillance and control activities around the Rockhampton Airport before and after international arrivals
- Investigate freshwater 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

## 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
- Map vector related disease notifications
- Maintain accurate surveillance and control records
- Use trends to implement and initiate appropriate control programs
- Distribute vector data to Queensland Health

## 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 counter disaster plans
- Develop an Exotic Incursion Response Plan
- Develop a Dengue/Zika Outbreak Response Plan
- Review treatment options effectiveness and efficiency on an annual basis and adjust preferred methods to reflect findings
- Develop work instructions

## Key Issue 5 – Commitment and 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 Central Queensland Mosquito Management Group and the State Local Government Mosquito Advisory Group and have assisted organisations such as the Central Queensland University 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 2005* 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 2005* in accordance with Councils Enforcement Strategy
- Ensure compliance with legislative requirements placed on local government and Vector Management Officers.

## Key Issue 6 – Education and 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 and 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 annually to ensure that it identifies and reflects changing priorities, operational capacity and the legislative framework and has been afforded adequate financial and staffing resources.





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