

# Operational policy

## Natural Resource Management

### Mosquito and biting midge control

*Operational policies provide a framework for consistent application and interpretation of legislation and for the management of non-legislative matters by the Department of Environment and Science. Operational policies are not intended to be applied inflexibly in all circumstances. Individual circumstances may require a modified application of policy.*

**Policy subject** Under what conditions will Queensland Parks and Wildlife Service (QPWS) authorise the control of mosquitoes and biting midges in QPWS managed areas?

#### Background

Mosquitoes are native insects that breed in salt, brackish or fresh water. Midges breed in substrate generally associated with wetlands such as intertidal areas and the banks and flood plains of streams and rivers. Larvae and pupae of mosquitoes and biting midges can be an important food source for aquatic animals. Mosquitoes and biting midges contribute to the biological diversity of natural areas.

More than 220 mosquito species can be found in Queensland. A substantial number of these have been implicated as vectors of some human diseases. Midges have not been implicated in the transmission of human diseases, though they can present a problem to humans through nuisance biting and have been identified as vectors for arboviruses of livestock overseas.

The Health Regulation 1996 provides local governments with the statutory support to undertake mosquito control programs to reduce the incidence of vector-borne disease. At the same time, QPWS has a charter to conserve nature and protect native species and their habitats, including mosquitoes and midges.

Direct control of mosquitoes and midges can be undertaken by habitat modification, biological control, or in some cases, by the use of chemicals. The Australian Pesticides and Veterinary Medicines Authority (APVMA) evaluates the appropriateness of chemicals for such control in relation to environmental issues associated with their use.

Indirect control can be achieved by town planning to restrict development near or downwind of mosquito or midge breeding sites, building appropriate housing styles (e.g. elevated vs. lowset), using insect screens, using mosquito nets, protective clothing and personal repellents and avoiding areas at certain times of the day or year when biting insects are likely to be a problem. Personal protective measures can be the most effective way to prevent the spread of vector-borne diseases.

Where human activity has created mosquito breeding habitats on QPWS managed areas, QPWS may undertake management programs to reduce mosquito breeding using the most ecologically sustainable techniques.

#### Definitions

**Abate (*temephos*)** is an organophosphorous insecticide which is non-specific in its action and has acute toxic effects on a wide variety of aquatic organisms. Was once used extensively to control mosquitoes in Moreton Bay but was generally replaced in the 1990s with the more specific agents of s-methoprene and Bti.

**Adulticiding** involves spraying insecticide in a fine mist, targeting adult mosquitoes.

**Approval** is written official permission.

**Arbovirus** is an arthropod-borne virus.

**Biological agents** include control agents which kill or inhibit the growth of target organisms, but do not self-perpetuate in the wild (such as bacterial products).

**Biological control** is the artificial control of pests and parasites by use of organisms, or their products, which naturally reproduce to control the population of other organisms.

**Biopesticides** are hormones, enzymes or other naturally occurring chemicals which can be used to control **pests**.

**Biting midges** are biting insects belonging to the family Ceratopogonidae.

**Bti** is a biological agent (bacterium) called *Bacillus thuringiensis* var. *israelensis* that is specific in its action, having toxic effects on larvae of mosquitoes when ingested.

**Habitat modification** involves larger scale earthworks or vegetation removal often involving the construction of deeper ditches to increase tidal flushing and reduce ponding in upper intertidal areas.

**Nuisance** biting are the effects of mosquitoes and midges, resulting in discomfort and skin irritations.

**QPWS managed areas** include the following areas:

- protected areas (State land) under the *Nature Conservation Act 1992*;
- state forests and other lands managed under the *Forestry Act 1959*;
- recreation areas under the *Recreation Areas Management Act 2006*;
- marine parks under the *Marine Parks Act 2004*; and
- other areas where QPWS has control, trusteeship or otherwise manages the land.

**Runnelling** involves small scale habitat modification through the creation of shallow, spoon-shaped channels (maximum depth 30cm) that take advantage of existing topography and drainage lines to enhance tidal flushing of mosquito breeding areas in the upper intertidal zone.

**S methoprene** is an insect growth regulator that disrupts the maturation process of mosquito larvae, preventing them from pupating and reaching the adult (vector) stage of their life cycle.

**Serious health risk** is demonstrated by recorded cases of notifiable arbovirus infections (such as Ross River virus) or large numbers of mosquito species that are known or possible vectors of arbovirus.

**Vectors** are organisms capable of carrying and infecting other organisms with a bacteria, virus or parasite.

## Determination

A State government or local government agency (or their agent) can undertake mosquito control activities on QPWS managed areas where a state of disaster has been declared under the *Disaster Management Act 2003* and the District Disaster Co-ordinator determines such action is necessary to ensure public safety or prevent or minimise loss of human life. No permit is required in this instance.

QPWS prefers and will promote indirect control of mosquito and biting midge problems.

However, an approval for direct control may be issued where a health authority considers an emergency situation or serious health risk exists, or a government department or local government authority propose control activities where the primary aim is to reduce the incidence of vector-borne disease.

### **Application assessment and decision**

Applications will be assessed against the criteria in Appendix A before a recommendation is made to the delegate. If approved, a permit will be issued under the legislation relevant to the target area.

### **Approval conditions**

All permits issued for this purpose will contain a condition that requires the permitted activity to be undertaken in conformity with the *Mosquito Management Code of Practice for Queensland – 2012*. Conditions will also be added to address ecological protection and public interest issues relevant to the target area.

### **Control measures**

Only the following control measures may be permitted:

- source reduction – the removal/eradication of container breeding sites generally associated with human habitation. This should occur as a preventative measure.
- biological control – natural biological control is the preferred method of direct control for mosquitoes and biting midges on QPWS managed areas. Biological agents may include fish and other aquatic species. However, only fish approved by the DAF and native aquatic invertebrates may be used.
- land or aerial application of pesticides – only APVMA registered chemicals are to be used for chemical control activities.
- runnelling – only approved in protected areas when the health risk is serious and no control measure with less environmental impact is available. It will be subject to consideration of the conservation values of the QPWS managed area.
- habitat modification – may be permitted in marine parks only when the health risk is serious and no control measure with less environmental impact is available. It will be subject to consideration of the conservation values of the QPWS managed area. Will not be permitted in Protection Zones.
- adulticiding (fogging) – generally not an acceptable control for mosquitoes and biting midges in QPWS managed areas, but may be used as a method of last resort to kill adult mosquitoes within urban areas where there is a serious health risk and alternatives have been exhausted.

### **Other matters to consider**

To the greatest possible extent, insecticides used to control mosquitoes in areas under this policy are to be based only on microbial insecticides developed from the bacterium *Bacillus thuringiensis* or alternatively insect growth regulators specific to mosquitoes ('S methoprene'). These substances have a low toxicity to non-target species, present the lowest environmental hazard and therefore should be the standard for any chemical control of mosquitoes on QPWS managed areas.

Temephos (Abate®) is registered for mosquito control but is not generally accepted for use in control programs. It should not be applied in shallow lakes (less than 30cm deep) and is no longer registered for control of biting midges. Its use in QPWS managed areas (including marine parks) should be generally prohibited except as a last resort, as it has implications for Workplace Health and Safety because it is a 'hazardous substance' (see Work Health and Safety Regulation 2011 – Schedule 9) (Also refer to comments on temephos in the *Procedural guide – Mosquito and biting midge control*).

There is currently no registered chemical for biting midges in Australia. The APVMA does issue 'off label permits' to use organophosphates such as Malathion for the control of biting midge in artificial waterways, such as canal estates with sand beaches. However, the use of such chemicals in natural waterways is generally considered inappropriate and they should not be used in QPWS managed areas.

## **Additional information**

*Procedural guide – Mosquito and biting midge control*

### **Disclaimer**

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### **Approved By**

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Signature

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Date

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