CONSERVATION COMMISSION OF WESTERN AUSTRALIA

POSITION STATEMENT NO. 4

JUNE 2011

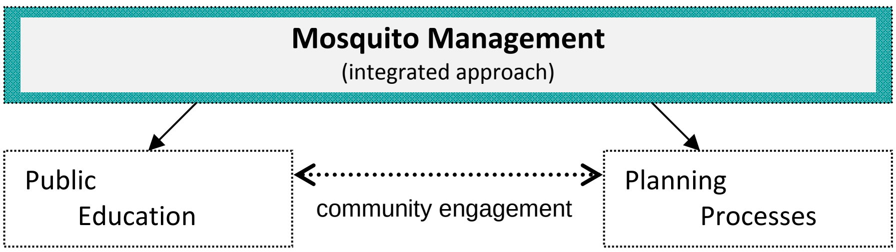
MOSQUITO MANAGEMENT

Background

Mosquito management within conservation reserves may be necessary to address public health concerns in relation to mosquito borne diseases. The need for mosquito control within lands vested in the Conservation Commission arises when humans come into contact with mosquitoes or reside in close proximity to mosquito prone areas within the conservation estate.

Mosquito management measures can vary from preventative measures through education and informed strategic planning processes (often called ‘cultural control’) and other approaches involving biological, chemical and physical controls (see Appendix – *Examples of Biological, chemical and physical mosquito controls*).

Mosquito management is considered to be more effective when it is undertaken through a strategic or integrated approach that reduces the need for biological, chemical or physical controls that may have adverse impacts on biodiversity values within the conservation estate.



- Public education:

Public education and dissemination of accurate scientific information relating to different mosquito species, their habitats and associated public health risks are an essential part of mosquito management. For example, public education and awareness can enable the public to adopt personal protection strategies such as avoiding mosquito habitats during periods of activity and other protective measures such as the use of insect proof clothing and repellents.

- Planning Processes:

Strategic town planning procedures that minimise the location of new residential development in mosquito prone areas are crucial in addressing the risk of mosquito borne diseases and therefore the need for chemical, biological or physical mosquito control. Planning processes are also instrumental in achieving effective mosquito management through community engagement, public education and consultation.

Other planning tools for addressing the risk of mosquito borne diseases include the requirement for mosquito risk assessments, mosquito monitoring and surveillance programs, mosquito management programs for specific areas and maintaining adequate buffer zones between mosquito habitats and new residential developments.

Relevant legislation

The *Conservation and Land Management Regulations 2002* require lawful authority from the Chief Executive Officer of the Department of Environment and Conservation (DEC) to be obtained for mosquito control to be carried out on lands vested in the Conservation Commission. This authority has been delegated to DEC Regional and District Managers.

The Environmental Impact Assessment of ‘proposals’ or ‘schemes’ under the *Environmental Protection Act 1986* may include mosquitoes as a relevant factor. Specific issues of concern include potential impacts of mosquitoes on the health, welfare and amenity of future residents and the potential short and long term environmental impacts of mosquito control measures (see *EPA Guidance Statement No. 40.: Management of mosquitoes by land developers*).

In addition to State legislation, mosquito control measures (biological, chemical or physical) may also trigger requirements under the *Environment Protection and Biodiversity Conservation Act 1999* in the context of ‘matters of national environmental significance’ (including Ramsar wetlands).

The Commission’s Position

Mosquito control within nature reserves, Ramsar wetlands and other wetlands with high conservation value is opposed in principle.

The Conservation Commission supports the use of town planning procedures to avoid the location of new residential developments near wetlands likely to provide habitat for large populations of mosquitoes and prone to outbreaks of mosquito borne diseases.

As the controlling body in which the State’s terrestrial conservation estate is vested, the Conservation Commission expects to be informed of proposals for mosquito control within conservation reserves, particularly, when they are likely to affect the environmental values of vested lands.

In those instances where larvicides are to be used, *Bacillus thuringiensis* var. *israelensis* and *Bacillus sphaericus* are the preferred methods, as they are considered to be highly-target specific. The insect growth regulator S-methoprene is also considered to be target-specific in adequate amounts. The application of these larvicides should be coupled with monitoring before and after their application to assess their efficacy and to prevent chemical resistance that may develop in subsequent mosquito generations.

Minor earthworks around wetlands, such as filling of wheel ruts, are acceptable, but widespread use of runnelling or major earthworks in tidal marshes, or elsewhere, in wetlands with high conservation value should not be undertaken until research examining its effects has been completed.

Fogging and the use of Bifenthrin Residual Adulticide are considered to be unacceptable methods of mosquito control due to their high toxicity to aquatic organisms

Appendix

Examples of Biological, chemical and physical mosquito controls

Type of control	Mechanism	Potential environmental impacts
Biological (bio-larvicides)		
Bacillus thuringiensis var. israelensis (Bti)	Once the larva ingests the crystalline endotoxin, the action of certain gut enzymes converts the crystal into by-products that destroy the epithelial lining of the larva's gut leading to death. The activity of the product when applied is limited to approximately 24 hours.	Considered to be highly target specific. Of all the larvicides available, Bti and Bs are considered to have the least impact on other life in the aquatic environment.
Bacillus sphaericus (Bs)	Following ingestion, destroys the epithelial lining of the larva's gut leading to death. It has the ability to replicate, producing more toxic spores and residual treatment can last up to three weeks.	
Chemical (larvicides and adulticides)		
Insect growth regulator (larvicide) e.g. S-methoprene	These substances work by mimicking a juvenile hormone (JH) that is present in the larval stage. When the larva absorbs s-methoprene that is added to the breeding environment, it mimicks the JH and prevents adult mosquitoes emerging from the pupal stage.	Considered to be 'target-specific' when applied in adequate amounts. However, its over application can lead to non-target impacts (e.g. can kill fish).
Temephos or Abate (larvicide)	This organophosphate is absorbed through larval tissue, disrupting the functioning of enzymes affecting the nervous system and leading to paralysis and death.	Potential impacts on non-target species and can have significant impacts on aquatic invertebrate fauna.
Fogging (adulticide)	Aerosol	In general, fogging ingredients are not considered target specific and some are considered to be lethal to aquatic life, particularly fish and toxic to birds.
Bifenthrin Residual Adulticide	External barrier treatments on surfaces including shrubs, hedges, tall grasses etc.	Bifenthrin adulticides should never be used near wetlands or water bodies as they can be lethal to fish and aquatic organisms.
Physical		
Runnelling	Runnels are small-scale channels that allow tidal flushing of pools within saltmarshes that allow mosquito larvae breeding in pools to be flushed out into the main estuary and by allowing fish to enter into the pools and feed on larvae.	Runnels involve a degree of modification of the physical environment. Their impact can be minimised by following natural drainage lines and having a low gradient to avoid erosion.

Source: Department of Health WA (2009) Mosquito Management Manual.