



Management of Mosquitoes and Biting Midge

Summer on the Coast... Means Mosquitoes

The perfect view, summer breezes... but nothing quite compensates for the loss of amenity that can be caused by mosquitoes and biting midge.

Mosquitoes and biting midge can make life outdoors unbearable, and mosquitoes are responsible for the spread of debilitating diseases, such as Dengue fever, Ross River fever and Zika virus. Many established suburbs have a reputation for being plagued by mosquitoes and biting midge over the warmer, wetter months, and new estates can very quickly suffer the same fate. It doesn't help 'saleability'.

Developers have a responsibility (as well as a vested interest) to minimise the potential impact of biting insects on amenity and public health under a raft of legislation and planning regulation, including the *Public Health Act 2005* and Public Health Regulation 2018, the *Planning Act 2016* and various local government regulations. Opportunities for developers to minimise the potential impact of biting insects are also regulated under the *Environmental Protection Act 1994*, the *Nature Conservation Act 1992*, *Marine Parks Act 2004*, *Fisheries Act 1994*, and others. The Local Government Association of Queensland has a Mosquito Management Code of Practice, that's adopted by local authorities and that also serves as a de facto manual for development.

Development within a recognised mosquito-prone area commonly requires the preparation of a 'biting insect management plan'. While the Code of Practice prescribes that such plans are based on a site-specific year-long survey of biting insects, it's often possible to skirt the time and expense of such surveys through the demonstration of local knowledge and the intelligent interpretation of available data.

The presence of species-specific breeding habitat, roosting habitat, and connectivity between the two and areas of proposed human activity, are all critical considerations. Other considerations include prevailing winds, micro-climate, the presence of perennial and / or ephemeral waters, topography and



Figure 1: A series of baited 'mosquito traps' are used to determine the prevalence of mosquitoes over a site.

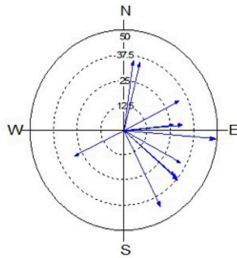


Figure 2: Pools within saltmarsh habitat commonly provide breeding habitat for a number of 'brackish water' species.

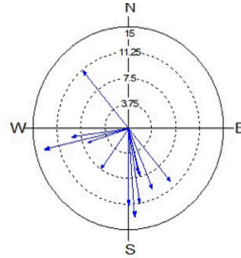


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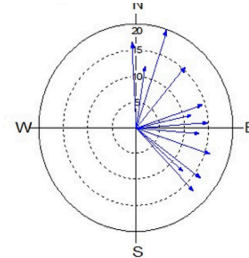
Mean Max Wind Direction



Mean 9am Wind Direction



Mean 3pm Wind Direction



Rose plots of mean wind speed and direction of all surveys. The angle of the arrow indicates the wind direction, the length of the arrow indicates wind speed.

Figure 3: An understanding of prevailing winds, together with knowledge of key breeding habitat, is used to predict the incidence of adult mosquitoes and biting midge

vegetation. There's a science to predicting when and where mosquitoes and biting midge will breed and where they'll then move to. Each of what may be a dozen or more species prevalent at a given locale will have their own preferred breeding conditions and habitat, and dispersal range. Some common coastal species readily disperse over 30 km. Variable weather patterns can result in different species dominating across the seasons and years.

On the coast of south-east Queensland, *Aedes vigilax* and *Culex sitiens* are commonly dominant over the summer months, with both species breeding in pools left by the tide (often within saltmarsh habitat). *A. vigilax* is a known vector of Ross River fever. A variety of species breed following rainfall in senescing freshwater pools.

The requirement for specific breeding habitat also provides the opportunity for targeted control measures (and the challenge of avoiding impacting non-target organisms). Development of a site presents the opportunity to significantly reduce both breeding and roosting habitat and to disrupt any connectivity between the two and areas of human activity. But poorly considered development can create ideal breeding and roosting habitat, and inadvertently connect habitat supporting high abundances of mosquitoes and / or biting midge with areas of human activity.

The effective management of mosquitoes and biting midge is relevant to both construction and operational phases of a development, with an integrated or holistic approach likely to achieve the best results. Site layout, landscaping, managing the physical environment and building design all offer opportunity to minimise the prevalence of biting insects. Of course, the design and management of wetlands and waterbodies of any type (including lakes, detention basins and sediment ponds) should be given particular attention.

Whilst there's a suite of (relatively) target-specific chemical and biological agents that effectively control mosquito breeding by impairing the development of their water-borne larvae, these control measures are largely used by local authorities working in collaboration with Queensland Health. Stocking waterbodies with larvivorous native fishes is a further measure commonly adopted by developers.

frc [environmental](#)'s Dr John Thorogood has assisted both government and developers with site-specific biting insect surveys, breeding and roosting habitat surveys and biting insect management plans to support the development approval process.

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