



Geographe Mosquito Management Group



Mosquito Management Program

2010 Annual Report

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1. Executive Summary

This report summarises the 2010 season detailing adult trap numbers, larval monitoring, aerial treatments, and emergence results.

Key outcomes for the 2010 season:

- 7 aerial treatments were conducted over Capel and 5 aerial treatments were conducted over Busselton.
- An average larval control of 87% for Busselton and 65% for Capel.
- The Shire of Capel had 6 cases of Ross River virus and 1 case of Barmah Forrest virus.
- The Shire of Busselton had 15 cases of Ross River virus

2. Introduction

The mosquito management program for both Shires has been operating since 2006, although no treatments occurred in 2006 due to low rainfall. Mosquitoes are a fact of life in the southwest of Western Australia; this is due to the quantity of wetlands in both the Shire of Capel and Busselton. A need for housing developments and reduced land availability means there are very few areas that are not within 5km of a mosquito breeding site, increasing the risk of becoming infected with a mosquito borne virus.

The mosquito management programs have been developed to meet the risks posed by mosquito borne diseases. It is simply not possible or environmentally desirable to eradicate mosquitoes as they are an important part of the ecosystem. However, it is possible to manage mosquito populations and the incidence of mosquito borne diseases such as Ross River virus with effective mosquito management.

The mosquito management program consists of 4 factors:

- Pre treatment larval monitoring
- Larviciding (aerial and hand treatments)
- Post treatment larval monitoring
- Adult mosquito trapping, identification and counting



Photo 1: Applying Bti to a wetland near Minninup Beach

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The water from the wetlands south of the Capel River flow into the Vasse Wonnerup estuary, a Ramsar declared wetland (Ramsar wetlands have international significance for their unique habitat and for bird life). The Ramsar declared wetlands resulted in the Shire of Capel and Busselton applying to the Federal Department of Sustainability Environment Water Population and Communities (DSEWPC) to operate a mosquito management strategy in this area, which is protected under the provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. The application for the Shire of Capel was approved on 14 March 2006 with no conditions. The application for the Shire of Busselton was approved on the 22 April 2005 with conditions. Below is a summary of the conditions for Busselton:

- Mosquito control program will operate on a 3 year basis only.
- S-methoprene will be used in accordance with the manufacturer's directions.
- A maximum of four applications per calendar year.
- Monitoring of non-target invertebrates.
- Avoidance of helicopter flight paths in known waterbird breeding areas.
- Ornithologist present to monitor and write a report on how to minimise the impacts of spraying operations and helicopter flight paths on waterbirds.

The Shire of Busselton have submitted a referral for continued larvicide application to the wetlands in and surrounding Vasse Wonnerup. The proposal was for up to seven application of larvicide per year, and adulticiding as required over a period of five years. The Shire of Busselton is currently awaiting Ministerial decision on the referral.

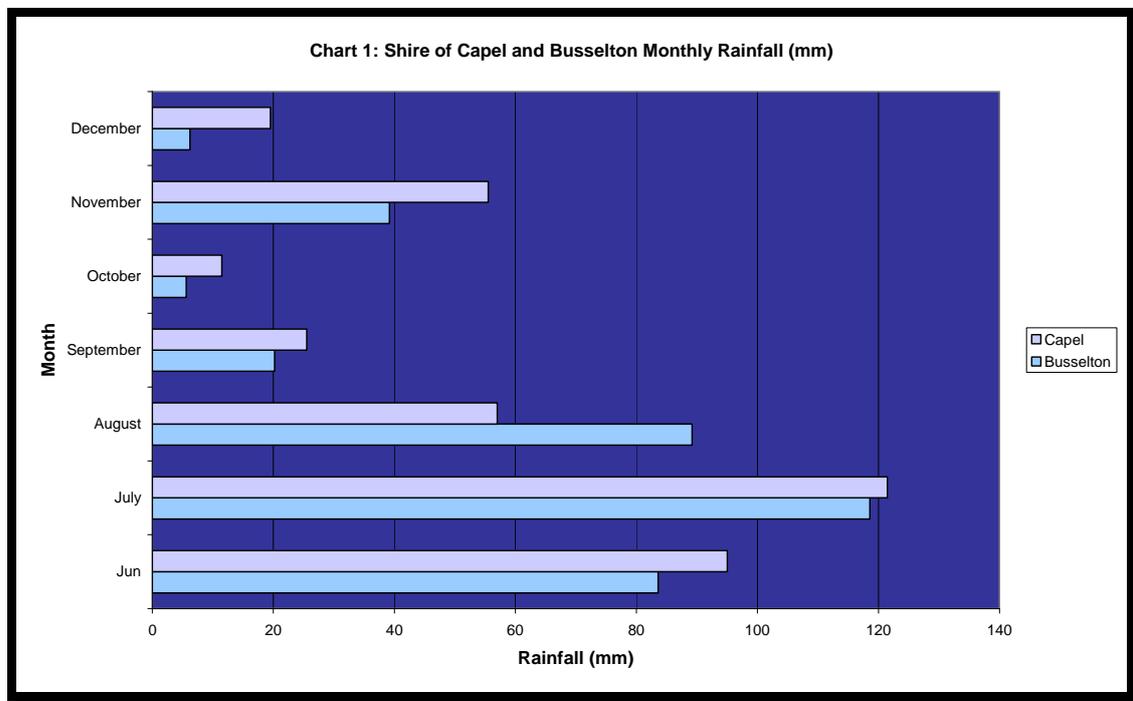
The Shire of Capel has a total of 929ha of wetland which stretches from Dalyellup down through to Forrest Beach and the Shire of Busselton has a total of 1459ha which stretches from below Forrest Beach through to Toby's Inlet near Dunsborough. Of this an estimated 1115ha is Ramsar protected wetland.

The main change for this season is the introduction of another larvicide product called Teknar 1200 SC which is a bacterium based product. For this season only hand applications could be used although it is envisioned for 2011 season to be able to apply this product via aerial treatment.

3. Weather Influences

The water level of the majority of wetlands within the two Shires is rainfall driven not tidal. There are a couple of tidal influenced sites in Busselton and Capel. The first tidal site for Busselton is Toby's Inlet and the top end of the Vasse Wonnerup wetland near Layman Bridge. Within Capel there are two isolated tidal influenced areas close to the coast one near Peppermint Grove Beach and the other south of Minninup Beach.

In 2010 the total rainfall from June to December was 362.58mm for Busselton and 385.5 mm for Capel. In chart 1, the significant rainfalls occurred in the beginning of the season. November also received large amounts of rain with a total of 39.2mm for Busselton and 55.5mm for Capel.



There were large solitary significant daily rainfall events in the end of July for both Shires with two lots of 20.3mm only a few days apart, 50mm received in August and the beginning of November received 23.2mm in a day. These rainfall events were followed by reasonably mild weather. This weather pattern increases the water levels and provides perfect conditions for larval hatching to occur. Although it was a dryer than average season, the rainfall pattern meant the aerial treatment numbers were not reduced.

4. Larval Monitoring

Larval monitoring is broken into two categories, pre treatment monitoring and post treatment monitoring. Pre treatment monitoring identifies the larval density, location, stage, species and water depth. Post treatment monitoring identifies the success of the treatment.

The season for 2010 began early with the first larval monitoring conducted on the 15th July. Due to early inundation of the wetlands, larval numbers were high and warranted an early aerial treatment in August at Capel and Busselton.



Photo 2: Mosquito larvae.

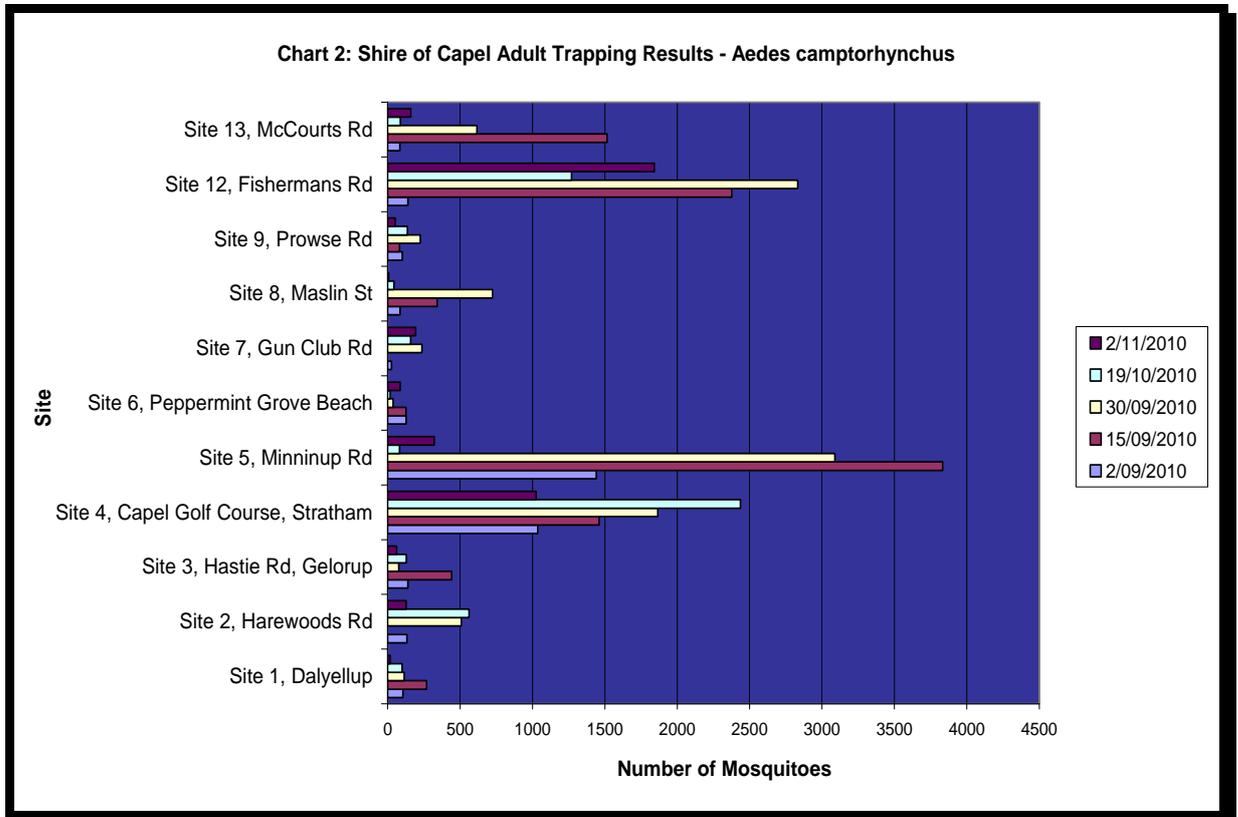
5. Adult Trapping

5.1 Shire of Capel Adult Trapping

An adult mosquito trap consists of several components; first one is an insulated tin where the dry ice is stored. Then there is a battery operated motor which rotates a small fan and operates a light. The mosquitoes are attracted to the trap by the CO₂ given off from the dry ice as it melts and the light, they are then sucked down into the trap by the fan. A container attached to the trap by a mesh sock holds the mosquitoes until they are ready to be processed.

Below in chart 2, are the adult trap numbers for the main target species *Aedes camptorhynchus* (salt marsh mosquito). This species is a vicious biter and carries both Barmah and Ross River virus; it predominantly likes brackish water and is mainly found in salt marshes. The site locations are where the traps are set; it doesn't mean that the site is responsible for the mosquito numbers.

The highest recording area is Stratham, due to the heavy vegetation cover and high acid soils making it harder to conduct aerial treatment.

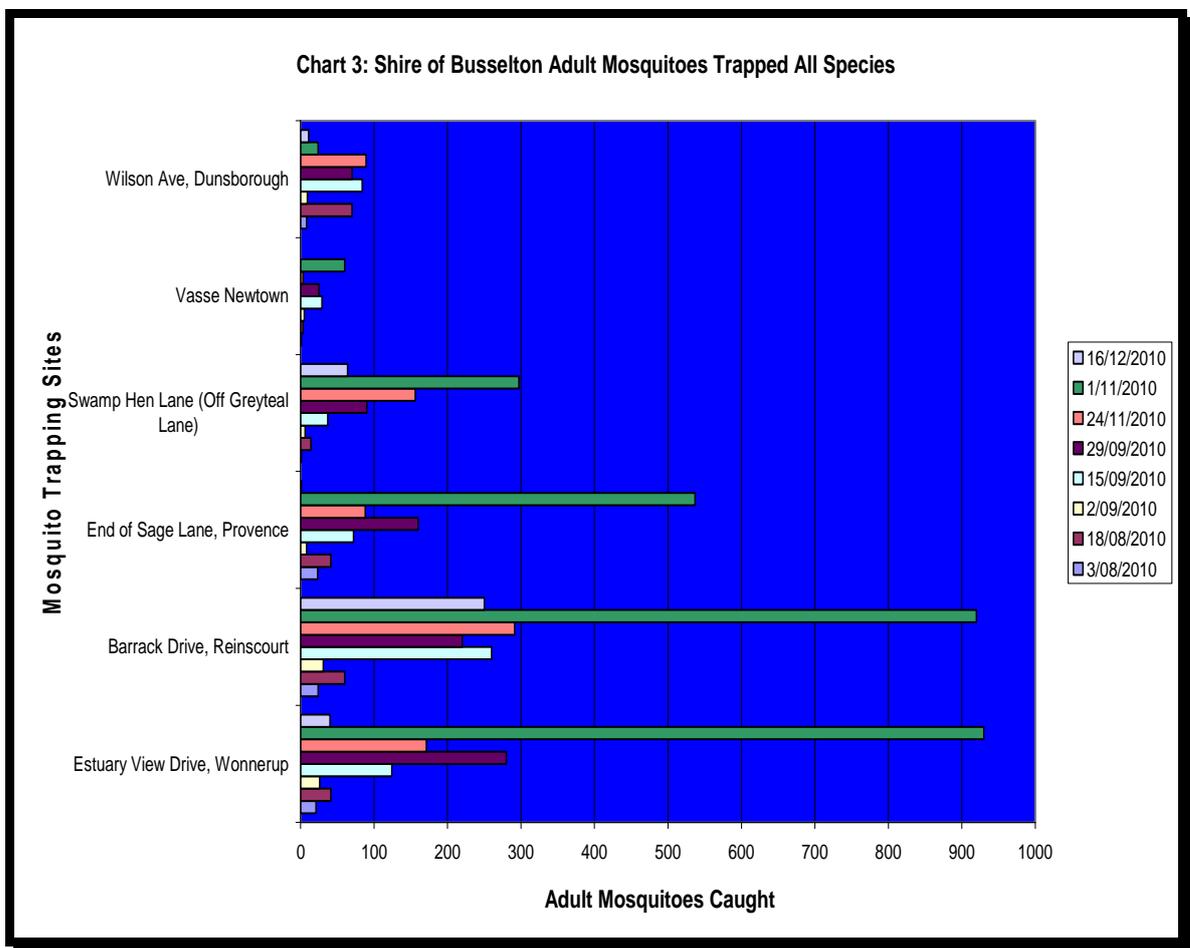


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5.2 Shire of Busselton Adult Trapping Data

The Shire of Busselton trapped regularly the 2011 season, from 6 trap sites. The trap sites were spread from Dunsborough up to Vasse Wonnerup area. Chart 3 shows the highest amount of adult mosquitoes caught were in November.

The peak in mosquito activity that occurred on the 1 November was 5 days after a scheduled larvicide treatment during which the hoppers on the helicopter failed delaying the treatment by 48 hours. The effect of a late treatment can be seen in the spike in adult mosquito numbers.



5.3 University of Western Australia Adult Trapping

The University of Western Australia Arbovirus Surveillance and Research Laboratory, also conducts trapping fortnightly. These mosquitoes are processed and used for detection of virus isolates. There are six trap sites within the Shires stretching from Woods Road in Capel through to Wilson Road, Quindalup in Busselton.

6. Mosquito Control Operations

6.1 2010 Larval Treatment Summary

There are two methods of treatment undertaken to reduce the amount of mosquito larvae emerging as adult mosquitoes. The first and main one used is aerial treatment where Prolink Prosand an insect growth regulator, is placed onto the wetlands via a helicopter where it dissolves in the water. The second method is hand treatment primarily using Prolink Briquettes which are placed out into the wetland using stakes or Bti, which is applied via pump spray pack or spray unit.

The 2010 season started off early with an aerial treatment occurring on the 6th August for Capel and Busselton. Because each adult mosquito can lay up to 300 eggs, an August treatment was favoured in order to reduce adult numbers early in the season. The early reduction in mosquito numbers could have prevented larger cohorts during the main virus season. Below is a rundown on the quantities of larvicide used per season to date:

Year	Quantity Used (kg)	
	Busselton	Capel
2007	2060	2580
2008	1300	2445
2009	1740	3100
2010	2560	2640

The Shire of Busselton conducted aerial treatments on the 6th August, 10th September, 8th October, 29th October and 18th November. The Shire of Capel conducted treatments on the 6th August, 24th September, 8th October, 29th October, 18th November and 26th November.

6.2 Hand treatments

There were more hand treatments than previous years due to the attainment of the spray unit (Photo 3). The spray unit enables targeted treatments, and treatment of isolated areas where breeding occurs and no aerial treatment is available or the size of the area is too small to warrant an aerial treatment. The Shire of Capel applied a total of 18.25L of BTI and the Shire of Busselton applied 3L of Bti.



Photo 3: Spray unit used for hand applications

6.3 Adulticides

The Shire of Capel don't use adulticides for mosquito control unless it is to control a major virus outbreak and the 2010 season saw further attenuation of the Shire of Busselton's fogging program as Federal conditions further restricted the use of adulticides.

6.4 Post-treatment Surveys and Emergence Results

After a treatment has occurred, mosquito management officers' head back into the wetlands and take samples of larvae to monitor the success of the treatment. This also allows for monitoring of the wetland after a treatment and the distribution of larvae.

If a treatment has occurred using Prolink Prosand, the post treatment survey is conducted 3 days after, this allows for the chemical to be ingested by the mosquito. Post – treatment surveys of treatments done using Bti are done usually the same day or the next day as the product works a lot faster than Prolink Prosand.

The Shire of Capel had an average of 65% emergence rate. Although due to some data not available and some samples being unattainable this figure may be a misrepresentation. The Shire of Busselton had an average of 87% emergence rate.

7. Recommendations for 2011 Season

There are no formal recommendations for the 2011 season. Although the mosquito management program's processes and methods are always refined so the most efficient operations can occur.

8. Acknowledgements

The Shire of Capel and Busselton would like to thank all property owners who allow us access onto their property to monitor larval activity in the wetlands; your cooperation is much appreciated.