Geographe Mosquito Management Group

Mosquito Management Program

2011 Annual Report
Contents

1. Executive Summary ............................................................. 1
2. Introduction ....................................................................... 2
3. Weather Influences ............................................................. 3
4. Larval Monitoring ............................................................. 4
5. Adult Trapping .................................................................... 5
   5.1 Shire of Capel Adult Trapping ........................................... 5
   5.2 City of Busselton Adult Trapping Data ......................... 8
   5.3 University of Western Australia Adult Trapping ............. 8
   5.4 Shire of Capel Mark Recapture Project ....................... 9
6. In The Media .................................................................... 10
7. Health Promotion .............................................................. 12
8. Mosquito Control Operations ............................................... 13
   8.1 2011 Larval Treatment Summary ................................. 13
   8.2 Hand treatments ........................................................ 14
   8.3 Adulticides ................................................................... 14
   8.4 Post-treatment Surveys and Emergence Results ............. 14
9. Recommendations for 2011 Season ..................................... 15
10. Acknowledgements .......................................................... 15
1. Executive Summary

This report summarises the 2011 season detailing adult trap numbers, larval monitoring, aerial treatments, and emergence results. The 2011 season was the longest season experienced since the beginning of the mosquito management strategy in 2006. This was primarily due to the extended rains received in December, a result of back to back La Nina weather patterns.

Aerial treatments were expanded in the Shire of Capel to encompass the use of Teknar 1200SC a BTI based liquid larvacide. The results were great in open areas but overall it was found to be unsuitable for heavily vegetated areas.

2011 saw the development of a mosquito awareness campaign called MAP. MAP stands for:

Management of Disease
Acceptance of Area
Protection of Self

MAP will help increase the awareness of mosquito borne disease. This has been done with the help of LadyMoz, a character created to help spread the MAP message.

Key outcomes for the 2011 season:

- 9 aerial treatments were conducted over Capel and 6 aerial treatments were conducted over Busselton.
- Creation of health promotion campaign LadyMoz
- Mosquito mark recapture conducted in Stratham, Shire of Capel
- The City of Busselton has received 20 complaints and the Shire of Capel has received 5 complaints about mosquitoes.
2. Introduction

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 City of Busselton. A need for housing developments and reduced land availability means there are very few areas that are not within 6km of a mosquito breeding site, increasing the risk of becoming infected with a mosquito borne virus.

The mosquito management programs have been developed and deployed in 2006 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

The Shire of Capel has a total of 929ha of wetland which stretches from Dalyellup down through to Forrest Beach and the City 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 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.

The City of Busselton have submitted a referral for continued larvicide application to the wetlands in and surrounding Vasse Wonnerup. Approval was issued with 15 conditions, some of which are below:
Limit of 7 treatments per annum
Adulticide (fogging) is only permitted to be applied within 1.5 km of the Vasse Wonnerup System if Ross River or Barmah Forest Virus has been detected and only if wind conditions are below 8 knots and will carry the adulticide away from the wetlands.

3. Weather Influences
The water levels of the majority of wetlands within the two local government areas are 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.

Like 2010, 2011 was a La Nina year with above average rainfall, this would explain the longer than normal season experienced. In 2011 the total rainfall from June to December was 431.4 mm for Busselton and 548.5 mm for Capel. In Chart 1, the significant rainfalls occurred in the beginning of the season. Although rainfall was low in December there was still significant inundation of the wetlands to trigger larval cohorts. This was primarily due to the quantity of water still in the wetlands late in the season.
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.

Not only was this season an extended season it was the first season we had incidences where the mosquito larvae in Busselton were at a different stage to the mosquito larvae in Capel. This posed challenges in the timing of treatments and on one occasion treatments were carried out over several days to allow for the varied stages in development.

Post treatment monitoring was carried out after each treatment. After an s-methoprene treatment only the pupae were collected, this reduced the occurrence of III or IV instars perishing and giving an unrealistic emergence result. By only collecting the pupae a faster and clearer result is achieved. After a BTi application few samples were taken as the BTi kills the larvae within 6-72 hours. What was hard to judge is the overall success rate of the treatment, a combination of larval monitoring and adult trapping numbers were used to achieve an average figure.

Photo 1: 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.

The following charts outline estimated adult mosquito numbers of Aedes camptorhynchus, divided into our four main areas Dalyellup and Gelorup, Stratham, Peppermint Grove Beach and Capel. Aedes camptorhynchus (salt marsh mosquito) 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.

![Chart 2: 2011 Adult Aedes camptorhynchus Dalyellup and Gelorup](chart2.png)
Chart 3: 2011 Adult Aedes camptorhynchus Stratham

<table>
<thead>
<tr>
<th>Date</th>
<th>Site 4, Capel Golf Club</th>
<th>Site 5, Minninup Road</th>
<th>Site 12, Fisherman Rd</th>
<th>Mangles Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th June</td>
<td>1200</td>
<td>800</td>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>19th August</td>
<td>1600</td>
<td>1000</td>
<td>800</td>
<td>600</td>
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<td>31st August</td>
<td>1400</td>
<td>1200</td>
<td>1000</td>
<td>800</td>
</tr>
<tr>
<td>13th September</td>
<td>1800</td>
<td>1600</td>
<td>1400</td>
<td>1200</td>
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<tr>
<td>29th September</td>
<td>2000</td>
<td>1800</td>
<td>1600</td>
<td>1400</td>
</tr>
<tr>
<td>6th October</td>
<td>2200</td>
<td>2000</td>
<td>1800</td>
<td>1600</td>
</tr>
<tr>
<td>16th November</td>
<td>2400</td>
<td>2200</td>
<td>2000</td>
<td>1800</td>
</tr>
<tr>
<td>12th December</td>
<td>2600</td>
<td>2400</td>
<td>2200</td>
<td>2000</td>
</tr>
</tbody>
</table>

Chart 4: 2011 Adult Aedes camptorhynchus Peppermint Grove Beach

<table>
<thead>
<tr>
<th>Date</th>
<th>Site 6, Peppermint Grove Beach</th>
<th>Site 7, Gun Club Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th June</td>
<td>1900</td>
<td>200</td>
</tr>
<tr>
<td>19th August</td>
<td>1400</td>
<td>400</td>
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<td>31st August</td>
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<td>13th September</td>
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<td>6th October</td>
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<td>1200</td>
</tr>
<tr>
<td>16th November</td>
<td>2400</td>
<td>1400</td>
</tr>
<tr>
<td>12th December</td>
<td>2600</td>
<td>1600</td>
</tr>
</tbody>
</table>
Overall Stratham had the highest trap numbers with Dalyellup and Gelorup being the second highest. Stratham was a very productive area in regards to larval numbers and the two aerial liquid larvicide treatments had a low success rate, resulting in higher adult numbers. The area itself is hard to treat due to heavy vegetation and acid sulphate soils reducing the efficacy of the treatments.
5.2 City of Busselton Adult Trapping Data

The City of Busselton trapped regularly the 2011 season, from 6 trap sites. The trap sites were spread from Dunsborough up to Vasse Wonnerup area. Overall the numbers stayed relatively low, considering the type of season experienced. There was only one major spike at Port Geographe on the 13th December. Those traps with zero collected depicts no trap set at this location during that particular trapping run, not zero mosquitoes caught.

![Chart 6: 2011 Adult Mosquitoes Collected](chart)

5.3 University of Western Australia Adult Trapping

The University of Western Australia Arbovirus Surveillance and Research Laboratory, also conducts trapping fortnightly on behalf of the Department of Health. 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.

The virus is detected through a series of laboratory procedures that isolate the virus within the mosquito. If the virus is detected the laboratory alert the Department of Health who then send a
notification in the form of a media release for the area. We use these media releases on our website, Capel Snippets and Mozz-E-Mail. Regional newspapers also use this information.

5.4 Shire of Capel Mark Recapture Project
From the 5th to the 19th October 2011 the Shire of Capel conducted a mosquito mark recapture project at Stratham. The project objectives were to determine the dispersal distance of mosquitoes bred in Stratham, determine the concentration of mosquitoes within 1km, 3km and 6km of the wetland and to obtain a greater understanding of the quantity and distribution of mosquitoes within the Stratham area.

A mark recapture collects mosquitoes over night, marks them with florescent dust and releases them. A bid is then made to recapture the marked mosquitoes over a certain area. A report of the project is available on the Shire of Capel website, www.capel.wa.gov.au.

54,000 mosquitoes were marked and released. Over the whole project period a total of 464,000 mosquitoes were recaptured. Of the 464,000, 82 were recaptured marked mosquitoes. The furthest recaptured mosquito travelled 6.4km and was recaptured 9 days after the release day. Overall 66% were recaptured within 1km radius of the wetland. There were also areas that had a high amount of adults collected. Additional mosquito traps have been placed within these areas, to better monitor them.
6. In The Media

Mosquitoes were a hot topic in the media this season with regular articles appearing in the West Australian, South West Times and Bunbury Mail. Some examples of these articles are on the next page. The articles highlight the importance and relevance of mosquito management. They also help to increase the awareness of mosquitoes within the area; the downside to this is it highlights the area as having a mosquito problem.

Every year the GMMG works towards improving and providing easy access to information for the community. We aim to achieve this through our websites, Mozz-E-Mail and local newspapers. If you would like to subscribe to Mozz-E-Mail please email the Shire of Capel at info@capel.wa.gov.au and place Mozz-E-Mail in the subject heading.
Ross River rise is due to weather

JORDAN McARDLE

THE Department of Health has voiced its concerns about the alarming increase in Ross River virus cases in the South West.

The only way a patient can be diagnosed with Ross River virus is by a specific blood test ordered by a doctor.

It can take up to three months to recover from the virus, so it’s important for people to take personal measures.
7. Health Promotion

This season Ladymoz and her MAP campaign were developed and instigated to help create awareness about mosquitoes and mosquito borne disease. Ladymoz has been created to act as an ambassador between Health staff and the mosquitoes. Using Ladymoz, we are able to give out tips and advice on how the community can avoid being bitten by a mosquito and reduce their risk of obtaining a mosquito borne disease.

The official launch for Ladymoz and the MAP campaign was at Capelfest on the 1st April 2012. Information folders containing a pen, information flyers on the Shire of Capel Mosquito Management Strategy, Ladymoz and the MAP campaign and Ross River virus, and stickers. A total of 126 folders were given out and there was plenty of opportunity to talk about mosquitoes and Ross River virus. All in all the launch was seen as a success and Ladymoz was a great conversation starter.

The Shire of Capel also had a display at the community information nights and Capelfest. The display showcased what is being done to manage mosquitoes. There was also a microscope, so the community were able to get up close and personal with mosquitoes.

The City of Busselton have conducted presentations to Council on the mosquito management program.
8. Mosquito Control Operations

8.1 2011 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 chemical is applied via a helicopter. The second method is hand treatment which is applied via pump spray pack, spray unit or via manual spreading.

Two chemical types were used this season in four different formats below is a summary of each chemical and the type of format used.

**s- methoprene (Prolink Prosand, Pellets and Briquettes)**
A chemical that operates as an insect growth regulator (IGR). IGRs interrupt the growth stages of the larvae. More often than not those that do grow through to the adult stage are not viable adults. The Shire of Capel and City of Busselton, use it in a granular version which is applied usually via helicopter into the wetland where it dissolves. They also use a slow release briquette, which is predominantly used in drains and smaller areas. The Shire of Capel also trialled the use of a slow release pellet, quite a costly format but it is intended to provide coverage for 28 days.

**Bacillus thuringiensis subspecies israelensis serotype H14 (Teknar 1200SC)**
A bacteria based formula that targets the larvae. As the larvae ingest the formula it affects their midgut and kills the mosquito larvae within 6 to 72 hours. This formula has only been used in the Shire of Capel in a liquid format in both aerial and hand applications.

As previously mentioned the 2011 season was the longest season since the start of our mosquito management program. The first treatment for the season was on the 17th August and the last treatment was carried out in Busselton on the 20th December. The last treatment for Capel was the 16th December. Below is a rundown on the quantities of Prolink Prosand used per season to date:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity Used (kg)</th>
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<tbody>
<tr>
<td></td>
<td>Busselton</td>
</tr>
<tr>
<td>2007</td>
<td>2060</td>
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<tr>
<td>2008</td>
<td>1300</td>
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<tr>
<td>2009</td>
<td>1740</td>
</tr>
<tr>
<td>2010</td>
<td>2560</td>
</tr>
<tr>
<td>2011</td>
<td>2900</td>
</tr>
</tbody>
</table>
Below is the total amount of Teknar 1200SC used by the Shire of Capel:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity Used (L)</th>
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<tbody>
<tr>
<td>2011</td>
<td>Capel 672</td>
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8.2 Hand treatments

There were small amounts of hand treatments conducted during the season. The majority were done with BTi and briquettes and there was a small hand treatment conducted with Prosand on the Ramsar wetlands in Busselton.

Photo 3: Hand application of BTI.

8.3 Adulticides

The Shire of Capel don’t use adulticides for mosquito control. The 2010 season saw further attenuation of the City of Busselton’s fogging program as Federal conditions further restricted the use of adulticides.

8.4 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 3-5 days after treatment has occurred, this allows for the chemical to be ingested by the mosquito. Post – treatment surveys of treatments done using Bti are usually done the same day or the next day as the product works a lot faster than Prolink Prosand.

9. Recommendations for 2011 Season

- Change the recording of hand treatments into one single spreadsheet, example in Appendix 1. This will provide a simpler reporting point for the end of the year.
- Additional adult traps to be placed at Gelorup and Stratham to increase monitoring in these areas.

10. Acknowledgements

The Shire of Capel and City of 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.

Additionally we would like to thank the Department of Health Mosquito Borne Disease Control Branch and University of Western Australia Arbovirus Surveillance and Research Laboratory for your ongoing support and advice.
## Appendix 1 – Excel Spreadsheet for Recording Hand Treatments

### Mosquito Hand Treatment Record

<table>
<thead>
<tr>
<th>Treatment Number</th>
<th>Treatment Date</th>
<th>Start Time</th>
<th>Finish Time</th>
<th>Larvacide</th>
<th>Areas Treated</th>
<th>Area m²</th>
<th>Quantity</th>
<th>Total</th>
<th>Applicators</th>
<th>Comments</th>
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