Progress Report August 2020. Mosquito control assessment.

Kawana Forest is one of several areas with increasing residential, retail and recreational areas that are experiencing more mosquito borne issues as the urban/natural environment interface collides more and more. This past year we have heard from the new shopping centre, sports teams using the western fields and several residents who have all advised of the mosquito issues during this past summer.

Our team have been undertaking preliminary work at this location to identify 1. Which mosquito species are causing the issues, 2. Where from and when they are breeding/emerging and 3. Is the identified breeding area a location we should include in our aerial treatment program starting with some trials.

Ground or aerial control is not always the answer due to the costs or may be part of an integrated program including education or physical barriers in an area where residents may have a low tolerance or simply not aware of these seasonal issues that surprise them after moving in, causing angst and frustration thinking they may be an issue all year.
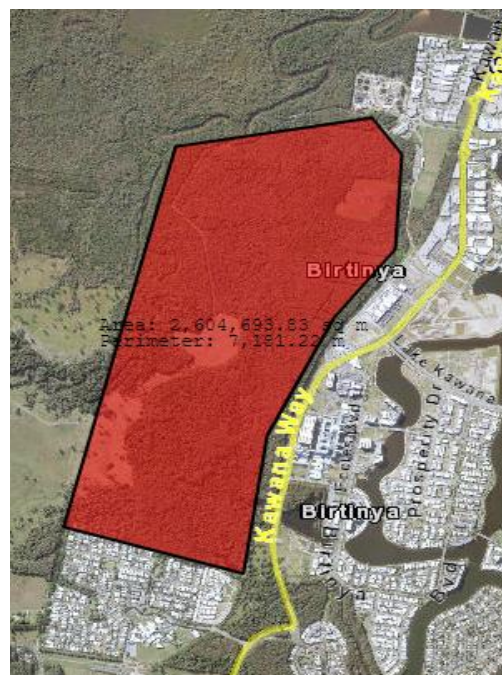


To paint a picture of where we are at with this I can provide the following data and our commentary which hopefully assists. Starting with the below graph of Kawana Forest highlighting rainfall data vs mosquito abundance and what we have found to date as we work through this issue.
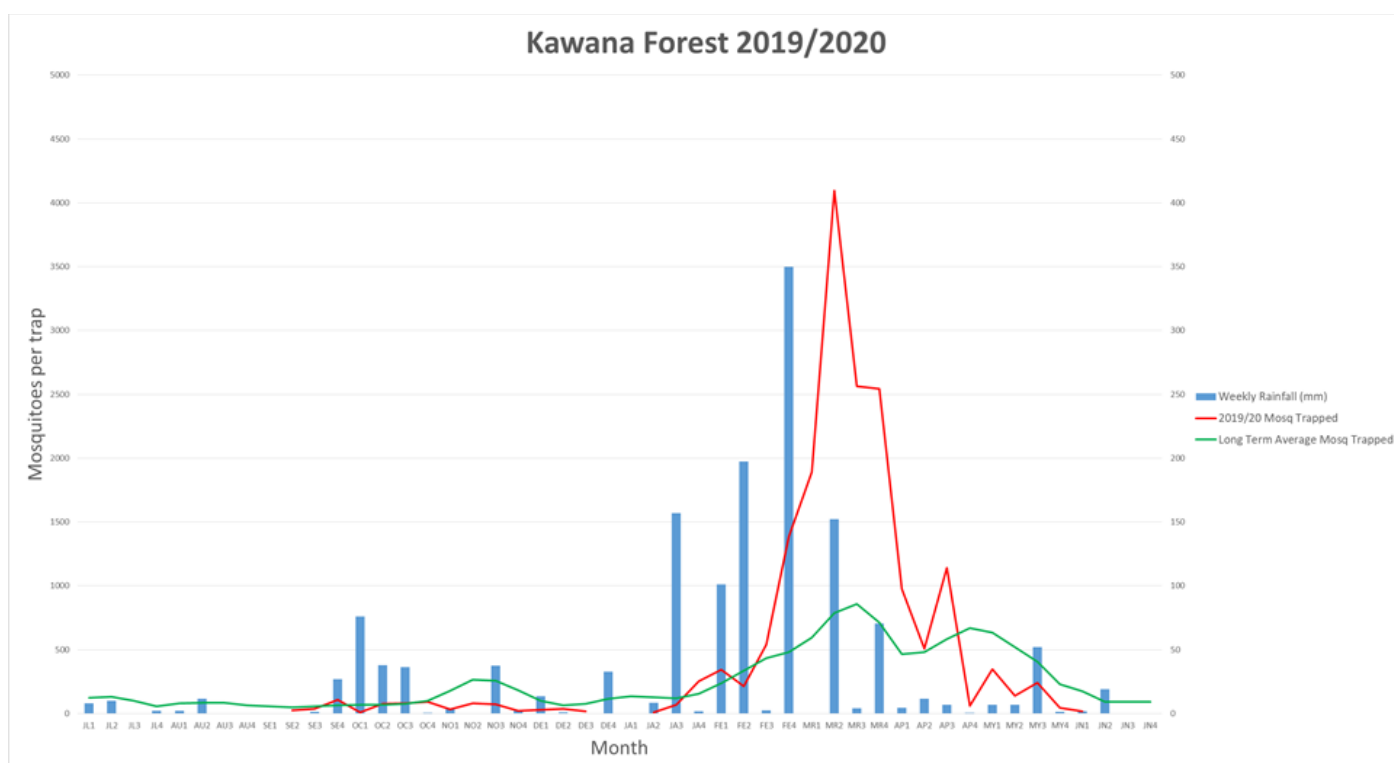


As represented by the red line on the above graph, this was the worst season we have on record for the Kawana Forest survey trap with what we would consider extremely high mosquito abundance for the immediate area. At the peak during most of March 2020 it was almost 5 times higher than the long term average (green line) which typically does not cause a lot of concern for surrounding residents. You can see a clear link between extreme rain events (blue bars) and peak mosquito abundance (red line) at Kawana Forest over the following weeks. Almost 300mm of rain that fell in the first two weeks of February started the rise in abundance and then 350mm in the last week of February really drove the increase of mosquito populations into mid-March.

The mosquito species most abundant are in the below table highlighted in yellow. The vast majority of these species specifically emerge from freshwater breeding habitat which we know is the 200ha+ of Kawana Forest conservation area. These particular species only fly a few hundred meters specifically from stagnant pooling freshwater found within coastal wet/swampy forested areas. Species on the list not highlighted are either tidal saltwater species or open grassed paddock breeding mosquitos so coming through the area from further afield and in relatively low numbers.

The most abundant family of species in the table is the Aedes group. These particular mosquitos lay their eggs on dry areas around temporary water bodies where predators cannot establish and can lay dormant for several years. A significant rainfall event in the summer months then floods the area and the eggs emerge once submerged, usually all in one large hatching event.

**Identification of species in the Kawana Forest survey trap**

| Species | Average Per Trap | Percent of Total |
|---|---|---|
| *Aedes procax* | 315 | 48% |
| *Aedes sp Marks #52* | 156 | 24% |
| *Aedes multiplex* | 68 | 10% |
| *Culex orbostiensis* | 34 | 5% |
| *Aedes vigilax* | 15 | 2% |
| *Aedes notoscriptus* | 14 | 2% |
| *Culex annulirostris* | 11 | 2% |
| Others (26 species) | 47 | 7% |
| **Totals** | **660** | **100%** |

How rain falls in freshwater mosquito habitats determines how productive they are. Average rainfall levels only partly flood breeding sites (for example at a guess only 25%) and they dry out after only producing average levels of mosquitoes which may not be an issue for surrounding residents. Extreme rain events like early 2020 can fully flood every potential breeding site (ie they are 100% flooded) and they produce extreme numbers of mosquitoes in a very short period of time. This is what occurred earlier this year across many areas of coastal lowlands with similar low lying habitat causing issues that neighbouring properties may not have experienced for many years due to the record rainfall totals.

From our mosquito trapping data in that area over the last ten years it appears that only one summer in every three has larger populations of mosquitoes. It appears to be a sporadic problem closely linked to extreme rain events. Now we know what type of problem it is, what the environmental 'triggers' are and when they occur we can assess the Kawana Forest conservation area to determine what percentage of this area would be required to trial an aerial treatment program. Essentially how much of this area holds water post 25mm, 50mm and 100mm+ rainfall. From there we can put some costings together for what it would cost to include in our treatment program for an average or well above average wet season.

In closing, the current Saltmarsh Mosquito control program currently treats 1000ha+ each run with typically 80%+ reductions each treatment across the coastal areas. However we have trialled similar control work over an area of freshwater mosquito breeding habitat of 100ha to the south west of Coolum (delete 'in similar habitat') in 2018 that we did not have much success with. This was due to the high organic matter in the water, thick canopy cover preventing consistent chemical application and myriad of mosquito species all emerging at different times depending on the saltwater/freshwater mix of the stagnant water. So in these larger freshwater mosquito habitats it can be a complex issue with the limited broad scale control options available to council. However we do enjoy a challenge and can keep you updated over the next few months of the progress of this preliminary work.
End.