Mosquito Surveillance Report

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Contents

Executive Summary

Most Recent Collection

As predicted, the most recent trap collection (June 10, 2014) saw normal (medium) levels of mosquitoes for this time of year, with geographic dispersal throughout the county.

Forecast

We forecast that mosquito levels will remain at medium-low levels for the rest of the month, falling by June 30th to approximately 125 mosquitoes per trap (70% range of 0-285).

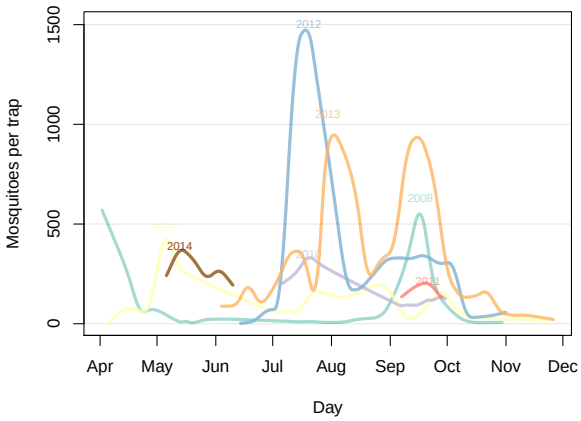
Predictive Model Validation

At 193.7 specimens per trap, the most recent collection was very similar to our prediction of 181 specimens per trap (and well within our 70% confidence interval of 23-339).

Visual Overview

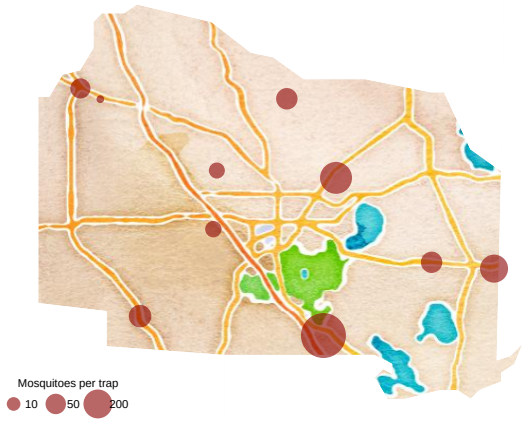
Time

As with previous years, the current mosquito population is at medium-low levels.



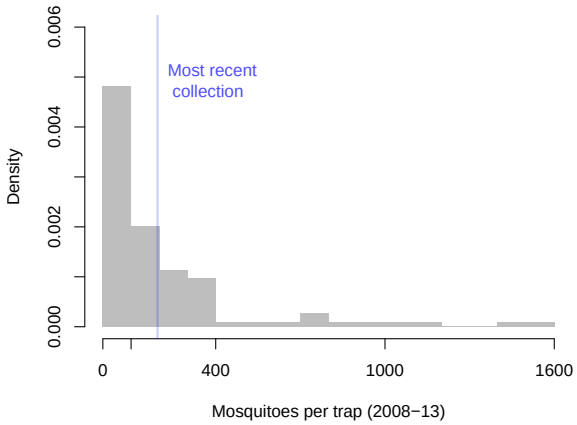
Space

Though numbers were highest in the traps in the east (Hawthorne) and south (Micanopy), mosquitoes were largely scattered throughout the county.



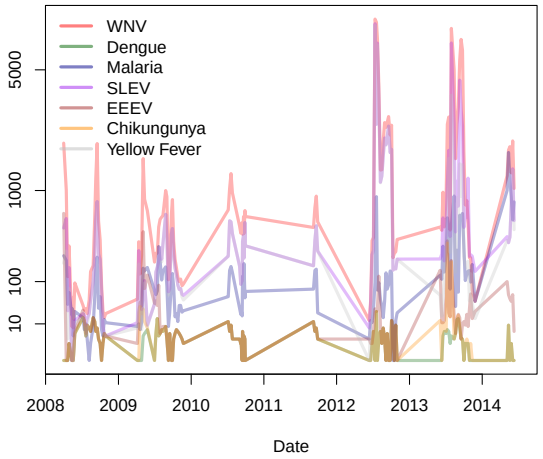
Normality

The most recent collection was at levels equivalent to approximately the 65th percentile of historical (2008-13) levels.



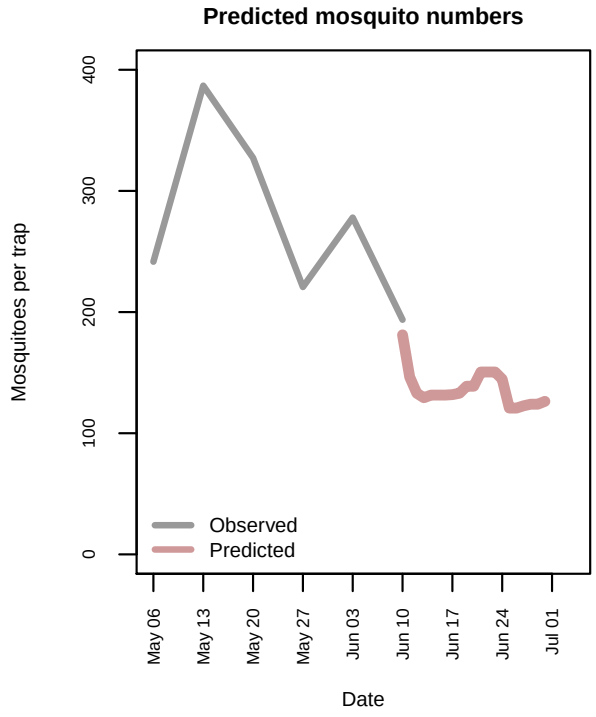
Disease Vectors

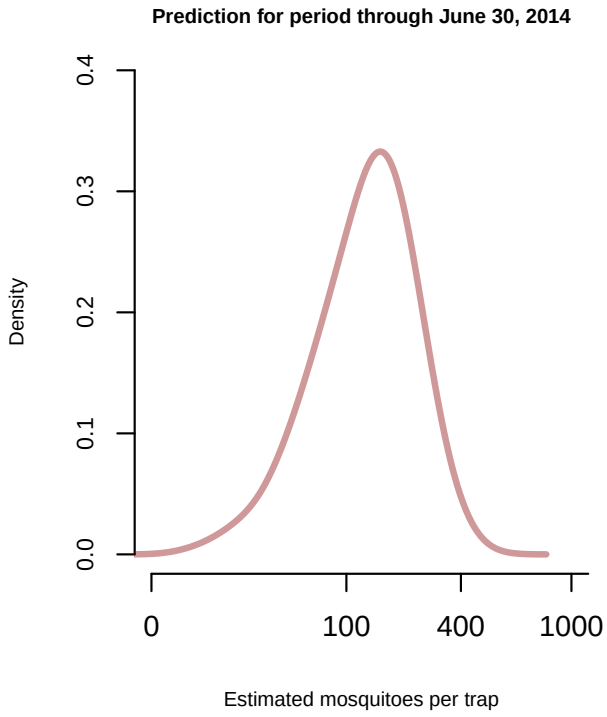
Of recently trapped mosquitoes, those species capable of carrying West Nile Virus are at high levels.

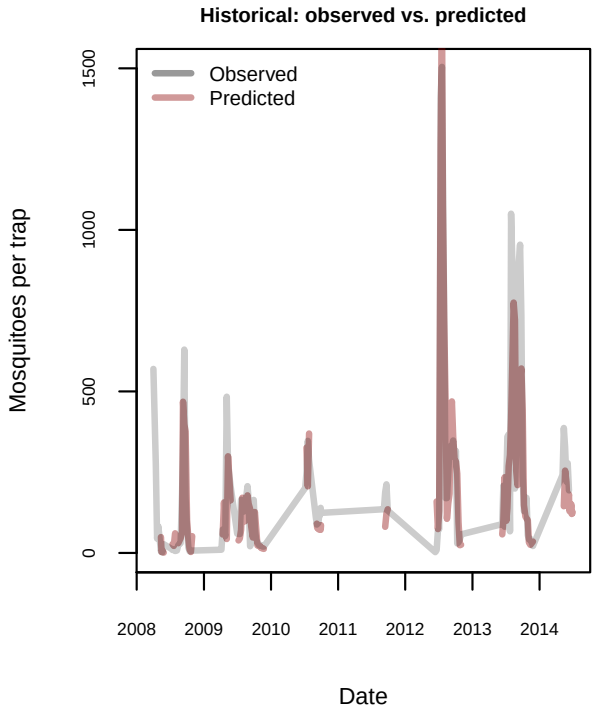


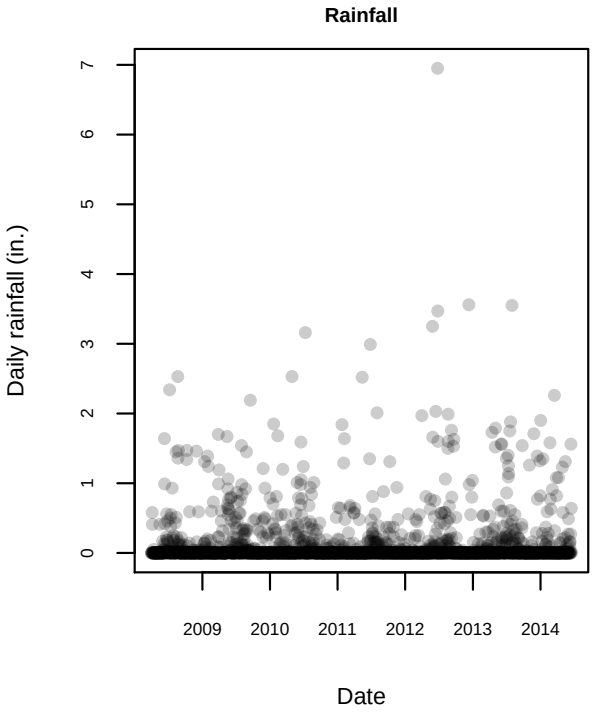
Forecast

We use recursive, quadratic linear regression modelling to forecast the average number of mosquitoes per trap up to 15 days in advance.[1]







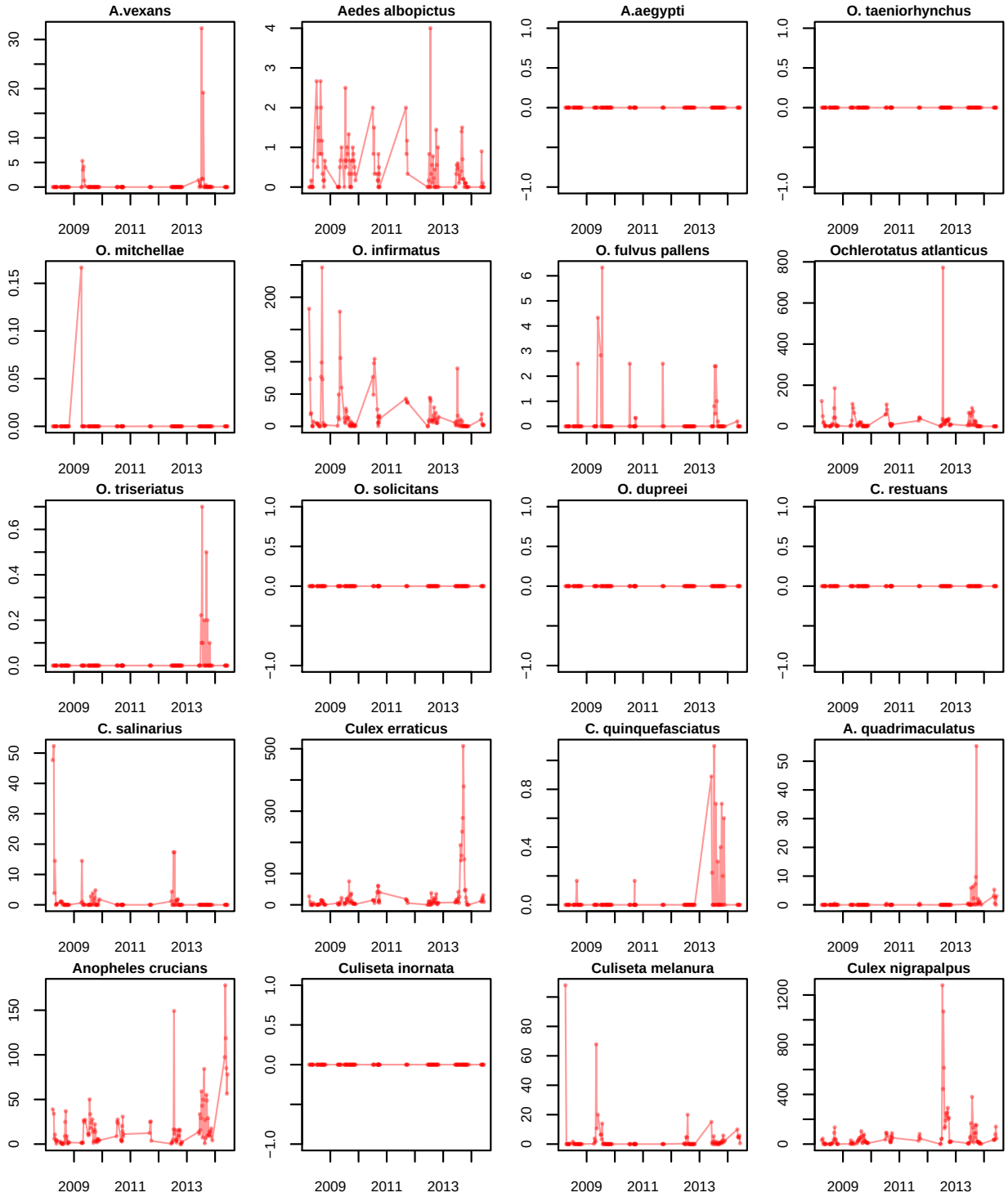


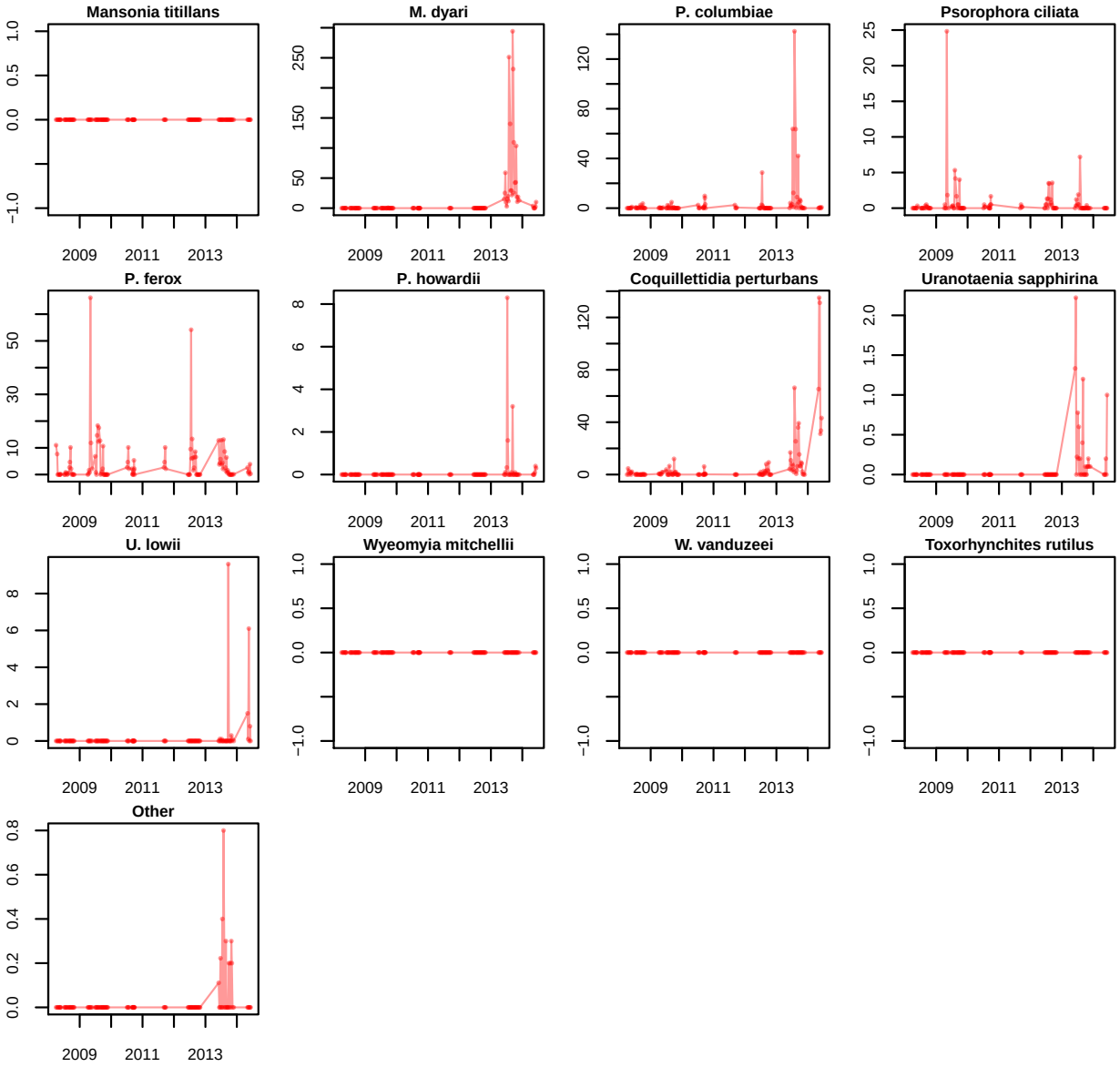
[1]For the first report, our forecast only extends one week in advance, due to delays in modelling and obtaining data.

Vectors of Disease by Location

Mosquito Types

No particular species shows abnormal growth in recent weeks.




Mansonia titillans
M. dyari
P. columbiae
Psorophora ciliata
P. ferox
P. howardii
Coquillettidia perturbans
Uranotaenia sapphirina
U. lowii
Wyeomyia mitchellii
W. vanduzeei
Toxorhynchites rutilus
Other
2009
2011
2013

Details of Predictive Model

Historically, the model has performed well, correctly predicting the late summer spikes in 2012 and 2013. Given the preference for accuracy at high numbers, the model intentionally includes outlying high observations, thereby weighting them.

Having simulated more than 65,000 unique models, our best fit equation (using the sum of least squares approach) was:

$$\hat{Y} = \beta_0 + \beta_1^2(5.6508) + \beta_2(0.5938)$$

where $\hat{Y}$ is the estimated mean number of mosquitoes per trap, β_0 is set to 0, β_1 is the cumulative rainfall in the period 15 to 29 days prior to the date of prediction and β_2 is the mean number of mosquitoes per trap in the most recent prior trap collection.

Though an original model relied only on rainfall, incorporating the most recent trap predicition saw our R-squared improve from 0.52 to 0.82. This means that we can now explain over 80% of the variance in mosquito populations up to 15 days ahead of time.