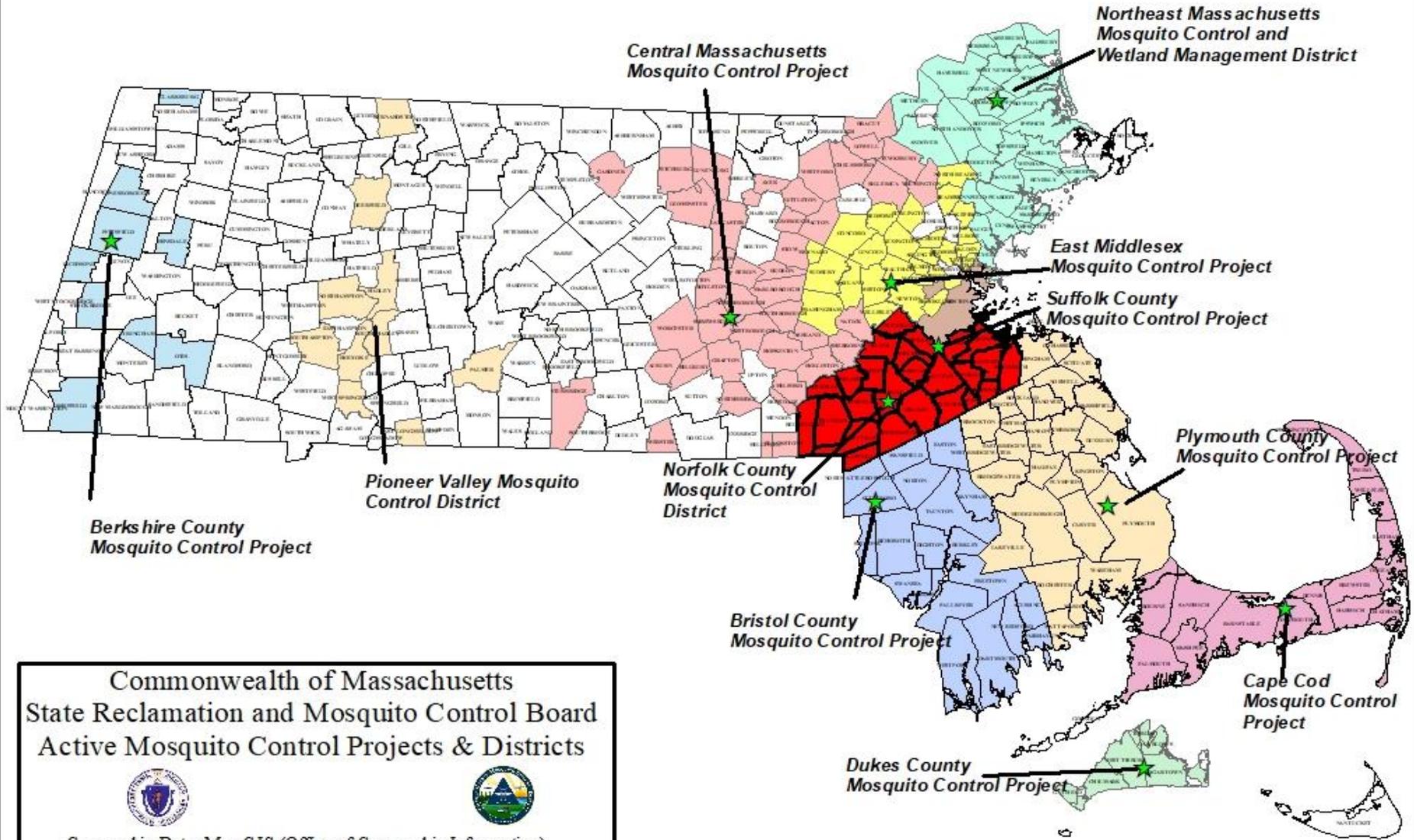




LiDAR: An Effective Tool for Accurate Flood Plain Aerial Larvicide Treatments?

A Trial Run from the Neponset River Flood Plain in Massachusetts

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**Commonwealth of Massachusetts
State Reclamation and Mosquito Control Board
Active Mosquito Control Projects & Districts**



Geographic Data: MassGIS (Office of Geographic Information)
Commonwealth of Massachusetts EOTSS
Created by Nate Boonisar, January 8, 2020



Main Goals

- Explain what LiDAR is
- Show three very similar flood events
 - 2013: Treatment area “guessed”
 - 2018: Not Treated
 - 2019: Treatment area using LiDAR
- Show results and new questions



Main Goals

- **NOTE:** Not intended to be a scientific study.
 - Idea for presentation originated in the “Request Results”
 - No control sites, inconsistent timing of trap setting.



What is LiDAR?

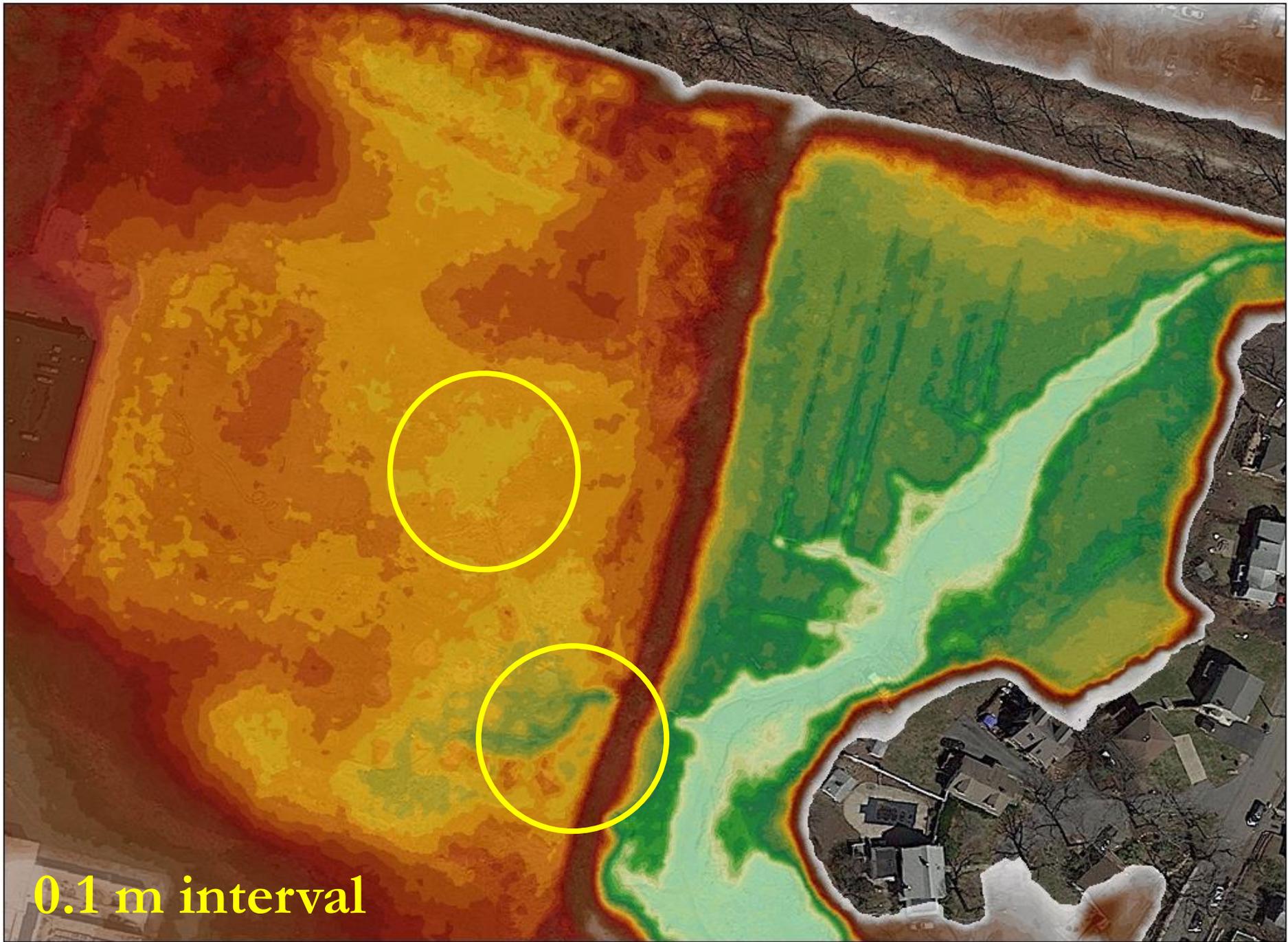
- Light Detection And Ranging
- NOAA: “a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the Earth”
 - Topographic (land)
 - Bathymetric (water)
 - Images taken from airplane or helicopter



What is LiDAR?

- Highly accurate elevation data
 - 5 to 25 cm accuracy
- Available from many GIS-related websites (MassGIS)
- Requires some GIS/Remote Sensing knowledge to convert the data to fit your needs





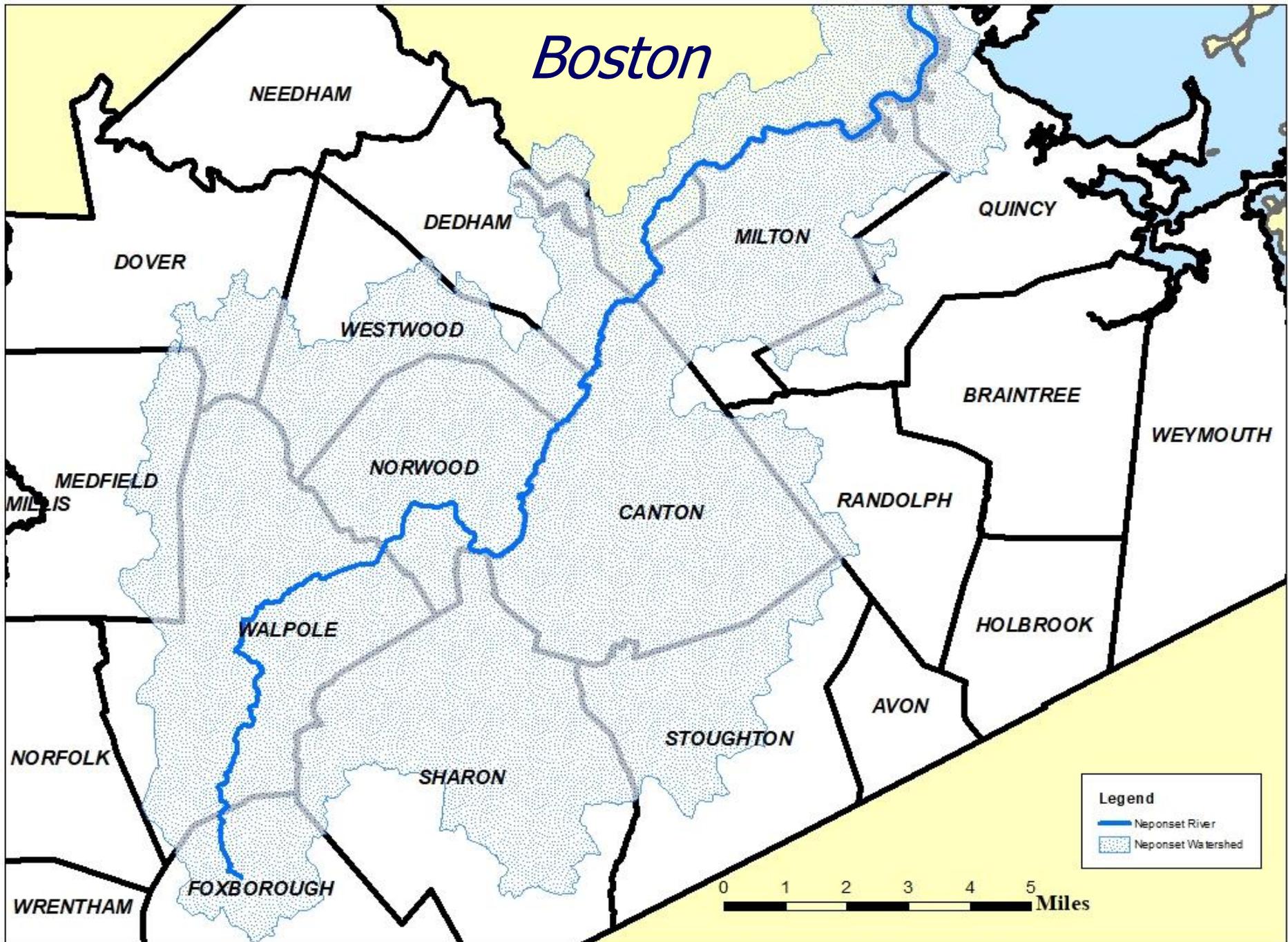
0.1 m interval

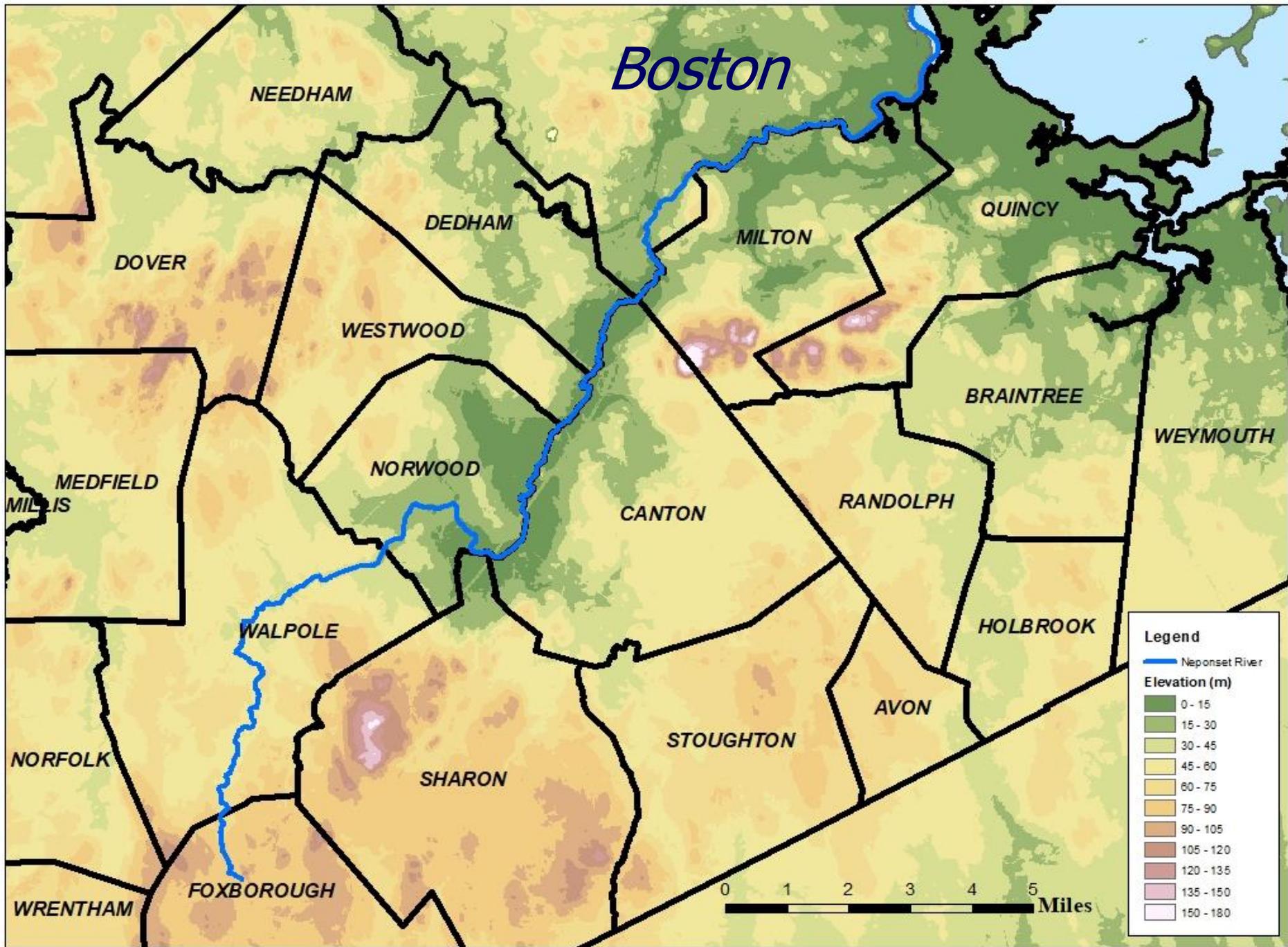


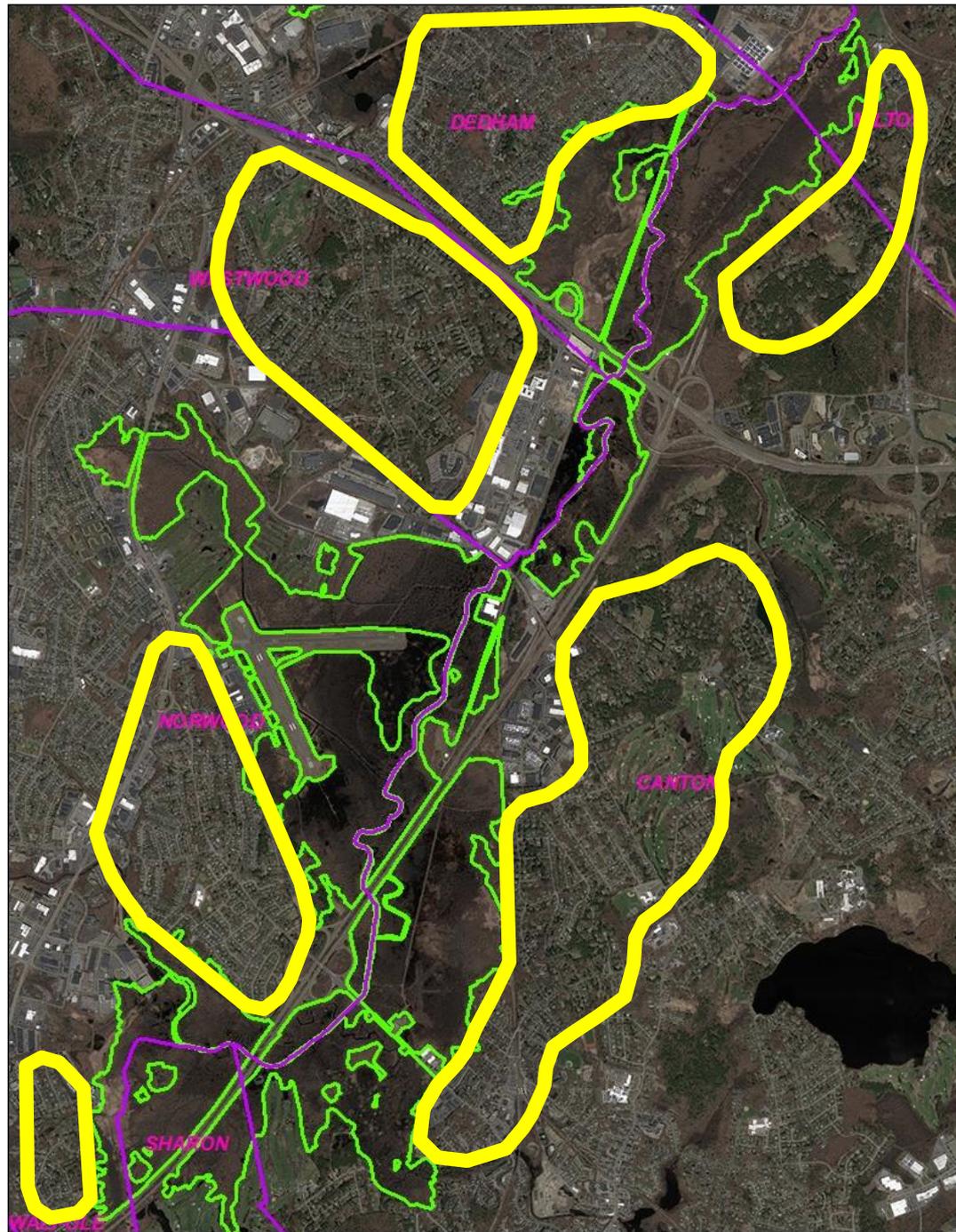
Neponset Flood Plain

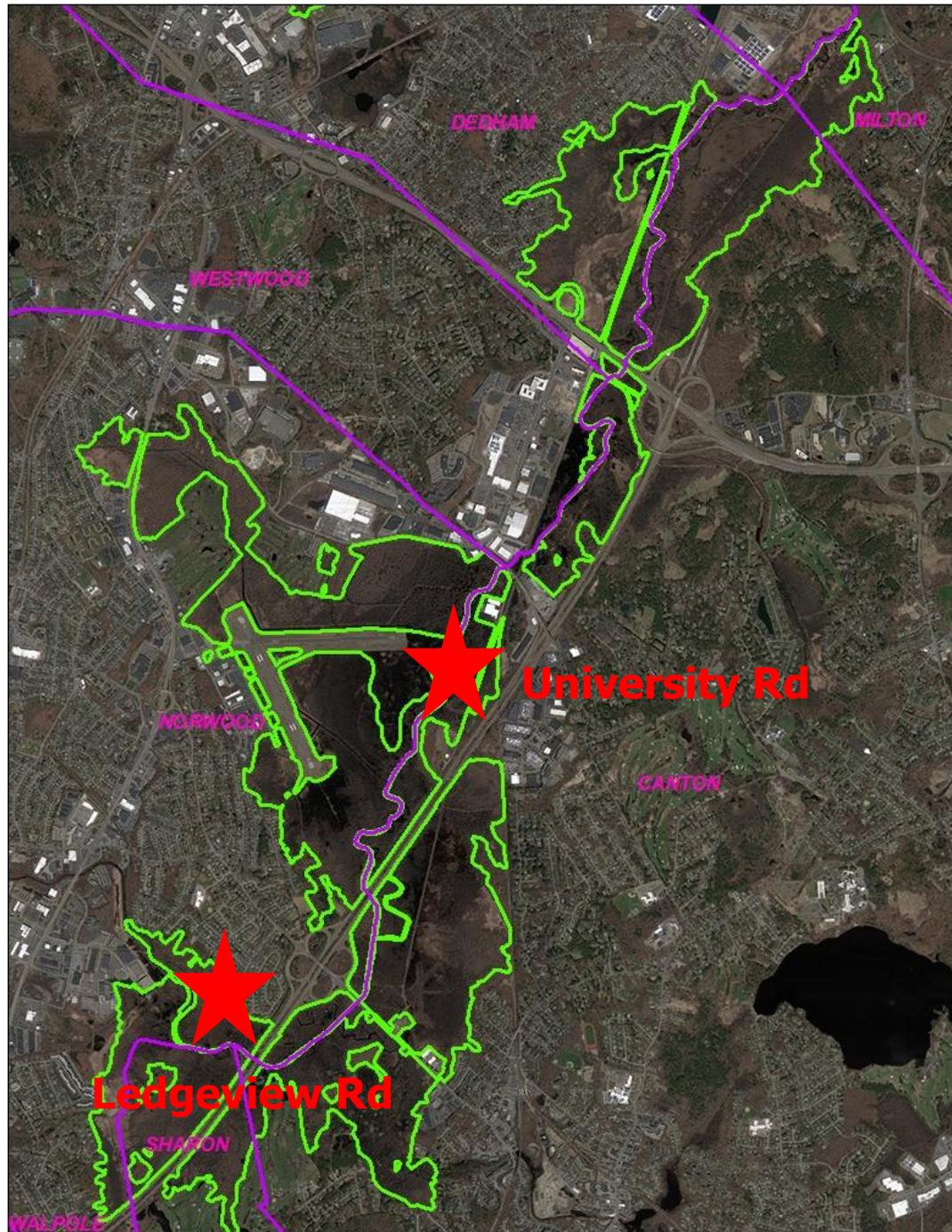
- Along the Neponset River
 - 6 miles long by 1 mile wide
 - 6 Towns (Canton, Dedham, Milton, Norwood, Sharon, Westwood)
 - **Ae vexans, Ps ferox**, (thousands!)
 - Oc Sticticus, Oc trivittatus
 - **Oc Canadensis????**
- Major problem for adjacent neighborhoods

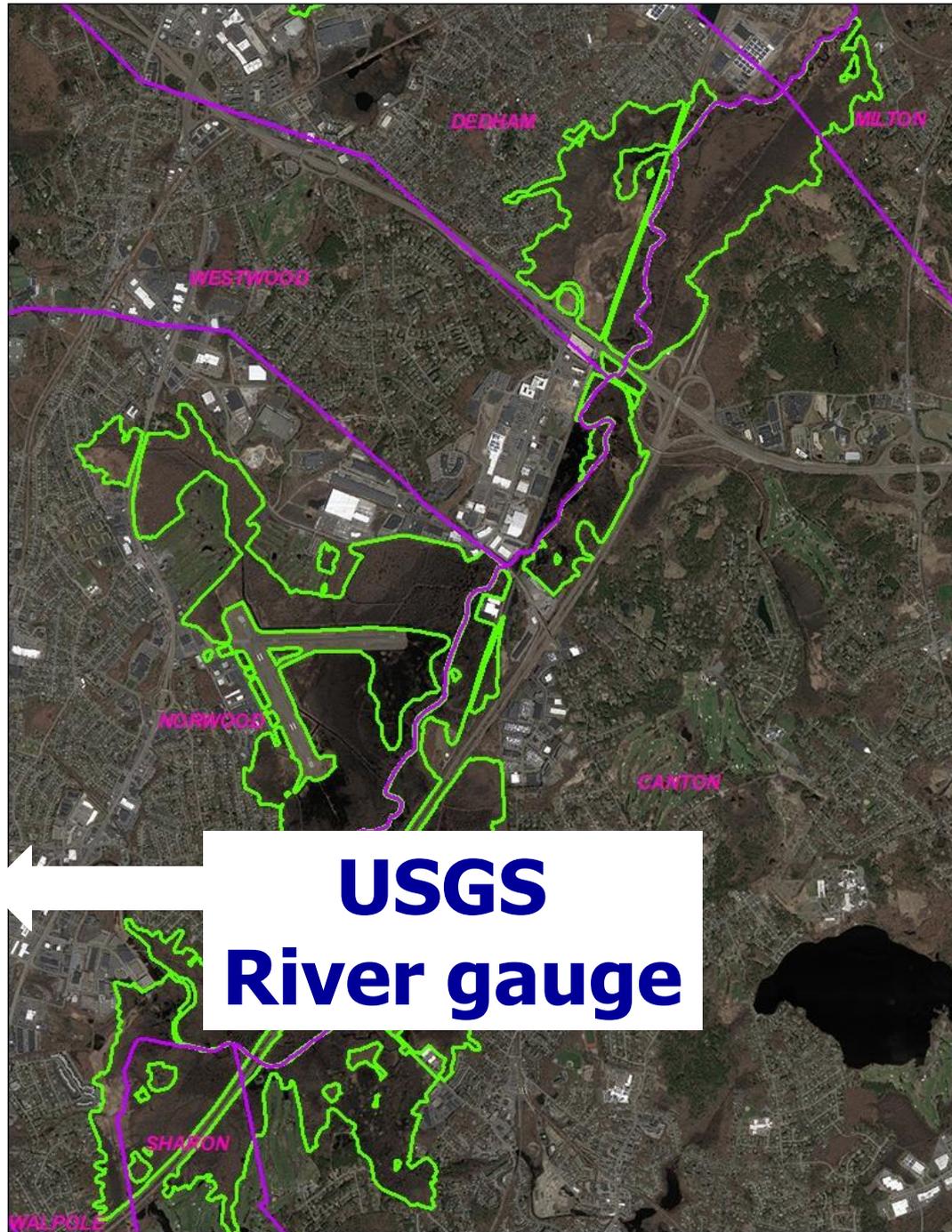
Boston











USGS 01105000 NEPONSET RIVER AT NORWOOD, MA



**Minor
Local**

**Significant
Neighborhood**

**Major
Multi-Town
(Flood stage)**



Neponset Flood Plain

- A gage height of 8 ft or above will likely trigger an aerial larvicide after larval surveillance
- The Problem:
 - Where is the water on the flood plain???

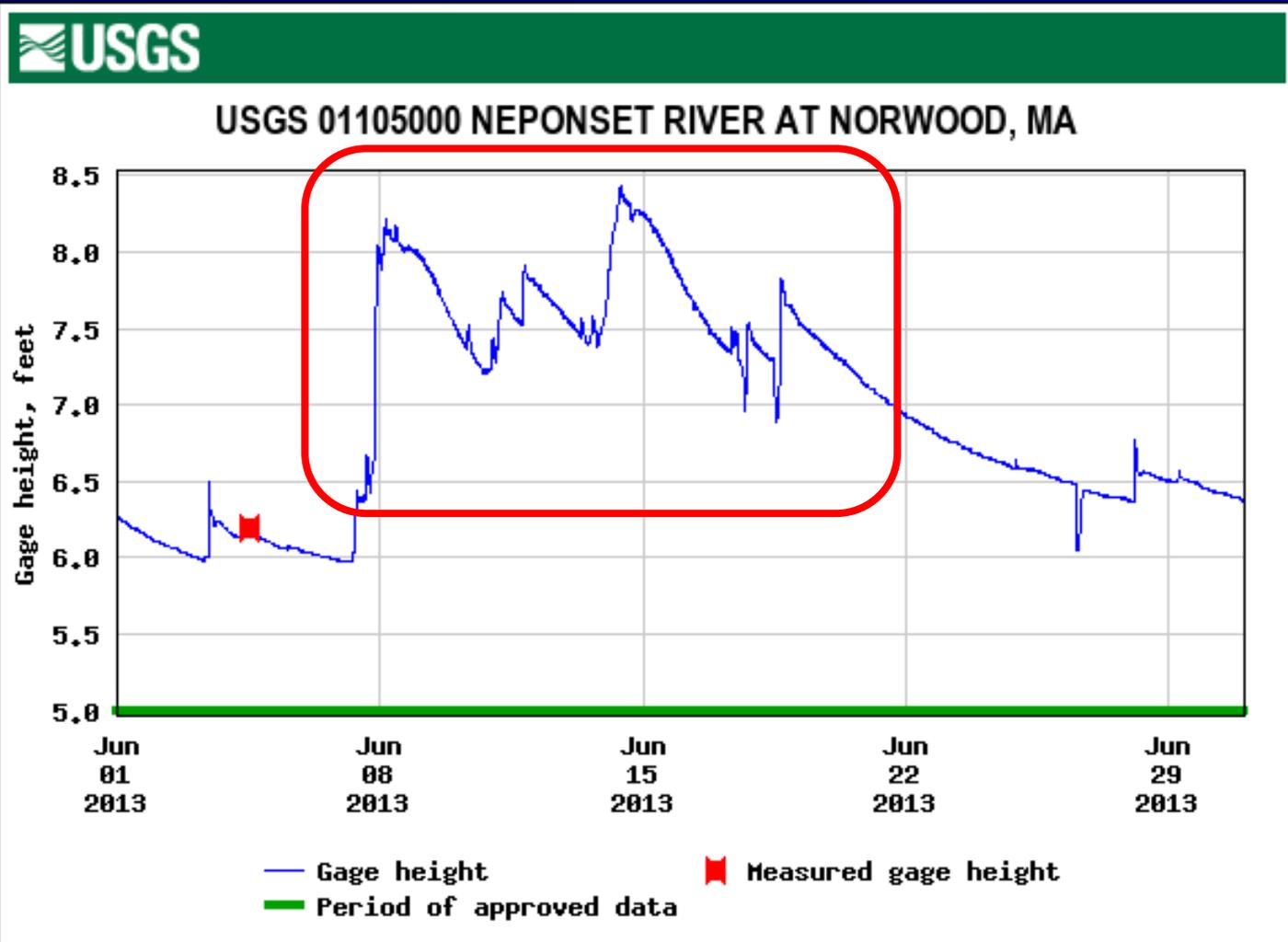


Neponset Flood Plain

- Wetland boundary maps show the maximum extent of flooding.
 - At gage height of 8 ft, large areas will be dry or too deep.
 - Treat it all?
 - Educated guess where water is? Treat it, hope for the best or at worst, take hundreds of angry ULV requests?
 - Fly along and look for water and treat?



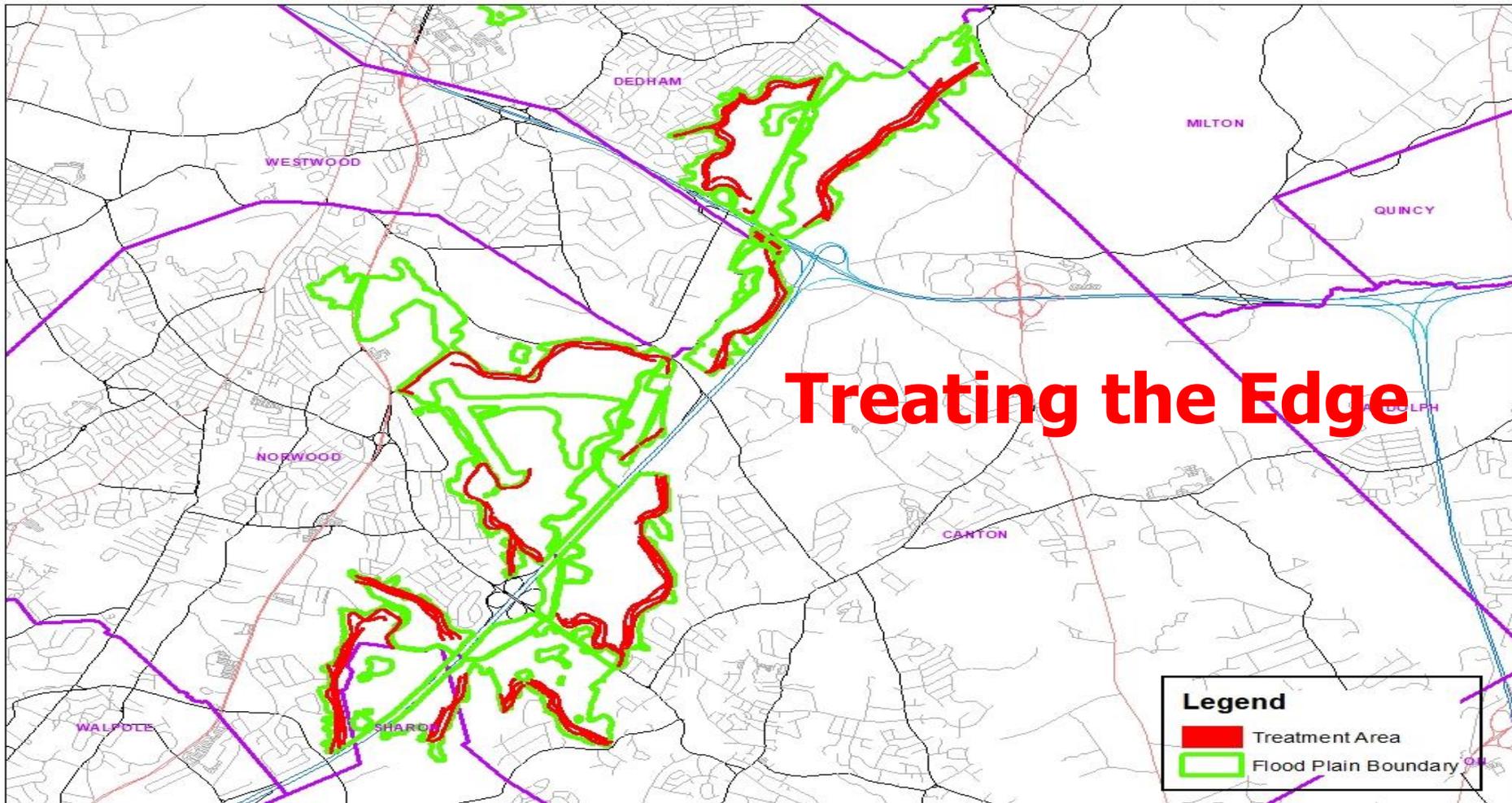
Neponset Flood Plain June, 2013





Neponset Flood Plain

June 13, 2013

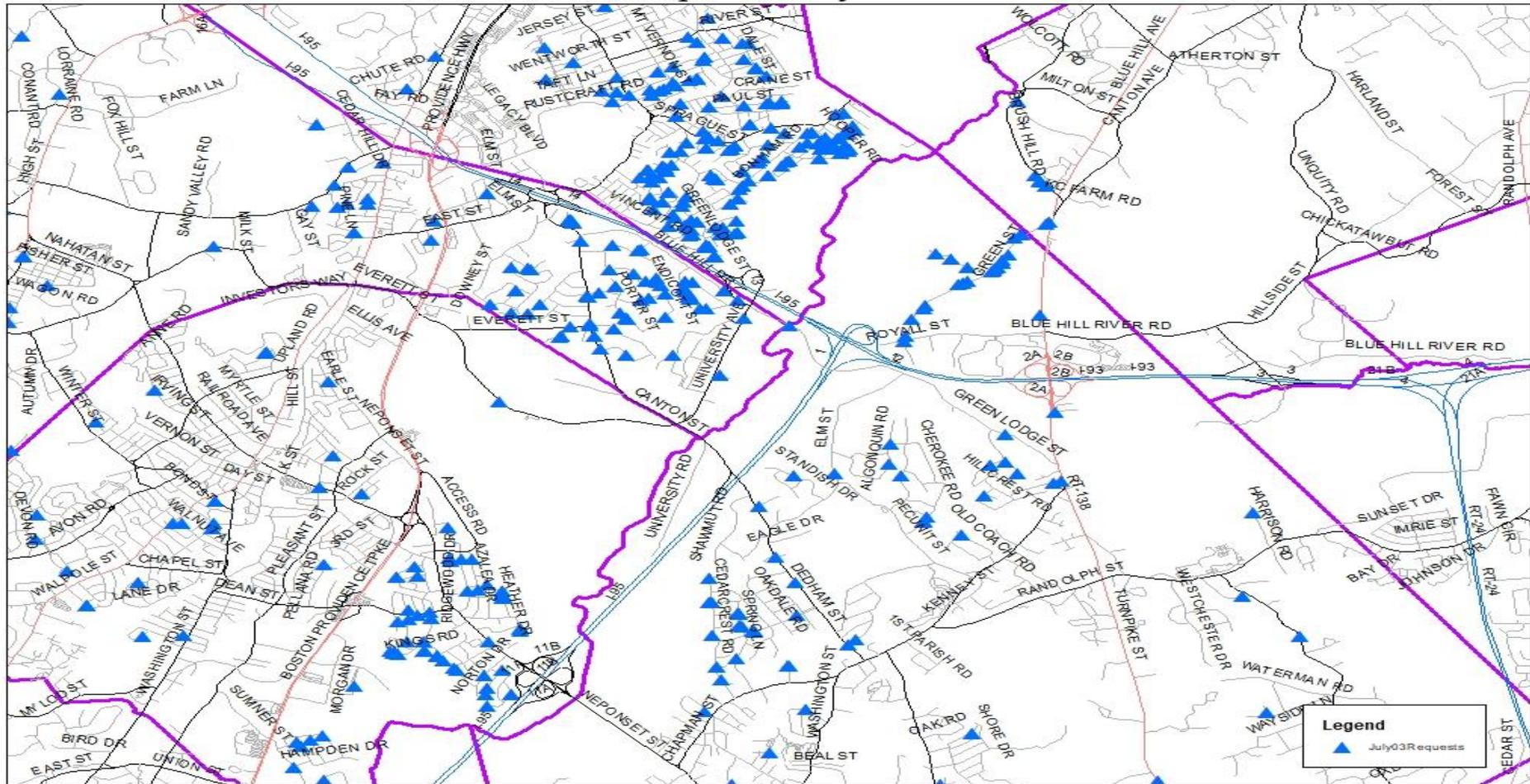




Neponset Flood Plain

July 3, 2013

ULV Requests, July 03, 2013





Neponset Flood Plain June, 2013

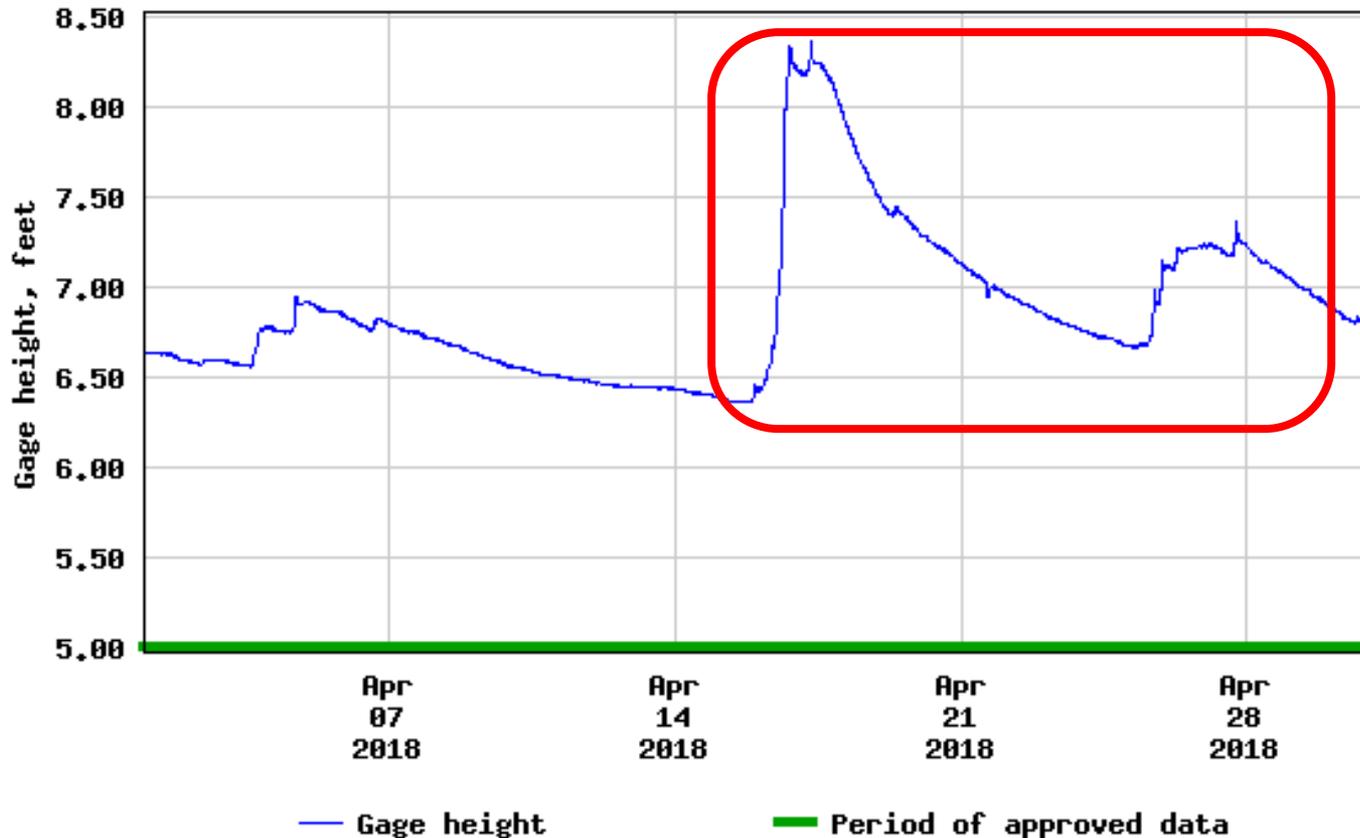
- University Rd CDC Trap mosquito numbers:
 - June 18, 2013: 314
 - 69% Ae Vexans
 - June 25, 2013: 13,556
 - 99.2% Ae Vexans, Ps Ferox
 - July 02, 2013: 10,759
 - 85.9% Ae Vexans, Ps Ferox
 - 9.0% Oc Canadensis (new hatch?)



Neponset Flood Plain April, 2018



USGS 01105000 NEPONSET RIVER AT NORWOOD, MA

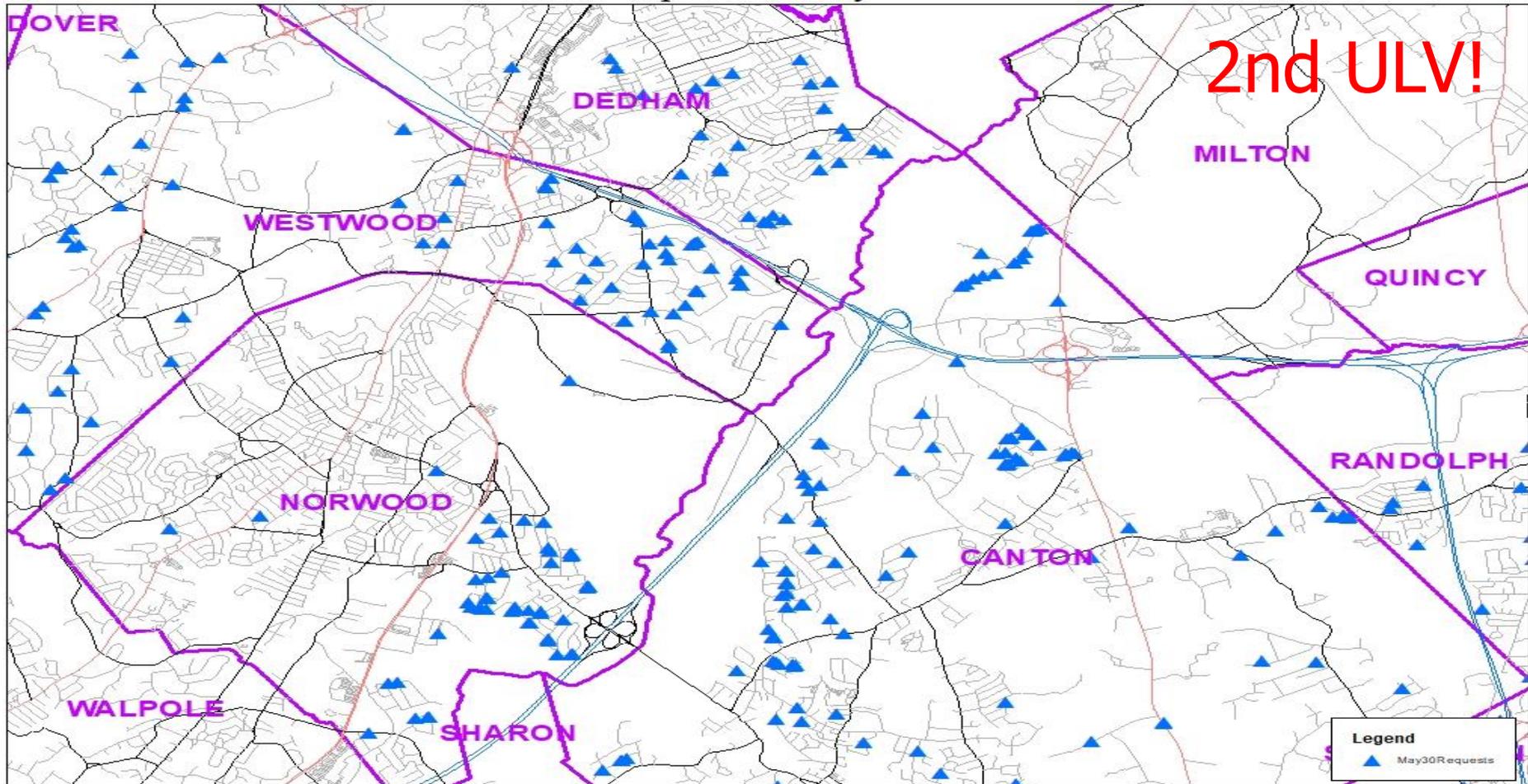




Neponset Flood Plain

May 30, 2018

ULV Requests -- May 30, 2018





Neponset Flood Plain May, 2018

- Ledgeview Dr CDC Trap mosquito numbers
 - May 14, 2018: 815
 - 65.9% *Oc Sticticus*
 - 28.3% *Oc Canadensis*

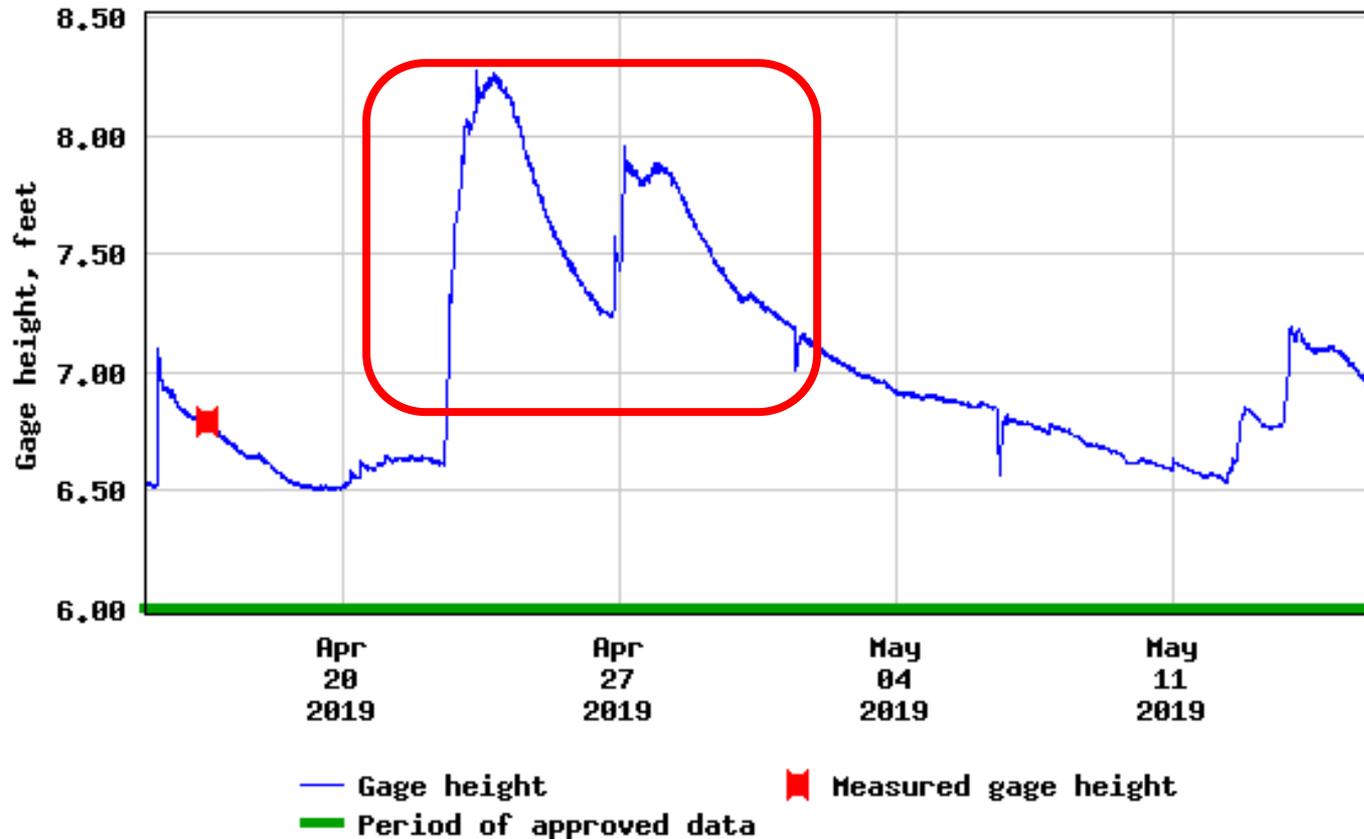
 - May 21, 2018: 3,170
 - 53.7% *Oc Canadensis*
 - 39.6% *Ae Aurifer*

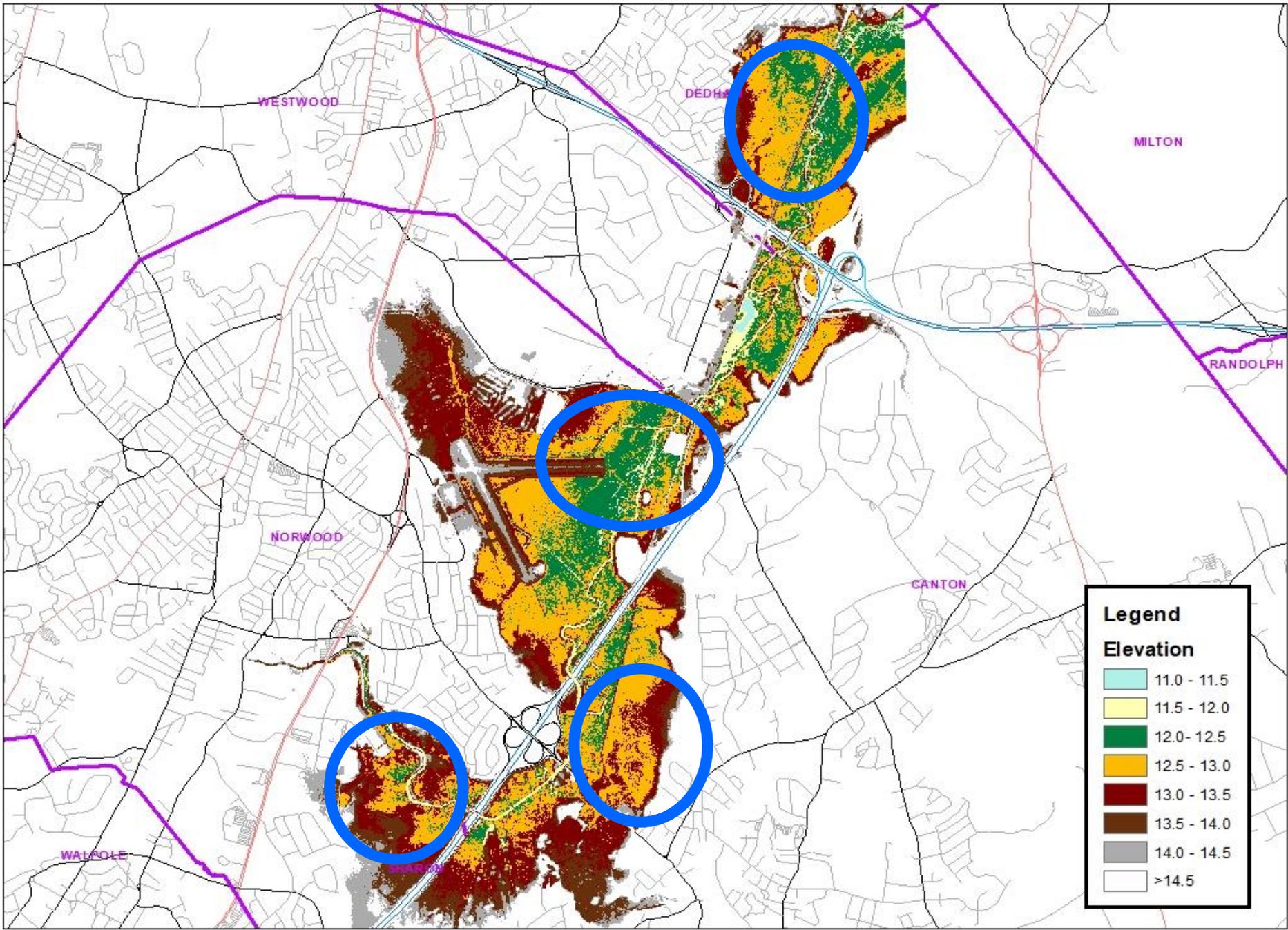


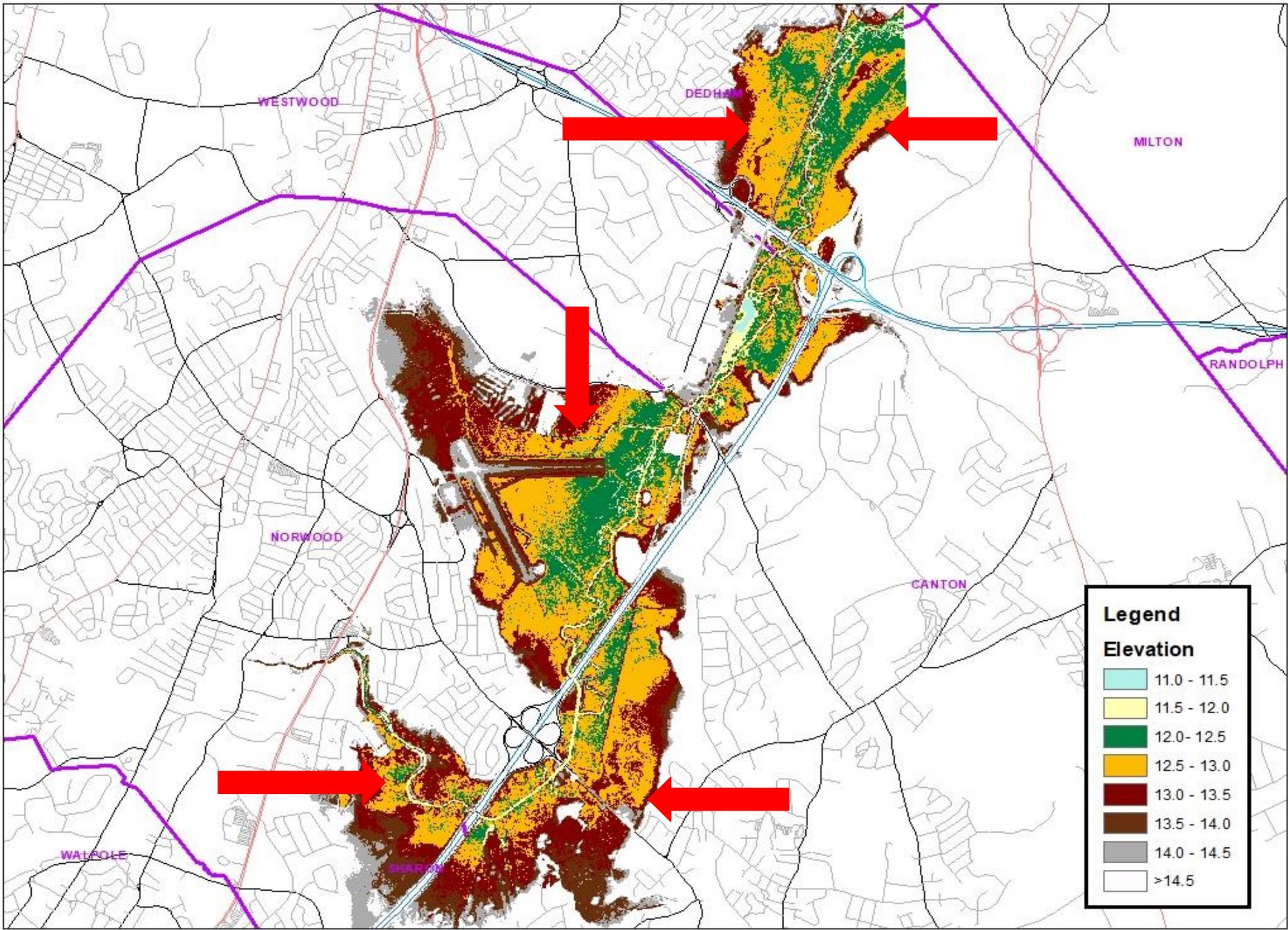
Neponset Flood Plain April - May, 2019

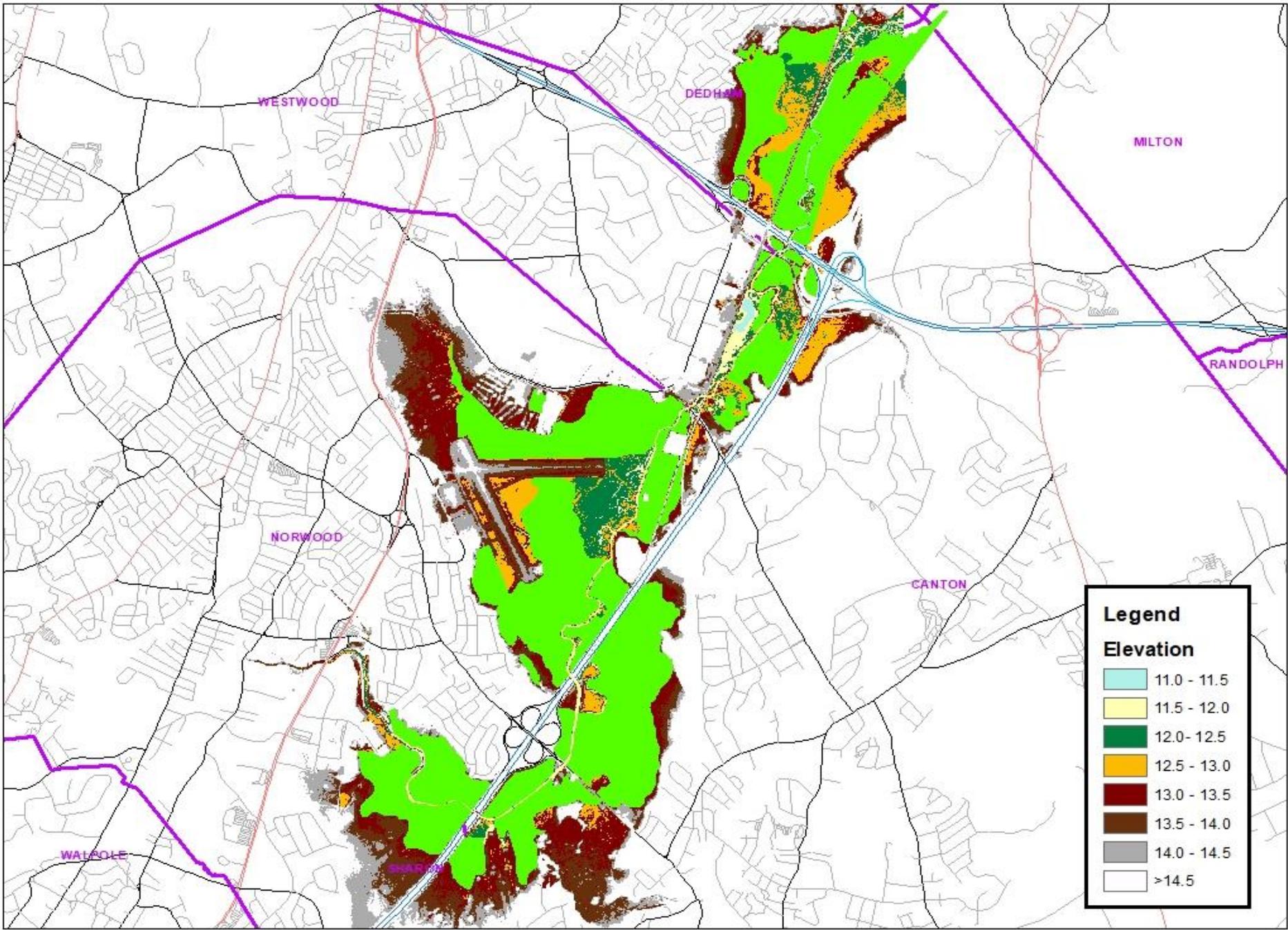


USGS 01105000 NEPONSET RIVER AT NORWOOD, MA

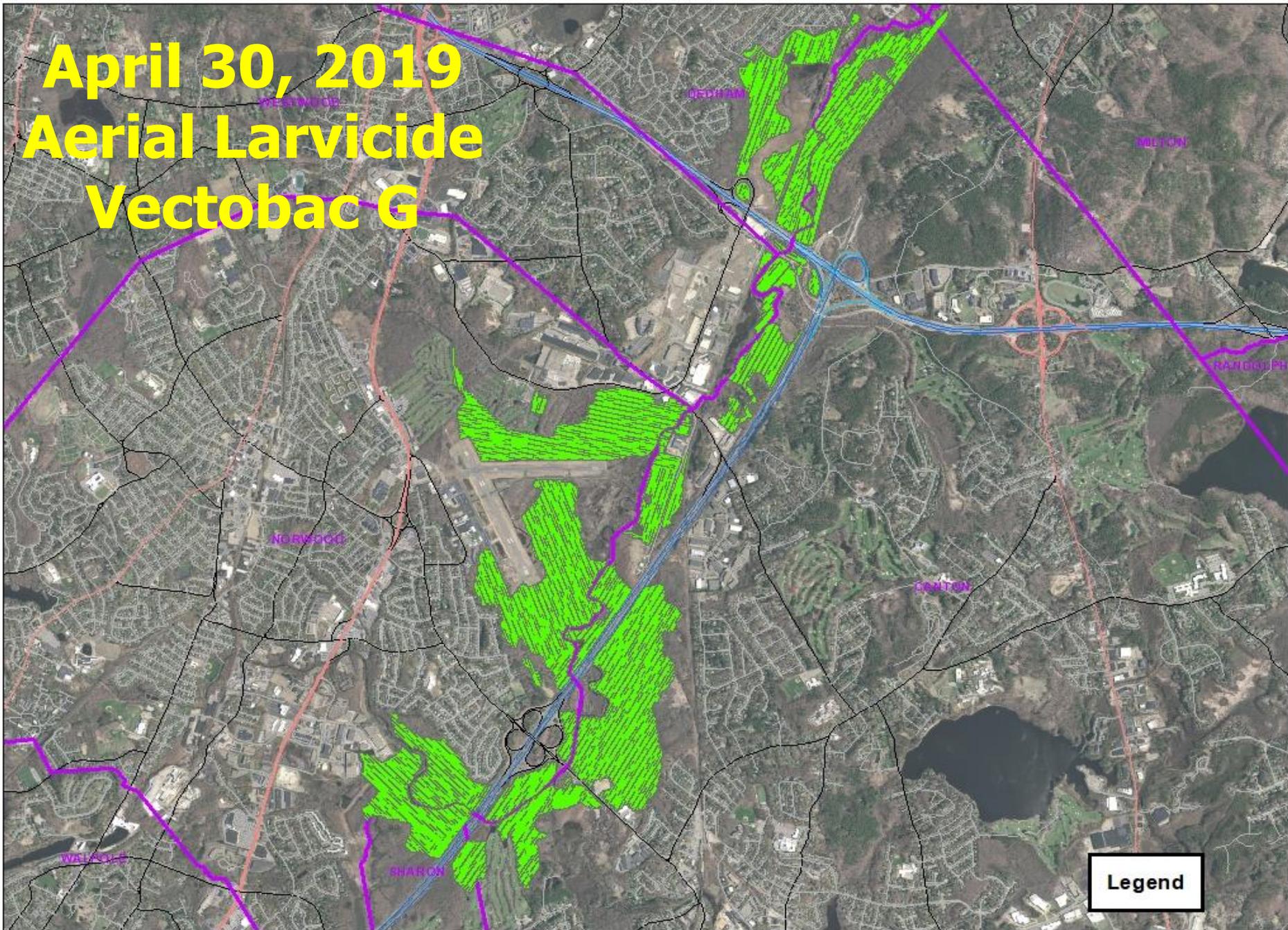








April 30, 2019 Aerial Larvicide Vectobac G



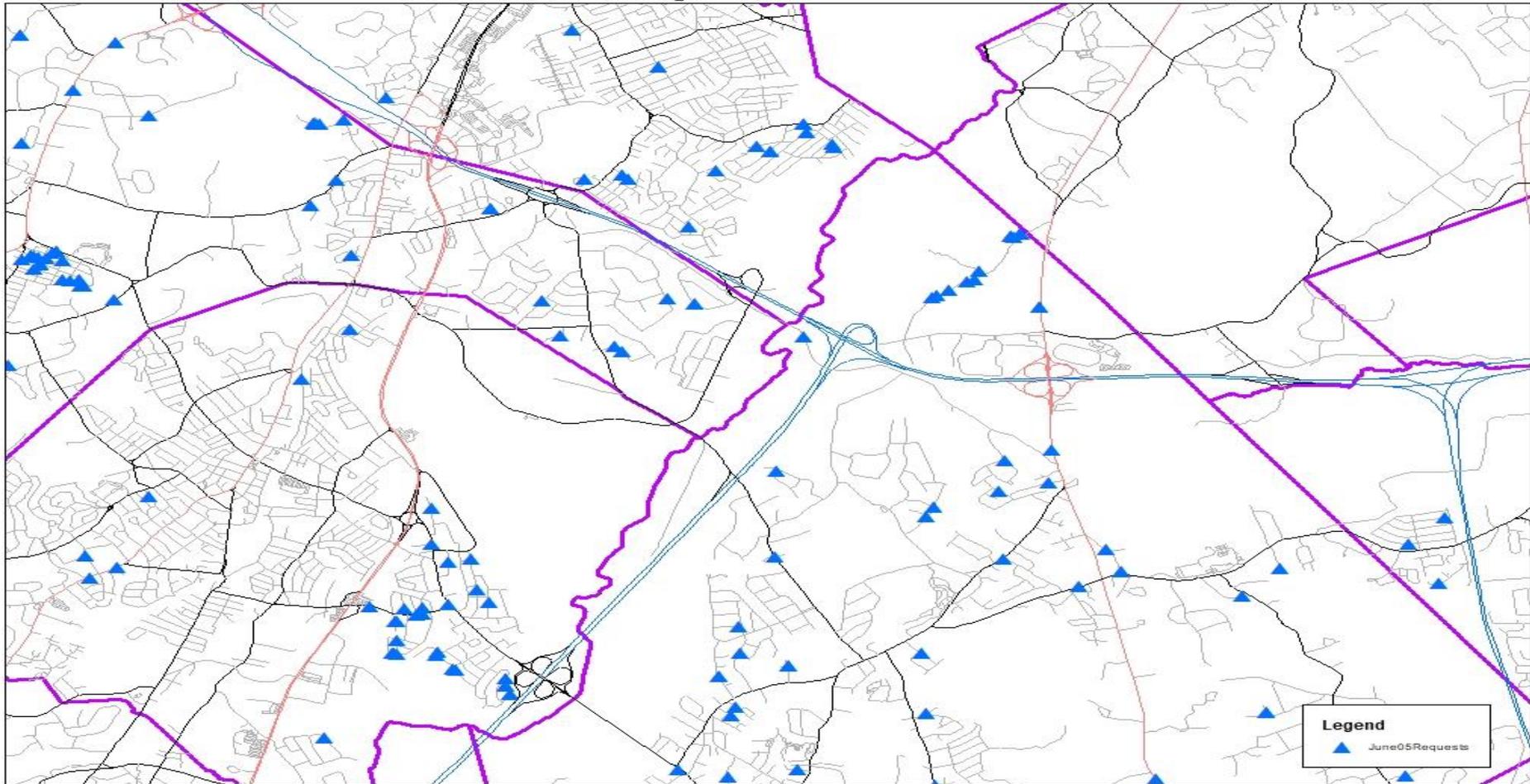
Legend



Neponset Flood Plain

June 05, 2019

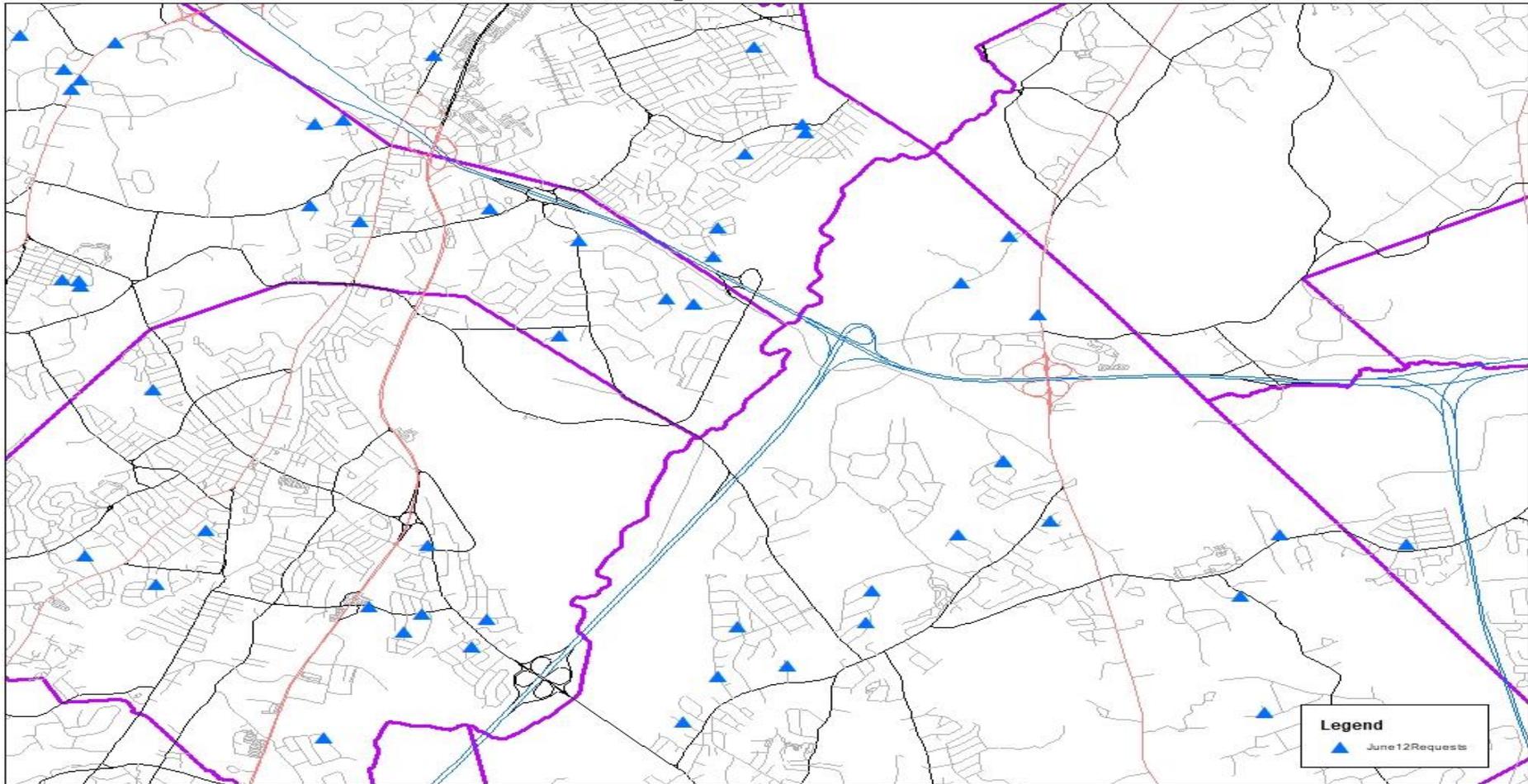
ULV Requests, June 05, 2019





Neponset Flood Plain June 12, 2019

ULV Requests, June 12, 2019





Neponset Flood Plain May, 2019

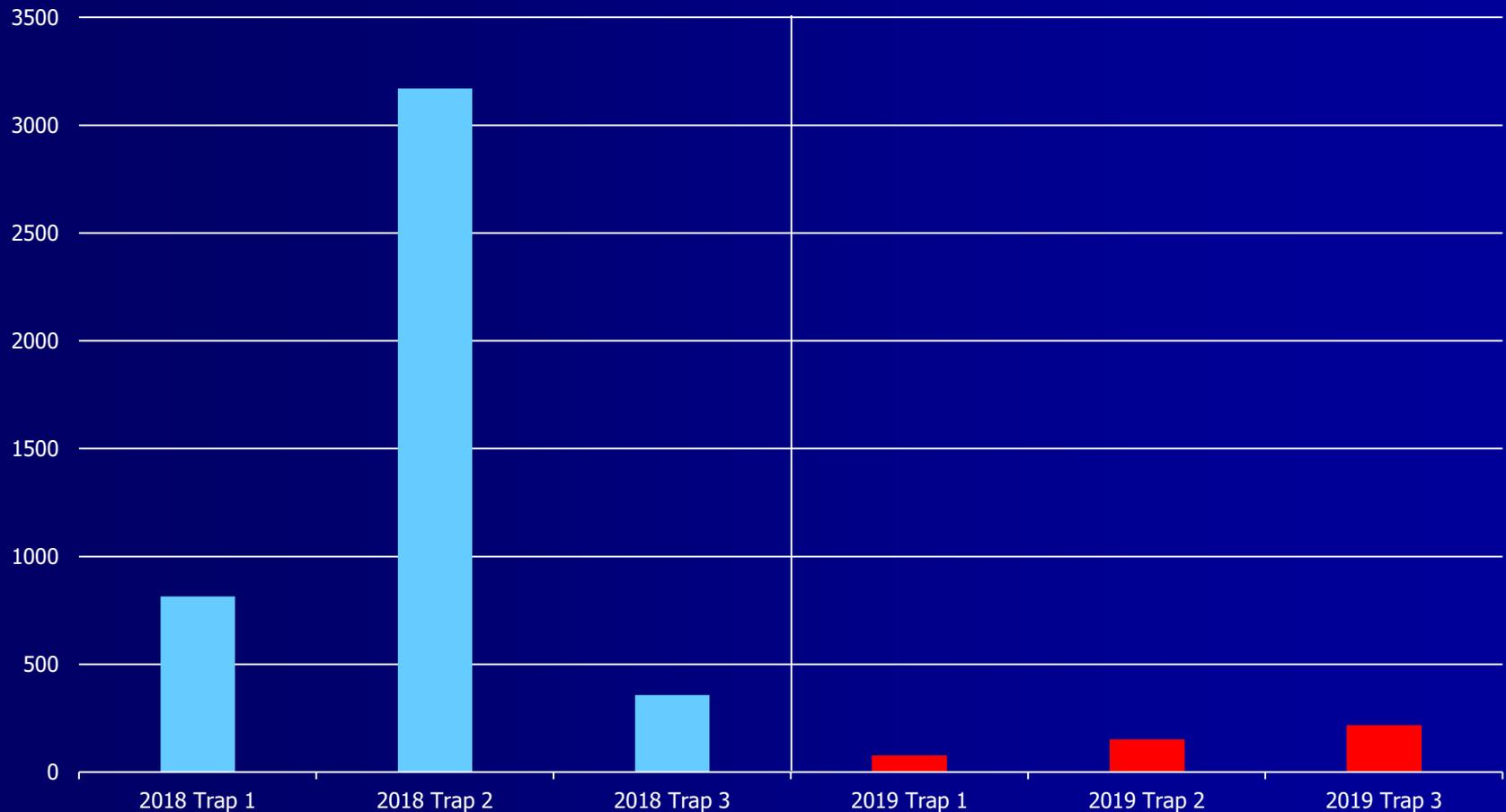
Ledgeview Dr CDC Trap mosquito numbers:

- May 28, 2019: 76
 - 39.4% Oc Canadensis
 - 21.1% Ae Vexans
- June 03, 2019: 153
 - 61.4% Oc Sticticus
 - 15.7% Oc Canadensis
 - 14.4% Ae Vexans



Neponset Flood Plain 2018, 2019

Trap Comparison: First Three Trap Nights, 2018 vs 2019





What next?

- Results very promising (definitely with the public and also mosquito numbers at Ledgeview)
 - University Rd results not as clear
- Will this be effective with summer flood species? (June flood)
- Ae Vexans/Ps Ferox = summer flood plain species. Oc Canadensis = mid/late-spring flood plain species???



Thank you!!

Acknowledgements:

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Jeff O'Neill, Central Life Sciences

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