

# 2019 Annual Report

Clackamas County Vector Control District  
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CLACKAMAS COUNTY VECTOR CONTROL DISTRICT

1102 ABERNETHY ROAD

OREGON CITY, OREGON 97045

FIFTY-THIRD ANNUAL REPORT

FOR THE YEAR 2019

COMPILED BY

Joshua Jacobson  
Executive Director

Theresa Micallef  
Office Manager

Jensen Price  
Biologist

Maggie Atchley  
Field Manager

| Table of Contents  | Page number |
|--|-------------|
| Cover  | i           |
| Author list  | ii          |
| Table of contents  | iii         |
| Executive Summary  | 1-2         |
| West Nile Virus Summary graphic  | 3           |
| Board of Trustees  | 3           |
| District Staff and Charter Statements  | 4           |
| Tables, Figures and Maps   | 5-13        |
| Biological Control, Zika Virus, Integrated Pest Management, Applied Research | 14-15       |
| Affiliated Professional Organizations  | 15-18       |

## Executive Summary

Dear Clackamas County Citizens,

It is my pleasure to present to you the 2019 Clackamas County Vector Control District Annual Report. We hope you find this document enlightening and informative.

Under ORS 452, the Clackamas County Vector Control District generates revenue through two types of taxes on property: a permanent levy of \$0.0065 per \$1,000 of assessed property value and a local option levy of \$0.025 per \$1,000 of assessed property value. The local option levy was re-approved in 2014 and will expire in 2019.

Since 2017, there has been no local transmission of **Zika Virus** in the continental United States. As of November, 2019, the mosquito vectors of Zika had not invaded Oregon, although it is expanding its range in California. We continued to conduct surveillance for the Zika vectors throughout the summer of 2019 as we had in the past few years. There was no local **West Nile Virus** (WNV) activity detected in Clackamas County in 2019 (Figure 1). However, there were nine human WNV cases reported in Oregon, two from Baker County, three in Malheur County, three in Harney County, and one travel case reported in Deschutes County. Mosquitoes, birds, and horses are competent hosts of WNV, and Oregon had its share in each category; however, none of this activity was reported from Clackamas County and its adjacent Counties (Figure 1).

The District charter mandates a focus on mosquito and fly control within the county, and in 2019, the District focused on two general areas of mosquito management: 1) larval mosquito surveillance and larval mosquito insecticide treatments, and 2) adult mosquito surveillance and adult mosquito control. The District answered **700 citizen requests** for mosquito control assistance, and a total of **2,290 mosquito treatments** conducted county-wide. Our mosquito surveillance program processed **19,853 larval mosquito samples** and **6,610 adult mosquito samples**. The District received **3 dead bird collection request**. The District continues to maintain a paper database and an electronic database for mosquito source mapping and mosquito source treatments.

The District promotes biologically-based suppression of mosquito and fly populations where feasible and practical. The use of *Gambusia affinis*, the ‘mosquitofish’, for biological control of mosquito larvae remains an important part of the mosquito control program. There were **1,952 individual fish** distributed into appropriate aquatic environments in 2019.

Mosquito and fly disease-vector information was provided by the District throughout the control season to interested citizens. The District received **106 requests for information** on a wide variety of pest species this year. Printed information or consultation was provided in each of these cases. Informational programs on mosquito and fly control were provided for schools, service clubs and any other interested group within the County.

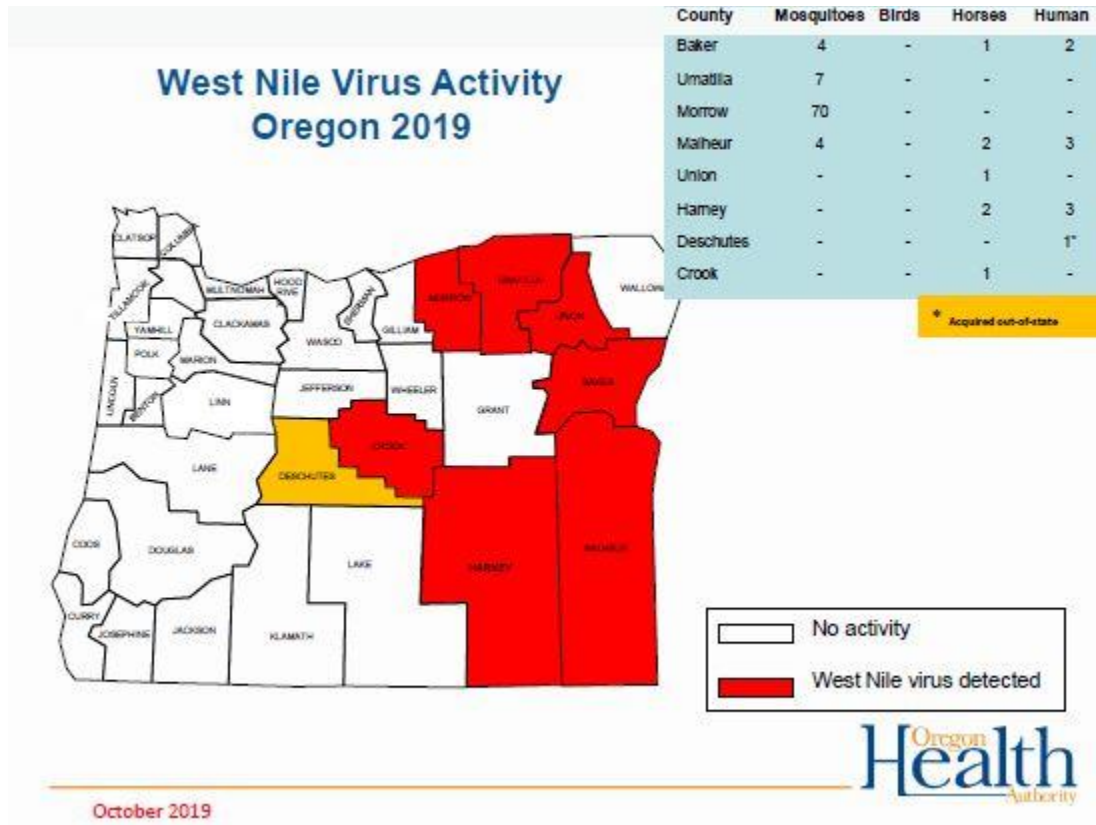
This year (2019) was the final year (5 of 5) for the District's local option levy. We continue to share data and expertise with the County department of Water and Environmental Services and we will continue to work closely with other organizations within the county to ensure that the public is protected from vector borne diseases such as Zika and WNV.

Sincerely,

*Joshua Jacobson*

Executive Director, Clackamas County Vector Control District

**Figure 1. Oregon County map of West Nile Virus activity in 2019.**



**Table 1. Board of Trustees**

District operations are supervised by a five-member board appointed to four year terms by the County Commissioners. Vector Control Board meetings are held the second Tuesday of each month at 2:30 p.m. in the Vector Control District office. Board members receive \$50 per month as compensation for services performed as a member of the governing body.

| Member                     | Term Expiration Date |
|----------------------------|----------------------|
| Dan Green, Board Chairman  | November 16, 2023    |
| John Borden, Vice Chairman | November 16, 2022    |
| Lowell Hanna, Treasurer    | November 16, 2020    |
| Michael Shaw, Secretary    | November 16, 2021    |
| Michael Bondi, Member      | November 16, 2020    |

**Table 2. District Staff**

| Employee                     | Title              |
|------------------------------|--------------------|
| Joshua Jacobson              | Executive Director |
| Theresa Micallef             | Office Manager     |
| Jensen Price                 | Biologist          |
| Maggie Atchley               | Field Manager      |
| Seasonal Employees (5 to 10) | Technician         |

All personnel employed by the District receive pesticide usage and safety training and are Licensed Public Pesticide Operators by the Oregon Department of Agriculture.

### **Vision Statement**

To progress towards a future free of vector borne disease using modern scientific, technical and educational tools.

### **Mission Statement**

The control of public health vectors within Clackamas County using an integrated management approach that aims to limit the number of mosquitoes and flies, reducing annoyance and vector-borne disease.

### **Core Values**

Clackamas County Vector Control District employees work towards the goal of protecting the public from vector borne diseases. In that spirit, we pledge to hold ourselves to the same standards as all Clackamas County employees.

Core values are embodied in six key concepts:

*Service, Professionalism, Integrity, Respect, Individual Accountability and Trust*

### **Legislative Guidance**

Under the authority of ORS 452.120, Clackamas County Vector Control District shall provide the two following documents to the Clackamas County Commissioners in the first quarter of each calendar year: 1) a proposed Annual Work Program to include an estimate of funds required for the next year, a description of the work contemplated, and the methods to be employed by CCDCD; 2) an Annual Report covering monies expended, methods employed, and work accomplished during the past fiscal year. Thus, to fulfill 2), this Annual Report.

**Table 3. Control and Surveillance 2019 Statistics.** The overall service statistics for the District are displayed below.

| Service type  | Service description                                | Statistic |
|---|--|-----------|
| Distribution of mosquitofish<br>( <i>Gambusia affinis</i> ) | Individual fish                                    | 1,952     |
| Mosquito and fly control                                    | Service calls fielded                              | 700       |
| Miscellaneous calls   | Advice over the phone                              | 106       |
| Mosquito control operations                                 | Total treatments (including multiple at same site) | 2,290     |
|   | Acres treated (adult control)                      | 6.56      |
|   | Acres treated (larval control)                     | 5.13      |
| Larval mosquito surveillance                                | Total larvae collected for identification          | 19,853    |
| Adult mosquito surveillance                                 | Total adults collected for identification          | 6,610     |
| Arbovirus surveillance                                      | Dead bird collections                              | 3         |

**Table 4. Summary of 2019 Insecticide Treatments.** The active ingredients, trade names, and amounts of mosquito larvicides and mosquito adulticides used during control operations of the District are summarized below.

| Insecticide type | Active Ingredient  | Trade Name                    | EPA Reg. No. | Amount of formulation used |
|------------------|--|-------------------------------|--------------|----------------------------|
| Larvacide        |  |                               |              |                            |
|                  | Long chain oxy-hydrocarbons  | Agnique MMF (liquid)          | 53263-28     | 17.9 oz.                   |
|                  | Long chain oxy-hydrocarbons  | Agnique MMF (granules)        | 53263-30     | 0.2 lbs.                   |
|                  | <i>Bacillus thuringiensis</i> var. <i>israelensis</i> ( <i>Bti</i> ) | AquaBac (granules)            | 62637-3      | 0.0 lbs.                   |
|                  | <i>Bti</i> bacteria  | Summitt <i>Bti</i> briquettes | 6218-47      | 203 units                  |
|                  | Methoprene   | Altosid Briquets (30 Day)     | 2724-375     | 265 units                  |
|                  | <i>Bti</i> and <i>Bs</i> bacteria                                    | 4 Star 45 day Briquettes      | 83362-3      | 1,096 units                |
|                  | <i>Bti</i> and <i>Bs</i> bacteria                                    | 4 Star 90 day Briquettes      | 88362-3      | 211 units                  |



|                                   |                           |           |              |
|-----------------------------------|---------------------------|-----------|--------------|
| <i>Bti</i> and <i>Bs</i> bacteria | VectoMax WSP<br>(packets) | 73049-429 | 1541 units   |
| <hr/>                             |                           |           |              |
| Adulticide                        |                           |           |              |
| Pyrethrins                        | Pyroicide 100             | 1021-1424 | 0.0 oz.      |
| Plant oils                        | EcoExempt                 | N/A       | 27,506.1 oz. |
| Tau-fluvalinate                   | Mavrik Aquaflo            | 2724-478  | 2,361.6 oz.  |

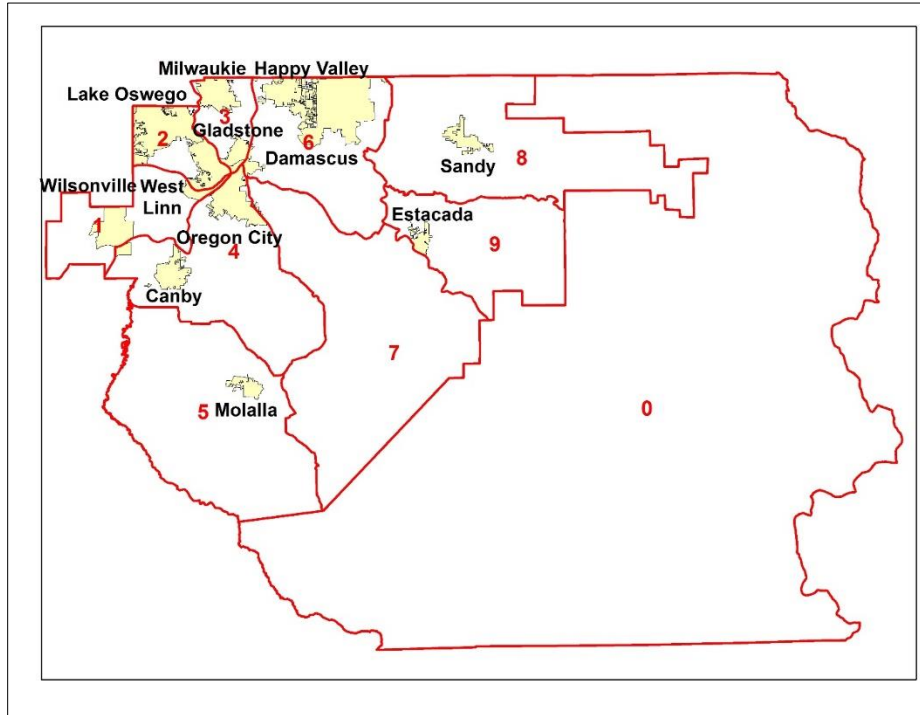
**Table 5. Adult mosquito surveillance: 2019 CO<sub>2</sub> encephalitis virus surveillance trap species composition.** The table below shows the number of each adult mosquito species collected and identified from traps baited with carbon dioxide and set out overnight.

| Genus                 | species              | Number collected | % of total collection |
|-----------------------|----------------------|------------------|-----------------------|
| <i>Aedes</i>          |                      | 359              | 5.39                  |
|                       | <i>sierrensis</i>    | 55               |                       |
|                       | <i>sticticus</i>     | 12               |                       |
|                       | <i>vexans</i>        | 47               |                       |
|                       | <i>washinoi</i>      | 244              |                       |
|                       | <i>Ae. species</i>   | 1                |                       |
| <i>Anopheles</i>      |                      | 261              | 3.92                  |
|                       | <i>freeborni</i>     | 36               |                       |
|                       | <i>punctipennis</i>  | 225              |                       |
|                       | <i>An. species</i>   | 0                |                       |
| <i>Culex</i>          |                      | 2047             | 30.73                 |
|                       | <i>erythrothorax</i> | 0                |                       |
|                       | <i>pipiens</i>       | 1536             |                       |
|                       | <i>stigmatosoma</i>  | 0                |                       |
|                       | <i>tarsalis</i>      | 511              |                       |
|                       | <i>Cx. species</i>   | 0                |                       |
| <i>Culiseta</i>       |                      | 3966             | 59.54                 |
|                       | <i>incidens</i>      | 3923             |                       |
|                       | <i>inornata</i>      | 43               |                       |
|                       | <i>particeps</i>     | 0                |                       |
| <i>Coquillettidia</i> |                      | 28               | 0.42                  |
|                       | <i>perturbans</i>    | 28               |                       |
| Total                 | collected            | 6,661            | 100.00                |

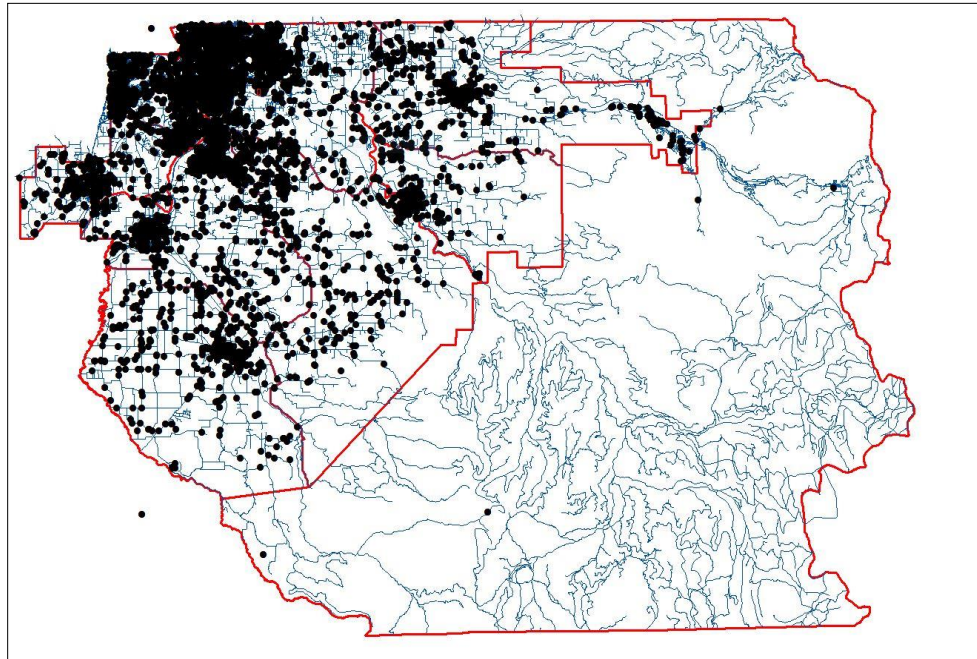
**Table 6. Larval mosquito surveillance: 2019 larval dipper sample species composition.** The table below shows the number of each larval mosquito species collected and identified from ‘dipper’ samples.

| Genus                | species             | number collected | % of total collection |
|----------------------|---------------------|------------------|-----------------------|
| <i>Aedes</i>         |                     | 29               | 0.15                  |
|                      | <i>cinereus</i>     | 0                |                       |
|                      | <i>japonicus</i>    | 4                |                       |
|                      | <i>sierrensis</i>   | 0                |                       |
|                      | <i>stictus</i>      | 0                |                       |
|                      | <i>vexans</i>       | 0                |                       |
|                      | <i>washinoi</i>     | 25               |                       |
|                      | <i>Ae. species</i>  | 0                |                       |
| <i>Anopheles</i>     |                     | 6                | 0.03                  |
|                      | <i>freeborni</i>    | 4                |                       |
|                      | <i>punctipennis</i> | 2                |                       |
|                      | <i>An. species</i>  | 0                |                       |
| <i>Culex</i>         |                     | 9,914            | 49.94                 |
|                      | <i>boharti</i>      | 63               |                       |
|                      | <i>pipiens</i>      | 9,709            |                       |
|                      | <i>stigmatosoma</i> | 95               |                       |
|                      | <i>tarsalis</i>     | 10               |                       |
|                      | <i>territans</i>    | 37               |                       |
|                      | <i>Cx species</i>   | 0                |                       |
| <i>Culiseta</i>      |                     | 6,862            | 34.56                 |
|                      | <i>incidens</i>     | 6,862            |                       |
|                      | <i>inornata</i>     | 0                |                       |
|                      | <i>particeps</i>    | 0                |                       |
|                      | <i>Cs. species</i>  | 0                |                       |
| Unidentified species |                     | 3,042            | 15.32                 |
| Total                |                     | 19,853           | 100.00                |

**Figure 2. Vector Control Zone Map.** Clackamas County is divided into 10 vector control zones. Technicians are assigned a zone of responsibility during the control season (March through September). Zone 0 is mostly federal lands not requiring mosquito control.

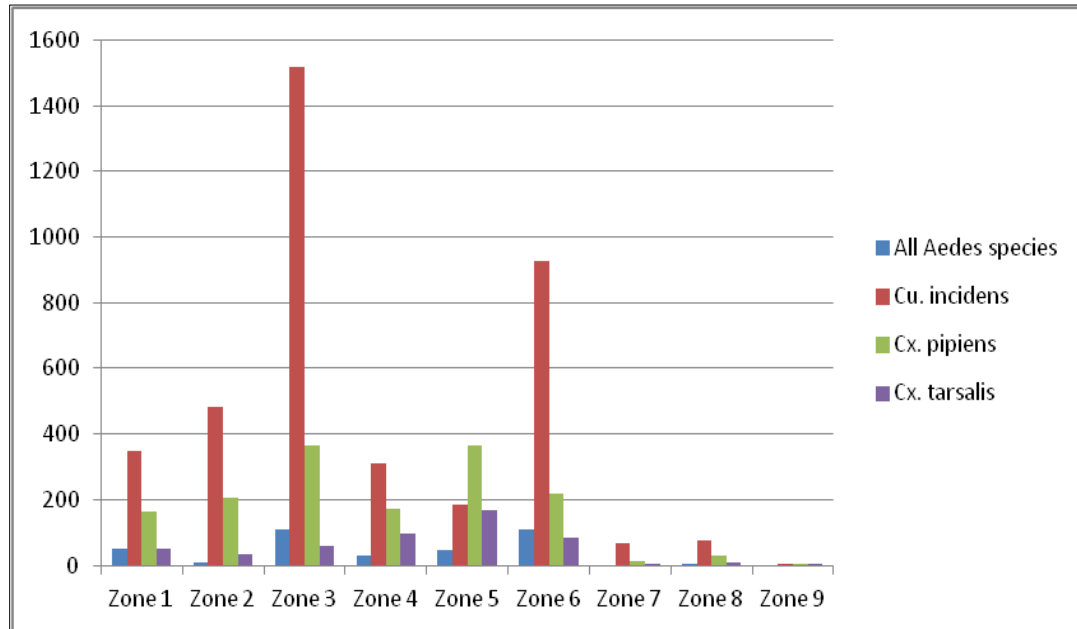


**Figure 3. Vector Control Treatment Map.** Dark solid circles are sites receiving treatments during 2019. Treatments focused on developed urban/suburban/rural areas.



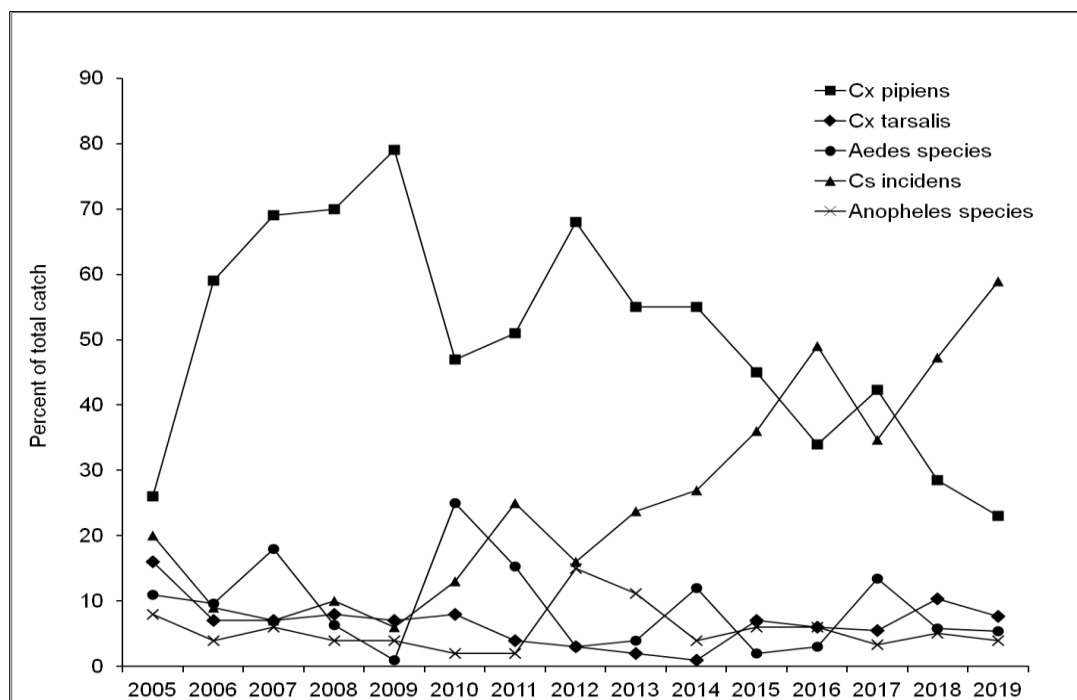
**Figure 4. Most abundant adult mosquito species by zone in 2019.**

Variation in abundance due primarily to zone ecology and sampling effort.

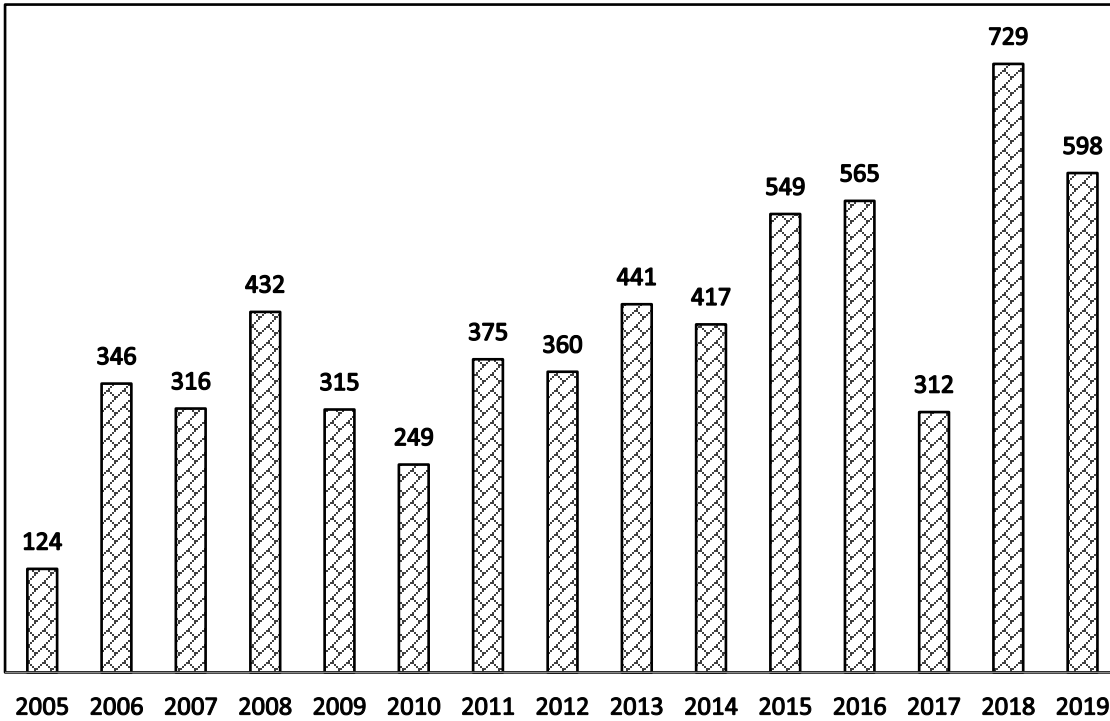


**Figure 5. Most abundant adult mosquitoes collected over entire**

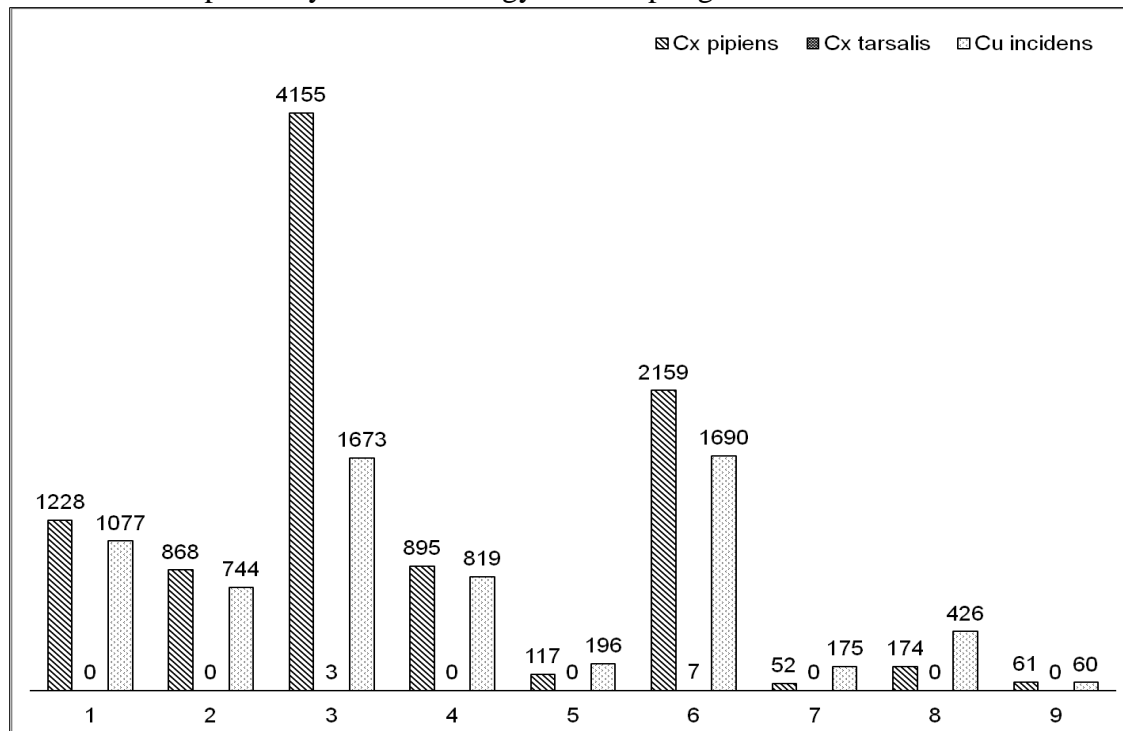
**District: 2005 to 2019.** Note increasing *Culiseta incidens* and decreasing *Culex pipiens* over the last few years. This may be due to general warming trends in Oregon (climate change) over the winter and spring months.



**Figure 6. Total number of adult dry ice traps set by year: 2005 – 2019.** Total number of traps set includes pre-spray trapping starting in 2016.

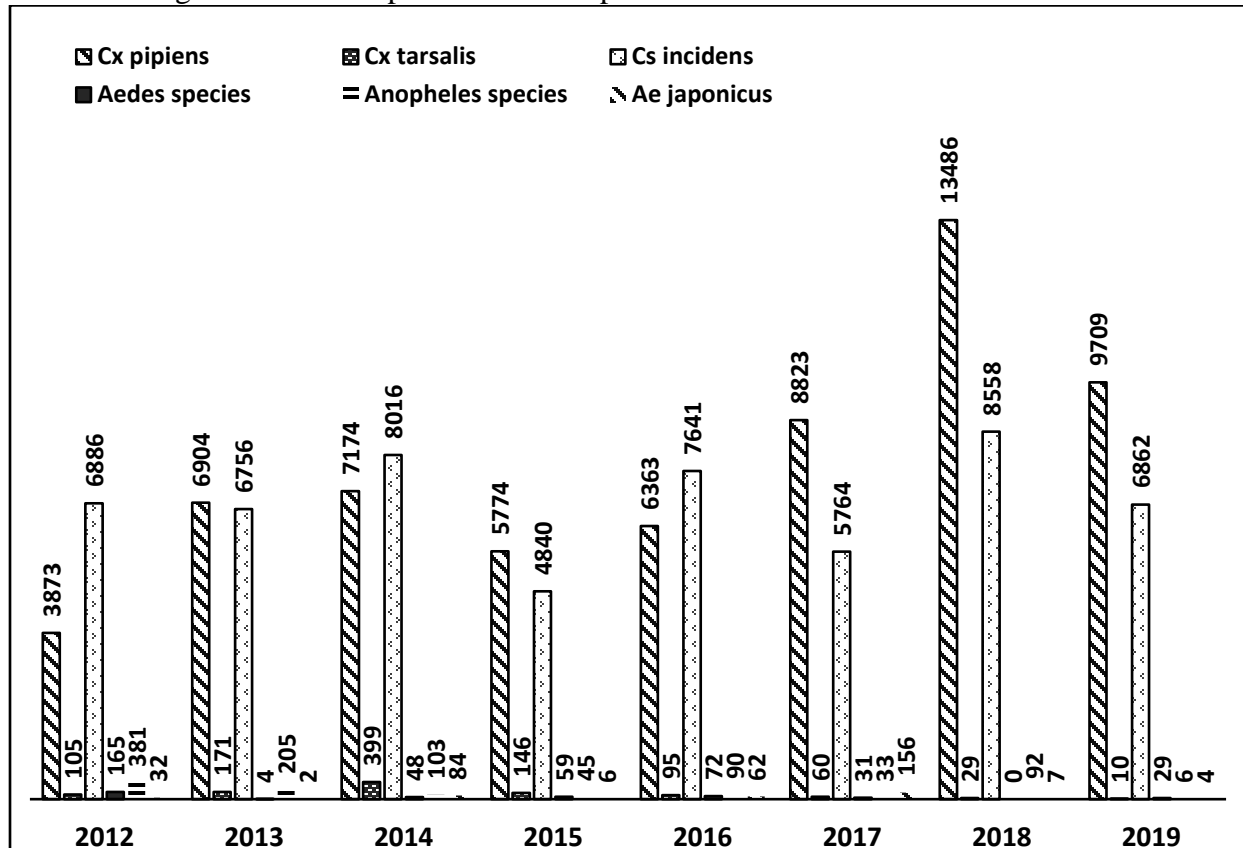


**Figure 7. Larval mosquito collection by zone for 2019.** Variation in abundance due primarily to zone ecology and sampling effort.



**Figure 8. Larval mosquito collections by year: 2012 – 2019.**

Continuation of regular pattern seen, with *Culex pipiens* and *Culiseta incidens* being the dominant species in all samples.



**Table 7. Miscellaneous service calls (106 total).** The Vector Control District receives numerous requests for information on miscellaneous pest problems. The species and number of inquiries about each received in 2019 are listed below.

| Pest          | # of Calls | Pest             | # of Calls |
|---------------|------------|------------------|------------|
| Ant           | 4          | Indian Meal Moth | 0          |
| Aphid         | 0          | Mole             | 1          |
| Bat           | 6          | Mouse            | 3          |
| Beaver        | 1          | Nutria           | 1          |
| Bed Bugs      | 0          | Opossum          | 7          |
| Bee           | 7          | Raccoon          | 7          |
| Box Elder Bug | 1          | Rat              | 28         |
| Carpenter Ant | 0          | Silverfish       | 0          |
| Cockroach     | 0          | Skunk            | 14         |
| Coyote        | 2          | Spider           | 1          |
| Crane Fly     | 0          | Squirrel         | 5          |
| Flea          | 0          | Stink bug        | 1          |
| Gnat          | 0          | Tick             | 1          |
| Gopher        | 1          | Vole             | 0          |
| Hornet        | 1          | Other            | 15         |

**Table 8. Public Outreach Events for 2019.** The District is always happy to give presentations to local entities on vector ecology and mosquito/fly control.

| <b>Event</b>                                    | <b>Location</b>  | <b>Date</b>           | <b>Participants</b>                     |
|---|------------------|-----------------------|---|
| STEAM Workshops                                 | Clackamas County | 2019 (multiple dates) | Rick Reynolds                           |
| Booth- Tree School, OSU Extention Service       | Oregon City, OR  | 23 March              | Josh                                    |
| Booth- Master Gardener's Spring Garden Fair     | Canby, OR        | 4-5 May               | Maggie, Amber                           |
| Booth- 39 <sup>th</sup> Annual ZNA NW Koi Show  | Beaverton, OR    | 27-28 July            | Jensen, Maggie                          |
| Booth- Clackamas County Fair                    | Canby, OR        | 13-17 August          | Holly, Alycia, Samantha, Amber, Shonlyn |
| Presentation- Citizens Informed and Aware Group | Oak Grove, OR    | 9 October             | Lowell                                  |
| Presentation- OMVCA                             | Portland, OR     | 13 November           | Josh                                    |

**Table 9. Ongoing Public Outreach in 2019.** This list includes efforts that continue throughout the calendar year.

| <b>Effort</b>                                  | <b>Scope</b>     | <b>Elements</b>  | <b>Timeline</b> |
|--|------------------|--|-----------------|
| CC Vector Control District Web Site            | World-wide       | Public information, District Educational Documents for Teachers, Mosquito Control Videos, News | Continuous      |
| CC Vector Control District Face Book Page      | World-wide       | Updates, news, other items relevant to vector control and the Citizens of CC                   | Continuous      |
| CC Vector Control District Calendar            | Clackamas County | Mosquito control tips in calendar  | 2019            |
| PAC/WEST Communication Public Outreach Program | Clackamas County | A range of efforts*  | 2019            |

\* The District Public Outreach Program through PAC/WEST includes telephone surveys, digital and social media messaging, direct mailers, local newspaper advertisements, scheduling public speaking engagements, production of

tote bags (1,500) and calendars (2,750), curation of our Facebook page, and an educational program that includes lesson plans, posters and pamphlets, and technical advice to teachers.

**Table 10. Continuing Education and Training in 2019.** Professional development is a key aspect of staff training, and the District supports this through travel grants and support for various educational venues.

| <b>Event</b>  | <b>Location</b>                                | <b>Date</b>     | <b>Participants</b>           |
|---|--|-----------------|-------------------------------|
| Oregon State University – Urban Pest Management                             | Clackamas Community College<br>Oregon City, OR | 6 February      | Josh, Jensen                  |
| SDAO – Annual Conference  | Sunriver, OR                                   | 7-10 February   | Josh                          |
| Clackamas County Soil & Water Conservation District - Klock Farm Bird Boxes | Clackamas, OR                                  | 13 March        | Jensen, Maggie                |
| OMVCA - Spring Meeting  | Central Point, OR                              | 1-2 April       | Josh, Jensen                  |
| NWMVCA – Annual Spring Workshop   | Richland, WA                                   | 19-21 April     | Josh, Jensen                  |
| Clarke & Adapco Mosquito Workshop   | Clark County, OR                               | 23 April        | Maggie, Holly, Amber, Alycia  |
| SDAO – Board of Directors and Management Staff Training                     | Tigard, OR                                     | 6 August        | Josh                          |
| SOVE – 49 <sup>th</sup> Annual Conference                                   | San Juan, Puerto Rico                          | 19-27 September | Josh                          |
| NWMVCA – 58 <sup>th</sup> Annual Conference                                 | Boise, ID                                      | 7-11 October    | Josh, Jensen, Maggie, Theresa |
| OMVCA – Fall Meeting  | Portland, OR                                   | 13 November     | Josh, Jensen, Maggie          |
| Entomological Society of America Conference                                 | St. Louis, MO                                  | 17-20 November  | Jensen, Maggie, Theresa       |



## Biological Control efforts for 2019

Biological control through distribution of *Gambusia affinis*, the mosquitofish, was promoted as the preferred means of mosquito control conducted by the District. Bio-rational insecticides, such as bacterial agents (*Bti* and *Bs*; Table 2), were utilized in situations where long lasting larval control was needed (swales, retention/detention ponds, storm drains, etc.). *Gambusia affinis* is not native to the Pacific Northwest and therefore cannot be introduced into any aquatic habitats that connect with the larger Willamette watershed. Citizens are advised of this during the distribution process.

## Zika Virus Vector Surveillance

As of November, 2019, the mosquitoes that transmit Zika Virus had not been detected in Clackamas County, and the entire state of Oregon. However, these invasive mosquitoes continue to expand their ranges throughout the western United States. Presently, they have invaded the northern San Joaquin Valley, but the Siskiyou Mountain range seems to be a geographical barrier to their spread north into Oregon. Zika vector surveillance was conducted in Clackamas County with ovi-traps. These traps allow the invasive *Aedes* mosquitoes that transmit Zika virus to lay eggs. Traps are inspected bi-weekly and any eggs collected are brought back to the laboratory for hatching. We did not detect any *Aedes albopictus* or *Aedes aegypti* (the two invasive Zika vectors that are rapidly enlarging their range) during the 2019 mosquito season. However, we did find numerous *Aedes japonicus* eggs in our traps. *Aedes japonicus* invaded the Willamette valley in 2006 and have persisted since in small numbers.

## Integrated Pest Management

The Northwest Mosquito and Vector Control Association supports management of vector populations when and where necessary by means of an integrated program (IPM) designed to benefit or to have minimal adverse effects on people, domestic animals, wildlife and the environment. The integrated pest management policy recognizes that vector populations cannot be eliminated, but may be suppressed to tolerable levels for the well-being of humans, domestic animals and wildlife, and that the selection of scientifically sound suppression methods must be based upon consideration of what is ecologically and economically beneficial in the long-term interest of humankind.

The following IPM principles are to be followed<sup>1</sup>:

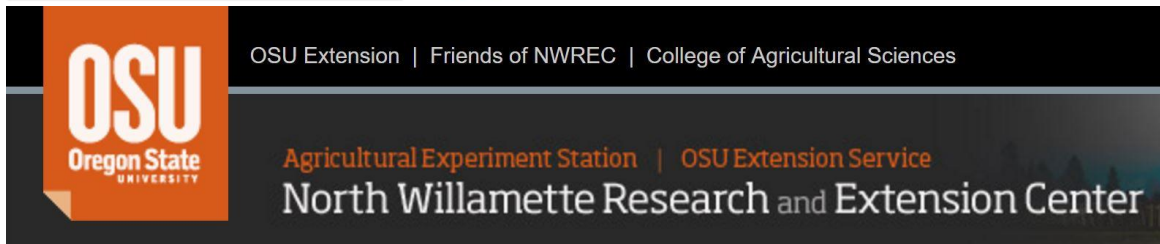
- Vector control measures should only be undertaken when there is adequate justification based upon surveillance data.
- The combination of methods of vector control should be chosen after careful consideration of the efficacy, health benefits, ecological effects and cost versus benefits of the various options; including public education, legal action, natural and biological control, elimination of larval mosquito sources, and insecticide applications.

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<sup>1</sup> All methods and materials used by the District are based on these principals supported by the Northwest Mosquito and Vector Control Association and the American Mosquito Control Association. <http://www.nwmvca.org/about.php>

- Larval mosquito habitats producing vectors, whether natural or created by human activity, should be altered in such a manner as to reduce their capacity to produce mosquitoes, while causing the least impact on the environment.
- Insecticides and application methods should be used in the most efficient and least hazardous manner in accordance with all applicable laws, regulations and available scientific data. The registered label requirements for insecticide use should be followed. When choices are available among effective insecticides, those offering the least hazard to non-target organisms should be used. Insecticides should be chosen and used in a manner that will minimize the development of resistance to a given insecticide in vector populations.
- Personnel involved in the vector control program are properly trained and supervised, certified in accordance with relevant laws and regulations, and are required to keep current with improvements in management techniques through continuing education and/or training programs.

**Collaborating Organizations.** The Clackamas County Vector Control District collaborates with the following organizations:







Advancing global health since 1903



OREGON VECTOR CONTROL ASSOCIATION





# Public Health

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