

# » State of Oregon West Nile Virus Summary Report



# Acknowledgments

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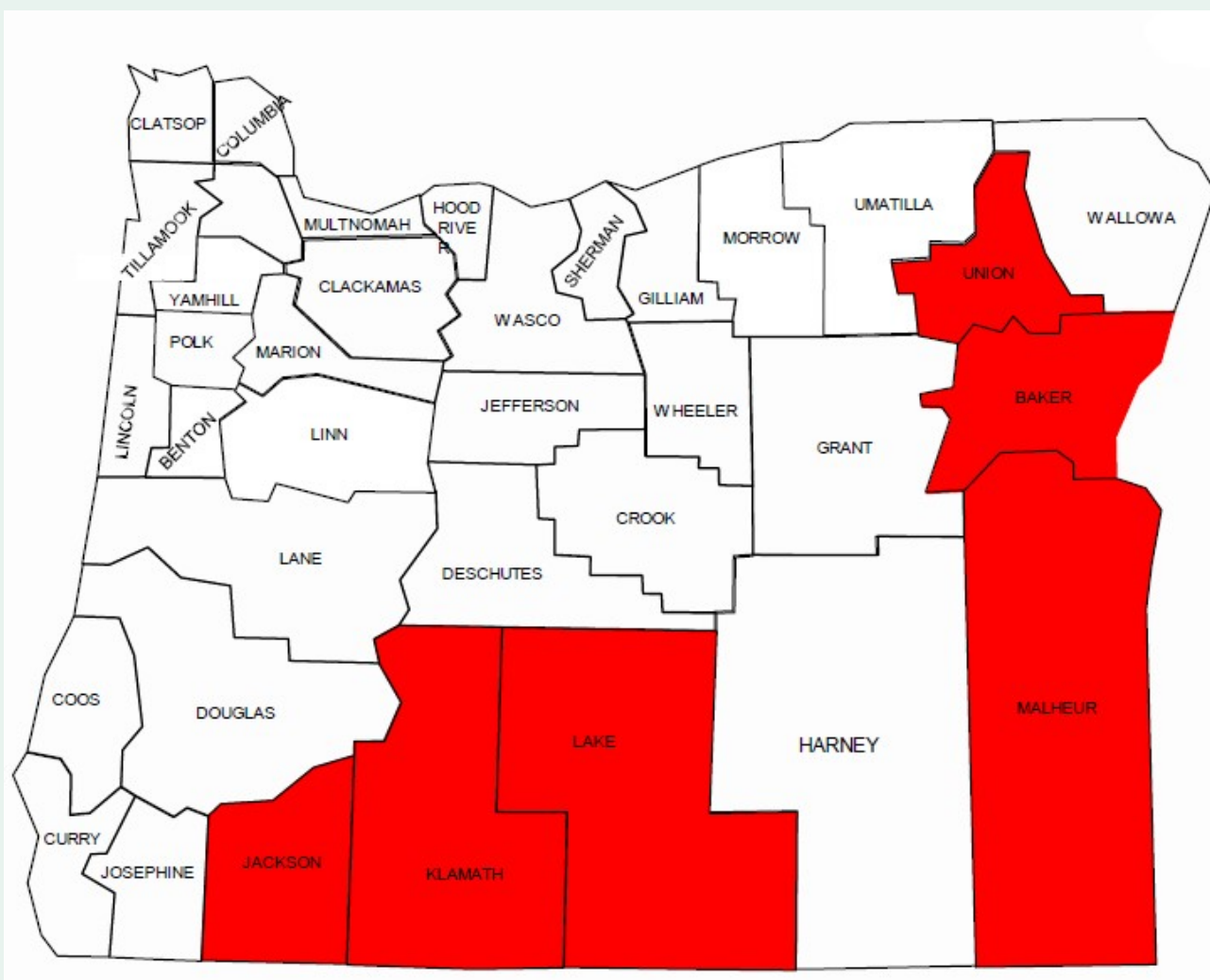






**Figure 2. Map of Oregon with shaded counties reporting WNV, 2022**

County	Mosquitoes	Birds	Horses	Human
Baker	21	0	0	2
Jackson	8	0	0	1
Klamath	0	0	2	1
Lake	0	0	1	0
Malheur	7	0	0	1
Union	9	0	0	0
<b>Total</b>	<b>45</b>	<b>0</b>	<b>3</b>	<b>5</b>



See <https://www.oregon.gov/oha/PH/DISEASESCONDITIONS/DISEASESAZ/WESTNILEVIRUS/Pages/wnile.aspx> for more information about West Nile virus.

# WNV surveillance and related activities

## Human surveillance

In 2022, five Oregon residents tested positive for WNV by Immunoglobulin M (IgM) antibody (Table 2). Illnesses related to neuroinvasive disease are usually characterized by the acute onset of fever with stiff neck, altered mental status, seizures, limb weakness, cerebrospinal fluid (CSF) pleocytosis or abnormal neuroimaging. Acute flaccid paralysis (AFP) may result from anterior myelitis, peripheral neuritis or post-infectious peripheral demyelinating neuropathy (i.e., Guillain-Barré syndrome). Less common neurological manifestations, such as cranial nerve palsies, also occur.

**Table 2. Trend data for Oregon residents who contracted WNV in Oregon, 2004–2022**

Year	All cases	Neuroinvasive	Deaths
2004	5	0	0
2005	8	1	0
2006	73	13	1
2007	27	7	1
2008	15	3	0
2009	8	0	0
2010	0	0	0
2011	0	0	0
2012	12	1	0
2013	16	8	0
2014	8	2	0
2015	1	0	0
2016	3	1	0
2017	7	4	1
2018	2	2	0
2019	9	6	0
2020	1	0	0
2021	5	0	0
2022	5	3	1
<b>Total</b>	<b>205</b>	<b>51</b>	<b>4</b>

Source: Oregon State Public Health Laboratory

## Veterinary surveillance

WNV surveillance in Oregon’s equine population resulted in 3 positive tests in 2022. Table 3 summarizes the test results by county.

**Table 3. Positive equine WNV test results, Oregon, 2022**

County	Horses Tested for WNV	Horses with Positive WNV Test Results
Klamath	2	2
Lake	1	1
Linn	1	0
<b>Total</b>	<b>4</b>	<b>3</b>

Source: Oregon State University Veterinary Diagnostic Laboratory

## Avian surveillance

WNV surveillance in Oregon’s avian population resulted in 0 positive test results out of 7 birds tested by OSU’s Veterinary Diagnostic Laboratory and the VCDs. Of the 7 birds collected, 4 were of the family Corvidae (aka corvids), while the remaining 3 were American species other than corvid. Table 4 shows Oregon’s avian species collection totals by county for 2022. Table 5 presents trend data for avian WNV testing and positive test results for Oregon counties for the years 2004–2022.



**Table 4. Avian WNV test results by county, Oregon, 2022**

County	Corvids tested	All other species tested	Total	Total Positive
Benton	0	1	1	0
Jackson	0	1	1	0
Multnomah	4	0	4	0
Union	0	1	1	0
<b>TOTAL</b>	<b>4</b>	<b>3</b>	<b>7</b>	<b>0</b>

Source: Oregon State Public Health Laboratory

**Table 5. Avian WNV tests and trend of positive test results, Oregon, 2004–2022**

Year	Number tested	Number positive	% positive
2004	448	23	5.1%
2005	298	15	5.0%
2006	212	25	11.8%
2007	246	55	22.4%
2008	117	2	1.7%
2009	90	16	17.8%
2010	24	0	0.0%
2011	20	0	0.0%
2012	35	2	5.7%
2013	22	2	9.1%
2014	35	7	20.0%
2015	36	11	30.6%
2016	44	12	27.3%
2017	27	1	3.7%
2018	30	1	3.3%
2019	19	0	0.0%
2020	24	1	4.2%
2021	32	2	6.3%
2022	7	0	0.0%

Source: Oregon State Public Health Laboratory



**Table 7. Female mosquito pools collected by Oregon VCDs and tested for WNV at Oregon State University, 2022**

County / VCD	<i>Aedes dorsalis</i>	<i>Aedes nigromaculis</i>	<i>Aedes vexans</i>	<i>Anopheles freeborni</i>	<i>Anopheles punctipennis</i>	<i>Coquillettidia perturbans</i>	<i>Culex erythrot horax</i>	<i>Culex NFS</i>	<i>Culex pipiens</i>	<i>Culex tarsalis</i>	<i>Culiseta inornata</i>	<i>Ochlerotatus nigromaculis</i>	Total mosquito pools
Baker								5	335				340
Clackamas													0
Columbia				7				122	91				220
Deschutes													0
Jackson						6	183	85	135				409
Klamath	12	1	23	34					19	25	2		116
Lane			9					10	23				42
Linn							14						14
Malheur									16				16
Morrow			99		11			175	199				484
Multnomah				2				18	67				87
Umatilla							1	1	2				4
Union			339					17	195				551
Washington				1				45	225				271
<b>Total:</b>	<b>12</b>	<b>1</b>	<b>470</b>	<b>34</b>	<b>10</b>	<b>11</b>	<b>6</b>	<b>198</b>	<b>478</b>	<b>1307</b>	<b>25</b>	<b>2</b>	<b>2554</b>

Source: Oregon vector control districts and Oregon State University

**Table 8. Trend data, WNV-positive mosquito pools\*, Oregon, 2004–2022**

Year	Mosquito species	Number of positive pools
2004	-	-
2005	<i>Culex tarsalis</i>	11
	<i>Culex stigmatosoma</i>	
	<i>Culex pipiens</i>	
2006	<i>Culex tarsalis</i>	22
2007	<i>Aedes vexans</i>	8
	<i>Culex pipiens</i>	2
	<i>Culex tarsalis</i>	23
2008	<i>Aedes vexans</i>	5
	<i>Culex pipiens</i>	3
	<i>Culex tarsalis</i>	8
2009	<i>Aedes vexans</i>	1
	<i>Anopheles freeborni</i>	1
	<i>Anopheles punctipennis</i>	1
	<i>Coquillettidia perturbans</i>	1
	<i>Culex pipiens</i>	75
	<i>Culex tarsalis</i>	131
2010	<i>Culex pipiens</i>	1
	<i>Culex tarsalis</i>	2
	<i>Culex sp.</i>	1
2011	<i>Culex sp.</i>	3
2012	<i>Culex pipiens</i>	53
	<i>Culex tarsalis</i>	3
	<i>Culex sp.</i>	15
2013	<i>Culex pipiens</i>	14
	<i>Culex tarsalis</i>	74
	<i>Anopheles freeborni</i>	1

2014	<i>Aedes vexans</i>	4
	<i>Culex pipiens</i>	13
	<i>Culex tarsalis</i>	41
2015	<i>Culex pipiens</i>	20
	<i>Culex tarsalis</i>	35
	Genus <i>Culex</i>	4
2016	<i>Culex pipiens</i>	21
	<i>Culex tarsalis</i>	28
	Genus <i>Culex</i>	2
2017	<i>Culex pipiens</i>	49
	<i>Culex tarsalis</i>	15
	Genus <i>Culex</i>	28
2018	<i>Culex pipiens</i>	13
	<i>Culex tarsalis</i>	37
	Genus <i>Culex</i>	7
2019	<i>Culex pipiens</i>	65
	<i>Culex tarsalis</i>	22
2020	<i>Culex pipiens</i>	2
	<i>Culex tarsalis</i>	1
2021	<i>Culex NFS</i>	3
	<i>Culex pipiens</i>	36
	<i>Culex tarsalis</i>	36
2022	<i>Aedes vexans</i>	2
	<i>Culex NFS</i>	3
	<i>Culex pipiens</i>	4
	<i>Culex tarsalis</i>	36

Source: Oregon State University Veterinary Diagnostic Laboratory

\*1 pool ≈ 40 mosquitoes

**Figure 3. Potential Oregon vectors of WNV based on laboratory vector competence studies**

Species	Association with other viruses <sup>a</sup>	Host preference	Activity time	Flight range	Vector competence for WNV <sup>b</sup>	Field isolations of WNV <sup>c</sup>	Potential to serve as a	
							Enzootic vector <sup>d</sup>	Bridge vector <sup>e</sup>
<i>Ae. aegypti</i>		Mammals	Crepuscular/day	200 m	+++ , 3	+	0	+
<i>Ae. albopictus</i>	EEE	Opportunistic	Crepuscular/day	200 m	++++, 3, 6	+	+	++++
<i>Ae. vexans</i>	EEE, WEE, SLE	Mammals	Crepuscular/night	>25 km	++ 1, 5, 8	+++	0	++
<i>Cq. perturbans</i>	EEE	Opportunistic	Crepuscular/night	5 km	+, 4	+	+	+
<i>Cs. melanura</i>	EEE	Birds	Crepuscular/night	9 km	+, 8	++	++	0
<i>Cs. inornata</i>	WEE	Mammals	Crepuscular/night	2 km	+++ , 5	+	+	++
<i>Cx. stigmatosoma</i>	SLE	Birds	Night	1 km	+++ , 5	0	+++	+
<i>Cx. erythrothorax</i>	WEE	Opportunistic	Crepuscular/day	<2 km	++++, 5	0	++	+++
<i>Cx. nigripalpus</i>	EEE, SLE	Opportunistic <sup>f</sup>	Crepuscular	5 km	++ , 4	+++	+++	++
<i>Cx. pipiens</i>	SLE	Birds	Crepuscular/night	2 km	+++ , 1, 3, 5	++++	+++++	++
<i>Cx. quinquefasciatus</i>	SLE	Birds	Crepuscular/night	2 km	+++ , 4, 5	0	++++	++
<i>Cx. restuans</i>	SLE	Birds	Crepuscular/night	2 km	++++, 4	+++	+++++	++
<i>Cx. salinarius</i>	EEE, SLE	Opportunistic	Crepuscular/night	10 km	++++, 4	+++	+++	++++
<i>Cx. tarsalis</i>	WEE, SLE	Opportunistic <sup>f</sup>	Crepuscular/night	>6 km	++++, 5, 7	++++	++++	+++
<i>Oc. atropalpus</i>		Mammals	Day and night	1 km	++++, 3	+	+	++
<i>Oc. canadensis</i>	EEE	Mammals	Day	2 km	++ , 8	+	0	++
<i>Oc. cantator</i>	EEE	Mammals	Day	>10 km	++ , 8	+	0	++
<i>Oc. dorsalis</i>	WEE	Mammals	Day and night	5 km	+++ , 5	+	0	++
<i>Oc. japonicus</i>	JE?	Mammals	Crepuscular/day	unk	++++, 2, 3	+++	+	++++
<i>Oc. melanimon</i>	WEE	Mammals	Day and night	>10 km	+++ , 5	0	0	++
<i>Oc. sierrensis</i>		Mammals	Crepuscular/day	1 km	+, 5	0	0	+
<i>Oc. sollicitans</i>	EEE	Mammals	Crepuscular/night	>25 km	++ , 1, 3	+	0	+
<i>Oc. taeniorhynchus</i>	EEE	Mammals	Day and night	>25 km	+, 1, 3	+	0	+
<i>Oc. triseriatus</i>		Mammals	Day	200 m	+++ , 8	++	0	+++
<i>Ps. ferox</i>	SLE	Mammals	Day	2 km	0, 8	+	0	0

Distribution and bionomics based on and generalized from information in Carpenter and LaCasse (1955), Darsie and Ward (1981), and Moore et al. (1993).

<sup>a</sup> Known association with other viruses with a similar transmission cycle. EEE, eastern equine encephalomyelitis virus; JE; Japanese encephalitis virus; SLE; St. Louis encephalitis virus; WEE; western equine encephalomyelitis virus. Based on Karabatsos (1985).

<sup>b</sup> Efficiency with which this species is able to transmit WNV in the laboratory. 0, incompetent; +, inefficient; +++++, extremely efficient vector. Based on 1 (Turell et al. 2000), 2 (Sardelis and Turell 2001), 3 (Turell et al. 2001), 4 (Sardelis et al. 2001), 5 (Goddard et al. 2002), 6 (Sardelis et al. 2002), 7 (Turell et al. 2003), or 8 (present study).

<sup>c</sup> Relative number of WNV-positive pools detected. 0, none; +, few; +++++, many.

<sup>d</sup> Potential for this species to be an enzootic or maintenance vector based on virus isolations from the field, vector competence, feeding behavior, etc. 0, little to no risk; +++++, this species may play a major role.

<sup>e</sup> Potential for this species to be an epizootic or bridge vector based on virus isolations from the field, vector competence, feeding behavior, etc. 0, little to no risk; +++++, this species may play a major role.

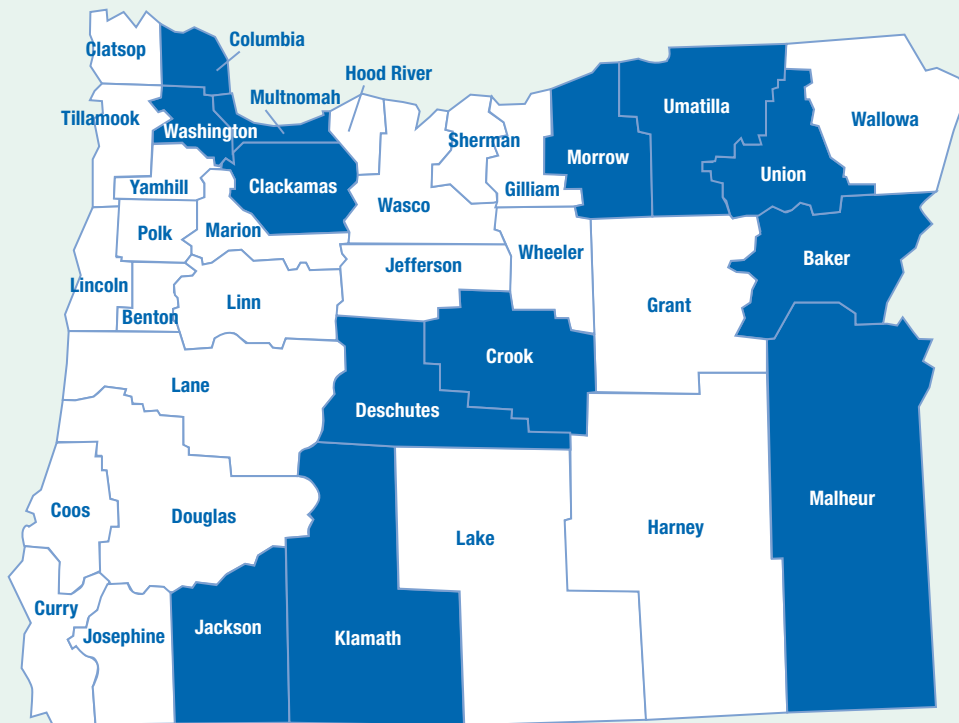
<sup>f</sup> Feeds primarily on avian hosts in spring and early summer and mixed between avian and mammalian hosts in late summer and fall.

\* Turell MJ, Dohm DJ, Sardelis MR, Oquinn ML, Andreadis DJ, Blow JA. An update on the potential of North American mosquitoes (*Diptera: Culicidae*) to transmit West Nile virus. *J Med Entomol* 2005; 42: 57–62. Used with permission.

# Vector control districts in Oregon

**Figure 4. Oregon counties with participating vector control districts (VCDs) and their activities**

County	Mosquito collection	Bird collection
Baker	YES	YES
Clackamas	YES	YES
Columbia	YES	YES
Crook	YES	YES
Deschutes	YES	YES
Jackson	YES	YES
Klamath	YES	YES
Malheur	YES	YES
Morrow	YES	YES
Multnomah	YES	YES
Umatilla	YES	YES
Union	YES	YES
Washington	YES	YES



Source: Oregon Health Authority



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