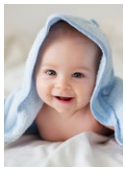
2020

State of Oregon West Nile Virus Summary Report







Oregon Health Authority

PUBLIC HEALTH DIVISION
Acute and Communicable Disease Prevention Program

Acknowledgments

This report was prepared by:

Emilio DeBess, DVM, MPVM

Brad Beauchamp, BA

Acute and Communicable Disease Prevention

800 N.E. Oregon St., Suite 772

Portland, OR 97232

Phone: 971-673-1111

Fax: 971-673-1100

This report is possible because of the input and hard work of all Oregon vector control districts and the Oregon State University Veterinary Diagnostic Laboratory.

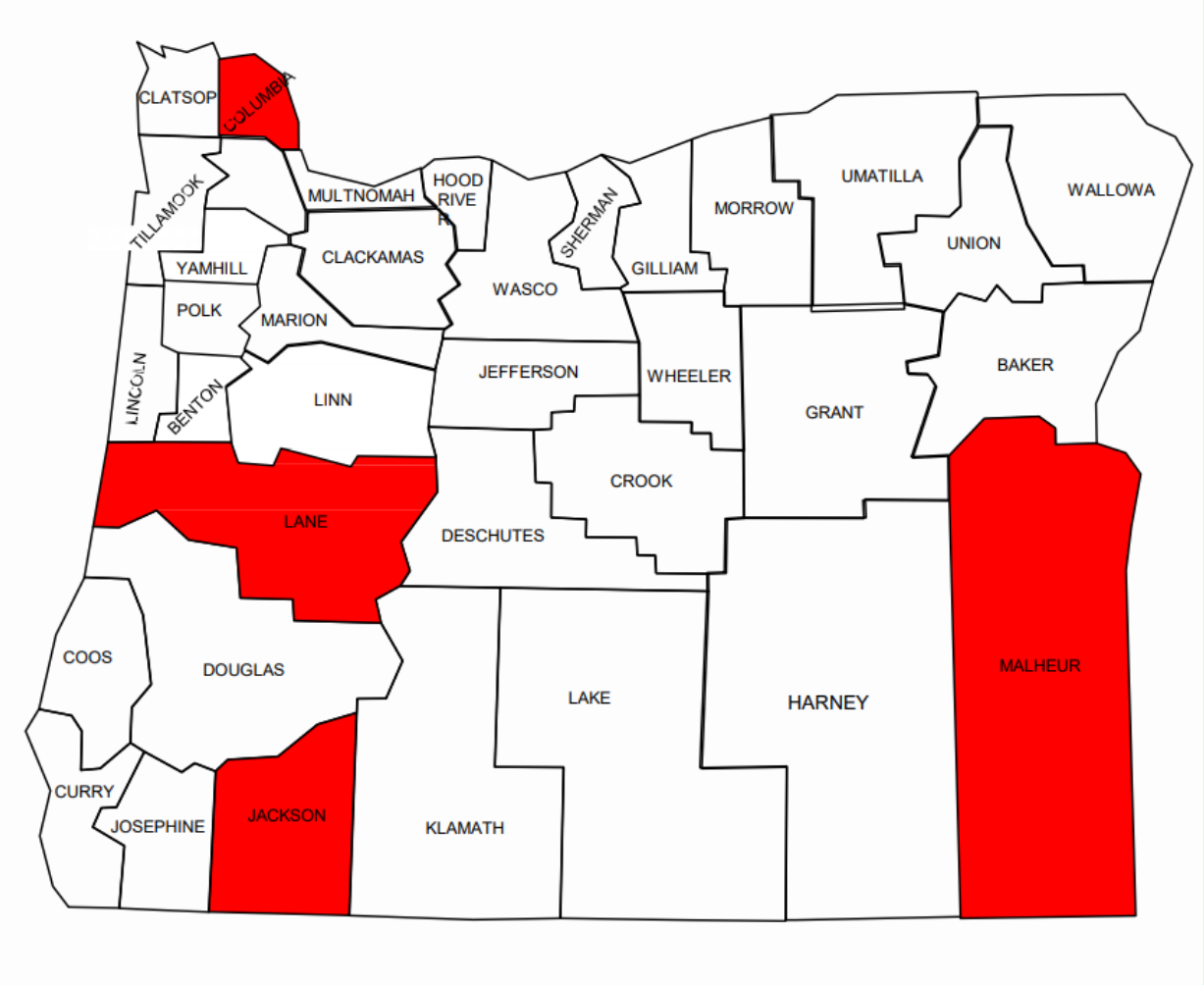
For more information, contact Emilio.E.DeBess@oha.oregon.gov

Please cite this publication as follows:

Oregon Public Health Division. State of Oregon West Nile virus summary report 2020. Oregon Health Authority: Portland, Oregon 2023

Figure 2. Map of Oregon with shaded counties reporting WNV, 2020

County	Mosquitoes	Birds	Horses	Human
Lane	0	1	0	0
Jackson	1	0	0	0
Malheur	2	0	0	0
Columbia	0	0	0	1
Total	**3**	**1**	**0**	**1**



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 2020, one Oregon resident 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, 2004–2020

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
Total	**195**	**48**	**3**

Source: Oregon State Public Health Laboratory

Table 4. Avian WNV test results by county, Oregon, 2020

County	Corvids tested	All other species tested	Total	Total Positive
Benton	2	4	6	0
Clackamas	1	4	5	0
Columbia	0	1	1	0
Lane	0	3	3	1
Multnomah	7	0	7	0
Umatilla	0	1	1	0
Washington	0	1	1	0
TOTAL	**10**	**14**	**24**	**1**

Source: Oregon State Public Health Laboratory

Table 5. Avian WNV tests and trend of positive test results, Oregon, 2004–2020

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%

Source: Oregon State Public Health Laboratory

Table 7. Female mosquito pools collected by Oregon VCDs and tested for WNV at Oregon State University, 2020

County / VCD	*Aedes dorsalis*	*Aedes nigromaculis*	*Aedes vexans*	*Anopheles freeborni*	*Anopheles punctipennis*	*Coquillettidia perturbans*	*Culex* NFS	*Culex pipiens*	*Culex tarsalis*	*Culiseta inornata*	Not Provided	Total mosquito pools
Baker			1					6	265			**272**
Clackamas								12	1			**13**
Columbia					3	3		128	46			**180**
Deschutes				7				12	12	7		**38**
Jackson								195	113		2	**310**
Klamath	50	164	126	97		3		13	77	53	12	**595**
Lane			7					9	24			**40**
Linn			39		2			40	19			**100**
Malheur								2	8			**10**
Morrow						6		455	231		8	**700**
Multnomah				1	1			4	56			**62**
Umatilla							3	17	17			**37**
Union			205					22	139			**366**
Washington					17	6		26	171			**220**
Total:	**50**	**164**	**378**	**105**	**23**	**18**	**3**	**941**	**1179**	**60**	**22**	**2,943**

Source: Oregon vector control districts and Oregon State University

Table 8. Trend data, WNV-positive mosquito pools*, Oregon, 2004–2020

Year	Mosquito species	Number of positive pools
2004	-	-
2005	*Culex tarsalis*	11
	Culex stigmatosoma	
	Culex pipiens	
2006	*Culex tarsalis*	22
2007	*Aedes vexans*	8
	Culex pipiens	2
	Culex tarsalis	23
2008	*Aedes vexans*	5
	Culex pipiens	3
	Culex tarsalis	8
2009	*Aedes vexans*	1
	Anopheles freeborni	1
	Anopheles punctipennis	1
	Coquillettidia perturbans	1
	Culex pipiens	75
	Culex tarsalis	131
	Culex sp.	52
2010	*Culex pipiens*	1
	Culex tarsalis	2
	Culex sp.	1
2011	*Culex sp.*	3
2012	*Culex pipiens*	53
	Culex tarsalis	3
	Culex sp.	15
2013	*Culex pipiens*	14
	Culex tarsalis	74
	Anopheles freeborni	1

2014	*Aedes vexans*	4
	Culex pipiens	13
	Culex tarsalis	41
2015	*Culex pipiens*	20
	Culex tarsalis	35
	Genus Culex	4
2016	*Culex pipiens*	21
	Culex tarsalis	28
	Genus Culex	2
2017	*Culex pipiens*	49
	Culex tarsalis	15
	Genus Culex	28
2018	*Culex pipiens*	13
	Culex tarsalis	37
	Genus Culex	7
2019	*Culex pipiens*	65
	Culex tarsalis	22
2020	*Culex pipiens*	2
	Culex tarsalis	1

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

[a] 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).

[b] 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).

[c] Relative number of WNV-positive pools detected. 0, none; +, few; ++++, many.

[d] 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.

[e] 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.

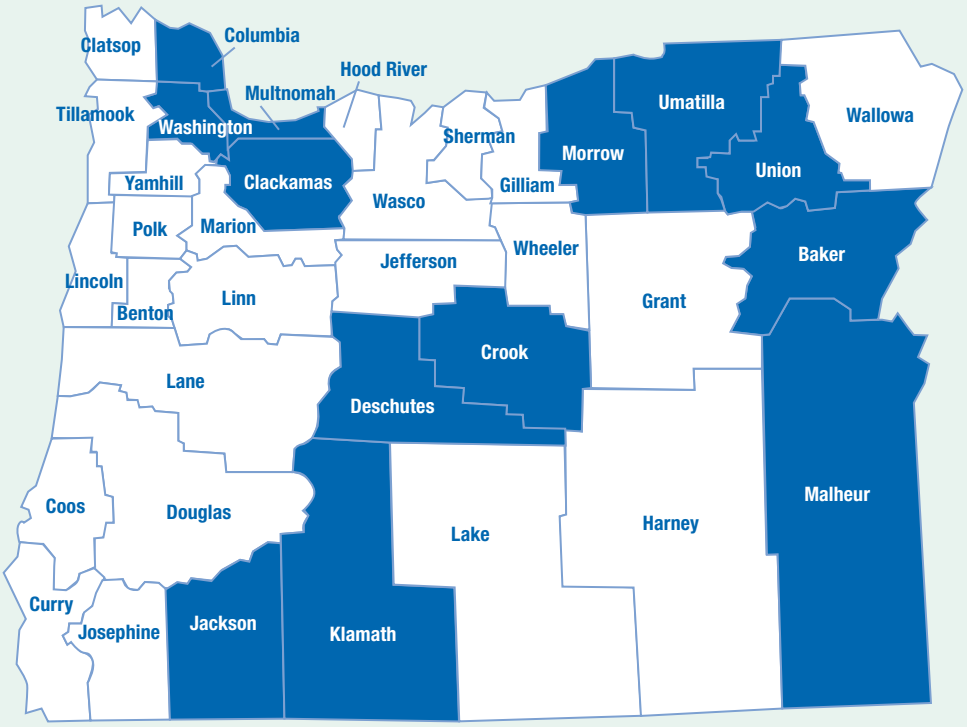
[f] Feeds primarily on avian hosts in spring and early summer and mixed between avian and mammalian hosts in late summer and fall.

* 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