# Supplemental Files 3-

**Meta-analysis of published frequencies of the first decade of field-based mortality and seropositivity in avian species affected by West Nile virus in the United States**

### Claudio Verdugo1,3, Claudio Fuentes2, Maureen T. Long3\*§

1Instituto de Patología Animal, Facultad de Ciencias Veterinarias, Universidad Austral de Chile, Valdivia, Chile

2Department of Statistics, Oregon State University, Corvallis OR, USA

3Department of Infectious Diseases and Pathology, College of Veterinary Medicine, University of Florida, Gainesville FL, USA

§Corresponding author

Email addresses:

CV: claudioverdugo@uach.cl

CF: fuentesc@stat.oregonstate.edu

MTL: longm@ufl.edu

### Supplemental File 3 – List of articles from which data was extracted for recalculation of the number of seropositive birds analyzed based on article, taxonomic strata, and time.

ALLISON AB, MEAD DG, GIBBS SE, HOFFMAN DM, STALLKNECHT DE (2004). West Nile virus viremia in wild rock pigeons. *Emerg. Infect. Dis.*, 10: 2252-2255.

BELL JA, BREWER CM, MICKELSON NJ, GARMAN GW, VAUGHAN JA (2006). West Nile virus epizootiology, central Red River Valley, North Dakota and Minnesota, 2002-2005. *Emerg. Infect. Dis.*, 12: 1245-1247.

BEVEROTH TA, WARD MP, LAMPMAN RL, RINGIA AM, NOVAK RJ (2006). Changes in seroprevalence of West Nile virus across Illinois in free-ranging birds from 2001 through 2004. *Am J Trop. Med. Hyg.*, 74: 174-179.

BRADLEY CA, GIBBS SEJ, ALTIZER S (2008). Urban land use predicts West Nile Virus exposure in songbirds. *Ecological Applications*, 18: 1083-1092.

DUSEK RJ, MCLEAN RG, KRAMER LD, UBICO SR, DUPUIS AP, EBEL GD, et al. (2009). Prevalence of West Nile virus in migratory birds during spring and fall migration. *Am J Trop. Med. Hyg.*, 81: 1151-1158.

DUSEK RJ, RICHARDSON D, EGSTAD KF, HEISEY DM (2006). Evaluating red-cockaded woodpeckers for exposure to West Nile virus and blood parasites. *Southeastern Naturalist*, 5: 561-565.

GIBBS SEJ, ALLISON AB, YABSLEY MJ, MEAD DG, WILCOX BR, STALLKNECHT DE (2006). West Nile virus antibodies in avian species of Georgia, USA: 2000-2004. *Vector-Borne and Zoonotic Diseases*, 6: 57-72.

GODSEY MS, JR., BLACKMORE MS, PANELLA NA, BURKHALTER K, GOTTFRIED K, HALSEY LA, et al. (2005). West Nile virus epizootiology in the southeastern United States, 2001. *Vector. Borne. Zoonotic. Dis.*, 5: 82-89.

HULL J, HULL A, REISEN W, FANG Y, ERNEST H (2006). Variation of West Nile virus antibody prevalence in migrating and wintering hawks in central California. *Condor*, 108: 435-439.

HULL JM, KEANE JJ, TELL L, ERNEST HB (2010). West Nile Virus Antibody Surveillance in Three Sierra Nevada Raptors of Conservation Concern. *Condor*, 112: 168-172.

JOZAN M, EVANS R, MCLEAN R, HALL R, TANGREDI B, REED L, et al. (2003). Detection of West Nile Virus Infection in birds in the United States by blocking ELISA and immunohistochemistry. *Vector-Borne and Zoonotic Diseases*, 3: 99-110.

KOMAR N, BURNS J, DEAN C, PANELLA NA, DUSZA S, CHERRY B (2001a). Serologic evidence for West Nile virus infection in birds in Staten Island, New York, after an outbreak in 2000. *Vector. Borne. Zoonotic. Dis.*, 1: 191-196.

KOMAR N, PANELLA NA, BURNS JE, DUSZA SW, MASCARENHAS TM, TALBOT TO (2001b). Serologic evidence for West Nile virus infection in birds in the New York City vicinity during an outbreak in 1999. *Emerg. Infect. Dis.*, 7: 621-625.

KOMAR N, PANELLA NA, LANGEVIN SA, BRAULT AC, AMADOR M, EDWARDS E, et al. (2005). Avian hosts for West Nile virus in St. Tammany Parish, Louisiana, 2002. *Am J Trop. Med. Hyg.*, 73: 1031-1037.

LILLIBRIDGE KM, PARSONS R, RANDLE Y, DA ROSA APAT, GUZMAN H, SIIRIN M, et al. (2004). The 2002 introduction of West Nile Virus into Harris County, Texas, an area historically endemic for St. Louis encephalitis. *American Journal of Tropical Medicine and Hygiene*, 70: 676-681.

LOSS SR, HAMER GL, GOLDBERG TL, RUIZ MO, KITRON UD, WALKER ED, et al. (2009a). Nestling Passerines Are Not Important Hosts for Amplification of West Nile Virus in Chicago, Illinois. *Vector-Borne and Zoonotic Diseases*, 9: 13-17.

LOSS SR, HAMER GL, WALKER ED, RUIZ MO, GOLDBERG TL, KITRON UD, et al. (2009b). Avian host community structure and prevalence of West Nile virus in Chicago, Illinois. *Oecologia.*, 159: 415-424.

MEDICA DL, CLAUSER R, BILDSTEIN K (2007). Prevalence of west Nile virus antibodies in a breeding population of American Kestrels (Falco sparverius) in Pennsylvania. *J Wildl. Dis.*, 43: 538-541.

NASCI RS, KOMAR N, MARFIN AA, LUDWIG GV, KRAMER LD, DANIELS TJ, et al. (2002). Detection of West Nile virus-infected mosquitoes and seropositive juvenile birds in the vicinity of virus-positive dead birds. *Am J Trop. Med. Hyg.*, 67: 492-496.

NEMETH N, KRATZ G, EDWARDS E, SCHERPELZ J, BOWEN R, KOMAR N (2007). Surveillance for West Nile virus in clinic-admitted raptors, Colorado. *Emerg. Infect. Dis.*, 13: 305-307.

NEMETH NM, DWYER JF, MORRISON JL, FRASER JD (2009). Prevalence of Antibodies to West Nile Virus and Other Arboviruses among Crested Caracaras (Caracara cheriway) in Florida. *Journal of Wildlife Diseases*, 45: 817-822.

NEWMAN SH, PADULA VM, CRAY C, KRAMER LD (2007). Health assessment of Black-crowned Night-herons (Nycticorax nycticorax) of the New York Harbor estuary. *Comp Biochem. Physiol B Biochem. Mol. Biol.*, 148: 363-374.

REED LM, JOHANSSON MA, PANELLA N, MCLEAN R, CREEKMORE T, PUELLE R, et al. (2009). Declining mortality in American crow (Corvus brachyrhynchos) following natural West Nile virus infection. *Avian Dis.*, 53: 458-461.

REISEN WK, BARKER CM, CARNEY R, LOTHROP HD, WHEELER SS, WILSON JL, et al. (2006a). Role of corvids in epidemiology of west Nile virus in southern California. *J Med. Entomol.*, 43: 356-367.

REISEN WK, CARROLL BD, TAKAHASHI R, FANG Y, GARCIA S, MARTINEZ VM, et al. (2009a). Repeated West Nile Virus Epidemic Transmission in Kern County, California, 2004-2007. *Journal of Medical Entomology*, 46: 139-157.

REISEN WK, MARTINEZ VM, FANG Y, GARCIA S, ASHTARI S, WHEELER SS, et al. (2006b). Role of California (Callipepla californica) and Gambel's (Callipepla gambelii) quail in the ecology of mosquito-borne encephalitis viruses in California, USA. *Vector. Borne. Zoonotic. Dis.*, 6: 248-260.

REISEN WK, WHEELER S, ARMIJOS MV, FANG Y, GARCIA S, KELLEY K, et al. (2009b). Role of Communally Nesting Ardeid Birds in the Epidemiology of West Nile Virus Revisited. *Vector-Borne and Zoonotic Diseases*, 9: 275-280.

REISEN WK, WHEELER SS, YAMAMOTO S, FANG Y, GARCIA S (2005). Nesting ardeid colonies are not a focus of elevated West Nile virus activity in southern California. *Vector-Borne and Zoonotic Diseases*, 5: 258-266.

RINGIA AM, BLITVICH BJ, KOO HY, VAN DE WYNGAERDE M, BRAWN JD, NOVAK RJ (2004). Antibody prevalence of West Nile Virus in birds, Illinois, 2002. *Emerging Infectious Diseases*, 10: 1120-1124.

SEBASTIAN MM, STEWART I, WILLIAMS NM, POONACHA KB, SELLS SF, VICKERS ML, et al. (2008). Pathological, entomological, avian and meteorological investigation of a West Nile virus epidemic in a horse farm. *Transboundary and Emerging Diseases*, 55: 134-139.

SHELITE TR, ROGERS CM, LITZNER BR, JOHNSON RR, SCHNEEGURT MA (2008). West Nile virus antibodies in permanent resident and overwintering migrant birds in south-central Kansas. *Vector-Borne and Zoonotic Diseases*, 8: 321-329.

STOUT WE, CASSINI AG, MEECE JK, PAPP JM, ROSENFIELD RN, REED KD (2005). Serologic evidence of West Nile virus infection in three wild raptor populations. *Avian Dis.*, 49: 371-375.

SULLIVAN H, LINZ G, CLARK L, SALMAN M (2006). West Nile virus antibody prevalence in red-winged blackbirds (Agelaius phoeniceus) from North Dakota, USA (2003-2004). *Vector. Borne. Zoonotic. Dis.*, 6: 305-309.

WALKER BL, NAUGLE DE, DOHERTY KE, CORNISH TE (2007). West Nile virus and greater sage-grouse: estimating infection rate in a wild bird population. *Avian Dis.*, 51: 691-696.

WHEELER SS, BARKER CM, FANG Y, ARMIJOS MV, CARROLL BD, HUSTED S, et al. (2009). Differential Impact of West Nile Virus on California Birds. *Condor*, 111: 1-20.

WILCOX BR, YABSLEY MJ, ELLIS AE, STALLKNECHT DE, GIBBS SEJ (2007). West Nile virus antibody prevalence in American crows (Corvus brachyrhynchos) and fish crows (Corvus ossifragus) in Georgia, USA. *Avian Diseases*, 51: 125-128.

YAREMYCH SA, WARNER RE, MANKIN PC, BRAWN JD, RAIM A, NOVAK R (2004). West Nile virus and high death rate in American crows. *Emerging Infectious Diseases*, 10: 709-711.

### Supplemental File 4 – List of articles from which data was extracted for recalculation of the number of dead birds testing positive for West Nile virus based on article, taxonomic strata, and time.

BECKWITH WH, SIRPENSKI S, FRENCH RA, NELSON R, MAYO D (2002). Isolation of eastern equine encephalitis virus and West Nile virus from crows during increased arbovirus surveillance in Connecticut, 2000. *American Journal of Tropical Medicine and Hygiene*, 66: 422-426.

BERNARD KA, MAFFEI JG, JONES SA, KAUFFMAN EB, EBEL G, DUPUIS AP, et al. (2001). West Nile virus infection in birds and mosquitoes, New York State, 2000. *Emerg. Infect. Dis.*, 7: 679-685.

BLACKMORE CGM, STARK LM, JETER WC, OLIVERI RL, BROOKS RG, CONTI LA, et al. (2003). Surveillance results from the first West Nile virus transmission season in Florida, 2001. *American Journal of Tropical Medicine and Hygiene*, 69: 141-150.

CAFFREY C, SMITH SCR, WESTON TJ (2005). West Nile virus devastates an American crow population. *Condor*, 107: 128-132.

CROSBIE SP, KOENIG WD, REISEM WK, KRAMER VL, MARCUS L, CARNEY R, et al. (2008). Early impact of West Nile virus on the Yellow-Billed Magpie (Pica nuttalli). *Auk*, 125: 542-550.

DAWSON JR, STONE WB, EBEL GD, YOUNG DS, GALINSKI DS, PENSABENE JP, et al. (2007). Crow deaths caused by West Nile virus during winter. *Emerg. Infect. Dis.*, 13: 1912-1914.

ELLIS AE, MEAD DG, ALLISON AB, STALLKNECHT DE, HOWERTH EW (2007). Pathology and epidemiology of natural West Nile viral infection of raptors in Georgia. *J Wildl. Dis.*, 43: 214-223.

GARVIN MC, TARVIN KA, SMITH J, OHAJURUKA OA, GRIMES S (2004). Patterns of West Nile virus infection in Ohio blue jays: Implications for initiation of the annual cycle. *American Journal of Tropical Medicine and Hygiene*, 70: 566-570.

GERHOLD RW, TATE CM, GIBBS SE, MEAD DG, ALLISON AB, FISCHER JR (2007). Necropsy findings and arbovirus surveillance in mourning doves from the southeastern United States. *J Wildl. Dis.*, 43: 129-135.

GIBBS SEJ, HOFFMAN DM, STARK LM, MARLENEE NL, BLITVICH BJ, BEATY BJ, et al. (2005). Persistence of antibodies to West Nile virus in naturally infected rock pigeons (Columba livia). *Clinical and Diagnostic Laboratory Immunology*, 12: 665-667.

HADLER J, NELSON R, MCCARTHY T, ANDREADIS T, LIS MJ, FRENCH R, et al. (2001). West Nile virus surveillance in Connecticut in 2000: An intense epizootic without high risk for severe human disease. *Emerging Infectious Diseases*, 7: 636-642.

KRAMER LD, BERNARD KA (2001). West Nile virus infection in birds and mammals. *Ann. N. Y. Acad. Sci.*, 951: 84-93.

NEMETH NM, BECKETT S, EDWARDS E, KLENK K, KOMAR N (2007). Avian mortality surveillance for West Nile virus in Colorado. *Am J Trop. Med. Hyg.*, 76: 431-437.

REISEN WK, BARKER CM, CARNEY R, LOTHROP HD, WHEELER SS, WILSON JL, et al. (2006). Role of corvids in epidemiology of west Nile virus in southern California. *J Med. Entomol.*, 43: 356-367.

REISEN WK, CARROLL BD, TAKAHASHI R, FANG Y, GARCIA S, MARTINEZ VM, et al. (2009a). Repeated West Nile Virus Epidemic Transmission in Kern County, California, 2004-2007. *Journal of Medical Entomology*, 46: 139-157.

REISEN WK, WHEELER S, ARMIJOS MV, FANG Y, GARCIA S, KELLEY K, et al. (2009b). Role of Communally Nesting Ardeid Birds in the Epidemiology of West Nile Virus Revisited. *Vector-Borne and Zoonotic Diseases*, 9: 275-280.

SAITO EK, SILEO L, GREEN DE, METEYER CU, MCLAUGHLIN GS, CONVERSE KA, et al. (2007). Raptor mortality due to West Nile virus in the United States, 2002. *J Wildl. Dis.*, 43: 206-213.

SIIRIN M, SARGENT C, LANGER RC, PARSONS R, VANLANDINGHAM DL, HIGGS S, et al. (2004). Comparative sensitivity of the VecTest antigen-capture assay, reverse transcriptase-PCR, and cell culture for detection of West Nile virus in dead birds. *Vector-Borne & Zoonotic Diseases*, 4: 204-209.

SIRIGIREDDY KR, KENNEDY GA, BROCE A, ZUREK L, GANTA RR (2006). High prevalence of West Nile Virus: A continuing risk in acquiring infection from a mosquito bite. *Vector-Borne and Zoonotic Diseases*, 6: 351-360.

STONE WB, OKONIEWSKI JC, THERRIEN JE, KRAMER LD, KAUFFMAN EB, EIDSON M (2004). VecTest as diagnostic and surveillance tool for West Nile virus in dead birds. *Emerg. Infect. Dis.*, 10: 2175-2181.

TESH RB, PARSONS R, SIIRIN M, RANDLE Y, SARGENT C, GUZMAN H, et al. (2004). Year-round West Nile virus activity, Gulf Coast region, Texas and Louisiana. *Emerging Infectious Diseases*, 10: 1649.

WALKER BL, NAUGLE DE, DOHERTY KE, CORNISH TE (2007). West Nile virus and greater sage-grouse: estimating infection rate in a wild bird population. *Avian Dis.*, 51: 691-696.

WHEELER SS, BARKER CM, FANG Y, ARMIJOS MV, CARROLL BD, HUSTED S, et al. (2009). Differential Impact of West Nile Virus on California Birds. *Condor*, 111: 1-20.

YAREMYCH SA, WARNER RE, MANKIN PC, BRAWN JD, RAIM A, NOVAK R (2004). West Nile virus and high death rate in American crows. *Emerging Infectious Diseases*, 10: 709-711.

### Supplemental file 5 – Species of birds in which data was extracted from publications for recalculation of the number of seropositive birds based on article, taxonomic strata, and time.

|  |  |  |  |
| --- | --- | --- | --- |
| **Order** | **Family** | **Species Name** | **Common Name** |
| **Anseriformes** | Anatidae | *Aix sponsa* | Wood Duck |
| **Anseriformes** | Anatidae | *Anas platyrhynchos* | Mallard duck |
| **Anseriformes** | Anatidae | *Aythya collaris* | Ring-necked duck  |
| **Anseriformes** | Anatidae | *Branta canadensis* | Canada Goose |
| **Ciconiiformes** | Ardeidae | *Ardea alba* | Great egret |
| **Ciconiiformes** | Ardeidae | *Bubulcus ibis* | Cattle egret |
| **Ciconiiformes** | Ardeidae | *Egretta thula* | Snowy egret |
| **Ciconiiformes** | Ardeidae | *Ixobrychus exilis* | Least Bittern |
| **Ciconiiformes** | Ardeidae | *Nycticorax nycticorax* | Black-crowned night heron  |
| **Columbiformes** | Columbidae | *Columba livia* | Rock pigeon |
| **Columbiformes** | Columbidae | *Columbina passerina* | Common ground dove |
| **Columbiformes** | Columbidae | *Zenaida asiatica* | White-winged dove |
| **Columbiformes** | Columbidae | *Zenaida macroura* | Mourning dove |
| **Cuculiformes** | Cuculidae | *Coccyzus americanus* | Yellow-billed cuckoo |
| **Falconiformes** | Accipitridae | *Accipiter cooperii* | Cooper’s Hawk |
| **Falconiformes** | Accipitridae | *Accipiter gentilis* | Northern Goshawk |
| **Falconiformes** | Accipitridae | *Buteo lineatus* | Red-shouldered Hawk |
| **Falconiformes** | Accipitridae | *Buteo jamaicensis* | Red-tailed Hawk |
| **Falconiformes** | Accipitridae | *Buteo swainsoni* | Swainson's hawk |
| **Falconiformes** | Falconidae | *Caracara cheriway* | Crested caracara |
| **Falconiformes** | Falconidae | *Falco sparverius* | American kestrel |
| **Galliformes** | Odontophoridae  | *Callipepla californica* | California quail |
| **Galliformes** | Odontophoridae  | *Callipepla gambelii* | Gambel's quail |
| **Galliformes** | Phasianidae | *Gallus gallus* | Chicken |
| **Galliformes** | Tetraonidae | *Centrocercus urophasianus* | Greater sage-grouse  |
| **Gruiformes** | Rallidae | *Fulica americana* | American coot |
| **Passeriformes** | Cardinalidae | *Cardinalis cardinalis* | Norhtern Cardinal |
| **Passeriformes** | Cardinalidae | *Guiraca caerulea* | Blue grosbeak |
| **Passeriformes** | Cardinalidae | *Passerina ciris* | Painted bunting |
| **Passeriformes** | Cardinalidae | *Passerina cyanea* | Indigo bunting |
| **Passeriformes** | Cardinalidae | *Pheucticus ludovicianus* | Rose-breasted grosbeak |
| **Passeriformes** | Cardinalidae | *Pheucticus melanocephalus* | Black-headed grosbeak |
| **Passeriformes** | Cardinalidae | *Piranga olivacea* | Scarlet tanager |
| **Passeriformes** | Cardinalidae | *Piranga rubra* | Summer tanager |
| **Passeriformes** | Corvidae | *Aphelocoma californica* | Western scrub-jay |
| **Passeriformes** | Corvidae | *Corvus brachyrhynchos* | American crow |
| **Passeriformes** | Corvidae | *Corvus ossifragus* | Fish crow |
| **Passeriformes** | Corvidae | *Cyanocitta cristata* | Blue Jay |
| **Passeriformes** | Corvidae | *Pica nuttalli* | Yellow-billed Magpie |
| **Passeriformes** | Emberizidae | *Chondestes grammacus* | Lark sparrow |
| **Passeriformes** | Emberizidae | *Junco hyemalis* | Dark-eyed junco |
| **Passeriformes** | Emberizidae | *Melospiza georgiana* | Swamp sparrow |
| **Passeriformes** | Emberizidae | *Melospiza lincolnii* | Lincoln’s sparrow |
| **Passeriformes** | Emberizidae | *Melospiza melodia* | Song sparrow |
| **Passeriformes** | Emberizidae | *Passerculus sandwichensis* | Savannah Sparrow |
| **Passeriformes** | Emberizidae | *Passerella iliaca* | Fox sparrow |
| **Passeriformes** | Emberizidae | *Pipilo aberti* | Abert’s towhee |
| **Passeriformes** | Emberizidae | *Pipilo erythrophthalmus* | Eastern towhee |
| **Passeriformes** | Emberizidae | *Spizella arborea* | American tree sparrow |
| **Passeriformes** | Emberizidae | *Spizella passerina* | Chipping Sparrow |
| **Passeriformes** | Emberizidae | *Spizella pusilla* | Field sparrow |
| **Passeriformes** | Emberizidae | *Zonotrichia albicollis* | White-throated Sparrow |
| **Passeriformes** | Emberizidae | *Zonotrichia atricapilla* | Golden-crowned sparrow |
| **Passeriformes** | Emberizidae | *Zonotrichia leucophrys* | White-crowned sparrow |
| **Passeriformes** | Emberizidae | *Zonotrichia querula* | Harris’ sparrow |
| **Passeriformes** | Fringillidae | *Carduelis tristis* | American goldfinch |
| **Passeriformes** | Fringillidae | *Carpodacus mexicanus* | House Finch |
| **Passeriformes** | Hirundinidae  | *Stelgidopteryx serripennis* | Northern rough-winged swallow |
| **Passeriformes** | Hirundinidae  | *Tachycineta bicolor* | Tree swallow |
| **Passeriformes** | Icteridae | *Agelaius phoeniceus* | Red-winged blackbird |
| **Passeriformes** | Icteridae | *Agelaius tricolor* | Tricolored blackbird |
| **Passeriformes** | Icteridae | *Dolichonyx oryzivorus* | Bobolink |
| **Passeriformes** | Icteridae | *Euphagus cyanocephalus* | Brewer's blackbird |
| **Passeriformes** | Icteridae | *Icterus bullockii* | Bullock's oriole |
| **Passeriformes** | Icteridae | *Icterus galbula* | Baltimore oriole |
| **Passeriformes** | Icteridae | *Icterus spurious* | Orchard oriole |
| **Passeriformes** | Icteridae | *Molothrus ater* | Brown-headed cowbird |
| **Passeriformes** | Icteridae | *Quiscalus major* | Boat-tailed grackle |
| **Passeriformes** | Icteridae | *Quiscalus mexicanus* | Great-tailed grackle |
| **Passeriformes** | Icteridae | *Quiscalus quiscala* | Common grackle |
| **Passeriformes** | Lanidae | *Lanius ludovicianus* | Loggerhead shrike |
| **Passeriformes** | Mimidae | *Dumetella carolinensis* | Gray catbird |
| **Passeriformes** | Mimidae | *Mimus polyglottos* | Northern mockingbird |
| **Passeriformes** | Mimidae | *Toxostoma redivivum* | California thrasher |
| **Passeriformes** | Mimidae | *Toxostoma rufum* | Brown thrasher |
| **Passeriformes** | Paridae | *Baeolophus bicolor* | Tufted titmouse |
| **Passeriformes** | Paridae  | *Poecile atricapillus* | Black-capped chickadee |
| **Passeriformes** | Paridae  | *Poecile carolinensis* | Carolina chickadee |
| **Passeriformes** | Parulidae | *Dendroica caerulescens* | Black-throated blue warbler |
| **Passeriformes** | Parulidae | *Dendroica coronata* | Yellow-rumped Warbler |
| **Passeriformes** | Parulidae | *Dendroica discolor* | Prairie warbler |
| **Passeriformes** | Parulidae | *Dendroica magnolia* | Magnolia warbler |
| **Passeriformes** | Parulidae | *Dendroica palmarum* | Palm warbler |
| **Passeriformes** | Parulidae | *Dendroica pensylvanica* | Chestnut-sided warbler |
| **Passeriformes** | Parulidae | *Dendroica petechia* | Yellow warbler |
| **Passeriformes** | Parulidae | *Dendroica pinus* | Pine warbler |
| **Passeriformes** | Parulidae | *Dendroica striata* | Blackpoll warbler |
| **Passeriformes** | Parulidae | *Geothlypis trichas* | Common yellowthroat |
| **Passeriformes** | Parulidae | *Helmitheros vermivorus* | Worm-eating warbler |
| **Passeriformes** | Parulidae | *Icteria virens* | Yellow-breasted chat |
| **Passeriformes** | Parulidae | *Mniotilta varia* | Black-and-white warbler |
| **Passeriformes** | Parulidae | *Oporornis formosus* | Kentucky warbler |
| **Passeriformes** | Parulidae | *Oporornis tolmiei* | MacGillivray’s warbler |
| **Passeriformes** | Parulidae | *Parula americana* | Northern parula |
| **Passeriformes** | Parulidae | *Protonotaria citrea* | Prothonotary warbler |
| **Passeriformes** | Parulidae | *Seirus noveboracensis* | Northern waterthrush |
| **Passeriformes** | Parulidae | *Seiurus aurocapillus* | Ovenbird |
| **Passeriformes** | Parulidae | *Setophaga ruticilla* | American redstart |
| **Passeriformes** | Parulidae | *Vermivora celata* | Orange-crowned warbler |
| **Passeriformes** | Parulidae | *Vermivora peregrina* | Tennessee warbler |
| **Passeriformes** | Parulidae | *Vermivora pinus* | Blue-winged warbler |
| **Passeriformes** | Parulidae | *Vermivora ruficapilla* | Nashville warbler |
| **Passeriformes** | Parulidae | *Wilsonia canadensis* | Canada warbler |
| **Passeriformes** | Parulidae | *Wilsonia citrina* | Hooded warbler |
| **Passeriformes** | Parulidae | *Wilsonia pusilla* | Wilson’s warbler |
| **Passeriformes** | Passeridae | *Passer domesticus* | House sparrow |
| **Passeriformes** | Regulidae | *Regulus calendula* | Ruby-crowned kinglet |
| **Passeriformes** | Remizidae | *Auriparus flaviceps* | Verdin |
| **Passeriformes** | Sittidae | *Sitta carolinensis* | White-breasted nuthatch |
| **Passeriformes** | Sturnidae | *Sturnus vulgaris* | European starling |
| **Passeriformes** | Thraupidae | *Piranga ludoviciana* | Western tanager |
| **Passeriformes** | Troglodytidae | *Cistothorus palustris* | Marsh wren |
| **Passeriformes** | Troglodytidae | *Thryothorus ludovicianus* | Carolina wren |
| **Passeriformes** | Troglodytidae | *Troglodytes aedon* | House wren |
| **Passeriformes** | Troglodytidae  | *Thryomanes bewickii* | Bewick's wren |
| **Passeriformes** | Turdidae | *Catharus fuscescens* | Veery |
| **Passeriformes** | Turdidae | *Catharus guttatus* | Hermit thrush |
| **Passeriformes** | Turdidae | *Catharus minimus* | Gray-cheeked thrush |
| **Passeriformes** | Turdidae | *Catharus ustulatus* | Swainson’s thrush |
| **Passeriformes** | Turdidae | *Hylocichla mustelina* | Wood thrush |
| **Passeriformes** | Turdidae | *Sialia sialis* | Eastern bluebird |
| **Passeriformes** | Turdidae | *Turdus migratorius* | American robin |
| **Passeriformes** | Tyrannidae  | *Contopus virens* | Eastern wood-pewee |
| **Passeriformes** | Tyrannidae  | *Empidonax flaviventris* | Yellow-bellied flycatcher |
| **Passeriformes** | Tyrannidae  | *Empidonax traillii/alnorum* | Traill’s flycatcher |
| **Passeriformes** | Tyrannidae  | *Empidonax virescens* | Acadian flycatcher |
| **Passeriformes** | Tyrannidae  | *Myiarchus cinerascens* | Ash-throated Flycatcher |
| **Passeriformes** | Tyrannidae  | *Myiarchus crinitus* | Great crested flycatcher |
| **Passeriformes** | Tyrannidae  | *Sayornis nigricans* | Black phoebe |
| **Passeriformes** | Tyrannidae  | *Sayornis phoebe* | Eastern phoebe |
| **Passeriformes** | Tyrannidae  | *Tyrannus verticalis* | Western Kingbird |
| **Passeriformes** | Vireonidae | *Vireo gilvus* | Warbling vireo |
| **Passeriformes** | Vireonidae | *Vireo griseus* | White-eyed vireo |
| **Passeriformes** | Vireonidae | *Vireo olivaceous* | Red-eyed vireo |
| **Piciformes** | Picidae | *Melanerpes carolinus* | Red-bellied woodpecker |
| **Piciformes** | Picidae | *Picoides borealis* | Red-cockaded Woodpecker |
| **Piciformes** | Picidae | *Picoides pubescens*  | Downy woodpecker |
| **Piciformes** | Picidae | *Picoides villosus* | Hairy woodpecker |
| **Strigiforme** | Strigidae | *Bubo virginianus* | Great Horned Owl |
| **Strigiforme** | Strigidae | *Strix nebulosa* | Great gray owl |
| **Strigiforme** | Strigidae | *Strix occidentalis* | Spotted owl |
| **Strigiforme** | Strigidae | *Tyto alba* | Barn owl |

### Supplemental File 6 - Species of birds in which data was extracted from publications for recalculation of recalculation of the number of dead birds testing positive for West Nile virus based on article, taxonomic strata, and time.

|  |  |  |  |
| --- | --- | --- | --- |
| **Order** | **Family** | **Scientific Name** | **Common Name** |
| **Anseriformes** | Anatidae | *Anas platyrhynchos* | Mallard duck |
| **Anseriformes** | Anatidae | *Branta canadensis* | Canada goose |
| **Charadriiformes** | Laridae | *Larus delawarensis* | Ring-billed gull  |
| **Ciconiiformes** | Ardeidae | *Ardea herodias*  | Great blue heron |
| **Ciconiiformes** | Ardeidae | *Butorides virescens* | Green Heron |
| **Ciconiiformes** | Ardeidae | *Egretta thula* | Snowy egret |
| **Ciconiiformes** | Ardeidae | *Nycticorax nycticorax* | Black-crowned night heron  |
| **Ciconiiformes** | Cathartidae | *Cathartes aura* | Turkey Vulture |
| **Columbiformes** | Columbidae | *Columba livia* | Rock pigeon |
| **Columbiformes** | Columbidae | *Columbina inca* | Inca Dove |
| **Columbiformes** | Columbidae | *Patagioenas fasciata* | Band tailed pigeon |
| **Columbiformes** | Columbidae | *Zenaida macroura* | Mourning dove |
| **Falconiformes** | Accipitridae | *Accipiter cooperii* | Cooper’s Hawk |
| **Falconiformes** | Accipitridae | *Accipiter striatus* | Sharp-shinned Hawk |
| **Falconiformes** | Accipitridae | *Buteo jamaicensis* | Red-tailed hawk |
| **Falconiformes** | Accipitridae | *Buteo lineatus* | Red-shouldered hawk |
| **Falconiformes** | Falconidae | *Falco sparverius* | American kestrel |
| **Galliformes** | Odontophoridae  | *Callipepla californica* | California quail |
| **Galliformes** | Phasianidae | *Bonasa umbellus* | Ruffed grouse  |
| **Galliformes** | Phasianidae | *Meleagris gallopavo* | Wild Turkey |
| **Galliformes** | Tetraonidae | *Centrocercus urophasianus* | Greater sage-grouse  |
| **Gruiformes** | Rallidae | *Fulica americana* | American coot |
| **Passeriformes** | Bombycillidae | *Bombycilla cedrorum* | Cedar Waxwing |
| **Passeriformes** | Cardinalidae | *Cardinalis cardinalis* | Norhtern Cardinal |
| **Passeriformes** | Cardinalidae | *Pheucticus melanocephalus* | Black-headed grosbeak |
| **Passeriformes** | Corvidae | *Aphelocoma coerulescens* | Western scrub-jay |
| **Passeriformes** | Corvidae | *Corvus brachyrhynchos* | American crow |
| **Passeriformes** | Corvidae | *Corvus corax* | Common raven |
| **Passeriformes** | Corvidae | *Corvus ossifragus* | Fish crow |
| **Passeriformes** | Corvidae | *Cyanocitta cristata* | Blue jay |
| **Passeriformes** | Corvidae | *Cyanocitta stelleri* | Steller’s Jay |
| **Passeriformes** | Corvidae | *Pica hudsonia* | Black-billed magpie |
| **Passeriformes** | Corvidae | *Pica nuttali* | Yellow-billed magpie |
| **Passeriformes** | Emberizidae  | *Junco hyemalis* | Dark-eyed junco |
| **Passeriformes** | Emberizidae  | *Melospiza melodia* | Song sparrow |
| **Passeriformes** | Emberizidae  | *Passerella iliaca* | Fox sparrow |
| **Passeriformes** | Emberizidae  | *Pipilo crissalis* | California Towhee |
| **Passeriformes** | Emberizidae  | *Pipilo maculatus* | Spotted Towhee |
| **Passeriformes** | Emberizidae  | *Zonotrichia atricapilla* | Golden-crowned sparrow |
| **Passeriformes** | Emberizidae  | *Zonotrichia leucophrys* | White-crowned sparrow |
| **Passeriformes** | Fringillidae | *Carduelis pinus* | Pine Siskin |
| **Passeriformes** | Fringillidae | *Carduelis psaltria* | Lesser Goldfinch |
| **Passeriformes** | Fringillidae | *Carduelis tristis* | American goldfinch |
| **Passeriformes** | Fringillidae | *Carpodacus mexicanus* | House Finch |
| **Passeriformes** | Fringillidae | *Carpodacus purpureus* | Purple Finch |
| **Passeriformes** | Hirundinidae  | *Hirundo rustica* | Barn Swallow |
| **Passeriformes** | Hirundinidae  | *Petrochelidon pyrrhonota* | Cliff Swallow |
| **Passeriformes** | Icteridae | *Agelaius phoeniceus* | Red-winged blackbird |
| **Passeriformes** | Icteridae | *Euphagus cyanocephalus* | Brewer's blackbird |
| **Passeriformes** | Icteridae | *Icterus bullockii* | Bullock's oriole |
| **Passeriformes** | Icteridae | *Molothrus ater* | Brown-headed cowbird |
| **Passeriformes** | Icteridae | *Quiscalus quiscula* | Common grackle |
| **Passeriformes** | Lanidae | *Lanius ludovicianus* | Loggerhead shrike |
| **Passeriformes** | Mimidae | *Dumetella carolinensis* | Gray catbird |
| **Passeriformes** | Mimidae | *Mimus polyglottos* | Northern mockingbird |
| **Passeriformes** | Paridae | *Baeolophus inornatus* | Oak Titmouse |
| **Passeriformes** | Parulidae | *Dendroica coronata* | Yellow-rumped Warbler |
| **Passeriformes** | Parulidae | *Dendroica petechia* | Yellow warbler |
| **Passeriformes** | Parulidae | *Seiurus aurocapillus* | Ovenbird |
| **Passeriformes** | Parulidae | *Vermivora celata* | Orange-crowned warbler |
| **Passeriformes** | Parulidae | *Wilsonia pusilla* | Wilson’s warbler |
| **Passeriformes** | Passeridae | *Passer domesticus* | House sparrow |
| **Passeriformes** | Sturnidae | *Sturnus vulgaris* | European starling |
| **Passeriformes** | Thraupidae | *Piranga ludoviciana* | Western tanager |
| **Passeriformes** | Turdidae | *Catharus guttatus* | Hermit thrush |
| **Passeriformes** | Turdidae | *Catharus ustulatus* | Swainson’s thrush |
| **Passeriformes** | Turdidae | *Sialia mexicana* | Western Bluebird |
| **Passeriformes** | Turdidae | *Turdus migratorius* | American robin |
| **Passeriformes** | Tyrannidae  | *Sayornis nigricans* | Black phoebe |
| **Passeriformes** | Tyrannidae  | *Tyrannus verticalis* | Western Kingbird |
| **Piciformes** | Picidae | *Colaptes auratus* | Northern flicker |
| **Piciformes** | Picidae | *Melanerpes formicivorus* | Acorn Woodpecker |
| **Piciformes** | Picidae | *Picoides nuttallii* | Nuttall’s Woodpecker |
| **Strigiforme** | Strigidae | *Bubo virginianus* | Great Horned Owl |
| **Strigiforme** | Strigidae | *Megascops asio* | Eastern streech owl |
| **Strigiforme** | Strigidae | *Megascops kennicottii* | Western Screech owl |
| **Strigiforme** | Strigidae | *Strix varia* | Barred owl |
| **Strigiforme** | Strigidae | *Tyto alba* | Barn owl |
| **Trochiliformes** | Trochilidae | *Calypte anna* | Anna’s Hummingbird |