



**National Wildlife Health Center
Wildlife Health Bulletin 2014-02**

West Nile Virus Causes Bald Eagle and Eared Grebe Mortality in Utah

To: Natural Resource/Conservation Managers
From: Dr. Jonathan Sleeman, Center Director, USGS National Wildlife Health Center
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Diagnostic evaluations on eared grebe (*Podiceps nigricollis*) and bald eagle (*Haliaeetus leucocephalus*) carcasses submitted to the USGS National Wildlife Health Center (NWHC) by the Utah Division of Wildlife Resources (UDWR) confirmed West Nile virus (WNV) to be the cause of death. These findings are consistent with the confirmation of WNV in a bald eagle from the same event by the Utah Veterinary Diagnostic Laboratory. These diagnoses were based on pathological findings, molecular testing (RT-PCR) and isolation of viable virus from most tissues. Extensive testing ruled out many other causes of death. Carcasses were negative for exposure to lead and organophosphate compounds; RT-PCR screening tests were negative for avian influenza and avian paramyxovirus-1 (Newcastle Disease virus); and no pathogenic bacteria such as *Pasteurella multocida* (causative agent of avian cholera) were isolated.

The event was first reported by the UDWR when sick and dead eared grebes were observed in a northern section of the Great Salt Lake (GSL) in mid-November 2013. Most birds were found dead or dying with clinical signs of drooping heads, lethargy, and inability to dive. At the time the event was reported, an estimated 2 million grebes were arriving during fall migration and were potentially at risk. UDWR estimates that between November 1 and December 31, 2013, up to 1 percent of the population has died (~10,000-20,000) during this mortality event. It is unclear if the entire 10,000-20,000 grebe mortality was due to WNV, and additional diagnostic evaluations on both eared grebes and bald eagles carcasses are in progress. The last significant eared grebe mortality event on the GSL was caused by avian cholera (*Pasteurella multocida*) and occurred during winter 2010 when an estimated 10,000 birds died. Grebes typically migrate from the GSL as food sources (brine shrimp) diminish and travel to the west coast of the United States to spend the remainder of winter in coastal bays and estuaries of California, the Salton Sea of California and the Gulf of California in Mexico.

In early December, the UDWR again contacted the NWHC to report morbidity and mortality in bald eagles that was occurring in proximity to the GSL. The first bald eagle was brought to the Wildlife Rehabilitation Center of Northern Utah on December 1, 2013. To date, 54 eagles have been found sick or dead in 6 counties in Utah (Box Elder, Davis, Weber, Salt Lake, Tooele and Utah counties). Clinical signs in eagles include head tremors, paralysis of the wings and legs, formation of plaques at the back of the throat, and progressive seizures. The GSL is a major overwintering site for bald eagles, estimated at 750 to 1,250 birds annually.

WNV is an arbovirus and mosquitoes, especially *Culex pipiens* and *Culex tarsalis*, are the main enzootic transmission vectors in birds in the Eastern and Western United States, respectively. WNV cases typically begin occurring in the United States in the late spring and early summer after emergence of overwintering female mosquitoes and the return of avian migrants such as American robins (*Turdus migratorius*) and American crows (*Corvus brachyrhynchos*), with cases peaking in late summer and autumn. WNV transmission typically ends in the temperate regions of the United States following onset of winter as the mosquitoes enter quiescence or diapause but can occur year-round in the Southern United States. However, WNV can also be shed orally and cloacally, giving rise to the possibility of transmission mechanisms beyond vector-borne transmission. Moreover, birds may become persistently infected and harbor WNV for several weeks to months following exposure which suggests WNV-infected carcasses, especially in cooler temperatures, might pose a risk to scavengers who feed on them. WNV has rarely been observed in wildlife in

North America during winter except in the Southern United States but should be considered as a potential diagnosis throughout the year based on these recent findings.

Following the introduction of WNV into the United States in 1999, the virus has been reported in over 300 species of birds. The virus has been reported in only two species of grebes, pied-billed grebe (*Podilymbus podiceps*) and Clark's grebe (*Aechmophorus clarkii*). The GSL mortality event is the first report of WNV infection in eared grebes. While WNV infection has been reported in over 36 species of raptors, records of WNV in bald eagles at the NWHC are rare. Prior to this event, the NWHC has tested 386 bald eagles for WNV of which 11 were positive.

As the investigation continues and the majority of the eared grebes migrate to their traditional wintering grounds, we request that wildlife managers monitoring areas where large concentrations of eared grebes or bald eagles overwinter report unusual mortality to NWHC (see contact information below) and to the relevant state or federal wildlife management agency.

For further information regarding West Nile virus:

NWHC WNV page: http://www.nwhc.usgs.gov/disease_information/west_nile_virus/index.jsp

Utah Division of Wildlife Resources, WNV page: <http://wildlife.utah.gov/wnv/>

Publications of Interest

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Harris, M.C., and J.M. Sleeman. 2007. Morbidity and mortality of bald eagles (*Haliaeetus leucocephalus*) and peregrine falcons (*Falco peregrinus*) admitted to the Wildlife Center of Virginia, 1993-2003. *Journal of Zoo and Wildlife Medicine* 38:62-66.

Hofmeister, E.K. 2011. West Nile virus: North American experience. *Integrative Zoology* 6:279-289.

Komar, N., R. Lanciotti, R. Bowen, S. Langevin, and M. Bunning. 2002. Detection of West Nile virus in oral and cloacal swabs collected from bird carcasses. *Emerging Infectious Diseases* 8:741-742.

Nemeth, N., D. Gould, R. Bowen, and N. Komar. 2006. Natural and experimental West Nile virus infection in five raptor species. *Journal of Wildlife Diseases* 42:1-13.

Saito, E.K., L. Sileo, D.E. Green, C.U. Meteyer, G.S. McLaughlin, K.A. Converse, and D.E. Docherty, et al. 2007. Raptor mortality due to West Nile virus in the United States, 2002. *Journal of Wildlife Diseases* 43:206-213.

To report or request assistance for wildlife mortality events or health issues, please visit the NWHC Web site at http://www.nwhc.usgs.gov/mortality_events/reporting.jsp or contact a NWHC staff member listed below ([see map of states by region](#)):

Western states: Barb Bodenstein, 608-270-2447, bbodenstein@usgs.gov

Central states: LeAnn White, 608-270-2491, clwhite@usgs.gov

Eastern states: Anne Ballmann, 608-270-2445, aballmann@usgs.gov

Hawaii and Pacific Islands: Thierry Work, 808-792-9520, thierry_work@usgs.gov

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