

# Zoonotic Disease Newsletter

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## In This Issue

*Seattle focuses on catch basins in preparation for increased West Nile virus activity in 2007*

*Avoid rabies – don't touch bats or other wild animals*

*Plague monitoring helps detect potential outbreaks*

*Bird feeding precautions urged to stem bird disease*

*New West Nile virus educational materials available*

*West Nile virus activity in the northwest*

*West Nile virus and zoonoses news and research headlines*



Zoonotic Disease Newsletter

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## Seattle focuses on catch basins in preparation for increased West Nile virus activity in 2007

By Colleen Schlonga, City of Seattle West Nile Virus Response Team

Wary of the spread of West Nile virus, the City of Seattle with Seattle Public Utilities (SPU) initiated a city-wide research effort in the summer of 2006. Building upon a smaller 2005 study, objectives of the 2006 research were to determine the quantity of mosquito larvae within storm-water drainage systems (catch basins), identify the environmental factors influencing larval abundance, and evaluate the efficacy of three common larvicides.

The goal of the research project (done in partnership with the Washington Cooperative Fish and Wildlife Research Unit at the University of Washington) was to develop effective strategies to evaluate and control mosquito breeding in SPU catch basins, which are important but challenging structures. Catch basins are underground structures designed to slow down and hold storm water and other runoff, allowing sediment to settle before the runoff eventually drains to a wastewater treatment facility or a body of water.

### Highlights: Larval Abundance

The study found that mosquito breeding occurred in catch basins in all parts of the city, with 90 percent of the basins being host to larvae at some point during the season. The mosquito-breeding season was defined as mid-June to the end of September, the peak season being from mid-July to the end of August.

While all areas had significant breeding, the west and southwest sectors of the city had statistically higher larvae counts for undetermined reasons. In addition, larval counts within the zone that consisted mainly of single family residences were statistically greater than those within the multi-family and neighborhood commercial zones.

Environmental variables—such as air and water temperature—accounted for no more than 25 percent of the differences in larval counts in the basins, suggesting that surrounding habitat may be equally or more important. High larval counts were associated with basins that contained any amount of plant material in the first half of the season, and debris that included up to 25 percent plant material later in the season. Results also indicated that sediment in the basins did not influence larval abundance.



SPU

In 2006, 99 percent of the 250 catch basins studied had water in them at one point during the mosquito season and 58 percent of the basins consistently had water. Around 90 percent of the basins studied produced mosquito larvae. The majority of Seattle's 46,000 catch basins will be treated with *Bacillus sphaericus* in 2007.



SPU

*Seattle catch basins* continues on page 2

*Seattle catch basins* continued from page 1



Christian Grue

Armed with a solid knowledge of larval abundance and control efficacy in catch basins, Seattle hopes their decision to treat most of their basins will help reduce mosquito populations and the number of West Nile virus infections.

### Highlights: Control Efficacy

A couple of low-toxicity bacterial larvicides and an insect growth regulator worked well in controlling larvae in the city's catch basins. The larvicides *Bacillus thuringiensis israelensis* (BTI), *Bacillus sphaericus* (BS), and Methoprene all significantly reduced the number of pupae (BTI and BS) or their hatching success (Methoprene).

Once applied, neither BTI nor BS was affected by light summer rainfall, with BS controlling larvae in the catch basins for at least seven weeks. Post-application precipitation did reduce the effectiveness of Methoprene, however some municipalities in the Pacific Northwest have had success by using extended release formulations of that product.

### Conclusion

Based on the results of this study, SPU decided to treat the vast majority of Seattle's 46,000 catch basins this summer with *Bacillus sphaericus*. Research of products containing the ingredient has shown that when used properly, it does not appear to harm mammals, birds, fish, or most insects or worms. A licensed contractor will apply the larvicide to secured catch basins, which are several feet underground and inaccessible to the public. The treatments are scheduled to occur in July and August and are weather dependent.

**Source:** "Catch Basins as Sources of Mosquitoes," Washington Cooperative Fish and Wildlife Research Unit, University of Washington, for Seattle Public Utilities. March 14, 2007. To read the research report in its entirety, go to [www.seattle.gov/util](http://www.seattle.gov/util) and click on "About West Nile Virus."

## Avoid rabies - don't touch bats or other wild animals

By Ron Wohrle, Environmental Health Veterinarian, WA DOH Zoonotic Disease Program



Big Brown Bat

Photo by Ty Smedee

WDFW

Facts about Washington bats and tips on preventing human and bat conflicts are available at WDFW's Web page, [wdfw.wa.gov/wlm/living/bats.htm](http://wdfw.wa.gov/wlm/living/bats.htm).

Recent human rabies cases tragically illustrate that people do not always understand the risks of coming into contact with wildlife, especially bats. In 2006, two young people, a Texas teenager and a 10-year-old Indiana girl, died from rabies after encountering bats in their homes. Both of these bat contacts were recognized at the time, but the danger of rabies was not recognized and neither exposure was reported to the local public health department or to a physician for preventative medical treatment.

People are most often exposed to rabies when they handle or bother bats. Any bat that is found on the ground, has been caught by a pet, or is found in the house or room of a sleeping person could have rabies. The local health agency should be consulted for possible testing of the bat or guidance on release or proper disposal.

In 2006, 15 bats from 11 Washington counties tested positive for rabies. Many people were exposed to those rabid bats and received the rabies vaccine as a precaution. Exposures have also occurred at summer camps, which is why kids and camp counselors need to understand the dangers of touching or living in areas where contact with bats can occur. Since May of 2007, three bats from three counties have been identified as rabid.

Any mammal can get rabies, including dogs and cats, so owners should make sure that their pets are up-to-date on their rabies vaccinations.

Bats are an important part of our environment and are not aggressive animals. The vast majority of them don't have rabies. Those seen flying at dusk feeding on insects are usually healthy and will avoid contact with people. However, any bat that is flying during the day or appears sick and unable to fly is more likely to be rabid. All wildlife should be avoided and never handled.

Learn more about preventing rabies at [www.doh.wa.gov/notify/factsheets/rabies.htm](http://www.doh.wa.gov/notify/factsheets/rabies.htm) and [www.cdc.gov/ncidod/dvrd/rabies/](http://www.cdc.gov/ncidod/dvrd/rabies/).



*Xenopsylla cheopis*, the oriental rat flea, is considered the world's most efficient vector of plague. It has been collected in Snohomish and King County and was probably introduced into Washington by rats arriving on ships.



The sagebrush vole, *Lagurus curtatus pauperrimus*, is considered to be a major reservoir of plague in eastern Washington. The flea, *Oropsylla bacchi johnsoni*, known only to occur in Washington and Oregon, is host specific to the sagebrush vole, helps to maintain the plague agent in the vole's population, and is an efficient vector of plague.



Another vector of plague is *Oropsylla montana*, a flea commonly found on the California ground squirrel, *Spermophilus beecheyi*. California ground squirrels are competent reservoirs of plague and are found in the south central Cascade Mountains of Washington. *Oropsylla montana* is considered the primary vector of sylvatic plague to humans in the North America.

## Plague monitoring helps detect potential outbreaks

By David Nash and Liz Dykstra, WA DOH Zoonotic Disease Program

The recent deaths of a 3-year-old boy from New Mexico and a hooded capuchin monkey from a Denver zoo serve as a reminder that plague activity often peaks during the summer. Human infections of plague in Washington are extremely rare, but the plague bacterium can be found in our state's wildlife.

The Department of Health, along with key partners such as the Yakama Nation, conduct serology surveys on wild carnivores to monitor plague prevalence in the state. A sudden increase in plague-positive carnivores indicates increased activity in the area's rodent population and serves as an early warning of increased human risk.

Plague is a systemic bacterial infection of rodents caused by *Yersinia pestis*. It is typically transmitted to humans and other animals by fleas or by handling infected animals with resulting entry of *Y. pestis* into cuts or abrasions.

Washington's reported history of human plague began in 1907, when three (possibly seven) people died in Seattle. Rats in Seattle were found to be plague positive until 1917. Since 1907, only one human bubonic plague case has been reported in Washington. The last case involved an animal trapper from Yakima County in 1984.

Plague showed up again when positive fleas were collected from rats and other rodents in Tacoma from 1942 to 1944 and again in 1954 and 1971. The introduction of plague into Seattle and Tacoma was attributed to flea-infected rodents or persons from foreign vessels, or flea-infected rodents in grain shipments from eastern Washington.

Evidence suggests sylvatic plague (plague that affects wildlife) epizootics have occurred sporadically as early as 1896 to 1937 among ground squirrel populations in eastern Washington. Sylvatic plague was confirmed in 1937 and studies have been conducted intermittently in the state since then. During a study from 1937-1941, positive fleas or tissues were collected from ground squirrels located in Adams, Lincoln, Spokane and Stevens counties and from cottontail rabbits in Lincoln and Spokane counties. Through 1947-1954, positive fleas were collected from chipmunks, field mice, and voles located in Yakima, Kittitas, Douglas, Grant and Lincoln counties.

Sylvatic studies resumed again in 1975 with carnivore serology surveys. Since 1975, plague has been reported from coyotes, bobcats, martens, badgers, mink, raccoons, and weasels. Plague activity has been detected in 17 of 20 counties in eastern Washington. Many of the positive cases were from carnivores that live in pine or fir habitats and were not associated with the sagebrush environments where previous plague foci had been. The first indication of plague among carnivores west of the Cascade Range occurred during the 1982-83 trapping season. One bobcat and coyote from northern Whatcom County and a bobcat from Pacific County tested positive. The reservoir for plague in western Washington has not been established.

Serology surveys were discontinued in 1988 and then resumed in 1997. The last positive plague samples were collected from two coyotes in Grant County during the 2001-2002 trapping season. As of the end of the 2005-2006 trapping season, 5,957 animals have been tested under the carnivore serology program since 1975, with 3.8 percent positive for plague.

People can protect themselves against the plague by using an insect repellent to prevent flea bites, treating cats and dogs with a flea control product, not touching wildlife, wearing gloves when touching any animal with an oozing wound, keeping wild rodents (and their fleas) out of homes and living spaces, and handling sick cats with caution. Areas where large groups of rodents have suddenly died should be avoided.

For additional information about plague in Washington and if you would like to participate in the serology survey program, please contact David F. Nash at [david.nash@doh.wa.gov](mailto:david.nash@doh.wa.gov). Information about plague can be found through the Zoonotic Disease Program's Web site, [www.doh.wa.gov/ehp/ts/ZOO.HTM](http://www.doh.wa.gov/ehp/ts/ZOO.HTM).

## Bird feeding precautions urged to stem bird disease

Washington Department of Fish and Wildlife, News Release, June 6, 2007



Carcasses of purple finches (healthy male pictured above) and pine siskins were recently sent to a Washington State University laboratory and tested positive for salmonella.

OLYMPIA - Recent reports of sick or dead birds at backyard feeders has prompted the Washington Department of Fish and Wildlife (WDFW) to recommend that people temporarily discontinue bird feeding, or take extra steps to maintain feeders.

Laboratory analysis of bird carcasses has confirmed salmonellosis, a common and usually fatal bird disease caused by the salmonella bacteria, said WDFW veterinarian Kristin Mansfield.

"Salmonellosis is probably the most common avian disease at feeders in Washington," Mansfield said. "The disease afflicts species such as finches, grosbeaks and pine siskins that flock together in large numbers at feeders and transmit the disease through droppings."

The first indication of the disease is often a seemingly tame bird on or near a feeder, Mansfield said.

It's possible, although uncommon, for people to become sick from the salmonella bacteria through direct contact with infected birds, bird droppings, or through pet cats that catch sick birds. Ron Wohrle, Environmental Health Veterinarian for the Washington Department of Health notes that more information on human health and salmonella is available at [www.doh.wa.gov/EHSPHL/factsheet/salmonel.htm](http://www.doh.wa.gov/EHSPHL/factsheet/salmonel.htm).

People who handle birds, bird feeders or bird baths should wear gloves and wash their hands thoroughly afterwards, Mansfield said.

Mansfield advised stopping backyard bird feeding for at least a few weeks, if not for the remainder of the summer, to encourage birds to disperse and forage naturally. "Birds use natural food sources year-round, even while using bird feeding stations," she said.

Bird enthusiasts who choose to continue feeding should reduce the number of feeders they maintain and spread them out, use feeders that accommodate fewer birds (using tubes rather than platforms), and clean feeders daily with a 1-to-10 solution of chlorine bleach and warm water. Since water attracts birds during warm, dry weather, keeping bird baths and fountains clean is also important, Mansfield said.

Read the complete news release at [wdfw.wa.gov/do/newreal/release.php?id=jun0607b](http://wdfw.wa.gov/do/newreal/release.php?id=jun0607b).



Updated West Nile virus "Do You Know What's Biting You" brochures and "Mosquito Repellent – How to Use It Safely" flyers are now freely available from the Department of Health. The order form is at [www.doh.wa.gov/ehp/ts/Zoo/WNV/education.html](http://www.doh.wa.gov/ehp/ts/Zoo/WNV/education.html).

The CDC is currently highlighting two new handouts, "How Do I Choose an Insect Repellent" and "West Nile Virus and Transplant Recipients." These and other educational materials can be found at their Web page, [www.cdc.gov/ncidod/dvbid/westnile/education.htm](http://www.cdc.gov/ncidod/dvbid/westnile/education.htm). CDC's educational materials are available to be downloaded for print, and some materials have limited printed versions available upon request.

### HOW DO I CHOOSE AN INSECT REPELLENT?

1-2 hours      2-4 hours      5-8 hours

**ON SKIN**

**MOSQUITOES** Choose the appropriate repellent for the length of time you'll be outdoors. Reapply according to product instructions.

Protection varies by species of mosquito.	<15% DEET	~15% DEET	~20%-50% DEET
Most mosquitoes that transmit diseases in the US bite from dusk-dawn.	<10% picaridin	~15% picaridin/IR3535	~30% oil of lemon eucalyptus/PMD

**TICKS** Generally, repellent with 20 - 50% DEET is recommended to protect against tick bites.

Other factors affecting efficacy include: individual chemistry, sweat, numbers of bugs. Apply creams and lotions 15 to 20 minutes before going outdoors.

In areas where both mosquitoes and ticks are a concern, repellents with 20 - 50% DEET may offer best, well-rounded protection.

The American Academy of Pediatrics has recommended that repellents containing up to 30% DEET can be used on children over 2 months of age.

The repellents shown here meet CDC's standard of having EPA registration and strong performance in peer-reviewed, scientific studies. They reflect products currently available in the U.S.

**ON CLOTHING AND GEAR**

**Permethrin**

Permethrin treatment of clothing and equipment can provide protection against mosquitoes and ticks through multiple washings. Follow label instructions.



Zoonotic Disease Program

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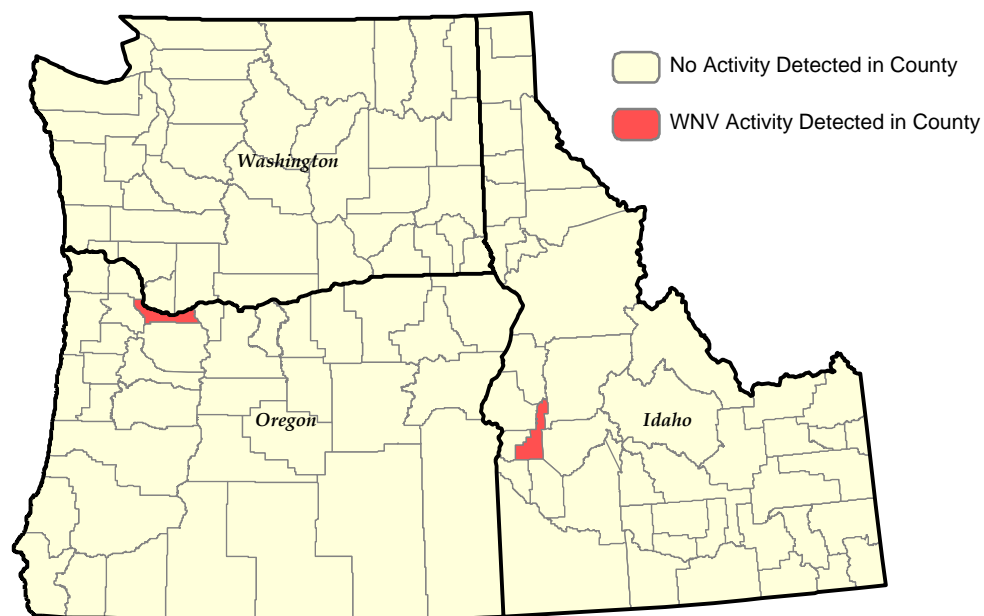
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## West Nile virus activity in the northwest, 2007



Source: Washington (June 29, 2007), Idaho (June 29, 2007), Oregon (June 28, 2007) State Health Department Web Sites

### WNV positive in the northwest

[Idaho](#): 2 mosquito pools

[Oregon](#): 1 bird

## West Nile virus news and research headlines

[Dead crow signals early start to West Nile virus in Oregon](#)

The Oregonian, June 28, 2007

[Gem County reports Idaho's first West Nile virus activity in 2007](#)

Idaho Department of Health & Welfare, News Release, June 8, 2007

[California announces first human case of the year](#)

California Department of Health Services, Press Release, June 20, 2007

[Efficacy of two pyrethroid insecticides applied as barrier treatments for managing mosquito populations in suburban residential properties](#)

Journal of Medical Entomology, 2007, Volume 44, Number 3

[WNV viremia in eastern chipmunks sufficient for infecting different mosquitoes](#)

Emerging Infectious Diseases, Volume 13, Number 6–June 2007

[West Nile virus could hit area hard this summer](#)

Seattle Times, June 22, 2007

## Zoonoses news and research headlines

[Hygiene at petting zoos not up to par](#)

Reuters Health News, June 20, 2007

[Human Plague in the Southwestern United States, 1957-2004: Spatial Models of Elevated Risk of Human Exposure to \*Yersinia pestis\*](#)

Journal of Medical Entomology, 2007, Volume 44, Number 3

[Revealed: Mosquitoes genes that could be controlling the spread of killer viruses](#)

Imperial College London, News Release, June 22, 2007