



Fight the Bite!

Preventing West Nile Virus

Erin Hodgson
Extension Entomologist

Outline

- History and recent spread
- Mosquito biology
- Symptoms and treatment
- Control and management
- Predicting outbreaks

History of West Nile Virus

- First discovered in Uganda (1937)
- Common in Africa, Europe and Middle East
- First appeared in U.S. in 1999 (New York)
- Spread to 48 U.S. States, Canada, and Mexico by 2004
- In U.S., >400 people, 1000's of horses have died

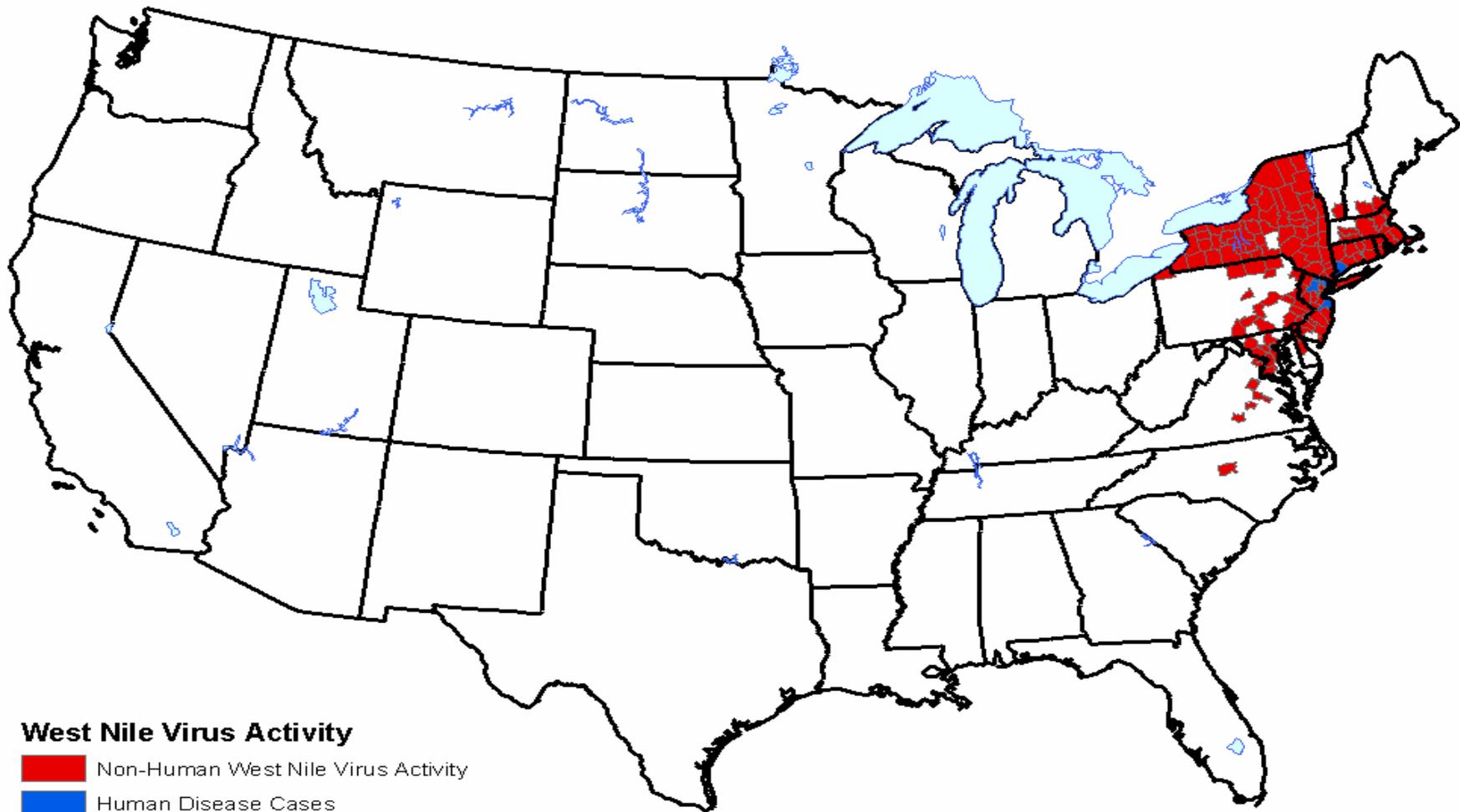


West Nile Virus Activity

-  Non-Human West Nile Virus Activity
-  Human Disease Cases

National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 1999 calendar year

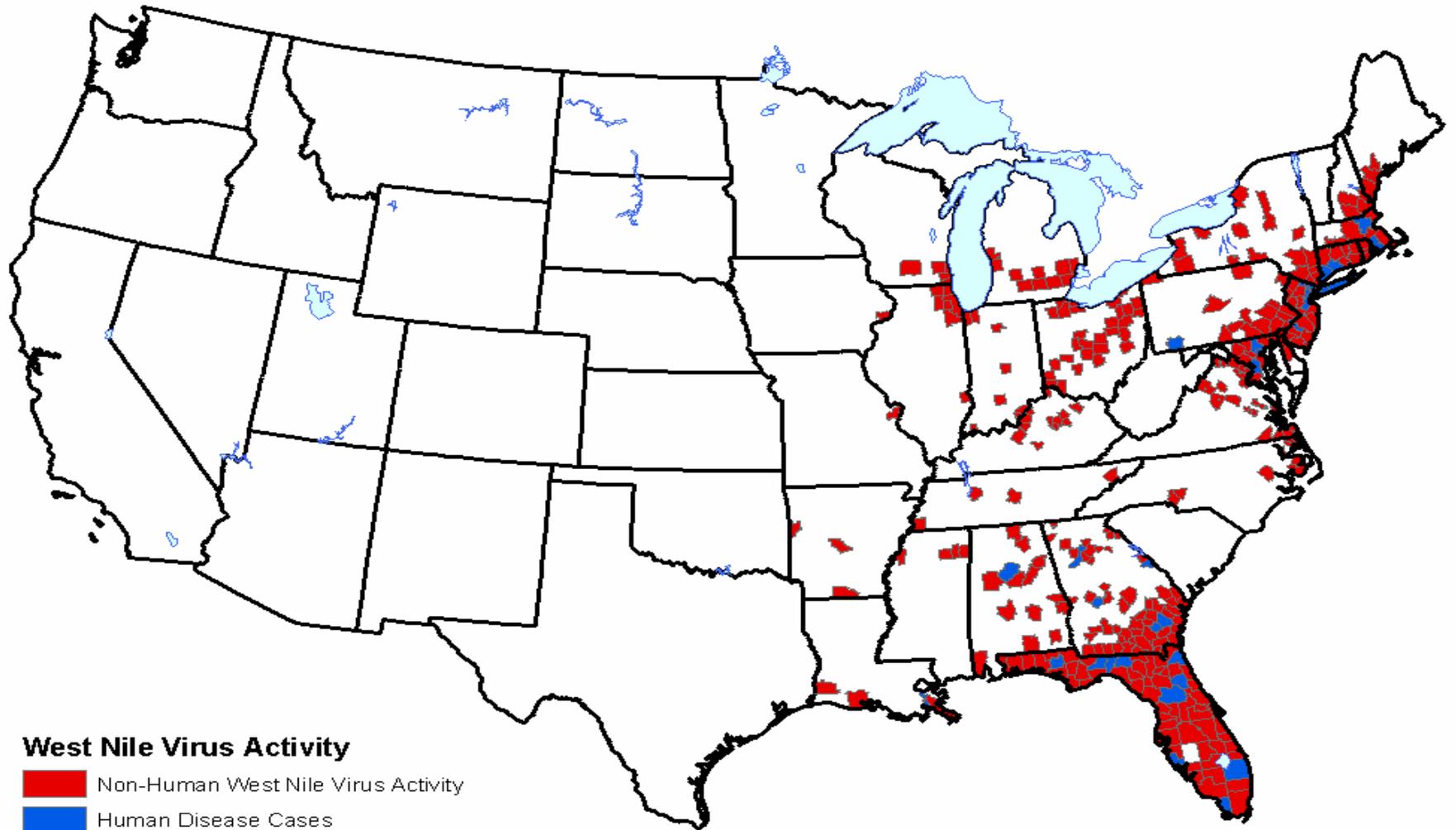
CDC



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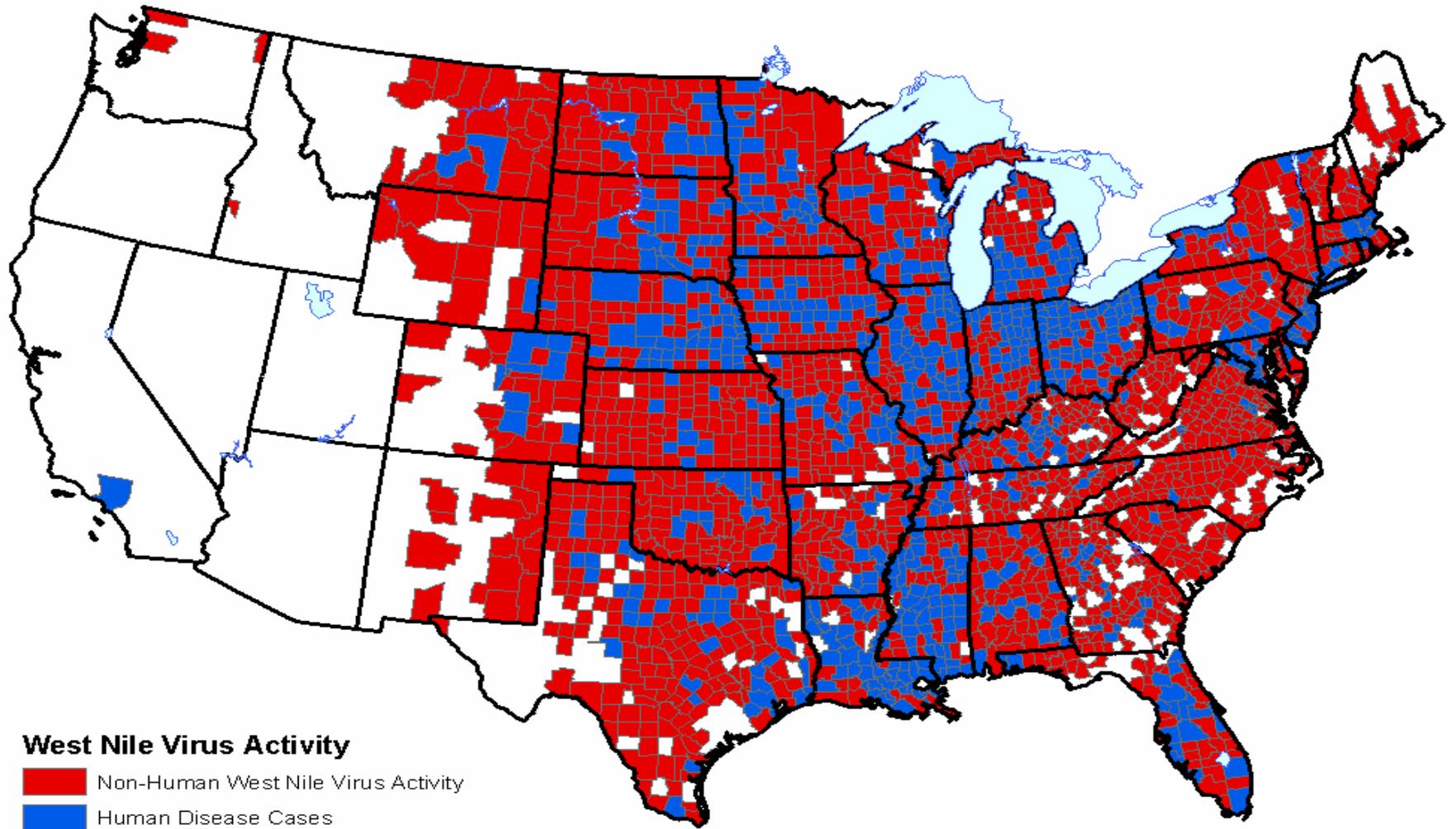


West Nile Virus Activity

-  Non-Human West Nile Virus Activity
-  Human Disease Cases

National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 2001 calendar year





West Nile Virus Activity

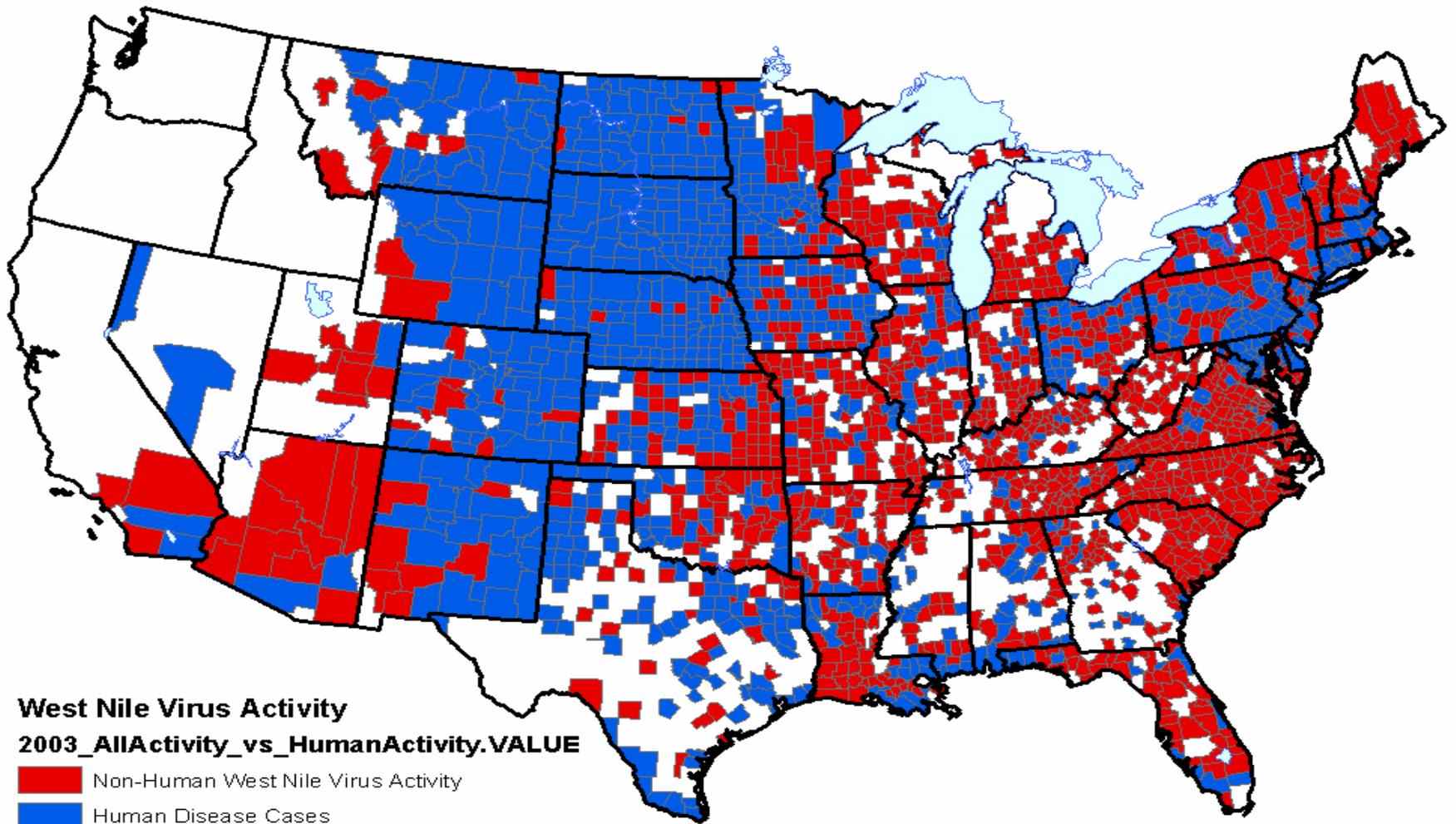
-  Non-Human West Nile Virus Activity
-  Human Disease Cases

National Center for Infectious Diseases

West Nile Virus Activity

Cumulative results for 2002 calendar year reported as of April 15, 2003





West Nile Virus Activity

2003_AllActivity_vs_HumanActivity.VALUE

-  Non-Human West Nile Virus Activity
-  Human Disease Cases

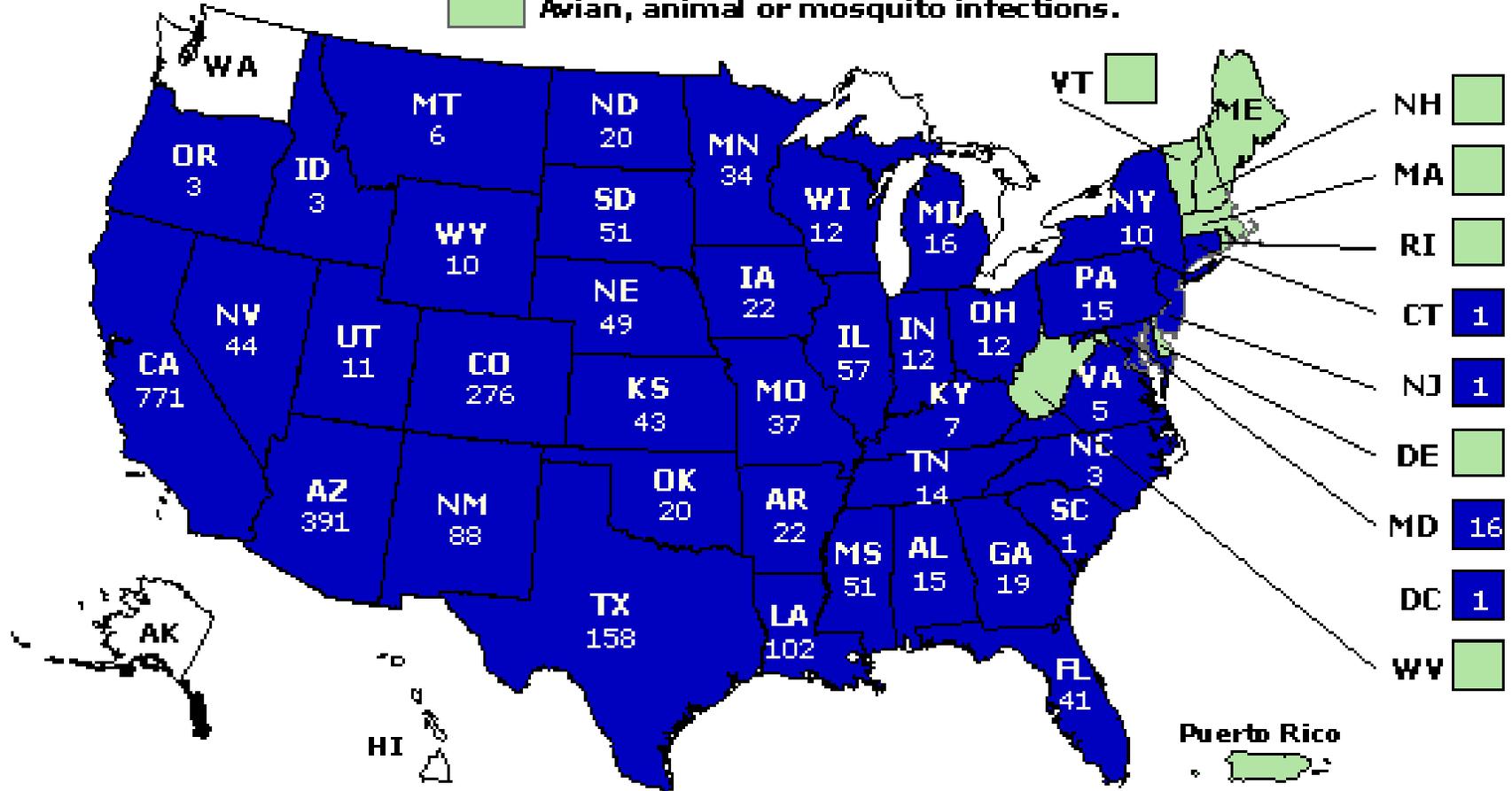
National Center for Infectious Diseases

West Nile Virus Activity

Cumulative results for 2003 calendar year reported as of October 24, 2003

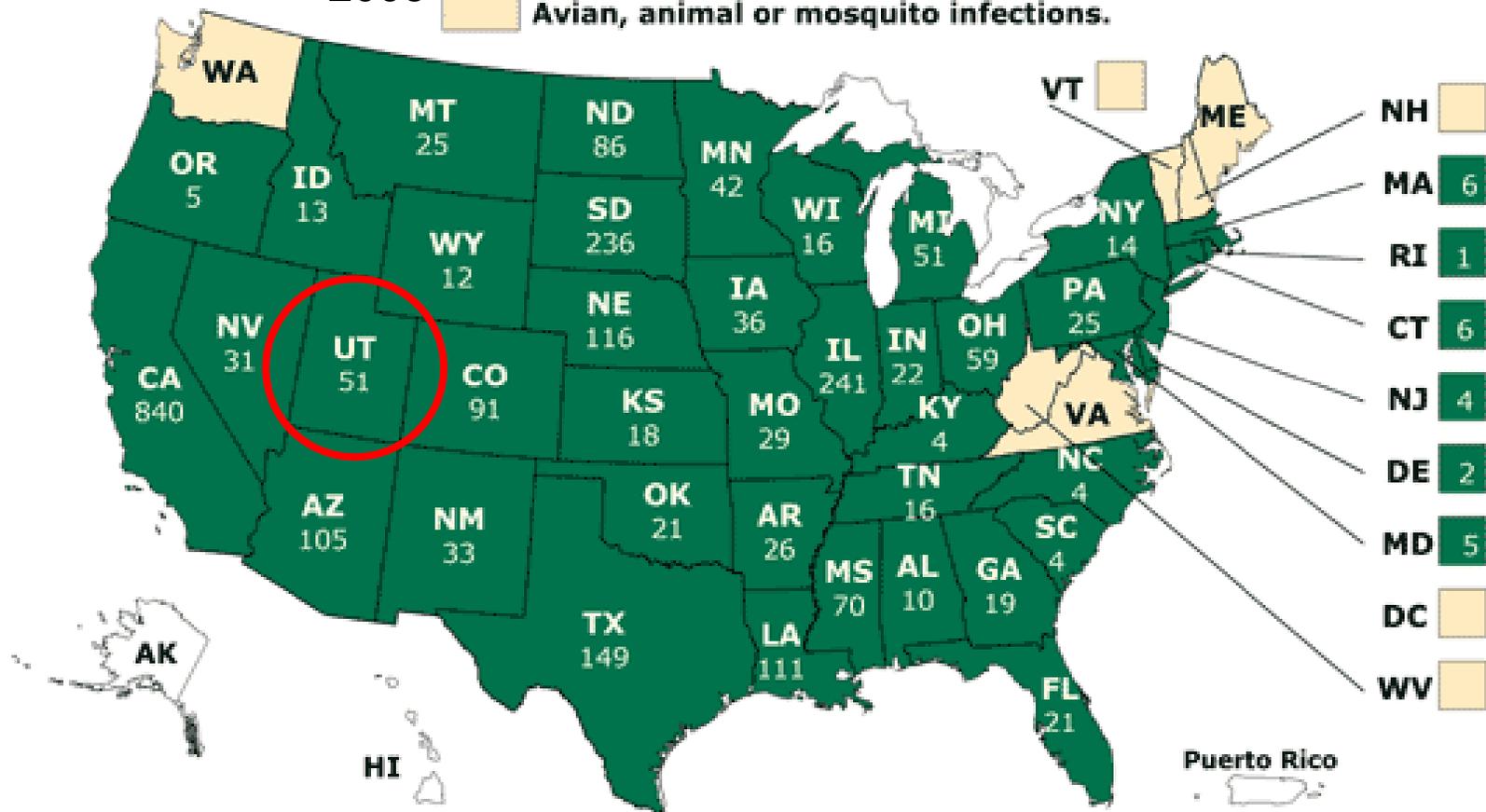
CDC

2004 Indicates human disease case(s).
 Avian, animal or mosquito infections.



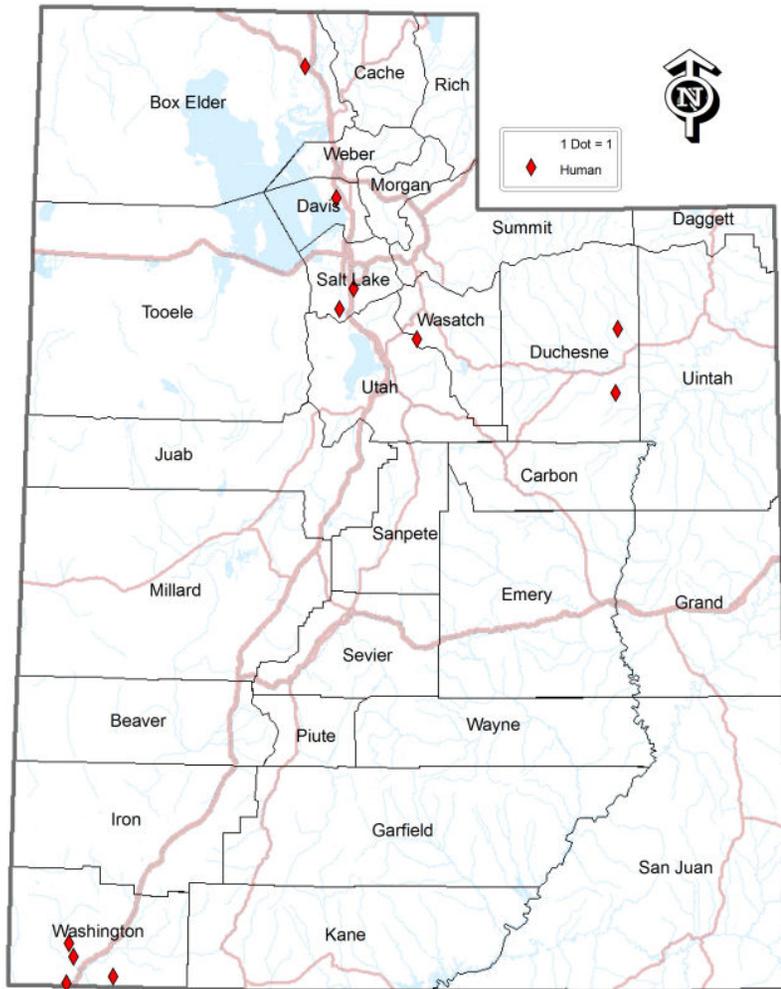
2005

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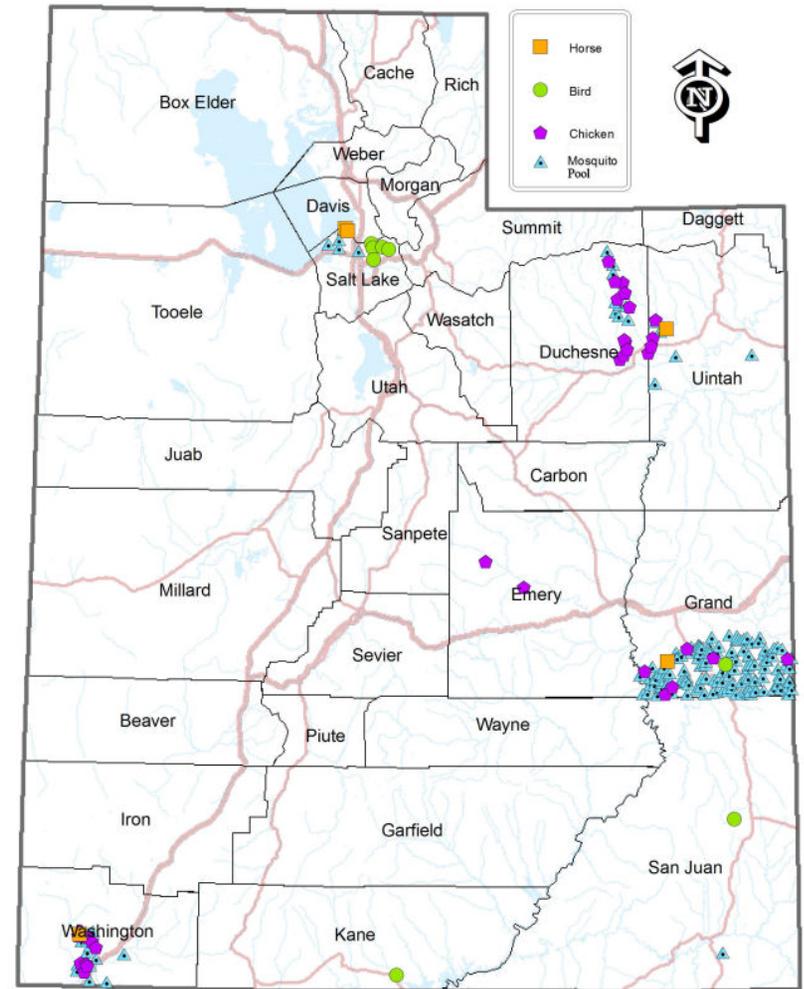
Recent WNV history in UT 2004

Human cases



<http://health.utah.gov/epi/diseases/wnv/>

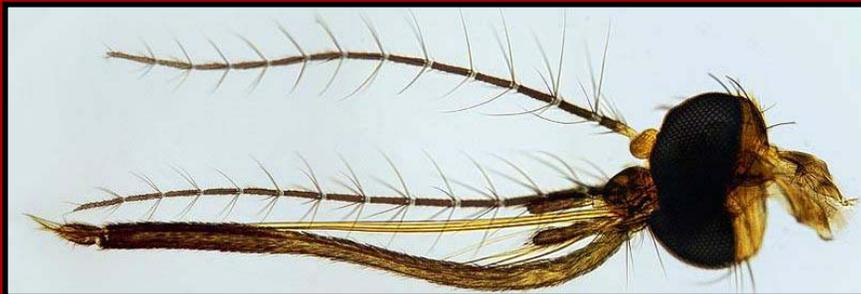
Non-human cases



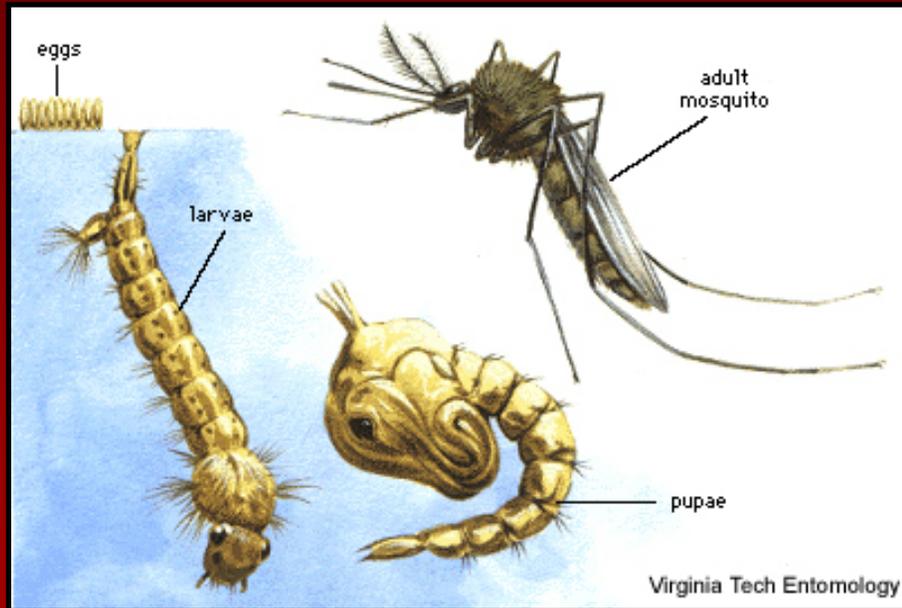
<http://health.utah.gov/epi/diseases/wnv/>

Mosquito biology

- Piercing sucking mouthparts
- Feed on nectar, but females require blood
- Persistent biters, attracted to CO₂ and heat



Life cycle of the vector



Mosquito biology

- Mosquitoes lay eggs in water
- Females lay ~200 eggs every 3 days
- Egg --> Adult takes 14 days
- Polluted, standing water is preferred
- Water standing for >4 days is ideal

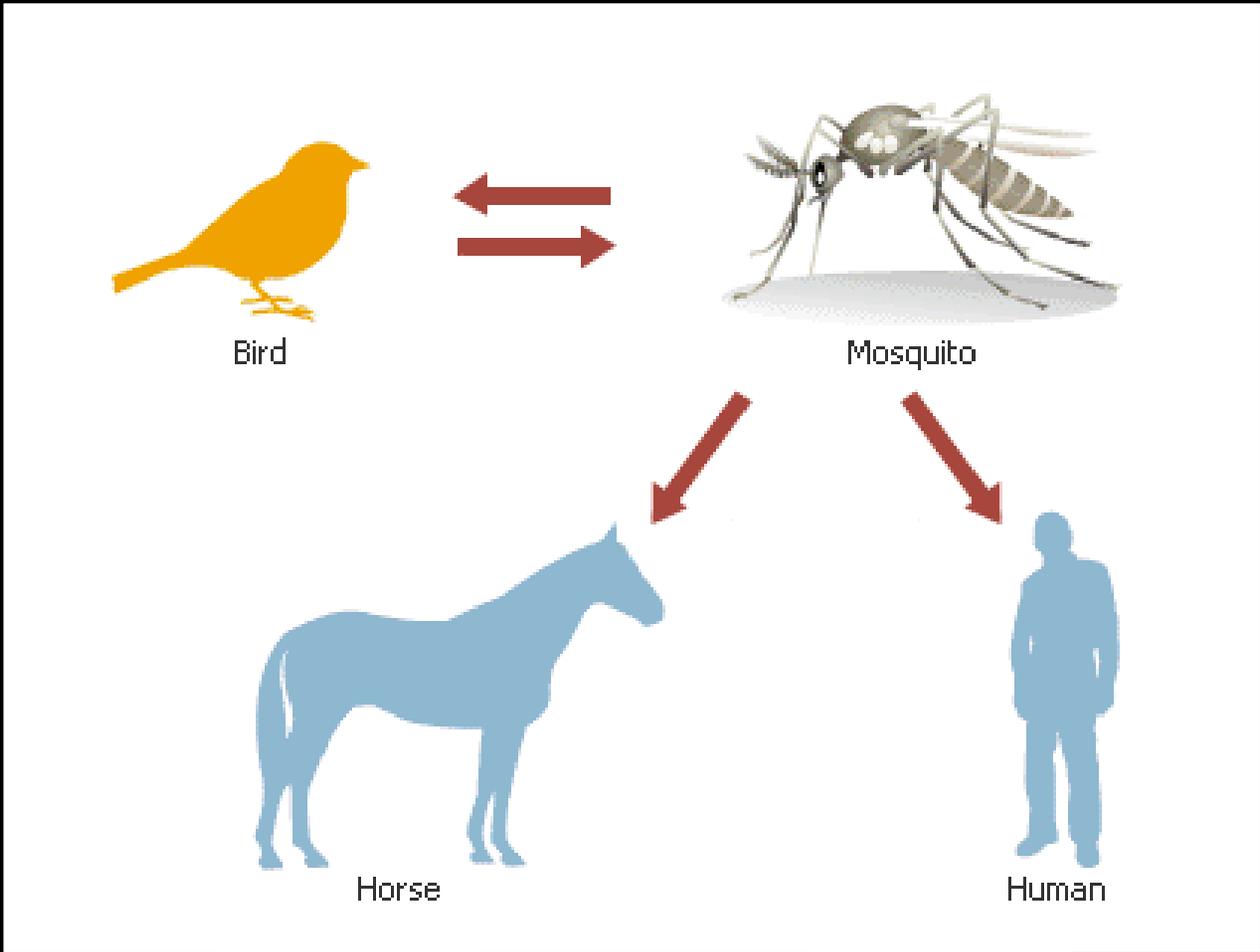
Culex tarsalis is #1 vector of WNV

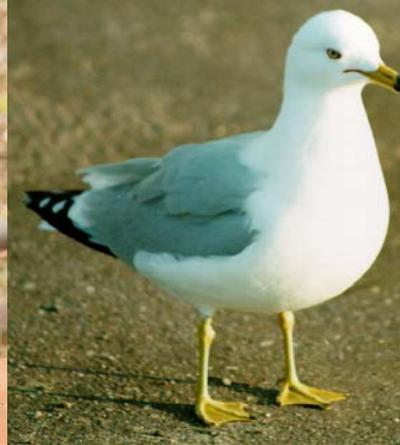
- Very efficient vector
- Are most active July - September
- Mostly feeding at dawn and dusk
- Birds are preferred hosts
- Will feed on small and large mammals



Life cycle of WNV

- Virus overwinters in mosquitoes
- Bird-to-bird in spring
 - American crows and blue jays are susceptible
- Bird-to-mammal in summer
 - Horses and humans are dead-end hosts

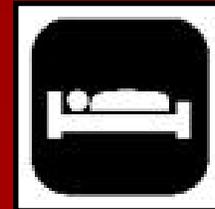




Symptoms of WNV



- None
 - 80% of people will not show any symptoms
 - Most healthy people will produce antibodies to fight against infection



Symptoms of WNV



- Mild
 - 20% of people have flu-like symptoms
 - Fever, headache, vomiting, skin rash
 - Symptoms last a few days in most people



Symptoms of WNV



- Severe (<1%)
 - Less than 1% of people get seriously ill and require hospitalization
 - High fever, headache, tremors, vision loss, coma, paralysis, encephalitis, meningitis
 - Symptoms last several weeks
 - Neurological effects can be permanent
 - People over 50 are at the most risk

Diagnoses and Treatment of WNV

- Antibody blood test confirmation
- For mild symptoms:
 - Rest, fluids, Advil, etc.
- For severe symptoms:
 - IV fluids and nutrition
 - Respiratory support
 - Prevention of secondary infections



Is there anything YOU
can do to prevent
WNV infection??

YES!!!

Prevention around the home...

Eliminate standing water

- Clean gutters
- Remove spare tires and equipment
- Make holes in garbage cans and recycling bins
- Use landscaping to avoid pooling water



Prevention around the home...

Keep standing water fresh

- Aerate fish and ornamental ponds
- Change bird baths and pet bowls
- Chlorinate pools and keep covers dry
- Turn over wading pools when not in use
- Keep watering cans and pots clean and dry



Mosquito-proof your home

- Keep doors and windows closed
- Repair tent and screens tears
- Insulate window AC's, fans
- Avoid peak feeding times
- Wear pants and long sleeves
- Use repellent!

What kind of mosquito repellent is best?

It depends.....

- Level of outdoor activity
- Sensitivity to chemicals

Mosquito control programs

- Integrated Mosquito Management (IMM)
 - Surveillance and targeted application
 - Low risk to animals and environment
- Adults
 - Ultra low volume (ULV) application
 - Ex., malathion, permethrin
- Larvae
 - Pellet, granule or film/oil application
 - Ex., methoprene, temephos, B.t.i.

What is UT doing to prevent WNV?

- City-wide mosquito control programs
- Limited applications
 - Public parks and recreation areas
 - Contracted special occasions
 - 4th of July, picnics, weddings, etc.

How can you find more (and current) information about WNV?

- Look for cases in the news
 - TV, radio and newspapers
 - USU Department of Biology
- Visit local and national websites

health.utah.gov/epi/diseases/wnv/

www.cdc.gov

What else can you do to help?



The screenshot shows the Utah Division of Wildlife Resources website. The main heading is "West Nile virus" in large blue letters. Below it is the sub-heading "Dead bird reporting form" in red. The text explains that the DWR is testing birds of the *corvid* family (ravens, crows, jays, and magpies) and *raptor* (hawks, eagles, falcons, and owls) for West Nile virus. It asks users to fill out a form if they want to report a dead bird, with instructions that birds must have died within 24 hours. The form includes a section for "Species or common name of bird" with a text input field, and a section for "Was the bird found dead?" with radio buttons for "Yes", "No", and "Unknown". There is also a text input field for "If no, please describe any unusual behavior before death (i.e., difficulty flying, etc.):". The website navigation includes "State Online Services", "Agency List", "Business.utah.gov", and "Search Utah.gov". A sidebar on the left lists various services like "Hunting", "Fishing", "Licenses", etc. A "FIGHT BITES" logo is also visible.



www.wildlife.utah.gov/wnv

www.extension.usu.edu

Predicting WNV outbreaks

- Very difficult to predict WNV
- Mosquito populations can vary
 - Develop faster in hot weather
 - Availability of standing water
- Horses already sick in ND and MN
 - Warm April and wet May/June

Summary of WNV

- Can cause serious illness (<1%)
- Undetected in most healthy people
- Reduce your risk:
 - Local updates in your area
 - Source reduction, eliminate standing water
 - Mosquito-proof your home
 - Use repellent when necessary

THANK YOU FOR
YOUR ATTENTION!!



QUESTIONS??

Types of repellents

- DEET – most effective, strong smelling
- Picaridin – effective, odorless
- Permethrin – very effective, not for skin
- Oil of eucalyptus – short term repellency
- Skin So Soft[®] – somewhat effective, <1 hour
- Other “plant-based” repellents
 - Peppermint, garlic, vanilla