



Eastern Equine Encephalitis Virus in Vermont

Update for the Vermont Legislature

February 2013

Outline



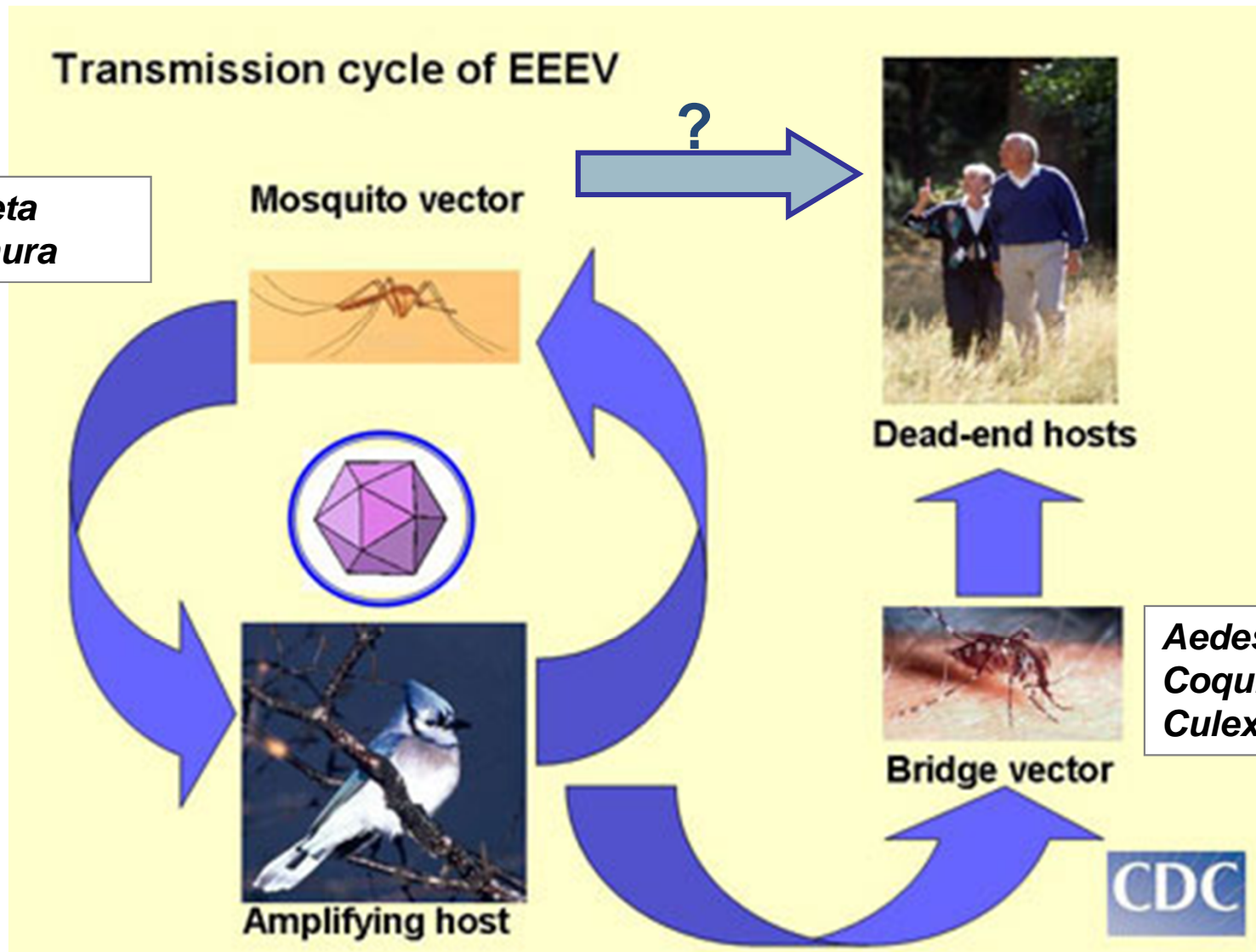
- What we know about EEE in Vermont
- Response we had to its detection in 2012
- Planning for 2013 season
- Q and A

What is Eastern Equine Encephalitis (EEE)?

- Caused by a mosquito-borne virus (like WNV)
- Eastern half of the US
- Not a new virus in the US
- Enzootic in birds – lives in passerine birds (perching song birds)
 - ▣ Transmitted among birds by bird-biting mosquitoes



EEEV Transmission Cycle



What is EEE?



- Infection when mosquitoes feed on infected birds and then feed on humans/animals
- Illness is rare in people
 - < 300 human cases in the past 50 years nationally
 - Becoming more common in the northeast?
 - Past decade, new activity detected in NH, ME, Quebec, Clinton County (NYS) and now VT
 - MA noticing more sustained activity

What is EEE?



- Onset 4 – 10 days after bite from infected mosquito
- Illness can be severe
 - ▣ 1 / 3 of serious infections end up being fatal
 - ▣ 1 / 3 of those who recover have continuing neurologic problems
- Symptoms of severe disease:
 - ▣ Fever, headache, irritability, restlessness, drowsiness, poor appetite, vomiting, diarrhea, mental status changes, seizures and coma

What is EEE?

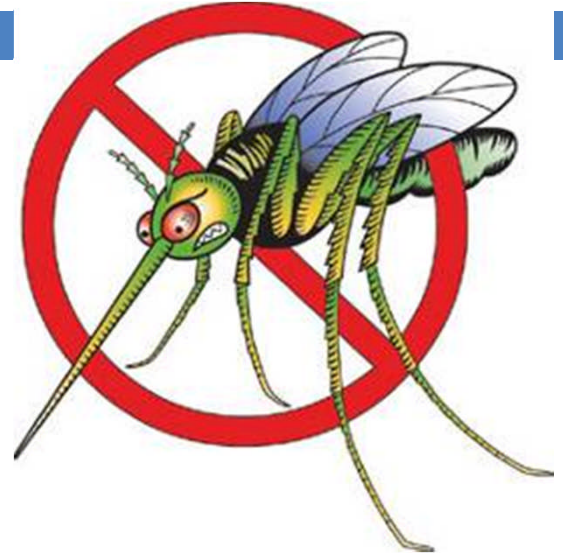
- Other species affected:
 - ▣ horses and donkeys
 - ▣ llamas and alpacas
 - ▣ emus and pheasants
- Vaccine licensed for horses – may also be effective in llamas, alpacas and emus



How do we prevent EEE?

- ▣ Prevent mosquito bites

- Limit exposure time
- Use repellents
- Limit exposed skin
- Keep screens in good repair
- Reduce mosquito populations

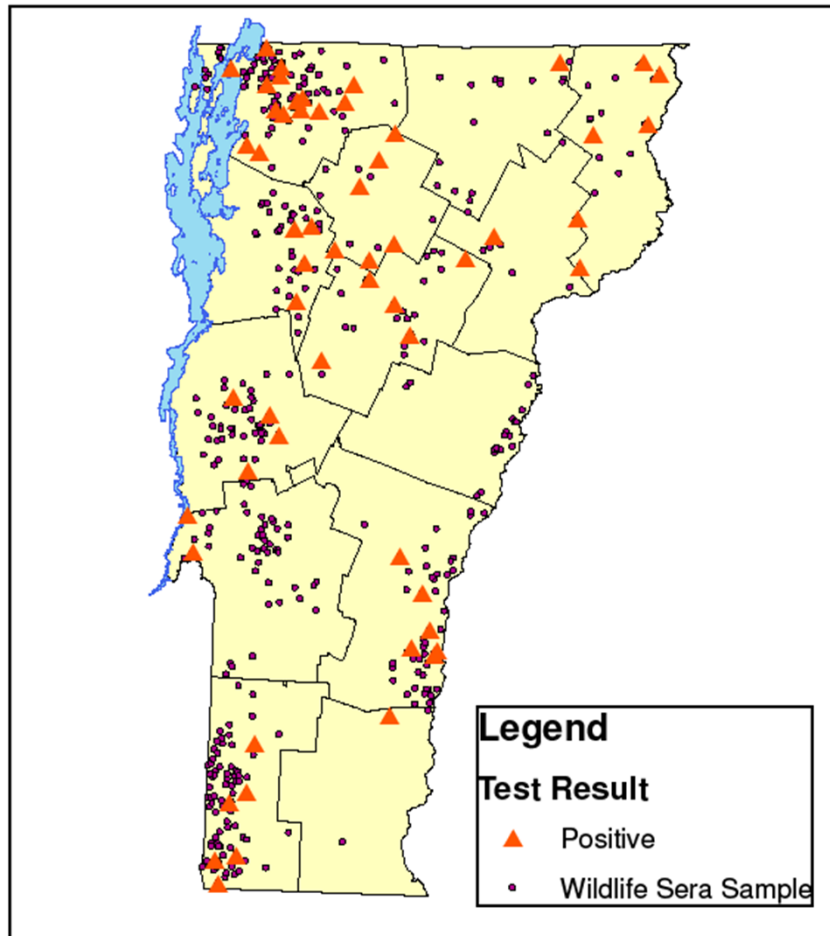


What do we know about EEE in VT



- Deer serosurvey – begun in 2010
- 2011 – outbreak on emu farm in Rutland County
- 2012 – first reports of human cases
 - ▣ 2 cases in Rutland County residents
 - ▣ Confirmed end of August
- 2012 – two confirmed cases in horses
 - ▣ Whiting and Pittsford
 - ▣ Confirmed in September

Results of 2010 Deer Serosurvey



- Positive findings
 - Deer – 50/489 (10.2%)
 - Moose – 6/21 (28.6%)
 - 8 positive yearlings

Scale 1:250,000
0 5 10 20 30 40 Miles
1 inch = 19.7 miles


Alan C. Graham
created 5/11/2011

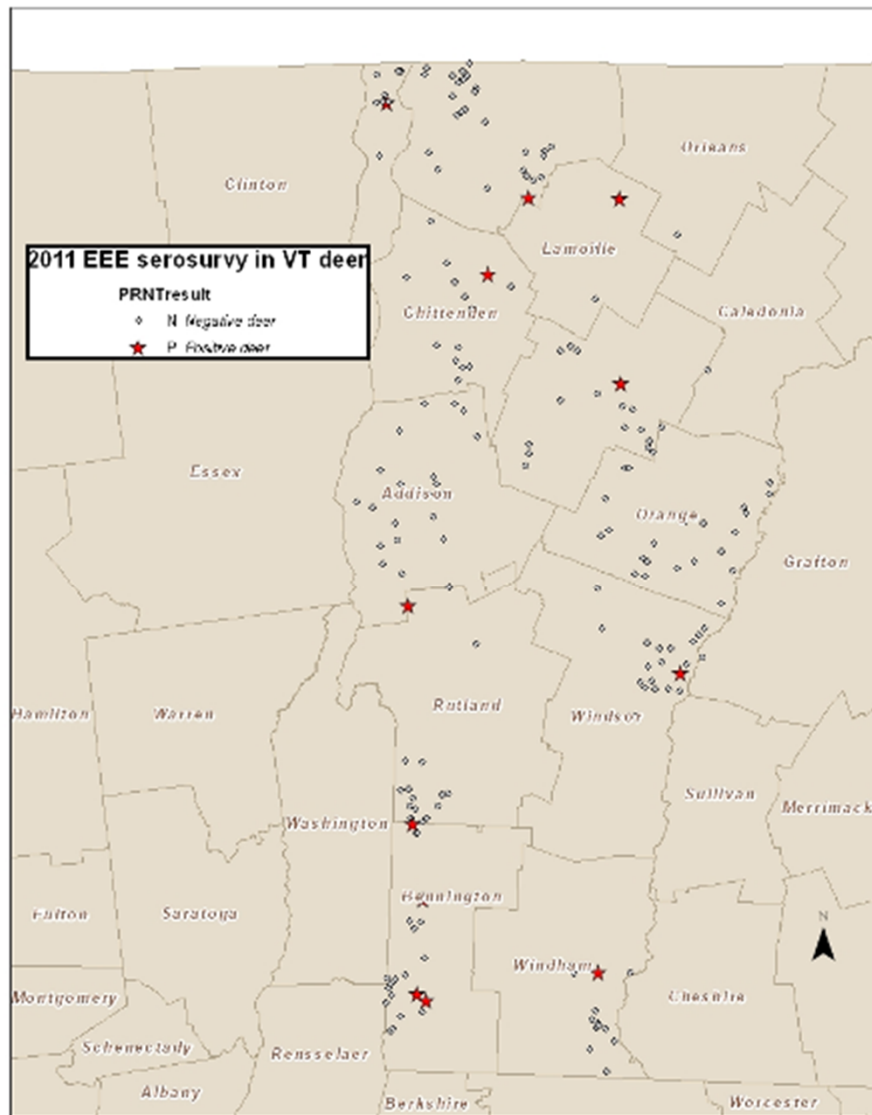


What Did Deer Serosurvey Mean?



- First evidence that EEE virus is present in Vermont
 - ▣ Widespread
- Keep up surveillance – both human and veterinary
- Continue and expand mosquito surveillance
- Continue to educate Vermonters about preventing mosquito bites

Results of 2011 Serosurvey



□ Positive findings

- ▣ Deer – 12/189 (6.3%)
- ▣ Moose – 1/39 (2.6%)
- ▣ Similar widespread distribution

EEE in VT emus



- Sept 21, 2011 – report of ill emus
- Several emus in a flock developed hemorrhagic gastroenteritis, ataxia
- Earliest onset Sept 15th
- By Sept 21st, 14 emus had died
- Last death on Sept 24th
- 19/93 died, 2 ill birds recovered
 - ▣ All ages affected

2012 – Human cases



- 2 EEE cases
- Rutland County residents
- Onset dates Aug 13th and Aug 27th
- Confirmed on Aug 31st
- Both died of the illness

Veterinary cases



- 2 EEE horse cases
- Rutland and Addison Counties
- Onset dates Sept 6th and Sept 16th
- One survived

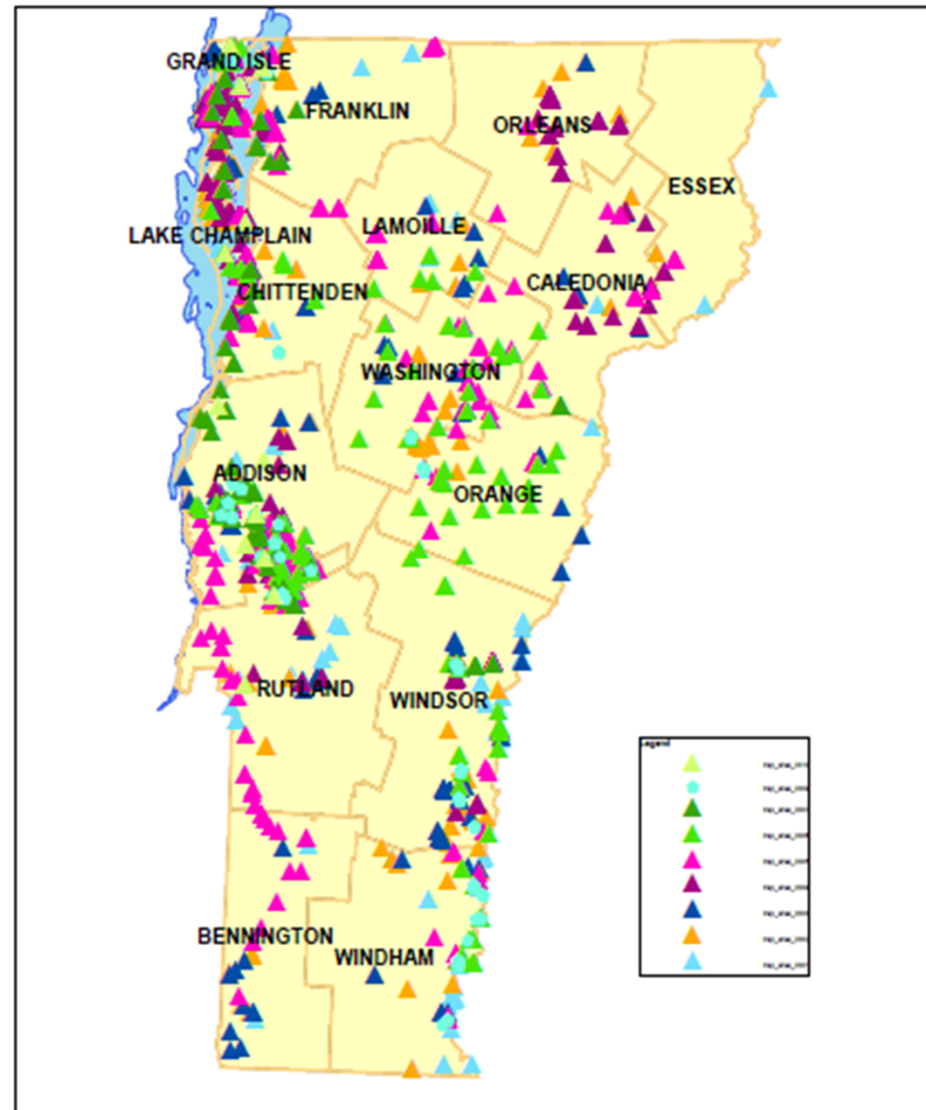
Mosquito surveillance



- ❑ Critical for providing early warning for risk
- ❑ Labor intensive
- ❑ Requires significant expertise

Mosquito Surveillance 2000 to 2012

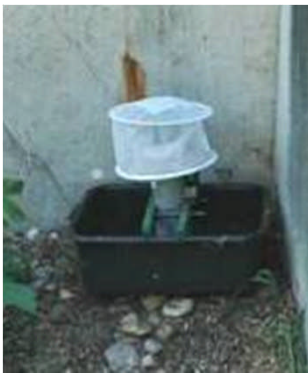
- West Nile virus funding started 2000
- 13 years of trap data
- Additional 1990 data from BLS mosquito district
- Focus on Eastern Equine Encephalitis trapping in 2010



Three Types of Mosquito Traps



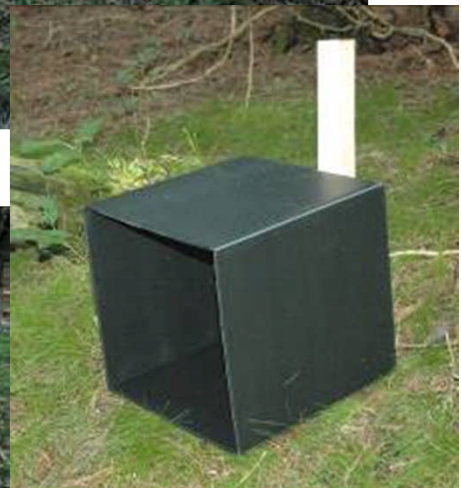
CDC Light Trap



Gravid Trap



Resting Box traps



Mosquito Pool Samples for Virus Testing

- ❑ Trap samples kept on dry ice
- ❑ Separated under microscope into pools (5-50 mosquitoes) of the same species
- ❑ Each pool placed into small vial for testing
- ❑ Tested at laboratory
- ❑ Data recorded and reported weekly



Where do we look for *Culiseta melanura*?



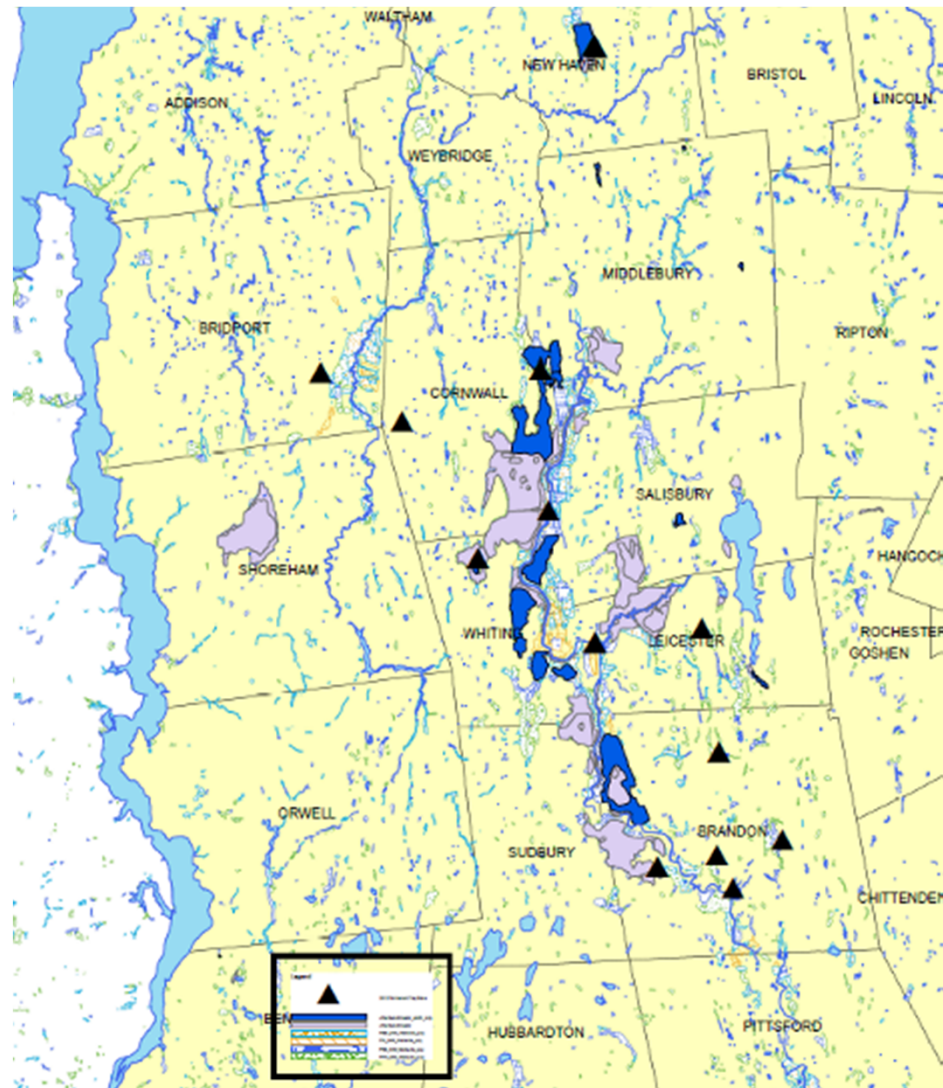
Prefers Acidic Hardwood swamps



Larvae found in holes under root masses

2012 Permanent Trap Sites

- Permanent traps needed to compare virus activity over time
 - ▣ 13 CDC Light Trap sites
 - ▣ 7 Resting Box trap sites



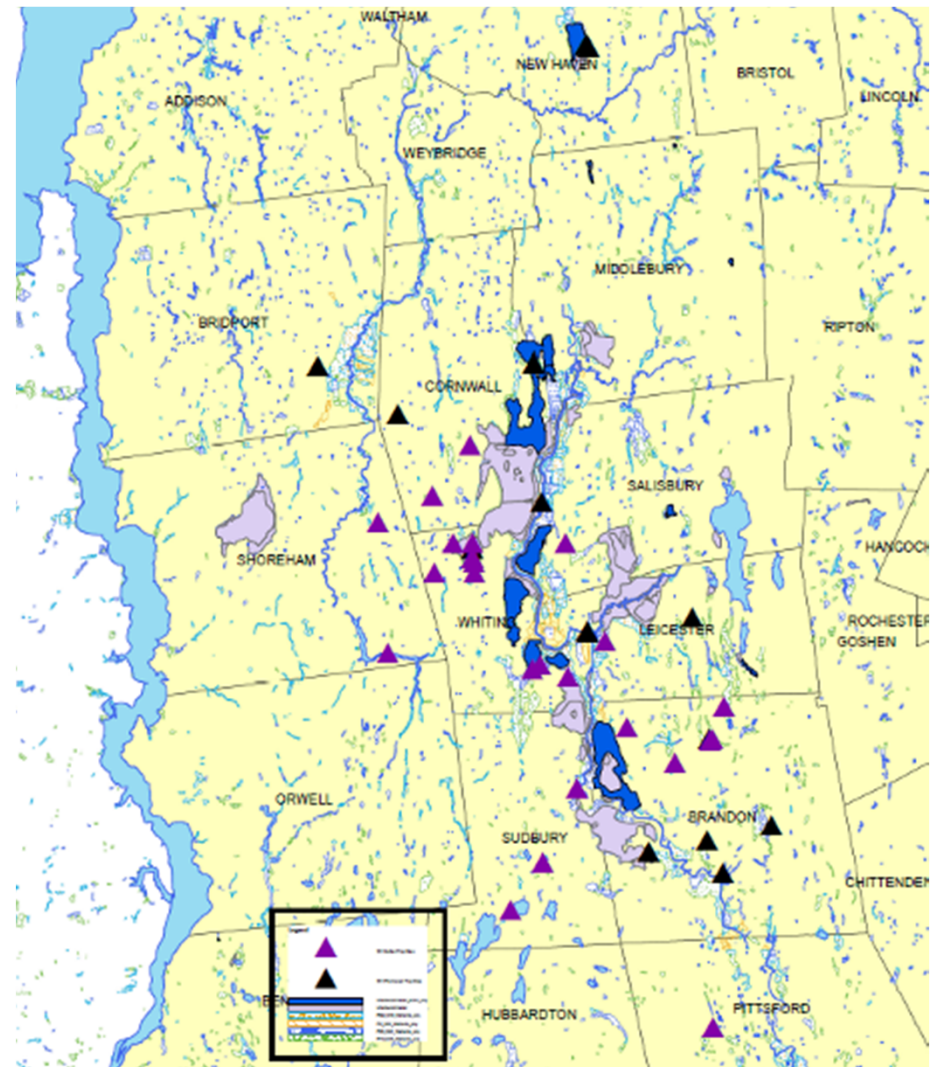
Mosquito Surveillance 2012



- First detection of EEE virus in VT mosquitoes
- 251 mosquito pools tested (13 species)
- 10 pools positive for EEE virus
- EEE virus found in 3 wetlands
- Single Whiting site had 8 positive samples
 - ▣ July 24 to Sept 9
- All EEE positive samples contained the same species
 - ▣ *Culiseta melanura* – primarily a bird-feeding species

2012 Added Trap Sites

- Additional traps added during the season as needed
 - 2 Gravid Trap sites
 - 19 additional CDC Trap sites
 - 3 additional Resting Box trap sites





2012 Response

Response to EEE in 2012



Educational Outreach

- Annual press release - June
- EEE positive mosquito pools reported Aug 24th
 - ▣ Press release
- Contacted town officials
 - ▣ Town Health Officers
- Direct outreach to vulnerable populations
 - ▣ Schools, nursing homes
- Advisory sent to healthcare providers Sept 9th



Health Advisory

September 6, 2012

Human Cases of Eastern Equine Encephalitis in Vermont

To: Vermont Healthcare Providers, Hospitals, and Ambulatory Care Centers
From: Harry Chen, MD, Health Commissioner

– Please Distribute Widely –

As of the beginning of September 2012, the first two human cases of Eastern Equine Encephalitis (EEE) have been confirmed in Vermont. Both are adults from the Addison and Rutland County area where mosquito pools have recently tested positive for EEE and West Nile virus (WNV). In addition, one case of WNV was confirmed in a Chittenden County resident. Overall, arboviral activity is still relatively low in the community.

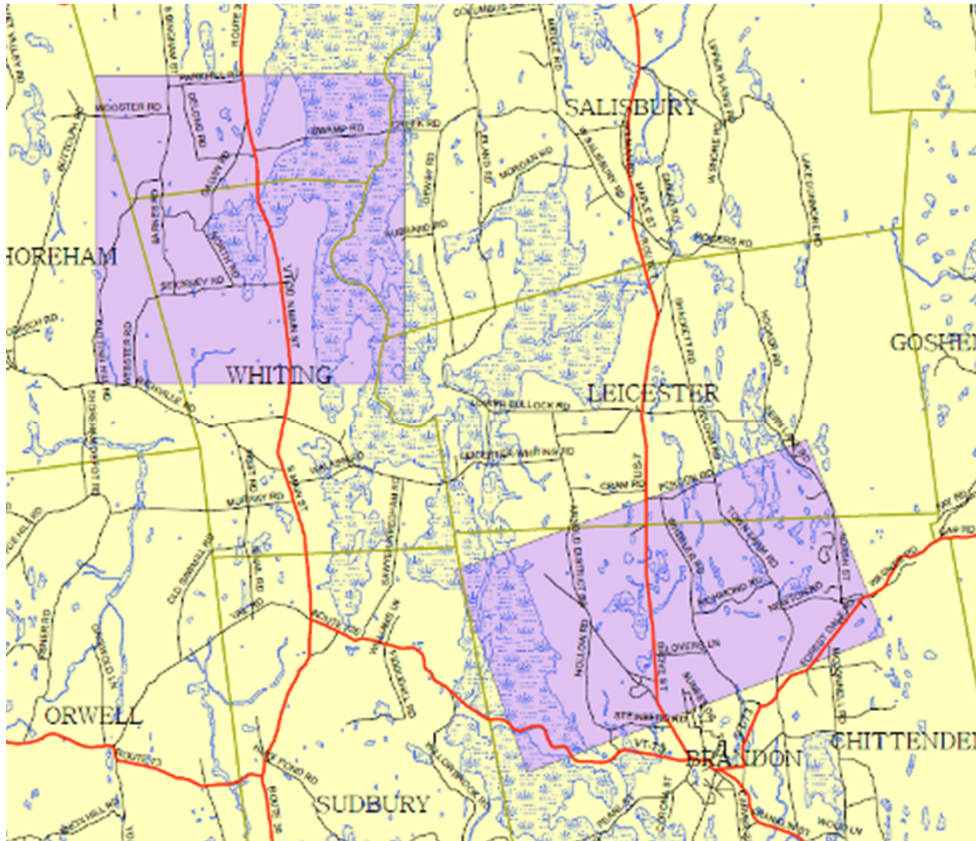
Response to EEE in 2012



Mosquito Control

- Options considered
 - ▣ Risk Assessment – To treat or not to treat?
 - ▣ Conference call (VDH, VAAFM, CDC, experts from other states) – What size treatment area?
- Steps taken
 - ▣ Increase trapping effort
 - ▣ Work with local mosquito districts
 - ▣ Public awareness campaign
 - ▣ Pre- and post-treatment trapping

Spraying Considerations



- Risk of human cases
- Aerial vs. ground
 - ▣ Target species breeding habitat and feeding habits
 - ▣ Access via roads
- Organic farms
- Bee keepers
- Temperature
- Wind
- Public input
- Applicators and equipment



Planning for 2013

Goals for 2013



- Create a more robust mosquito surveillance program
- Improve timeliness of mosquito testing
- Expand communication between state and local officials and between officials and the general public
- Develop a response plan that is transparent and based as much as possible on available data

GOAL: prevent human and animal illness

Mosquito Surveillance 2013



- Expand surveillance in Addison/Rutland Co. region
- As resources permit, surveillance in other parts of the state
- Lab capacity
 - ▣ Health and Agriculture are working together to develop capability to test mosquitoes for EEE and WNV for the 2013 season
 - ▣ Human and animal testing may be added at the new public health lab

Proposed Mosquito Surveillance - 2013

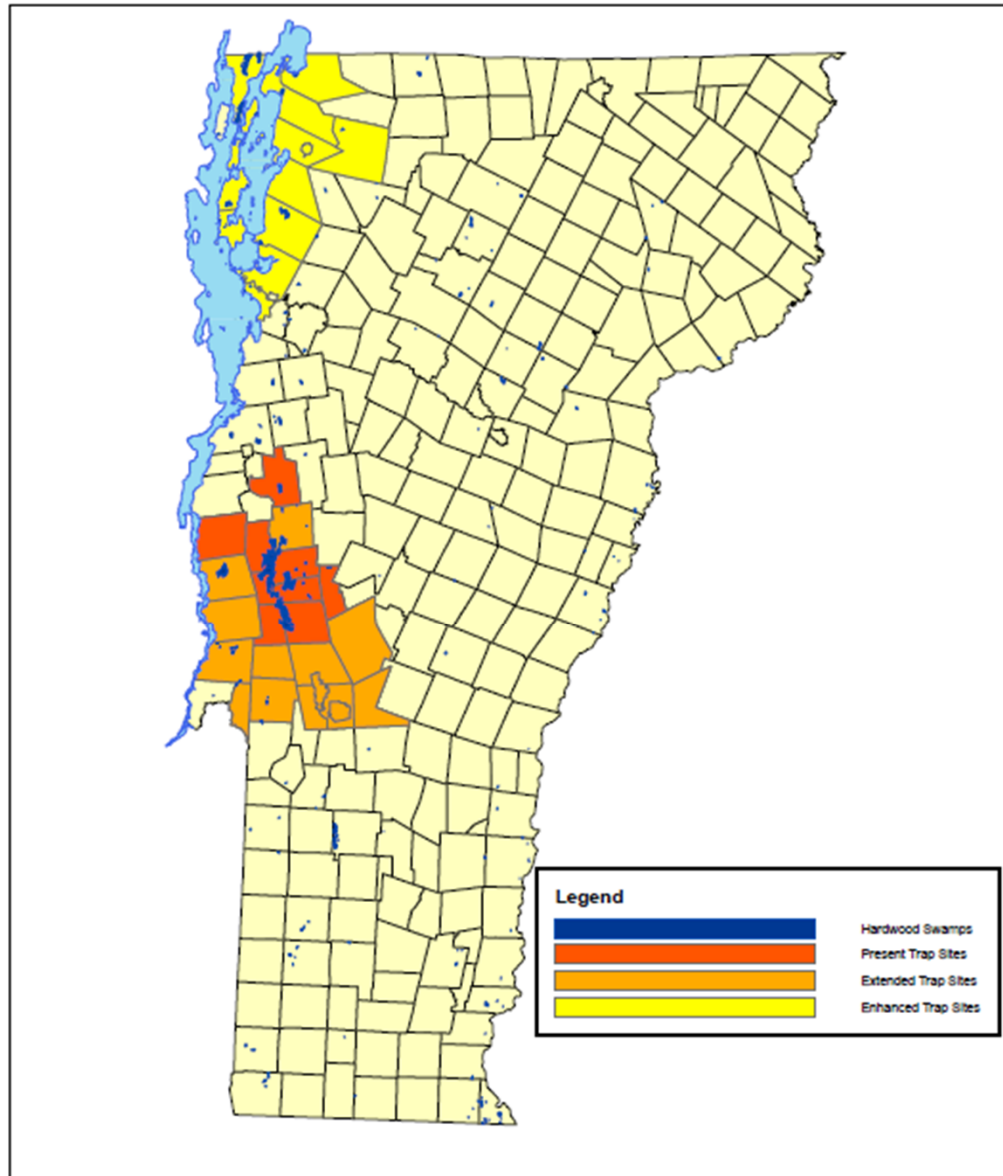


- Increase mosquito surveillance and testing
 - ▣ Last year - routine 17 trap sites with 271 samples tested
 - ▣ This year - add another 39 trap sites and test up to 1800 samples
- Any trap site with positive arbovirus test results will be surveyed twice a week.
- Test results will be reported weekly and posted on the Department of Health website

Proposed Mosquito Surveillance - 2013

- Surveillance trap areas prioritized as follows:
 - ▣ Present - towns with an arbovirus risk and towns in the mosquito districts
 - ▣ Extended - adjacent towns with a lower risk area based on last year arbovirus activity
 - ▣ Enhanced - northwestern towns section with trap data and habitat
- Proposed surveillance areas for 2013
 - ▣ Pilot Study in Chittenden, Franklin, Grand Isle Cos.
 - subsequent years surveys will reflect what we learn in 2013
 - ▣ Subject to review and revision
 - ▣ *Flexible* – respond to disease presence as necessary

Priorities for 2013 Arbovirus Surveillance



2013 Survey Areas



0 5 10 20 30 40 Miles
1 in = 19.73 miles
1:1,250,000

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created 2/22/2013



Agency of Agriculture:
2013 Budget Adjustment Act Request

Through June 30, 2013

□ 2012 Adulticide Backfill to MCD	\$50,000
□ Additional Backfill, VMC OT ('12)	\$56,877
□ Field Technician (1) (4/1 to 6/31)	\$10,000
□ Mileage, expenses	\$5,000
□ <u>Sample Analyses (300@25\$)</u>	<u>\$7,500</u>
TOTAL	\$129,377

Agency of Agriculture:

FY2014 Budget Request, Increase over FY2013

<u>Budget Item FY 2014</u>	<u>Amt. Req.</u>	<u>Increase over FY13</u>
□Larvicide (Mosquito Control Dists.)	\$170,000	\$30,000
□Vector Mgmt. Coordinator (1 FTE)	\$89,500	\$64,500
□Survey Technicians (2, 4 months	\$27,000	\$27,000
□Mileage, Expenses, Supplies	\$13,500	\$13,500
□Tick Survey	\$10,000	\$10,000
□Sample Analysis (1500 @ 25\$)	\$37,500	\$37,500
□Aerial Adulticide(s)(72,000 Acres	\$139,000	\$139,000
□Communication, Outreach	\$10,000	\$10,000
TOTAL	\$496,500	\$331,500

Health Dept Budget Requests

FY 2013 Budget Adjustment Act Request

□ Epidemiological services:	\$20,468
□ WNV/EEE Testing equipment:	\$110,000
□ WNV/EEE Lab supplies	<u>\$5,500</u>
Total	\$135,968

FY 2014

□ Epidemiological services:	\$28,669
□ WNV/EEE lab supplies	<u>\$5,500</u>
Total	\$34,169

Risk Assessment

- Response should be graded: (example)
 - ▣ Low risk: general educational outreach
 - ▣ Moderate risk: targeted educational outreach
 - ▣ High risk: spraying for mosquitoes

But...

- Risk assessment not straightforward
 - ▣ Lack of data presents a challenge
 - ▣ Many variables affect risk
- No matter what we do, no way to guarantee that we can prevent all illness



Response to EEE Detection – Education and Outreach

- Educational messages
 - Avoid mosquito bites
 - Avoid outdoor activity from dusk to dawn
- Communication avenues
 - Media – print, radio, TV
 - Flyers – through town officials
 - Website
 - Phone: 211 /toll-free hotline
 - Phone calls to high-risk populations – schools, nursing homes
 - Mailings, door-to-door, email, Facebook?
- Maximize local and state collaboration
- How to do this on a weekend?

Response to EEE Detection – Mosquito Control

□ Options for 2013

▣ Larviciding

▣ Adulticiding

- Ground-based spraying in mosquito district towns
- Aerial spraying if significant risk appears

▣ Response determined by state, local or combination

- Discussion needed

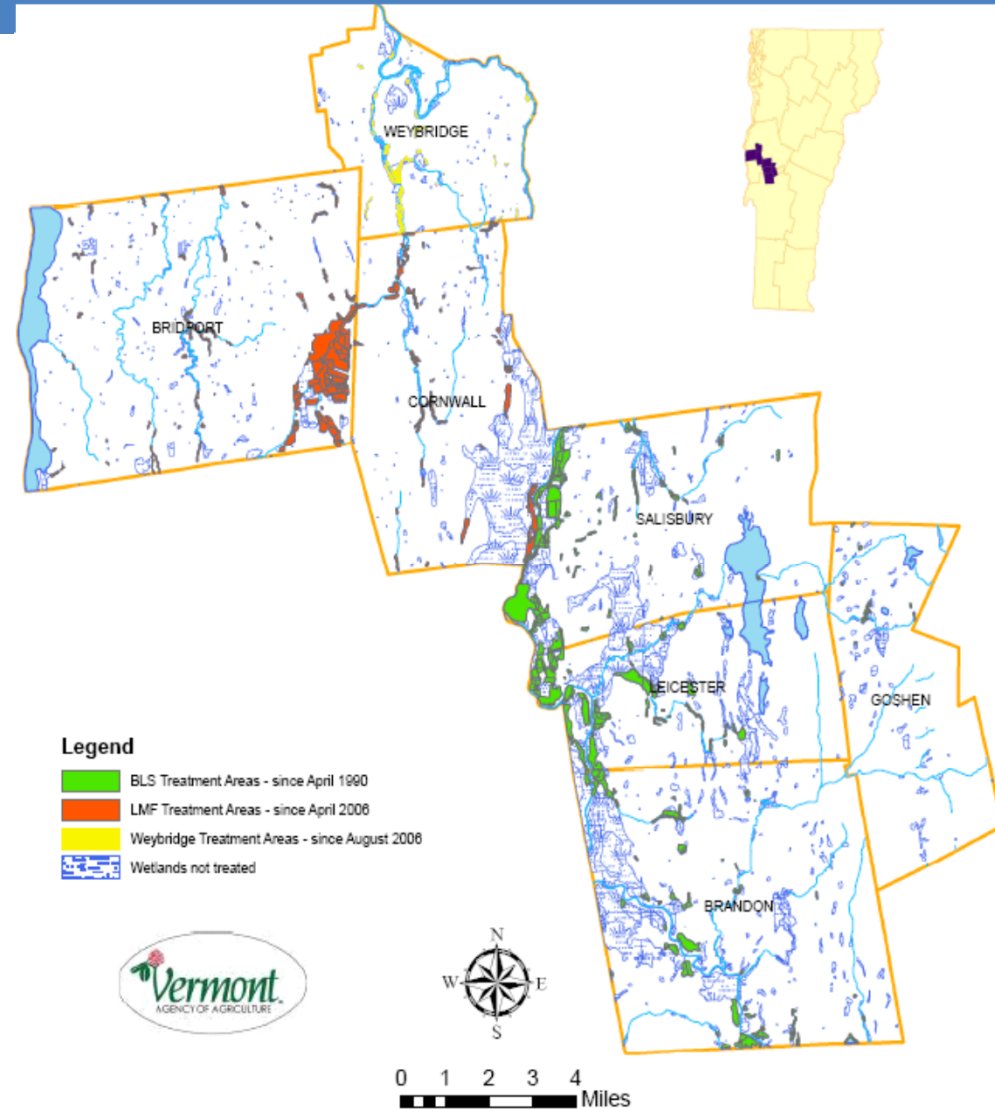
▣ Role of existing mosquito districts

- Larval control for nuisance suppression
- Vector control for disease prevention?

▣ New mosquito districts?

Organized Mosquito Districts in Vermont

- BGLS District
 - ▣ Brandon, Goshen, Leicester, Salisbury
- LFICD District
 - ▣ Bridport, Cornwall
- Weybridge District
 - ▣ Weybridge



Human Serosurvey Project



- Question: How many mild cases or asymptomatic cases result from EEE infection?
- Study will determine how many people in the area have evidence of exposure to the virus but did not become ill.
- Asking for volunteers who live in the towns of Sudbury, Brandon or Whiting
 - ▣ Blood sample
 - ▣ Questionnaire
- Details still being worked out – stay tuned



Questions?