

A photograph showing the silhouettes of a man and a woman standing in a field. The man is on the right, wearing a hat and pointing towards the right. The woman is on the left, wearing a long coat. The background is a textured, brownish surface.

# **West Nile Virus, 2001: Southern and Western Expansion**

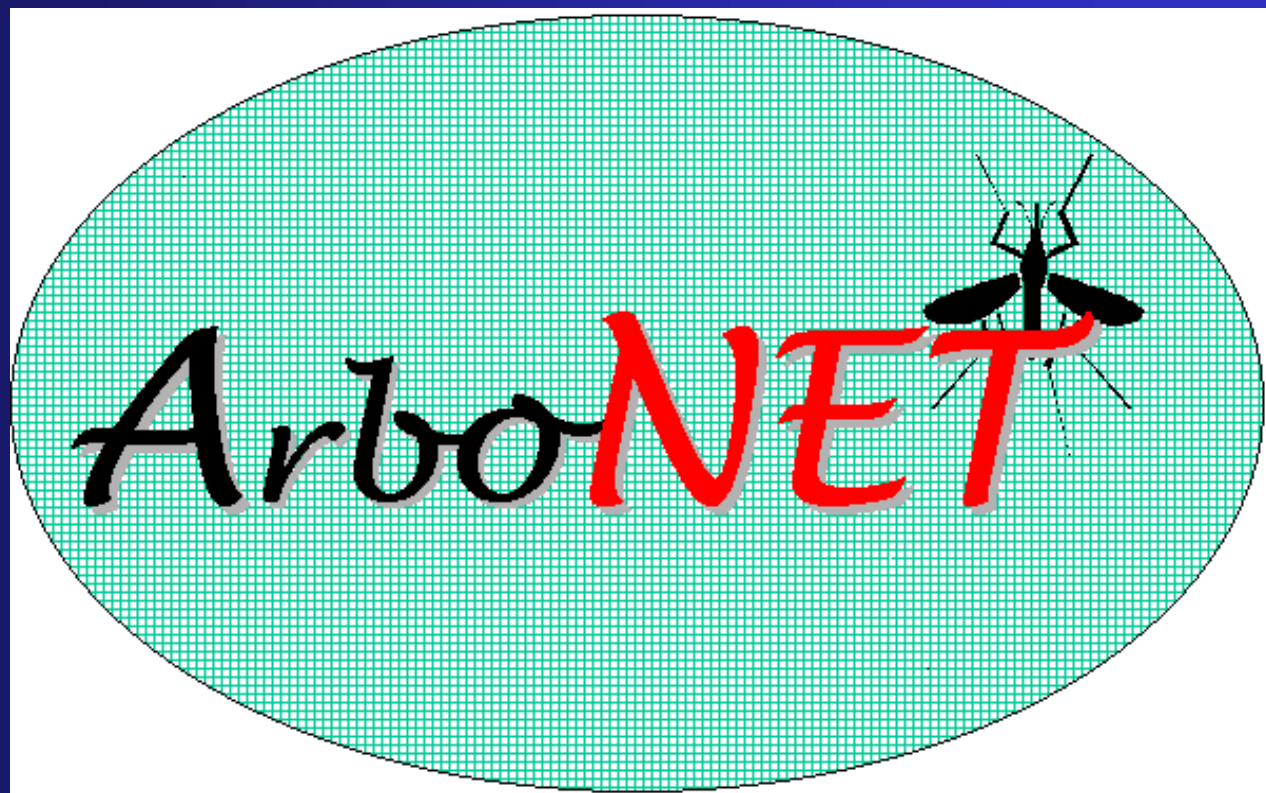
**3<sup>rd</sup> National West Nile Virus  
Planning Meeting  
Atlanta, Georgia  
March 22-23, 2002**



# **WNV Surveillance, United States, 2001\*: *Order of Topics***

---

- **ArboNET overview**
- **Birds**
- **Mosquitoes**
- **Equines**
- **Humans**
- **Summary & conclusions**



# How many states collected West Nile virus (WNV) surveillance data in 2001?

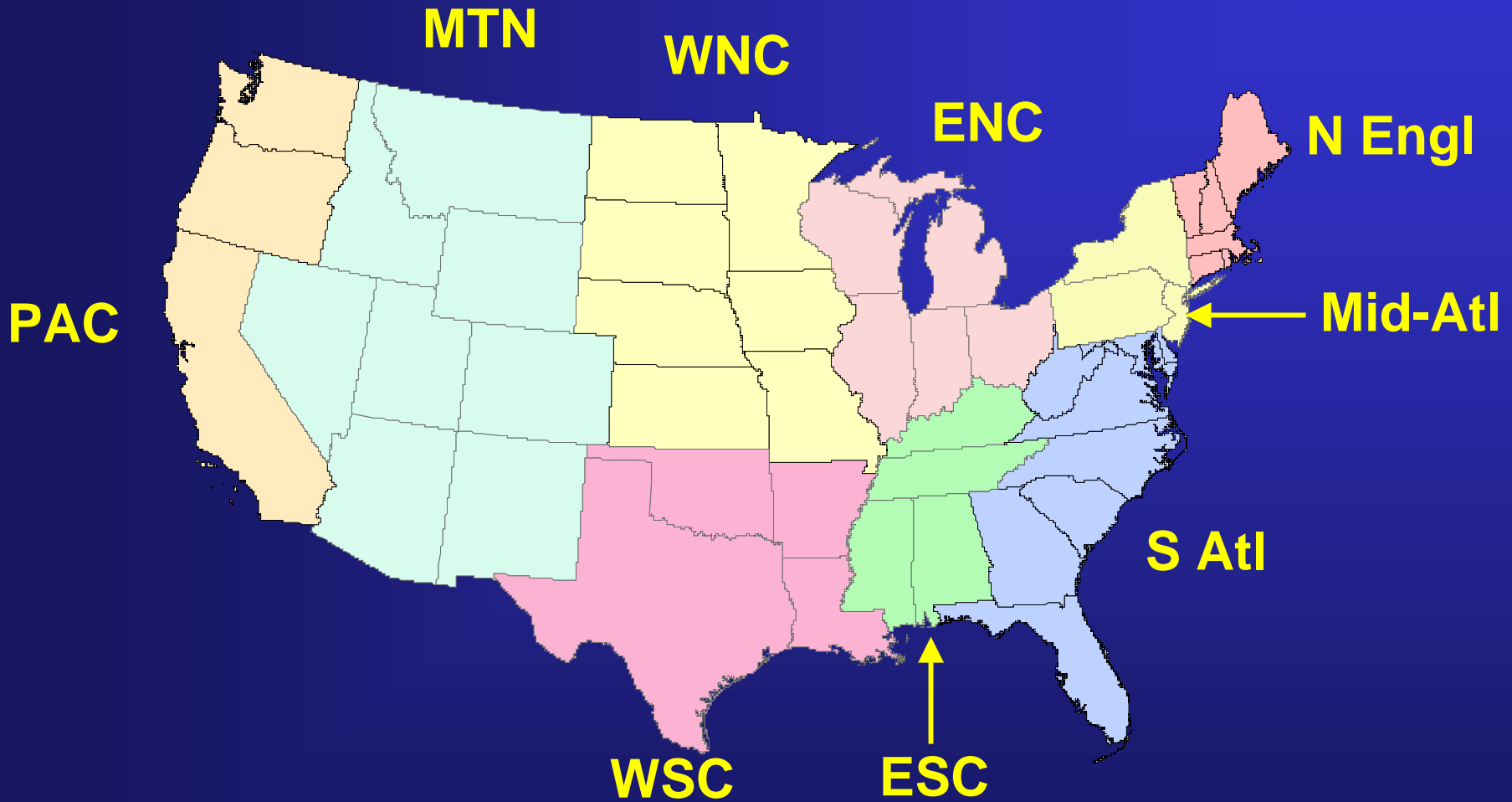
---

- 39 state/local jurisdictions reporting dead bird denominator data
- 35 - mosquito denominator data
- 29 - human denominator data
- 27 – veterinary/horse denominator data
- 11 - sentinel animal denominator data
- 4 - seroprevalence denominator data

# How much activity in 2001?

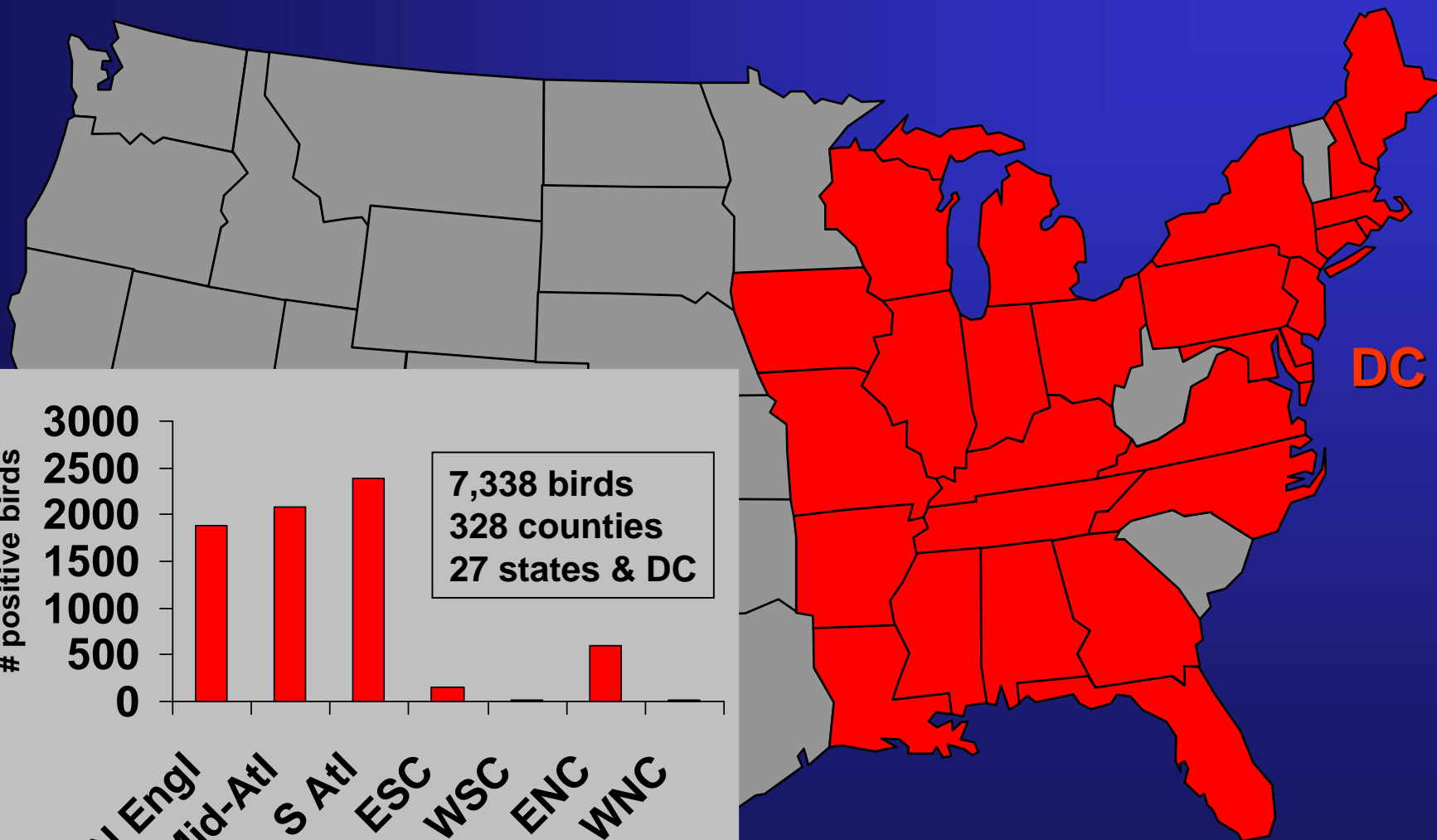
---

- 1999**      **28 counties in 4 states reported any WNV activity**
- 2000**      **136 counties in 12 states & DC reported any WNV activity**
- 2001**      **358 counties in 27 states & DC reported any WNV activity**



CDC Surveillance Regions

# States Reporting WNV-Positive Dead Birds, 2001\*



\* As of 3/13/2002

# WNV Surveillance, United States, 2001\*: *Summary of Dead Bird Data*

---

- 69,102 dead birds reported
- 32,918 tested (48% of reported)
- 7,338 WNV-positive (22% of tested)
  - 5,161 in genus *Corvus* (71%)
  - 2,177 in other genera (29%)
- 54% of tested crows “positive”
- 9% birds from other species “positive”

\* As of 3/13/2002



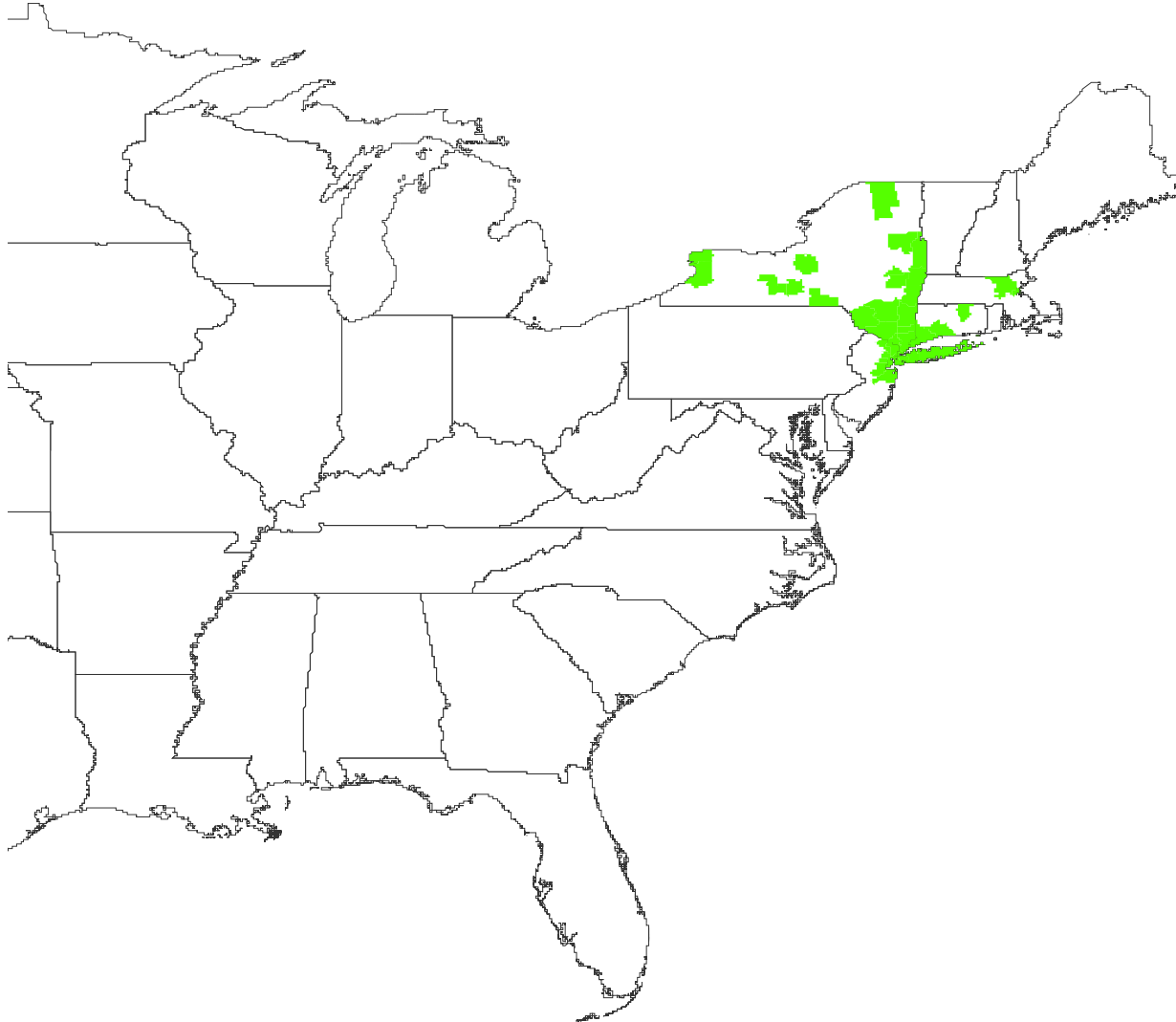
U.S. counties reporting any West Nile virus-infected **birds** in **1999** (N = 28 counties)



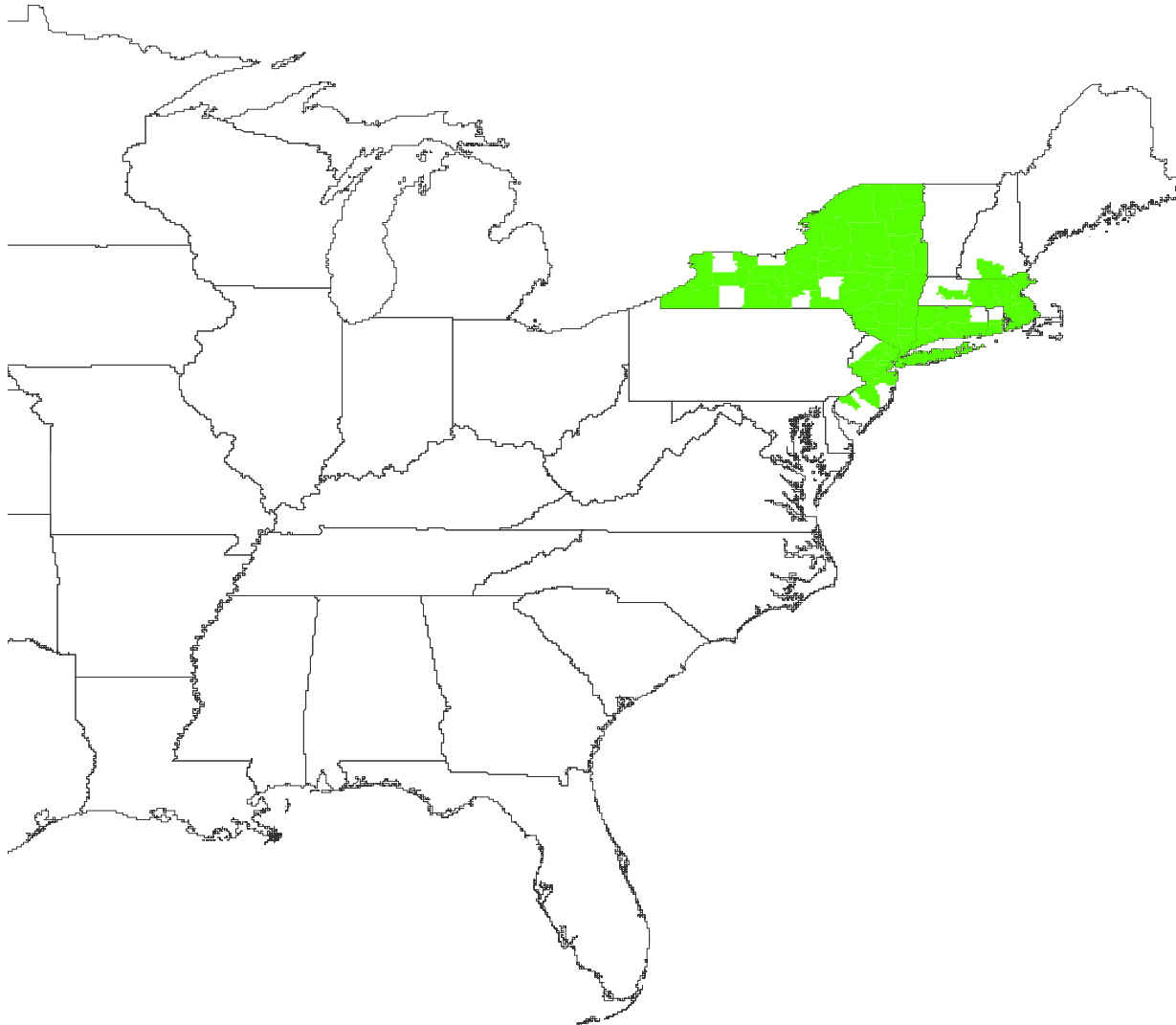
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - May 2000** (N = 4 counties)



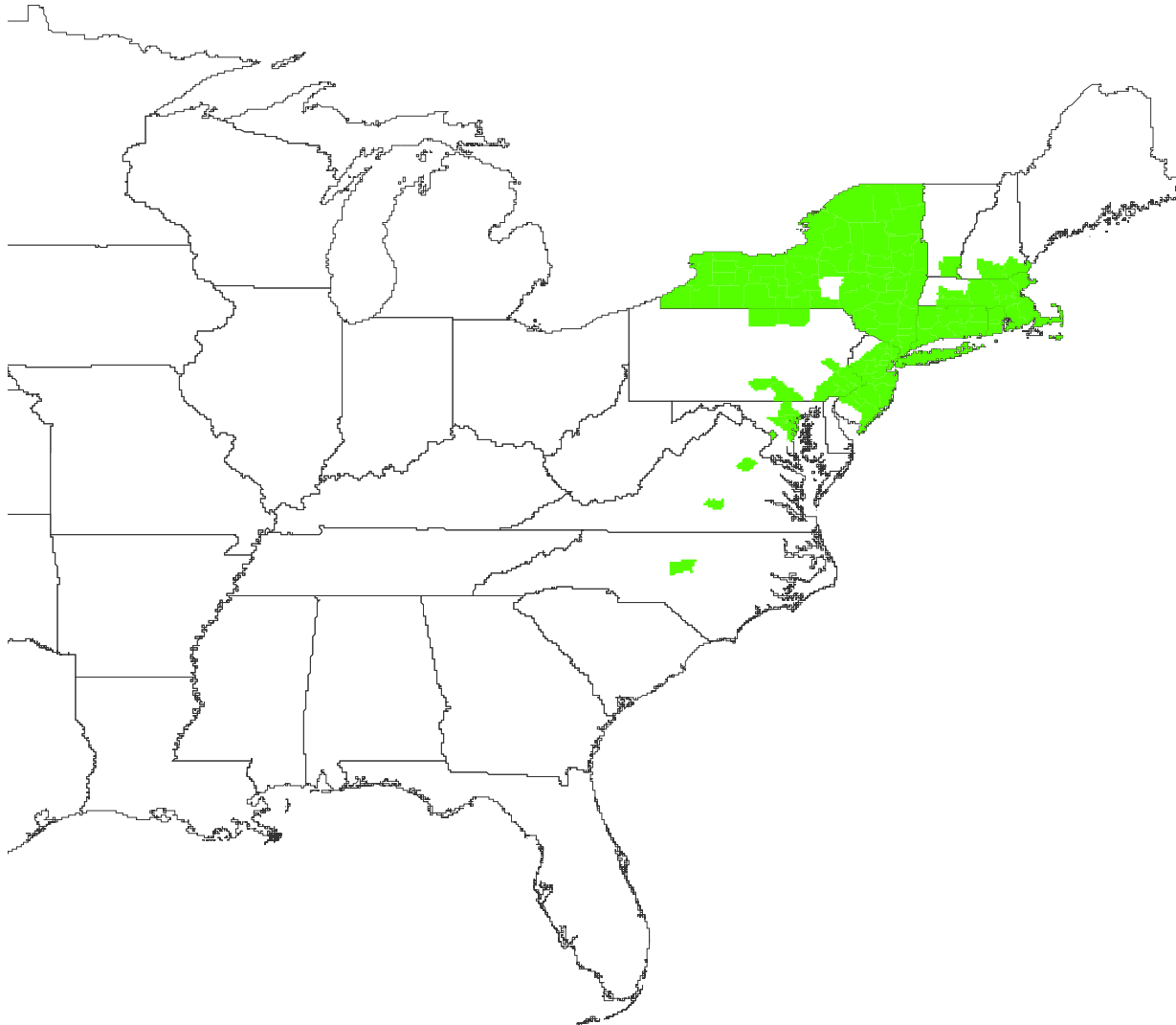
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Jul 2000** (N = 40 counties)



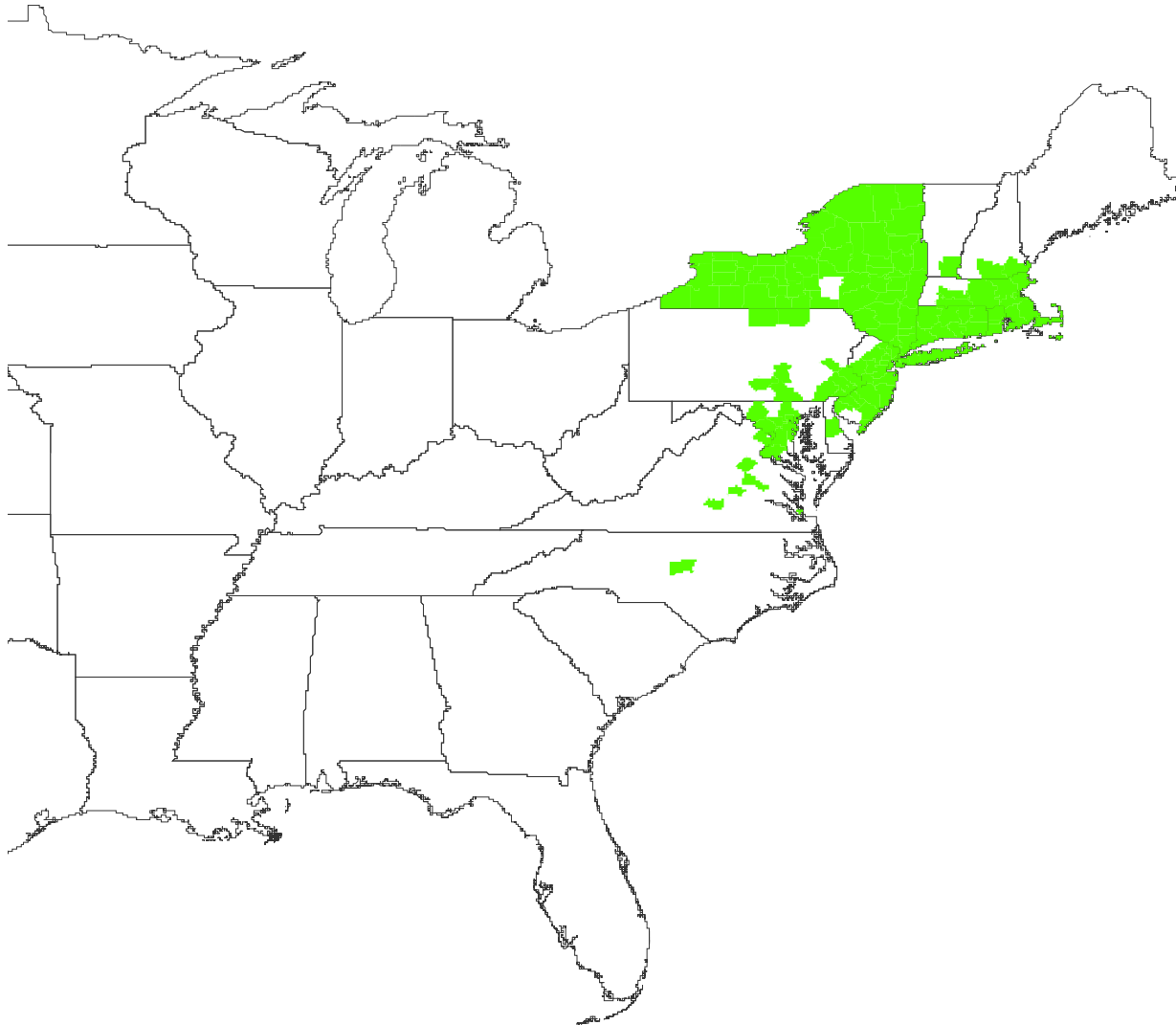
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Aug 2000** (N = 88 counties)



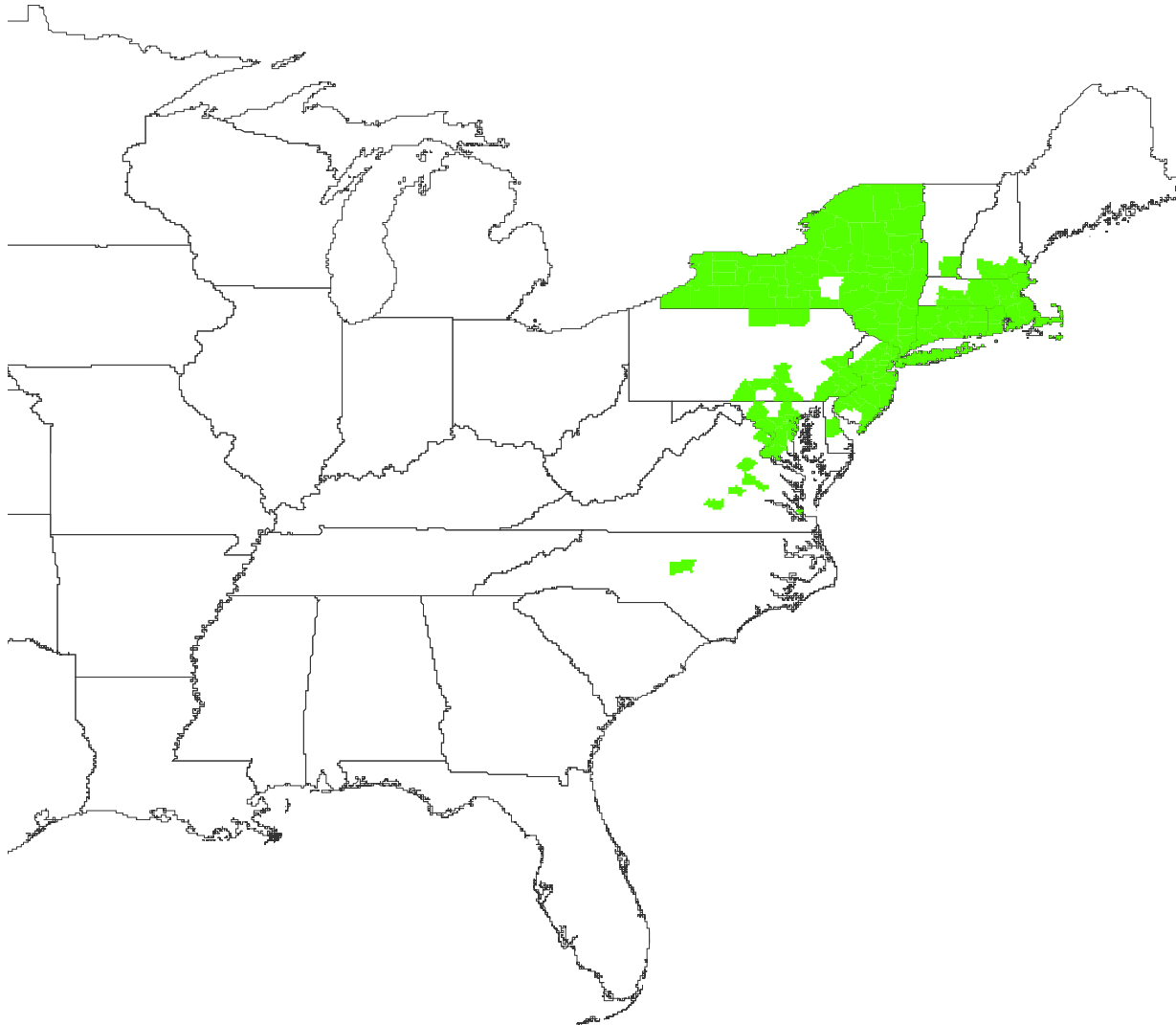
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Sep 2000** (N = 122 counties)



U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Oct 2000** (N = 134 counties)



U.S. counties reporting any West Nile virus-infected birds from **Jan - Dec 2000** (N = 136 counties)

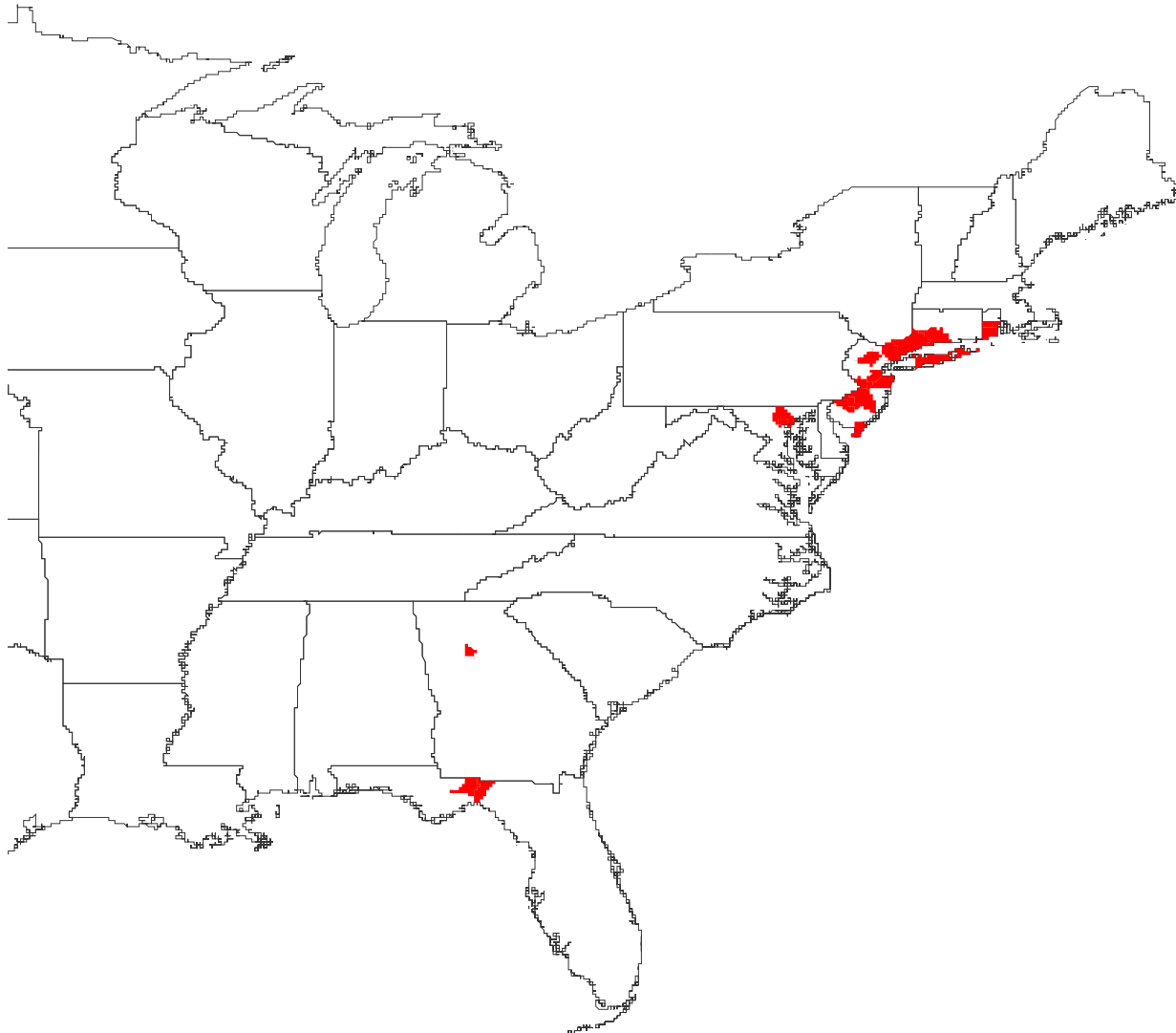


U.S. counties reporting any West Nile virus-infected **birds** from **Jan - May 2001** (N = 11 counties)

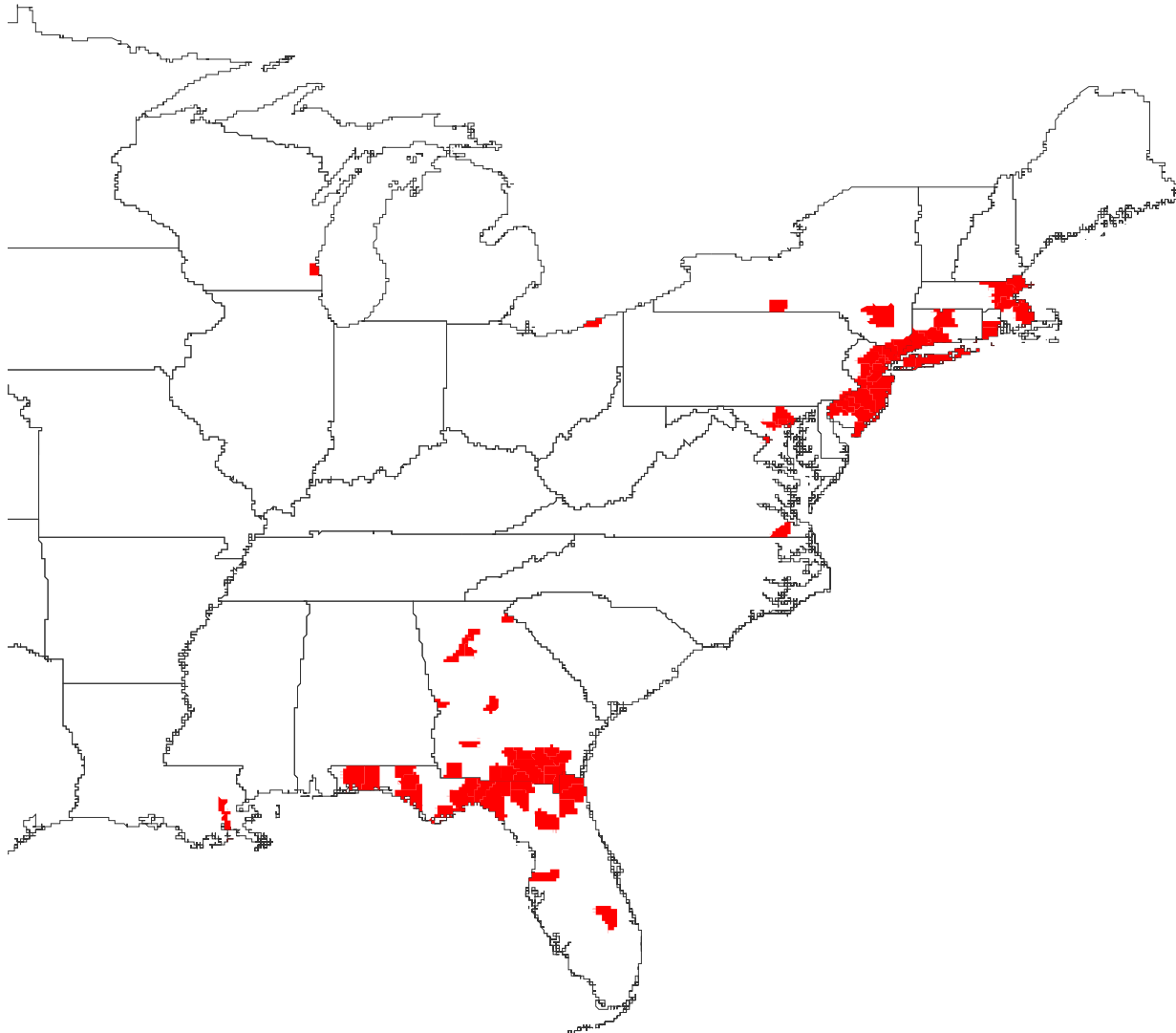




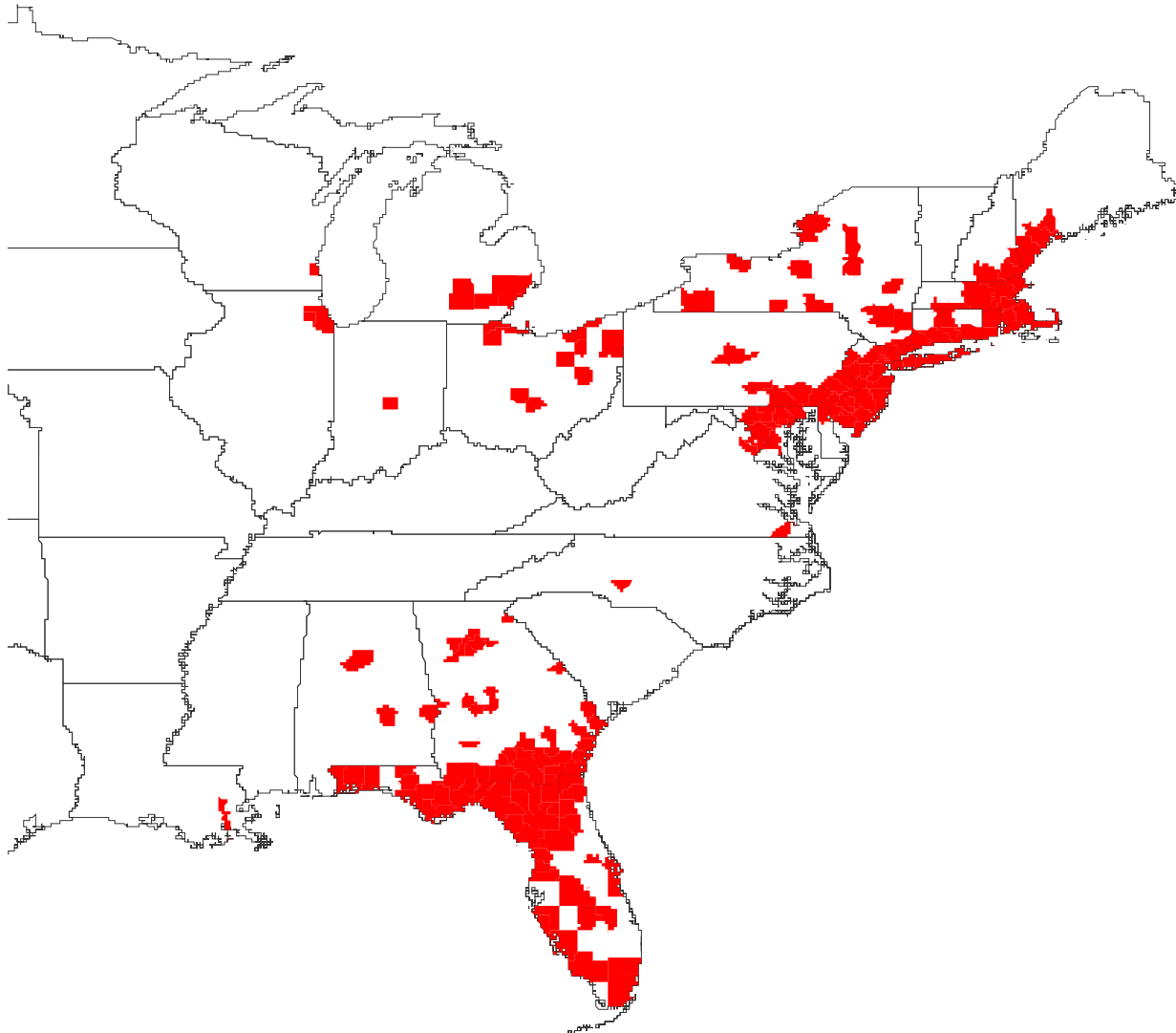
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Jun 2001** (N = 22 counties)



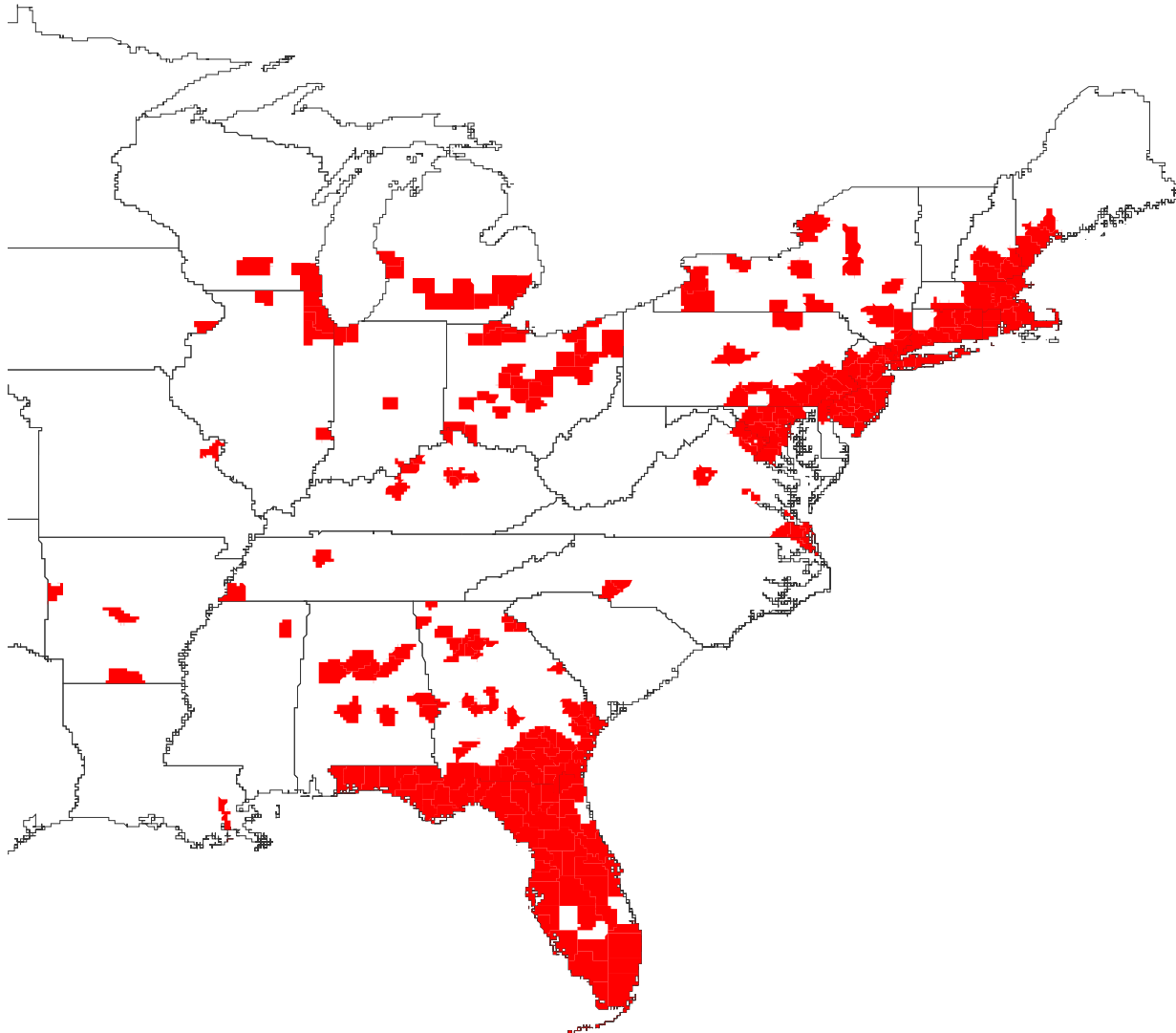
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Jul 2001** (N = 82 counties)



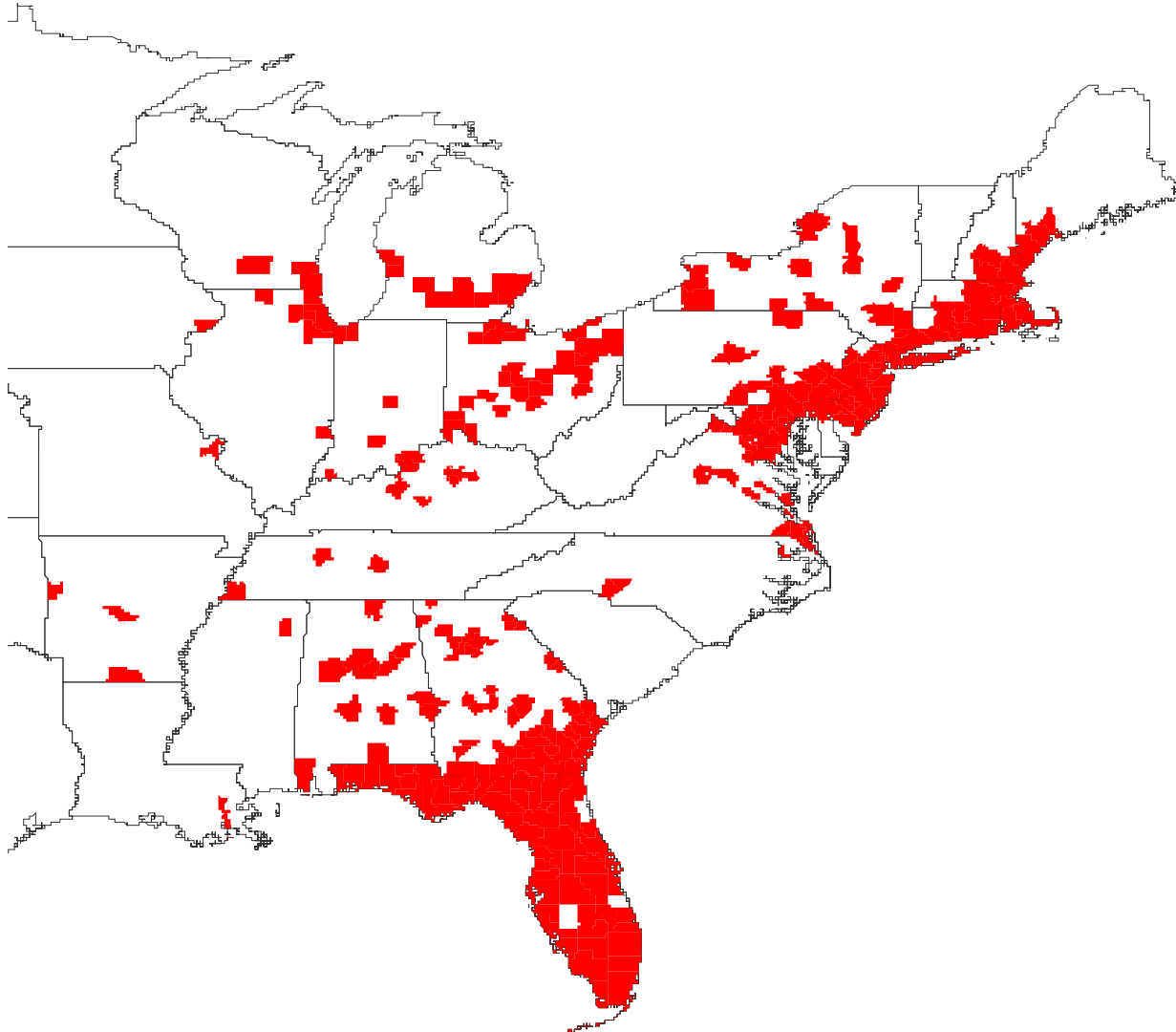
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Aug 2001** (N = 200 counties)



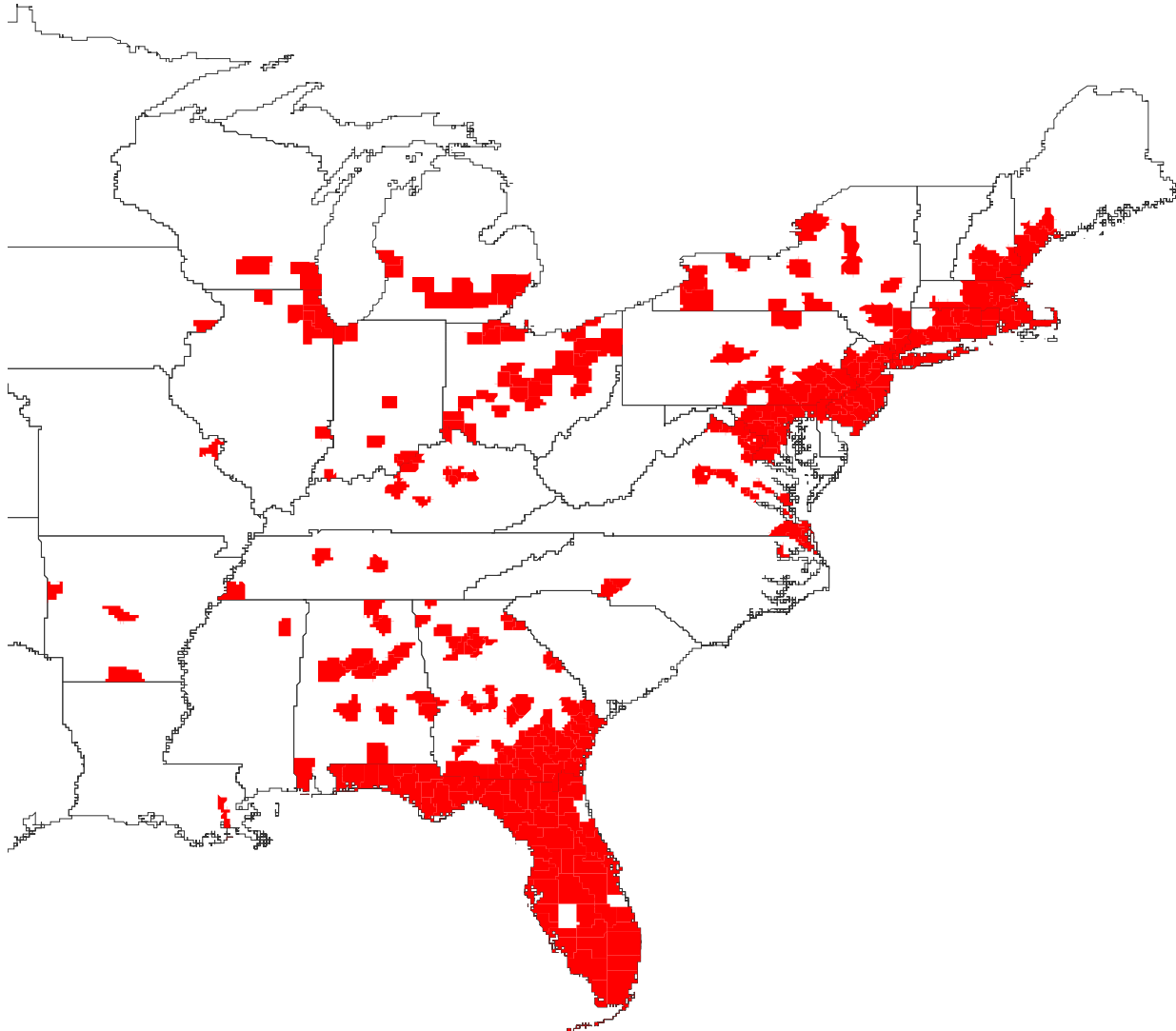
U.S. counties reporting any West Nile virus-infected birds from **Jan - Sep 2001** (N = 298 counties)



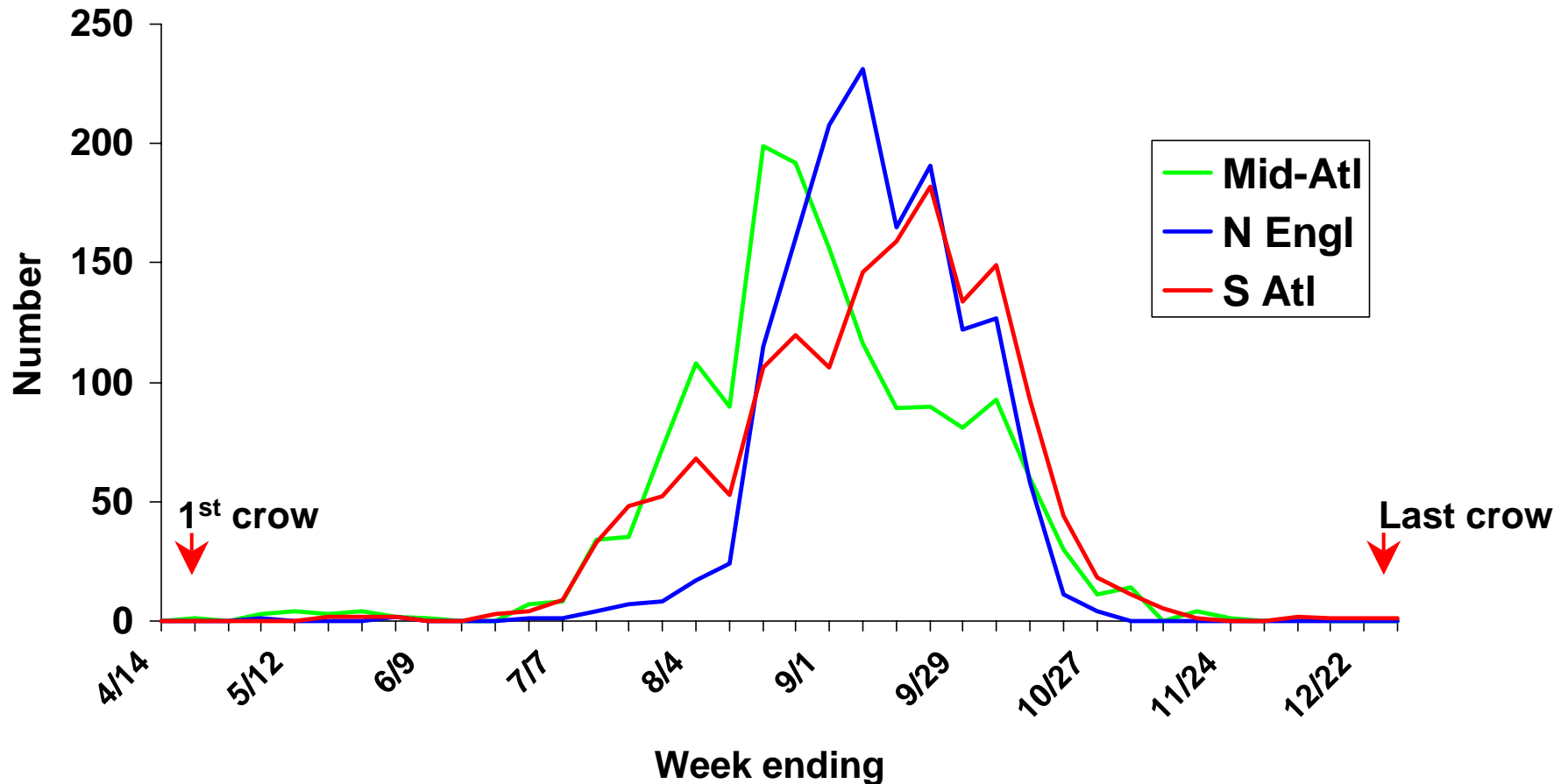
U.S. counties reporting any West Nile virus-infected **birds** from **Jan - Oct 2001** (N = 327 counties)



U.S. counties reporting any West Nile virus-infected  
**birds** from **Jan - Dec 2001** (N = 328 counties)

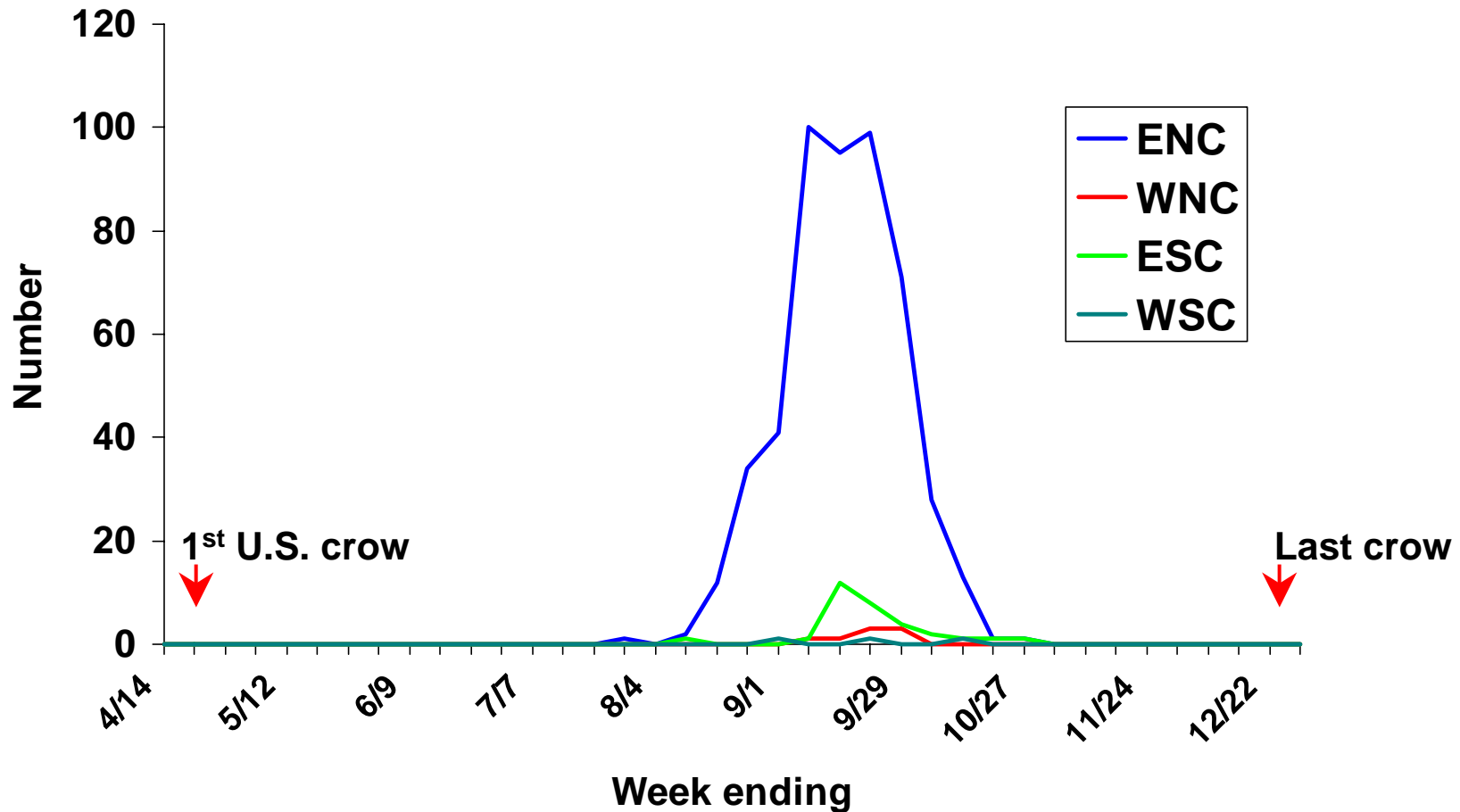


# No. of WNV-Positive Crows Reported, Mid-Atlantic, New England, & South Atlantic Regions, by Week, 2001\*



\*As of 2/1/02

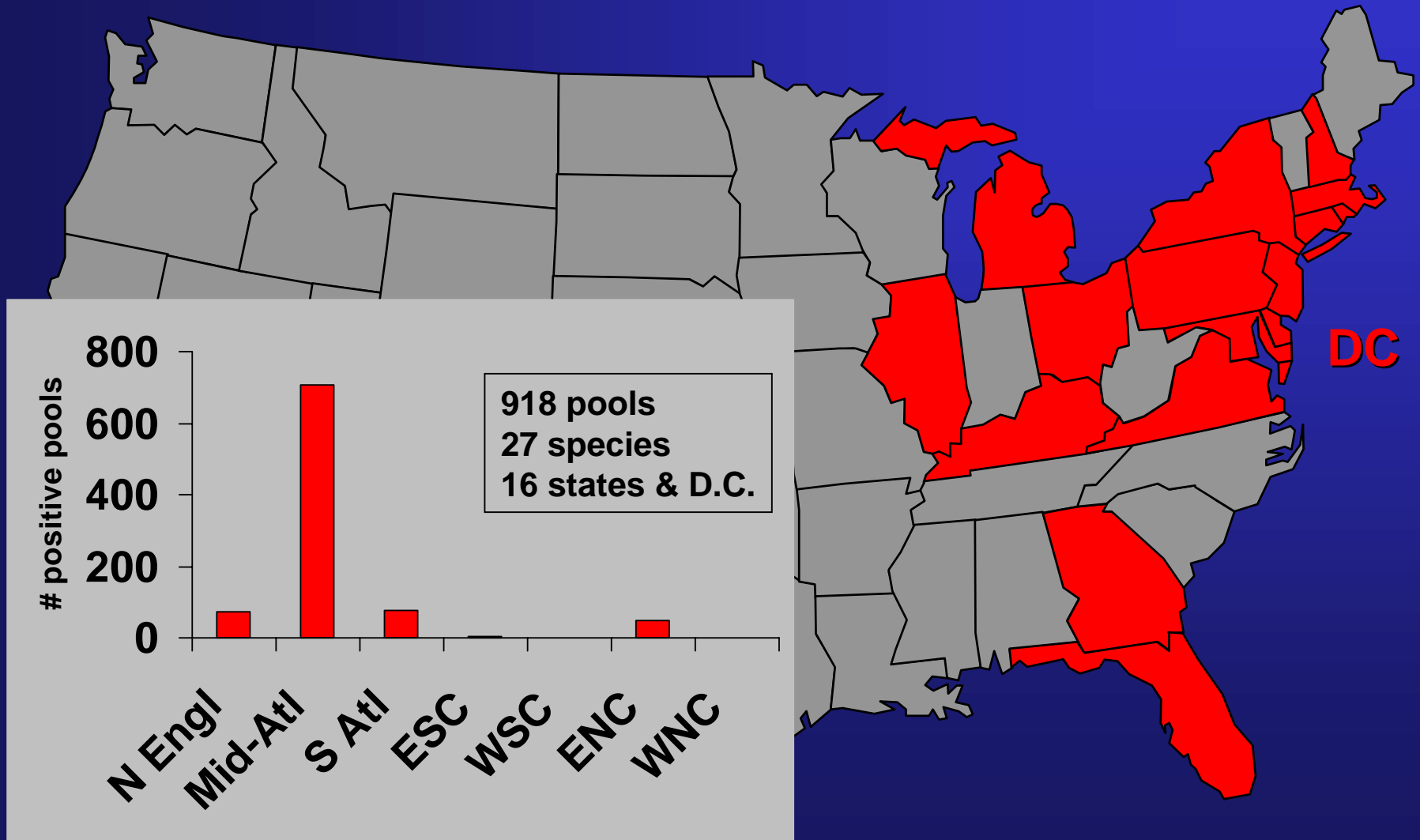
# No. of WNV-Positive Crows Reported, North Central & South Central Regions, by Week, 2001\*



\*As of 2/1/02



# States Reporting WNV-Positive Mosquito Pools, 2001\*



\* As of 3/13/2002

# Summary of Mosquito-Based WNV Surveillance, United States, 2001\*

---

- 918 WNV-positive mosquito pools
- 27 positive species
  - 543 pools (59%) *Cx pipiens*, *Cx restuans*, or mixed
  - 70 (8%) *Cx salinarius*
- Earliest: *Cx pipiens*, 31 MAY, Middlesex County, NJ
- Latest: *Cx pipiens*, 25 OCT, Camden County, NJ

\* As of 3/13/2002

# WNV-Positive Mosquito Species Reported, United States, 2001\*

<i>Culex</i>	<i>Aedes</i>	<i>Ochlerotatus</i>	<i>Anopheles</i>	Other
<i>pipiens</i>	<i>albopictus</i>	<i>atlanticus</i>	<i>barberi</i>	<i>Cs. melanura</i>
<i>restuans</i>	<i>cinereus</i>	<i>canadensis</i>	<i>punctipennis</i>	<i>Cq. perturbans</i>
<i>quinq</i>	<i>vexans</i>	<i>cantator</i>	<i>atropos</i>	<i>Deinocerites cancer</i>
<i>salinarius</i>		<i>japonicus</i>	<i>crucians</i>	<i>Ps. columbiae</i>
<i>nigripalpus</i>		<i>sollicitans</i>	<i>quadrimaculatus</i>	<i>Orthopodomyia signifera</i>
		<i>taeniorhynchus</i>		<i>Uranotaenia sapphirina</i>
		<i>triseriatus</i>		
		<i>trivittatus</i>		

\* As of 3/13/2002

# U.S. Counties Reporting WNV-Positive Mosquitoes



**1999**

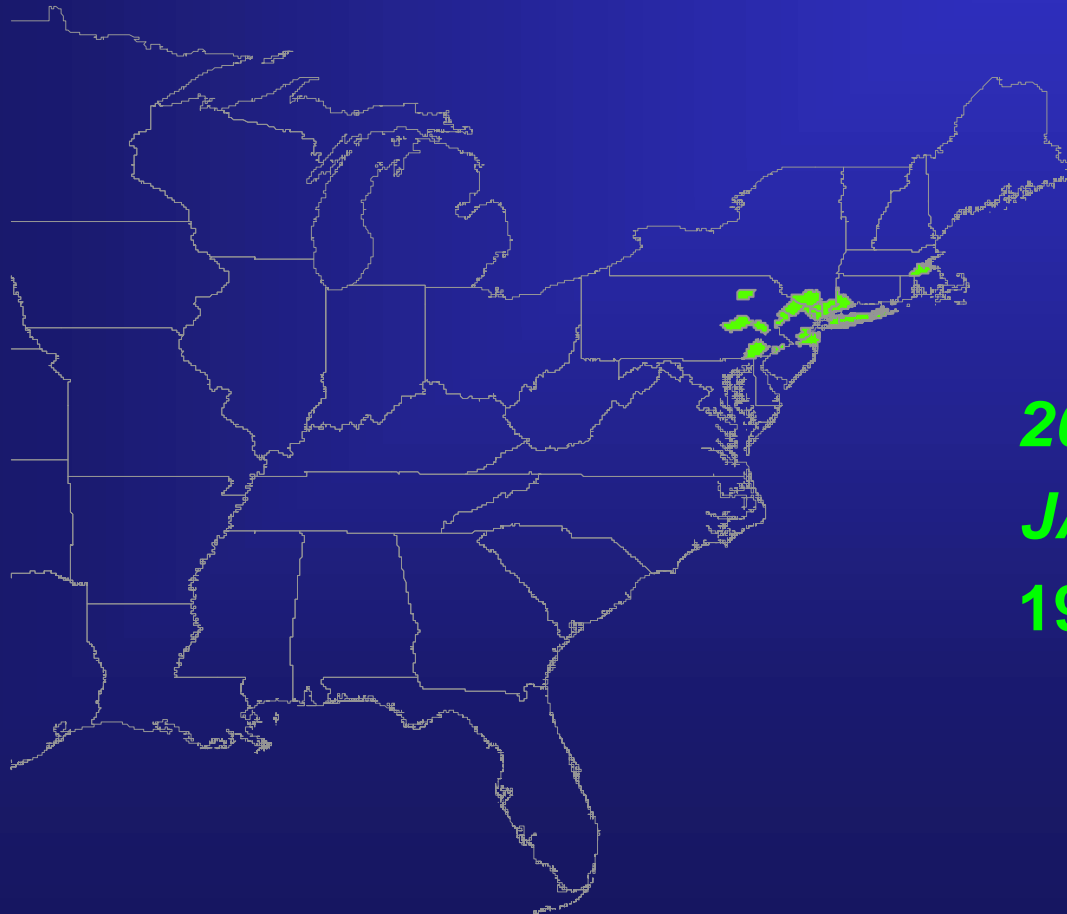
**8 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



**2000**  
**JAN - JUL**  
**6 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



**2000**  
**JAN - AUG**  
**19 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



**2000**  
**JAN - SEP**  
**27 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



**2000**  
**JAN - DEC**  
**33 counties**



# U.S. Counties Reporting WNV-Positive Mosquitoes



**2001**

**JAN - JUN**

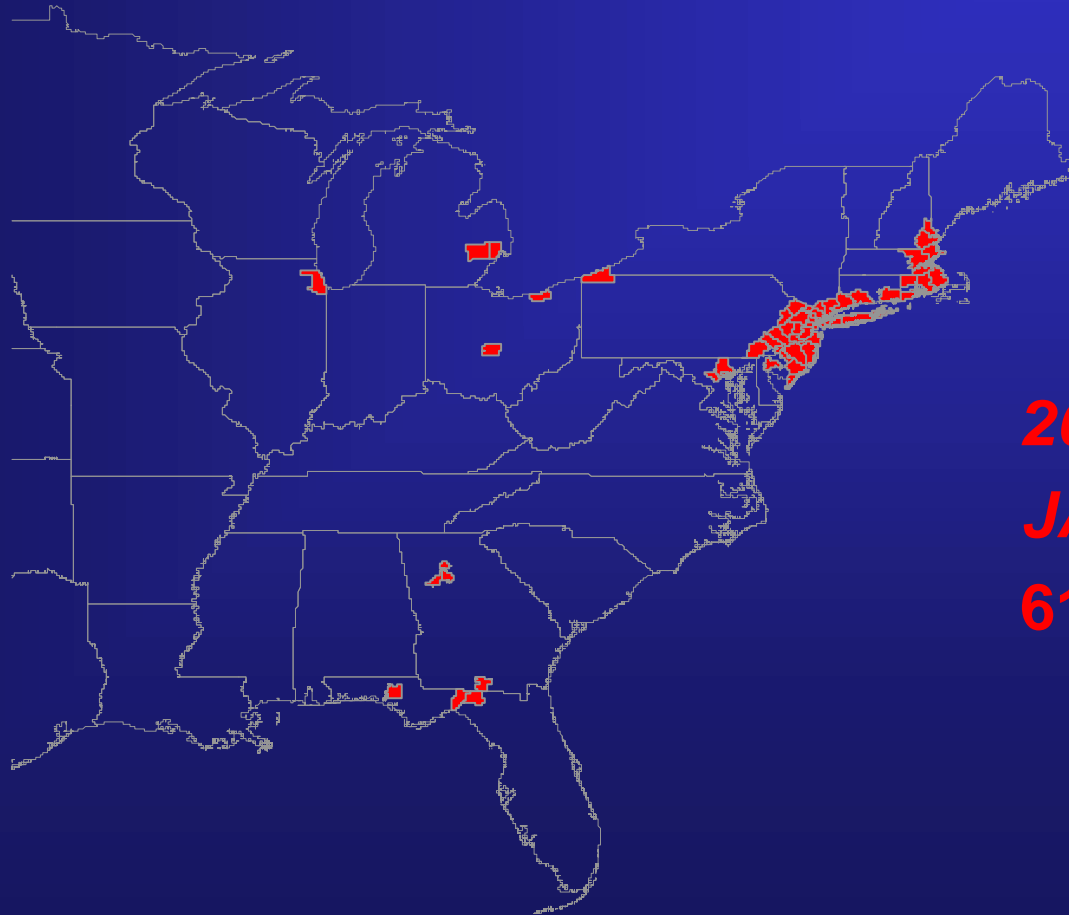
**6 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



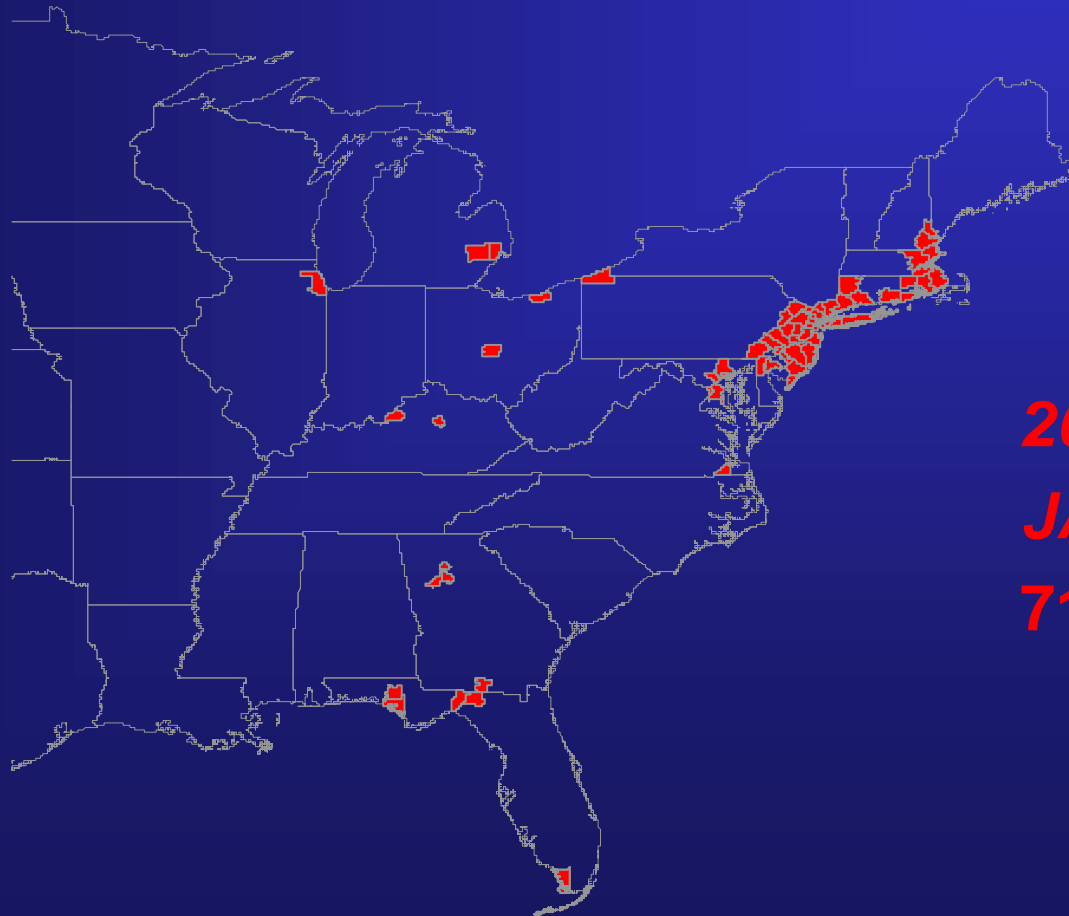
**2001**  
**JAN - JUL**  
**32 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



**2001**  
**JAN - AUG**  
**61 counties**

# U.S. Counties Reporting WNV-Positive Mosquitoes



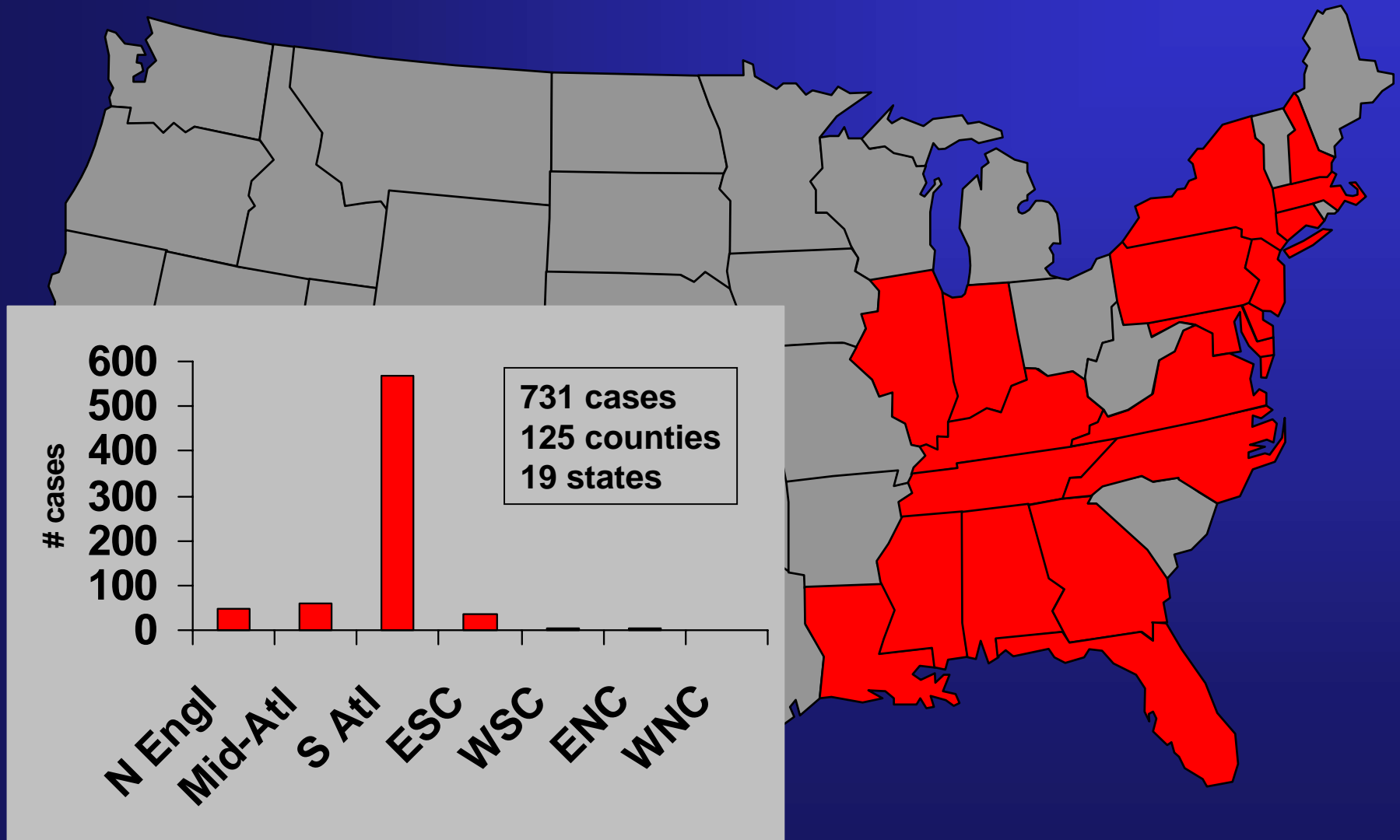
**2001**  
**JAN - DEC**  
**71 counties**

# Non-Human Mammals Reported WNV-Infected, United States, 1999-2001

---

<b>Species</b>	<b># Infected</b>	<b>WNV Disease</b>
<b>Horse</b>	<b>~700</b>	<b>Yes</b>
<b>Cat</b>	<b>1</b>	<b>?</b>
<b>Domestic rabbit</b>	<b>1</b>	<b>?</b>
<b>Gray Squirrel</b>	<b>1</b>	<b>?</b>
<b>Eastern Chipmunk</b>	<b>1</b>	<b>?</b>
<b>Striped Skunk</b>	<b>1</b>	<b>?</b>
<b>Big Brown Bat</b>	<b>1</b>	<b>?</b>
<b>Little Brown Bat</b>	<b>1</b>	<b>?</b>

# States Reporting Equine WNV Disease Cases, 2001\*



\* As of 3/13/2002

**U.S. counties reporting equine WNV illnesses  
1999 (N = 2 counties)**

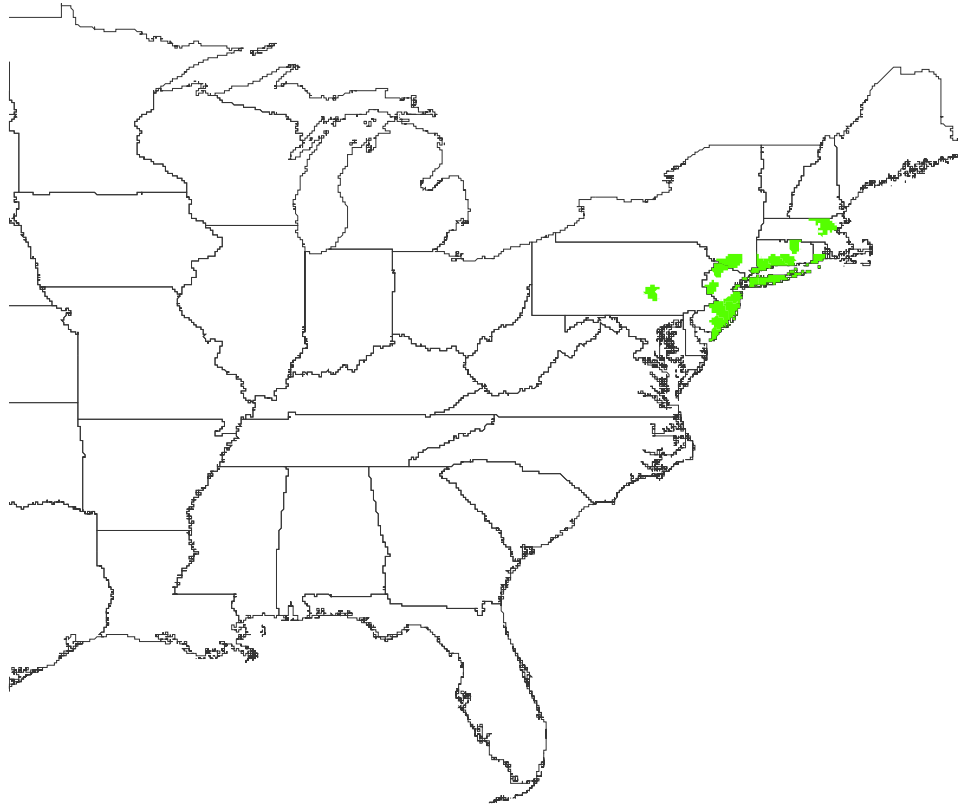


**U.S. counties reporting equine WNV illnesses**  
**Jan - Aug 2000 (N = 6 counties)**

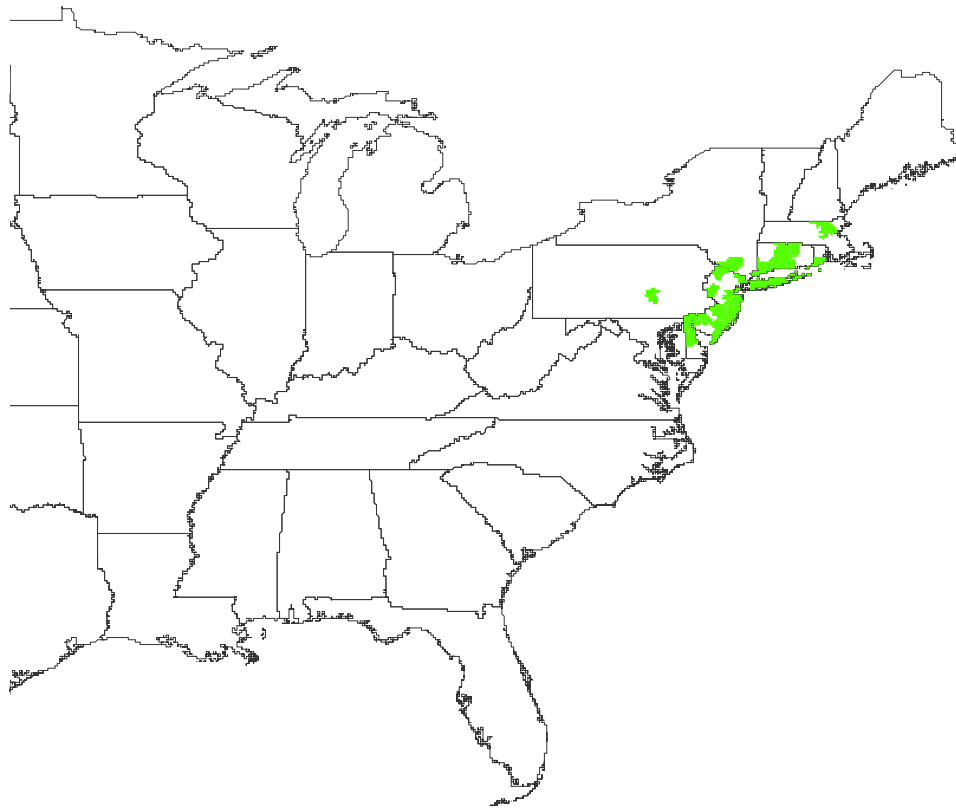




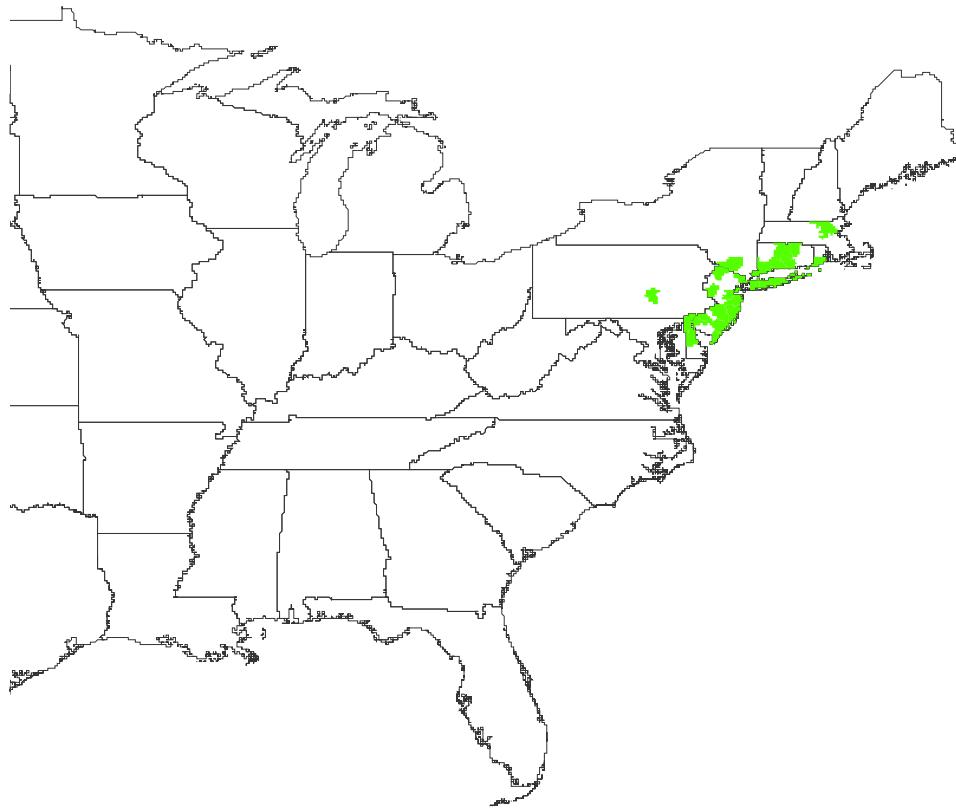
**U.S. counties reporting equine WNV illnesses  
Jan - Sep 2000 (N = 19 counties)**



**U.S. counties reporting equine WNV illnesses  
Jan - Oct 2000 (N = 26 counties)**



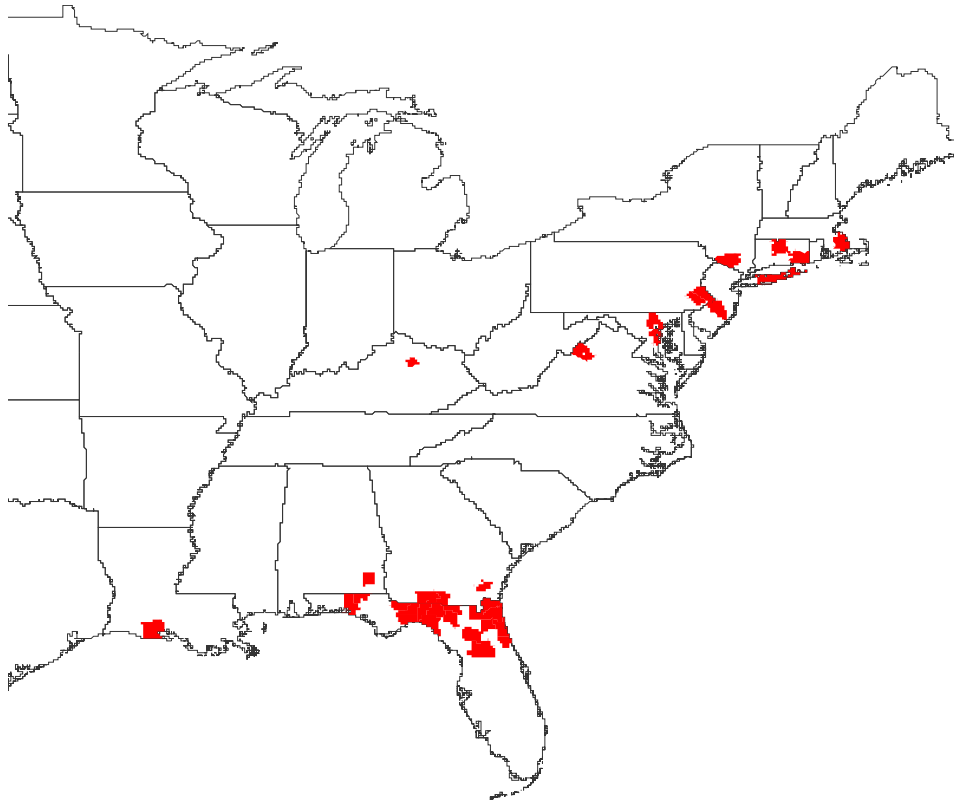
**U.S. counties reporting equine WNV illnesses  
Jan - Dec 2000 (N = 26 counties)**



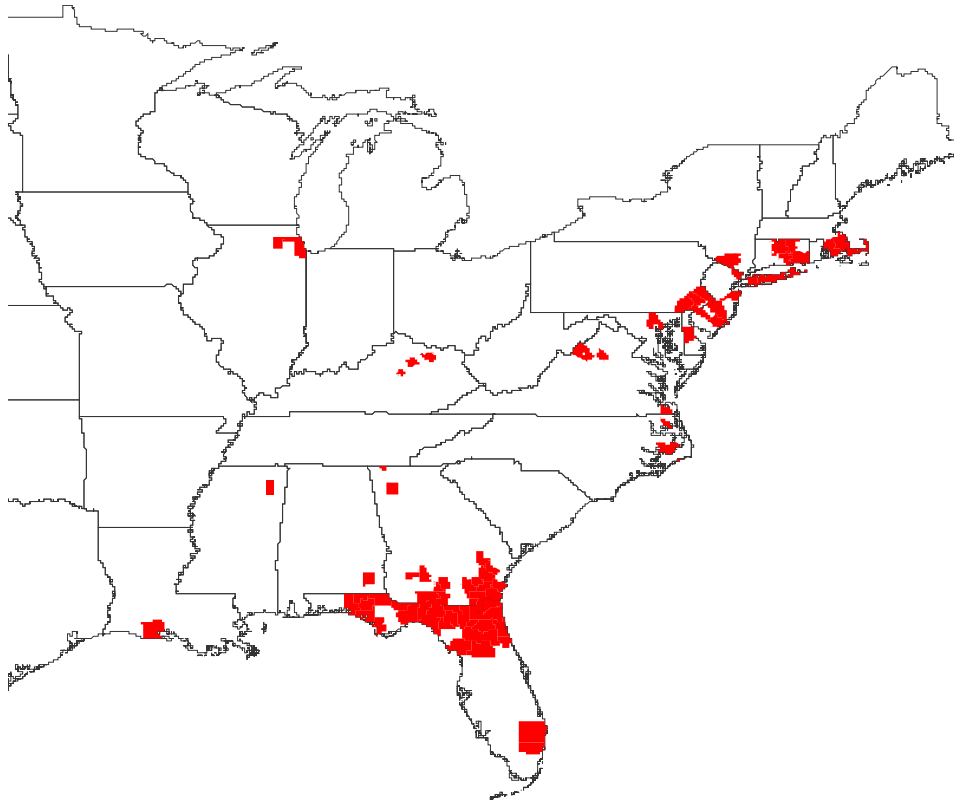
**U.S. counties reporting equine WNV illnesses**  
**Jan - Jul 2001 (N = 9 counties)**



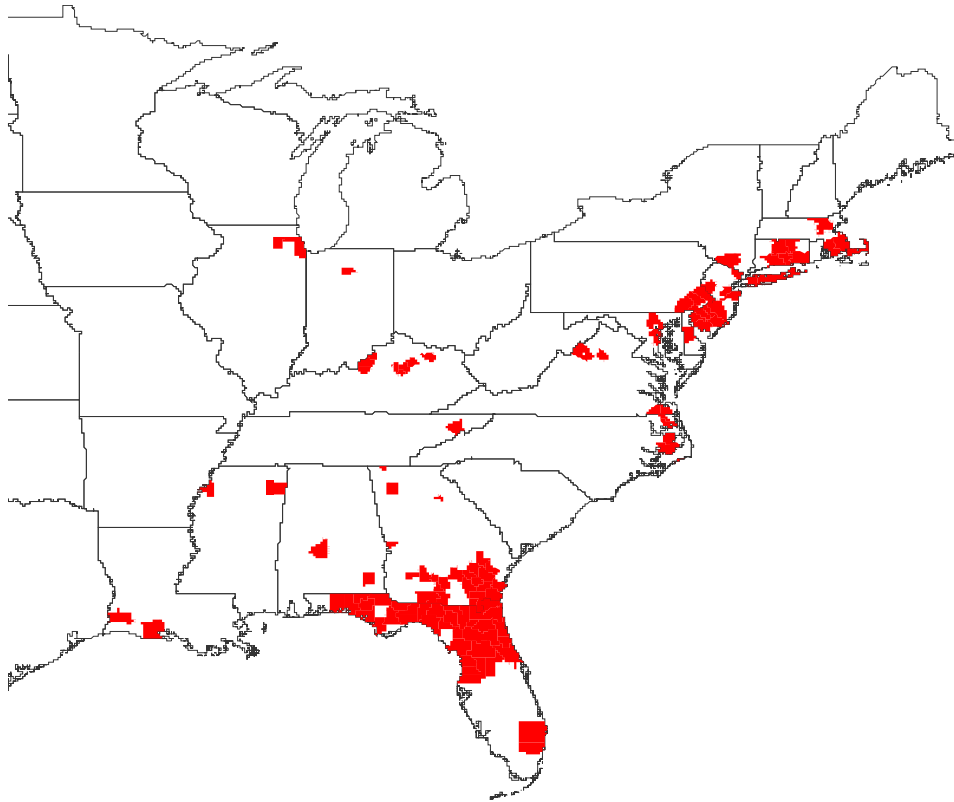
**U.S. counties reporting **equine** WNV illnesses  
Jan - Aug 2001 (N = 36 counties)**



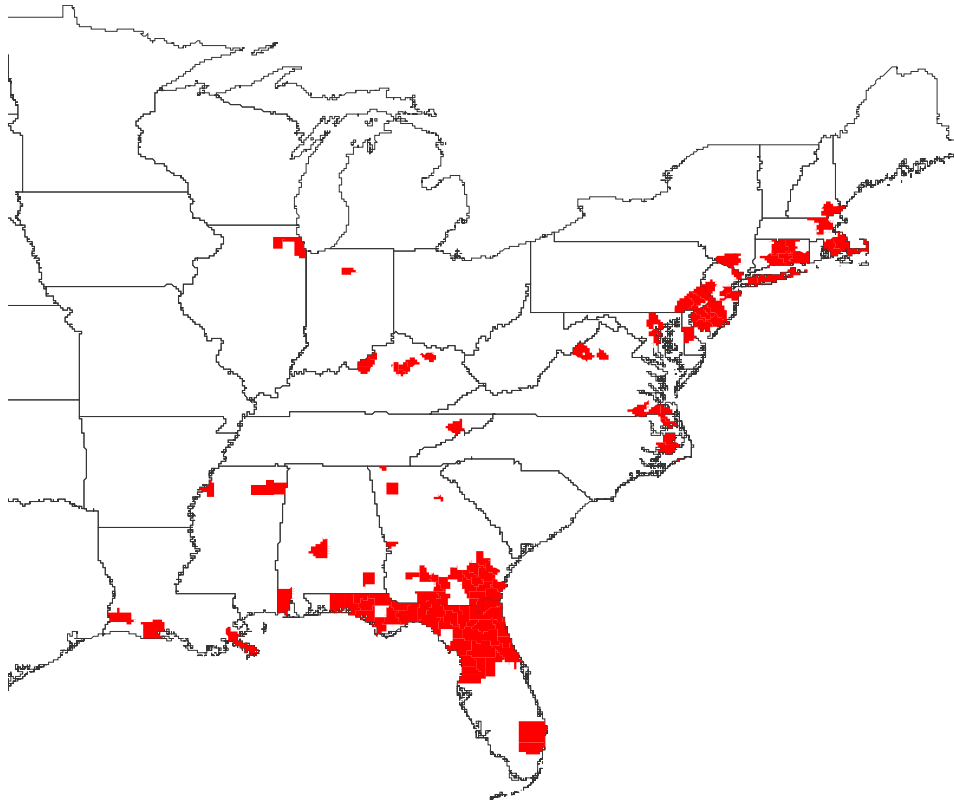
**U.S. counties reporting equine WNV illnesses**  
**Jan - Sep 2001 (N = 84 counties)**



**U.S. counties reporting equine WNV illnesses**  
**Jan - Oct 2001 (N = 119 counties)**

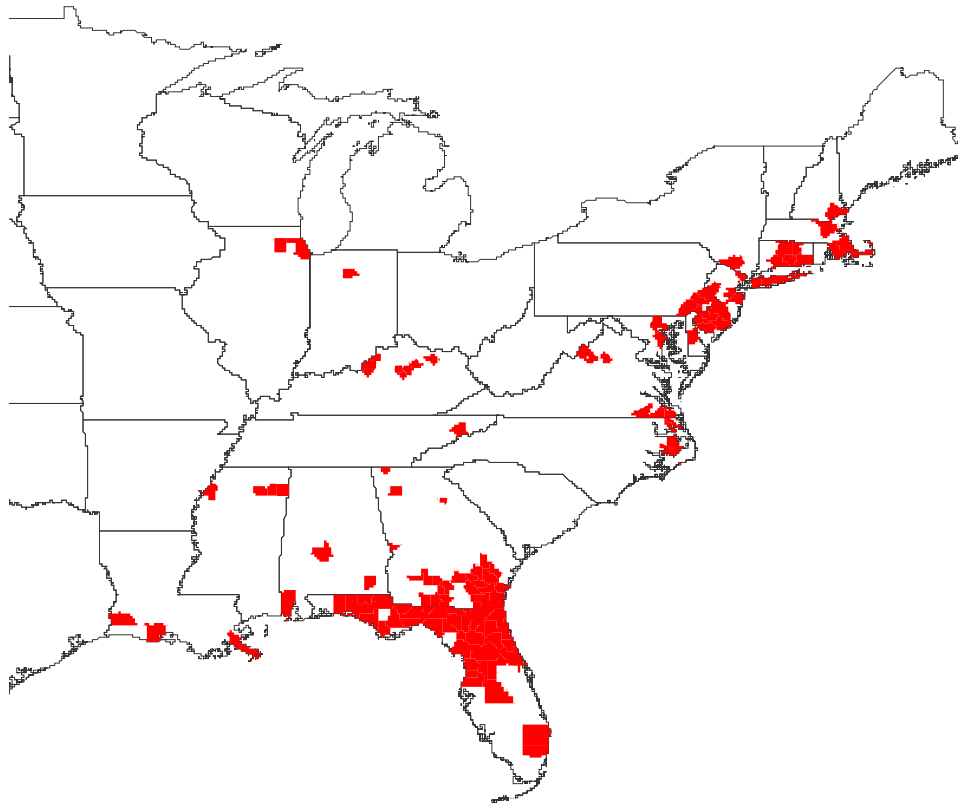


**U.S. counties reporting equine WNV illnesses  
Jan - Nov 2001 (N = 124 counties)**

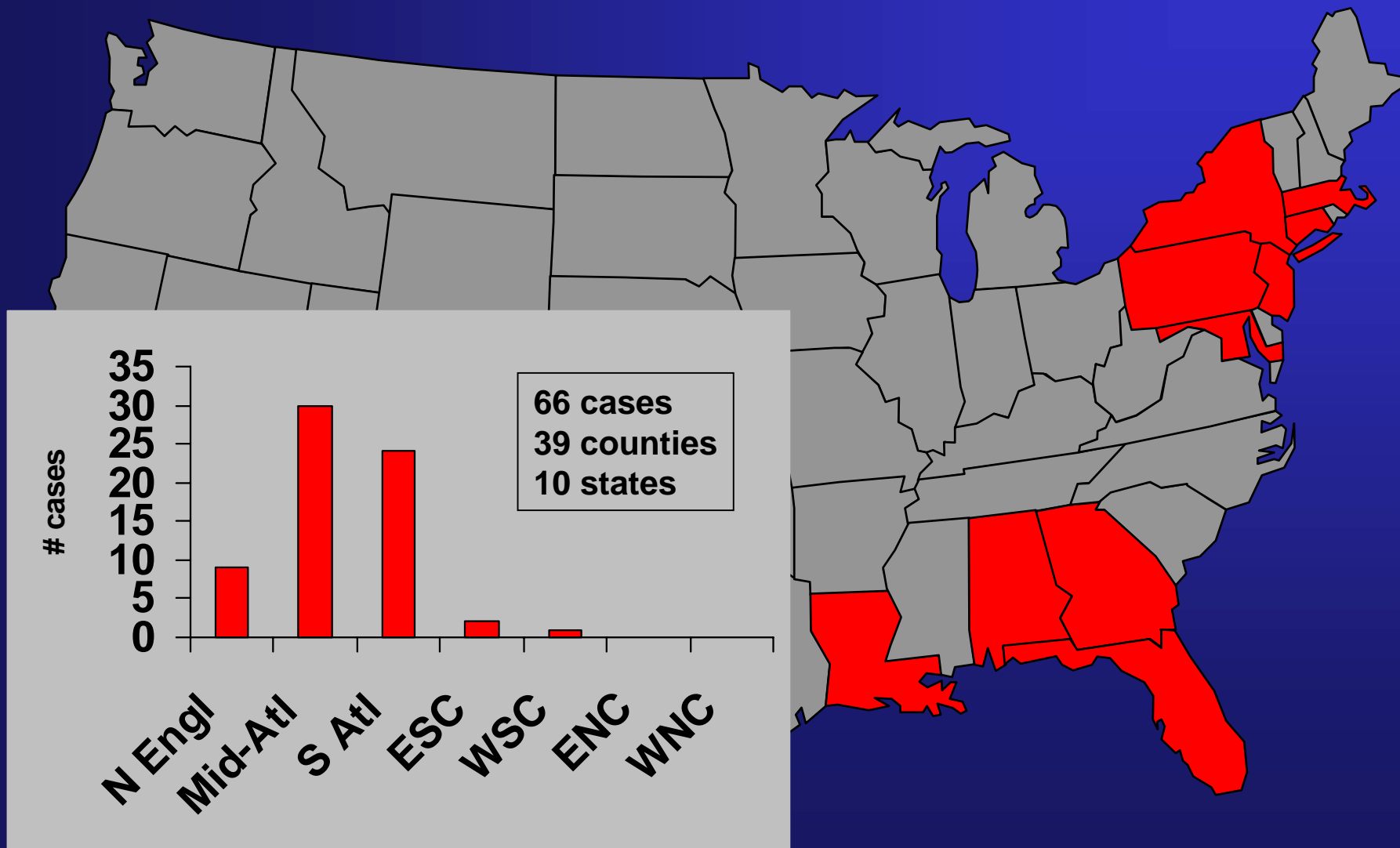




**U.S. counties reporting equine WNV illnesses  
Jan - Dec 2001 (N = 125 counties)**



# States Reporting Human WNV Disease Cases, 2001\*

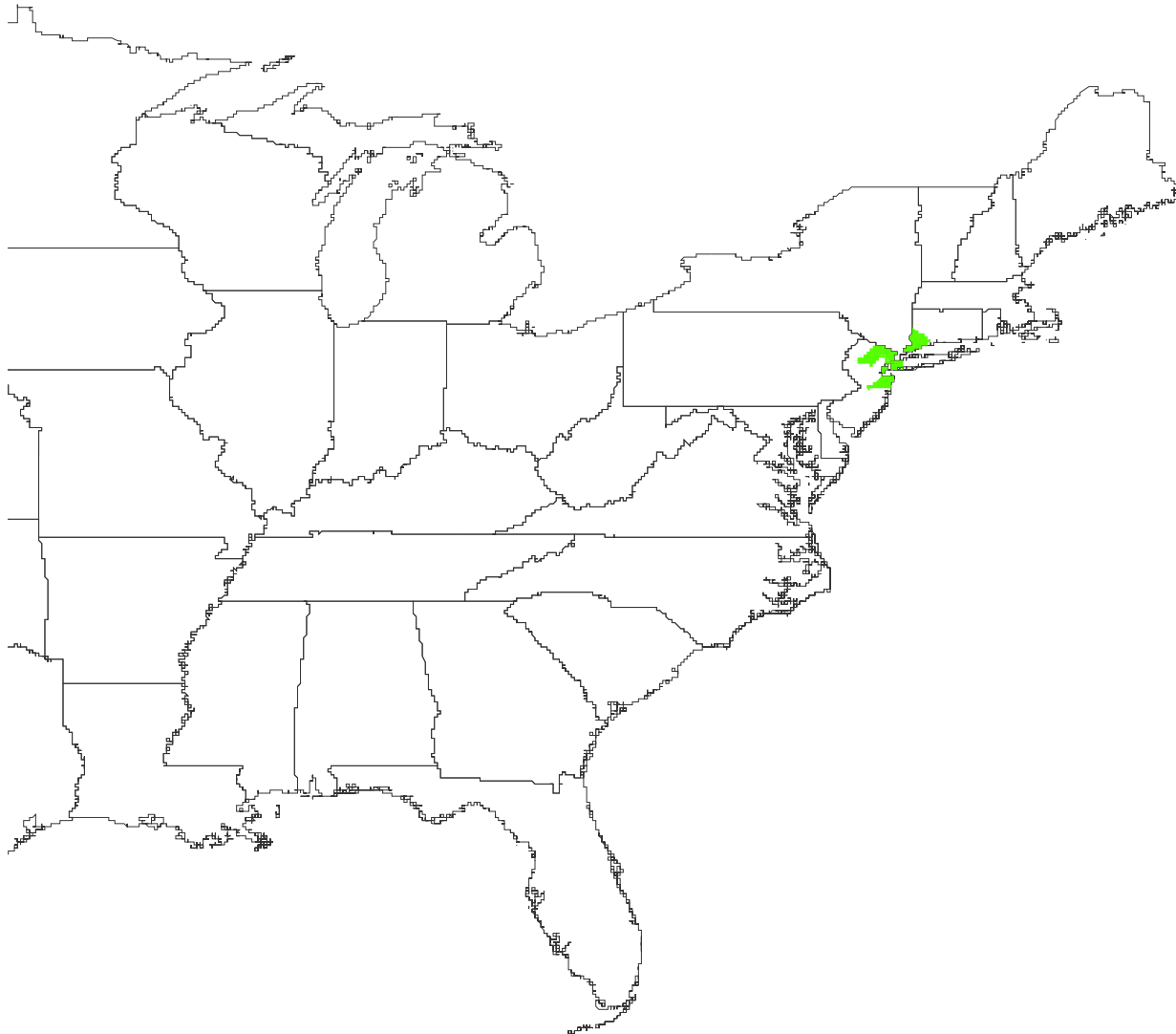


\* As of 3/13/2002

U.S. counties reporting **human** WNV illness  
**1999** (N = 6 counties)



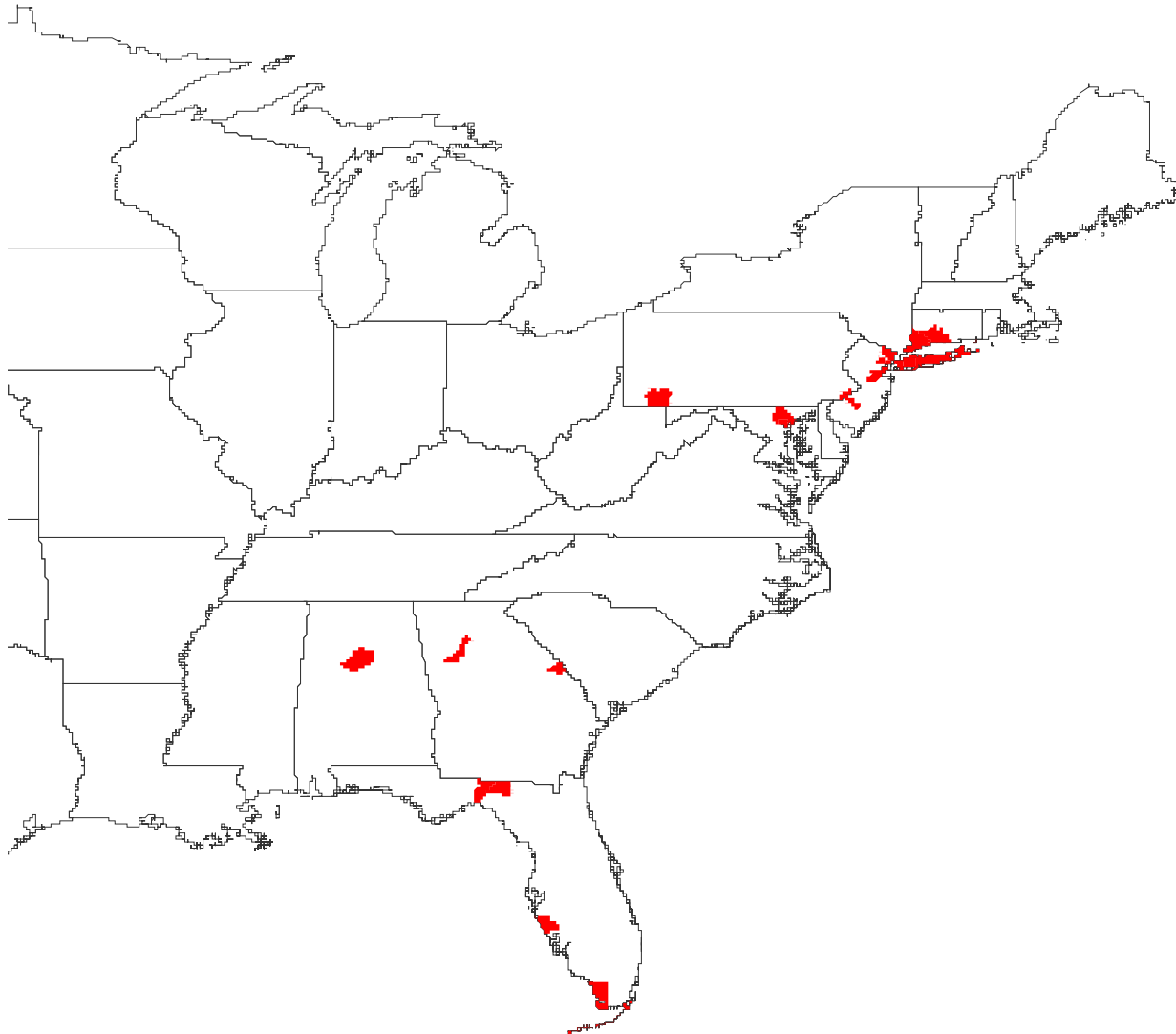
U.S. counties reporting **human** WNV illness  
**2000** (N = 10 counties)



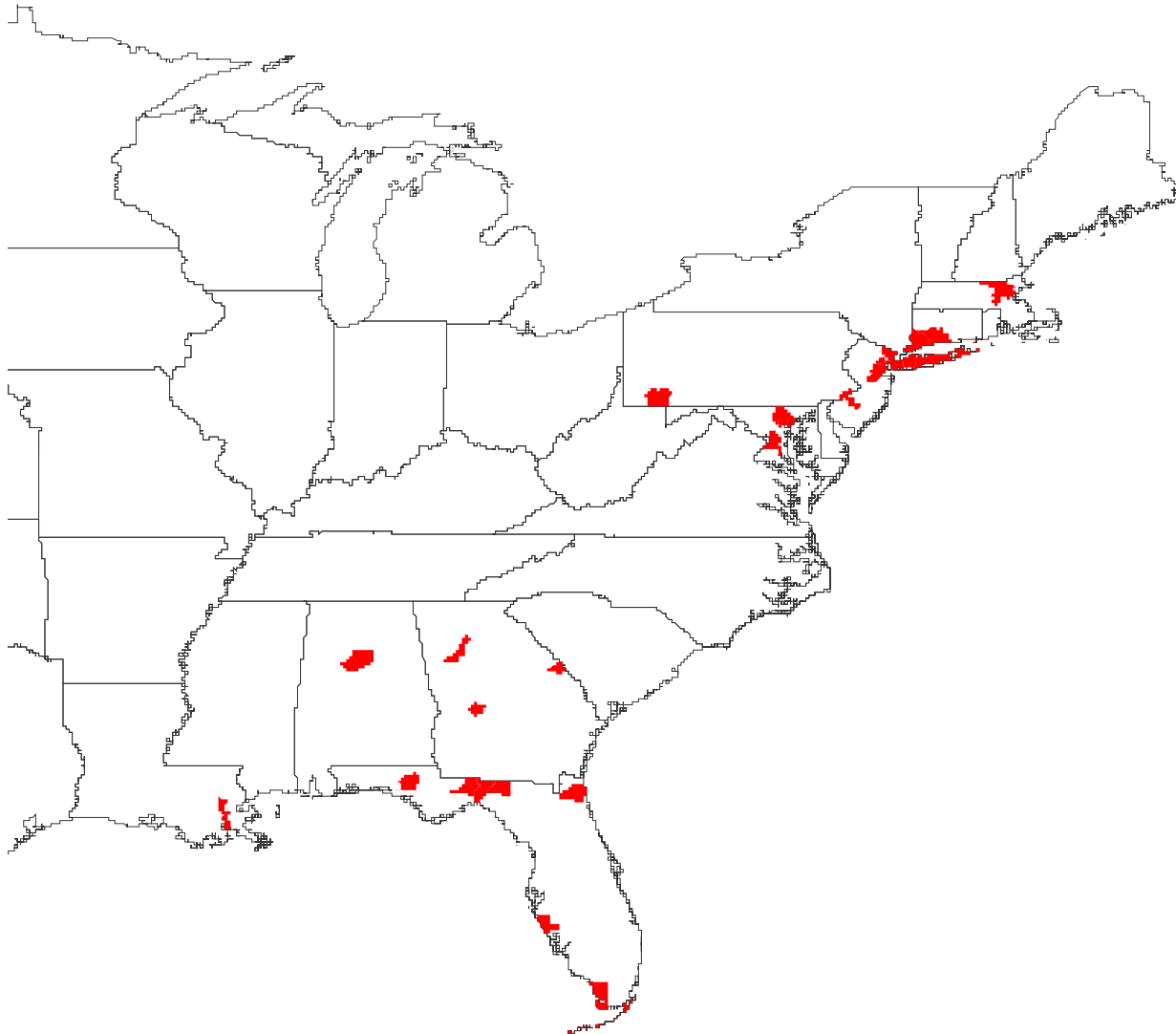
U.S. counties reporting **human** WNV illness  
**Jan - Jul 2001** (N = 5 counties)



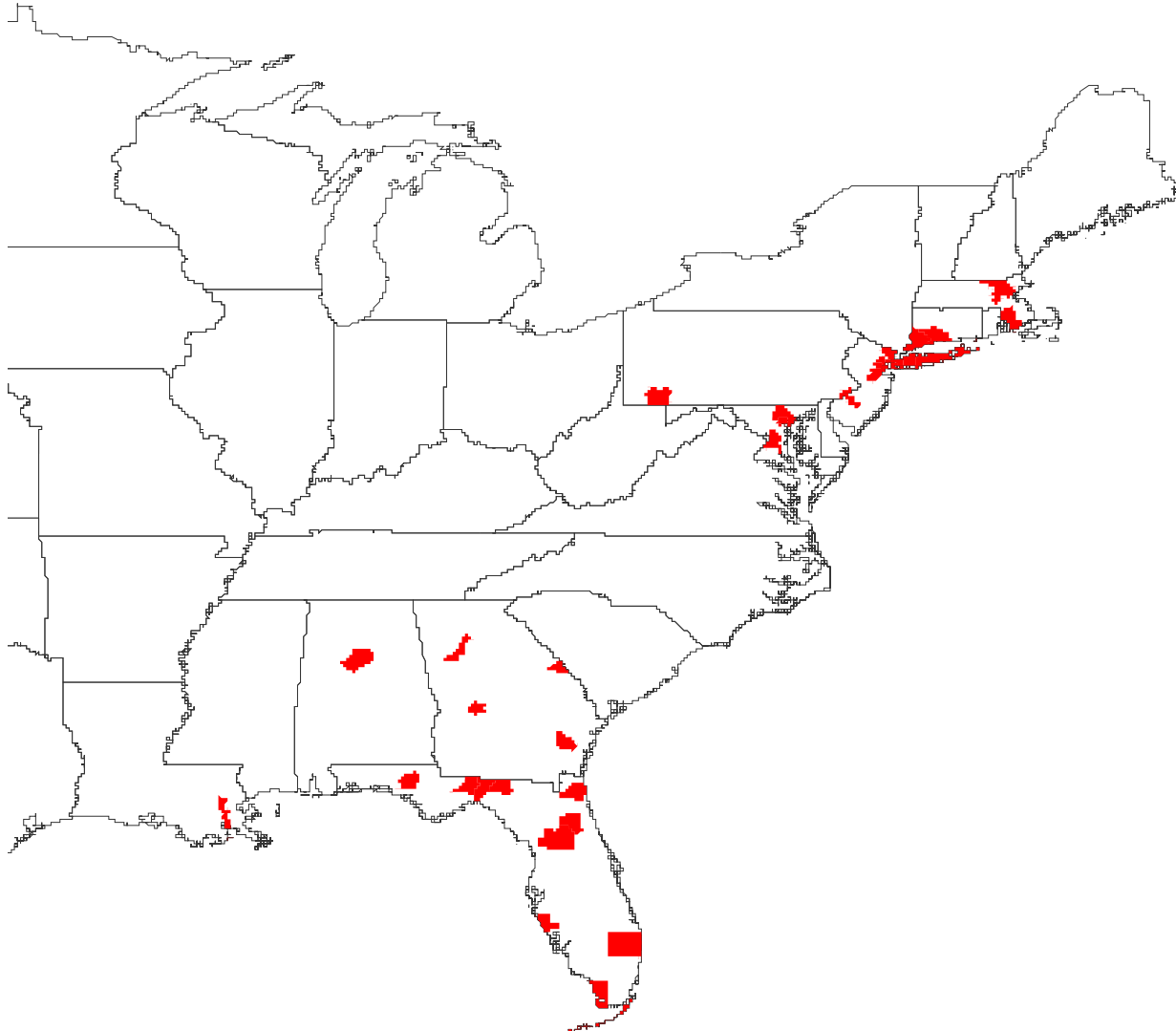
U.S. counties reporting **human** WNV illness  
**Jan - Aug 2001** (N = 22 counties)



U.S. counties reporting **human** WNV illness  
**Jan - Sep 2001** (N = 33 counties)

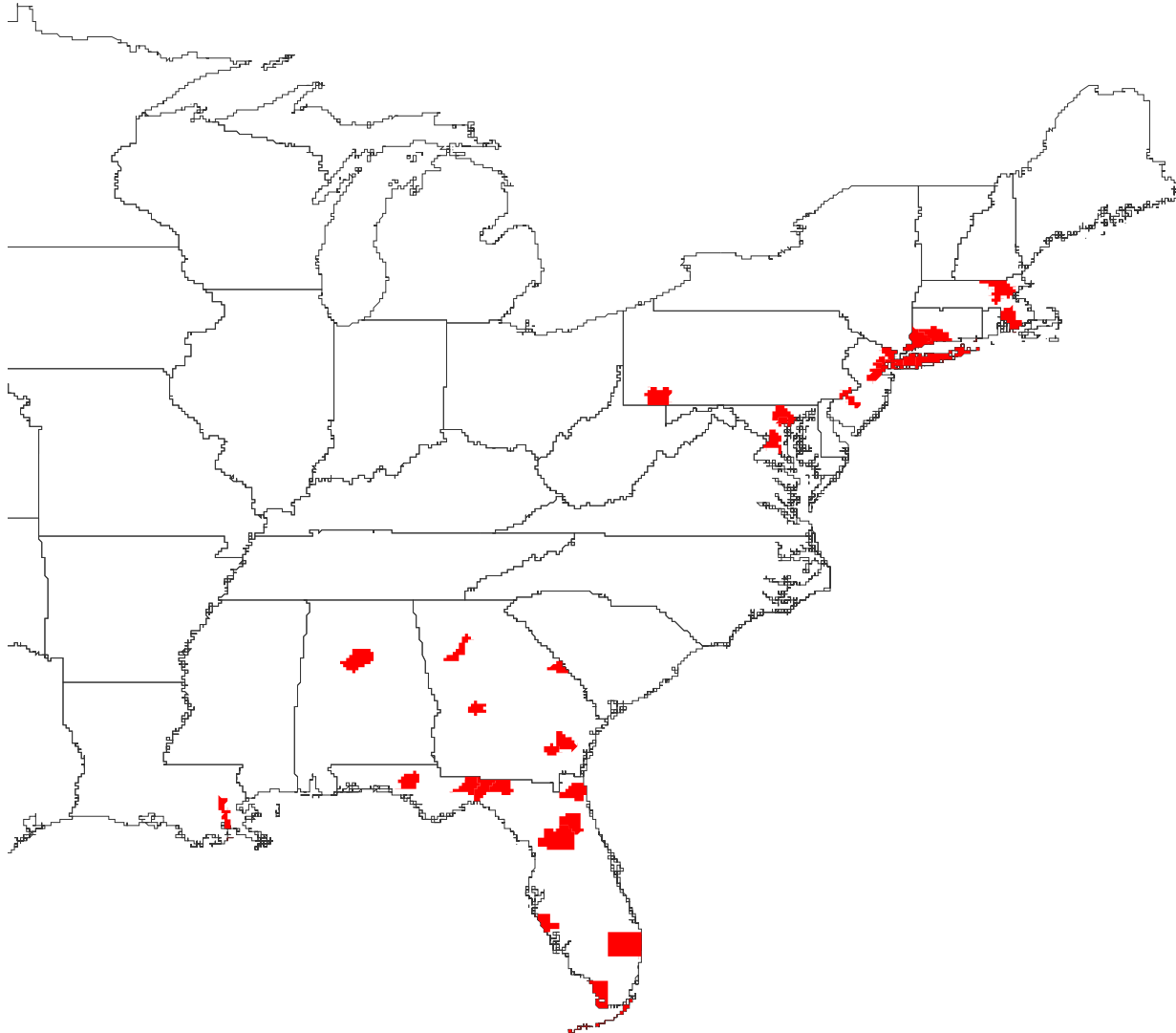


U.S. counties reporting **human** WNV illness  
**Jan - Oct 2001** (N = 38 counties)





U.S. counties reporting **human** WNV illness  
**Jan - Dec 2001** (N = 39 counties)



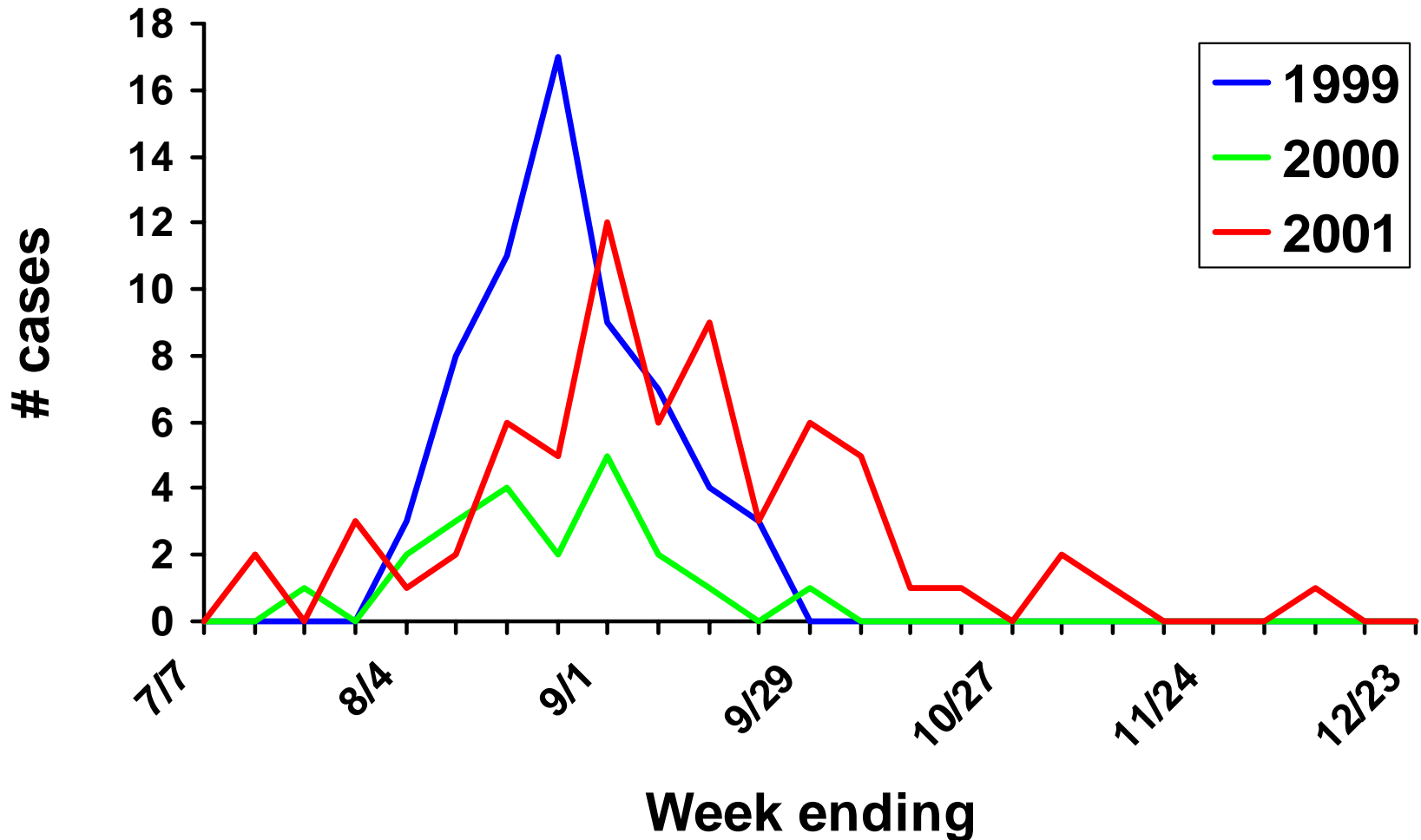
# Reported Human WNV Disease Cases, United States, 1999-2001\*

---

Year	Cases	States	Counties	Onset Dates
1999	62	1	6	2 AUG – 24 SEP
2000	21	3	10	20 JUL – 27 SEP
2001	66	10	39	13 JUL – 7 DEC

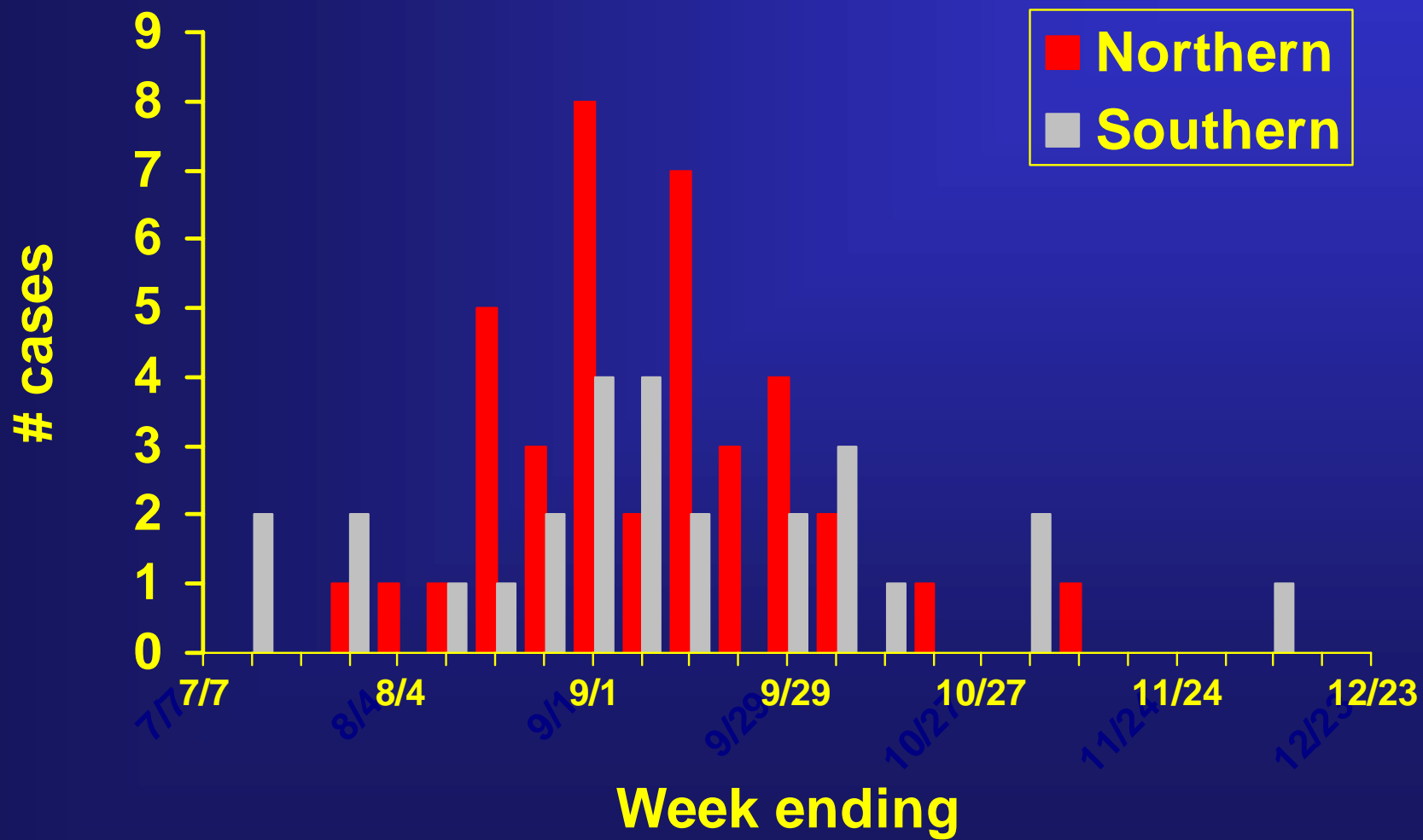
\* As of 3/13/2002

# Human WNV Disease Cases, by Week of Onset, United States, 1999-2001\*



\* As of 3/13/2002

# Human WNV Disease Cases, by Week of Illness Onset, "Northern" vs. "Southern" United States, 2001\*



\* As of 3/13/2002



# WNV Case-Patient Demographics & Mortality, United States, 1999-2001

	1999-2000	2001*
n	83	66
Age (yr)		
median	65	68
range	5 – 90	19 - 90
Males	54%	65%
CFR	11%	14%

\* As of 3/13/2002

# Summary of any WNV Activity, United States, 1999-2001\*

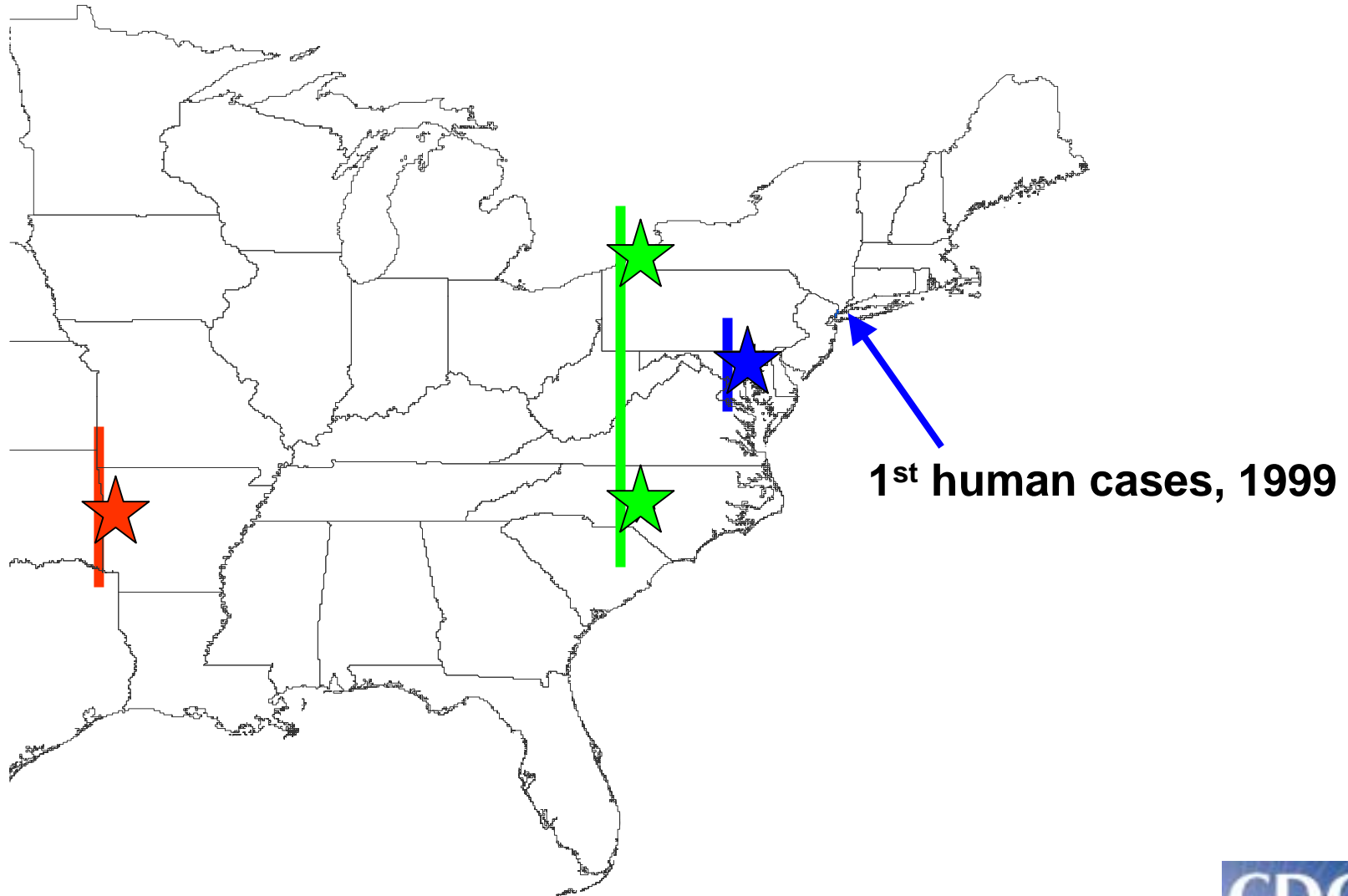
---

Year	States	Counties	Date Range
1999	5	28	9 AUG – 15 NOV
2000	13	145	6 FEB – 17 NOV
2001	28	358	8 APR – 26 DEC

\* As of 3/13/2002

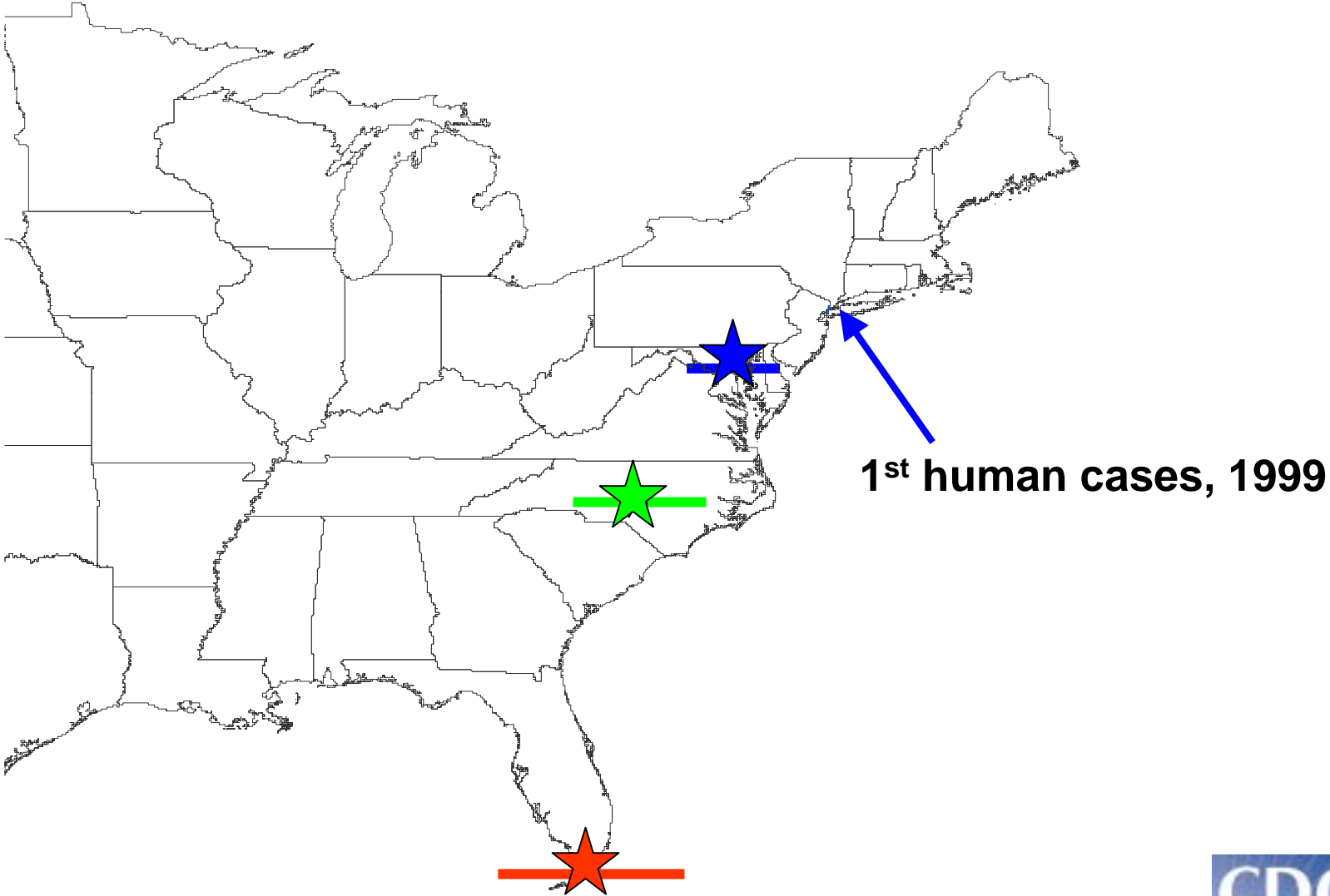
# Western-Most U.S. Counties Reporting WNV-Positive Bird

2001, 2000, 1999



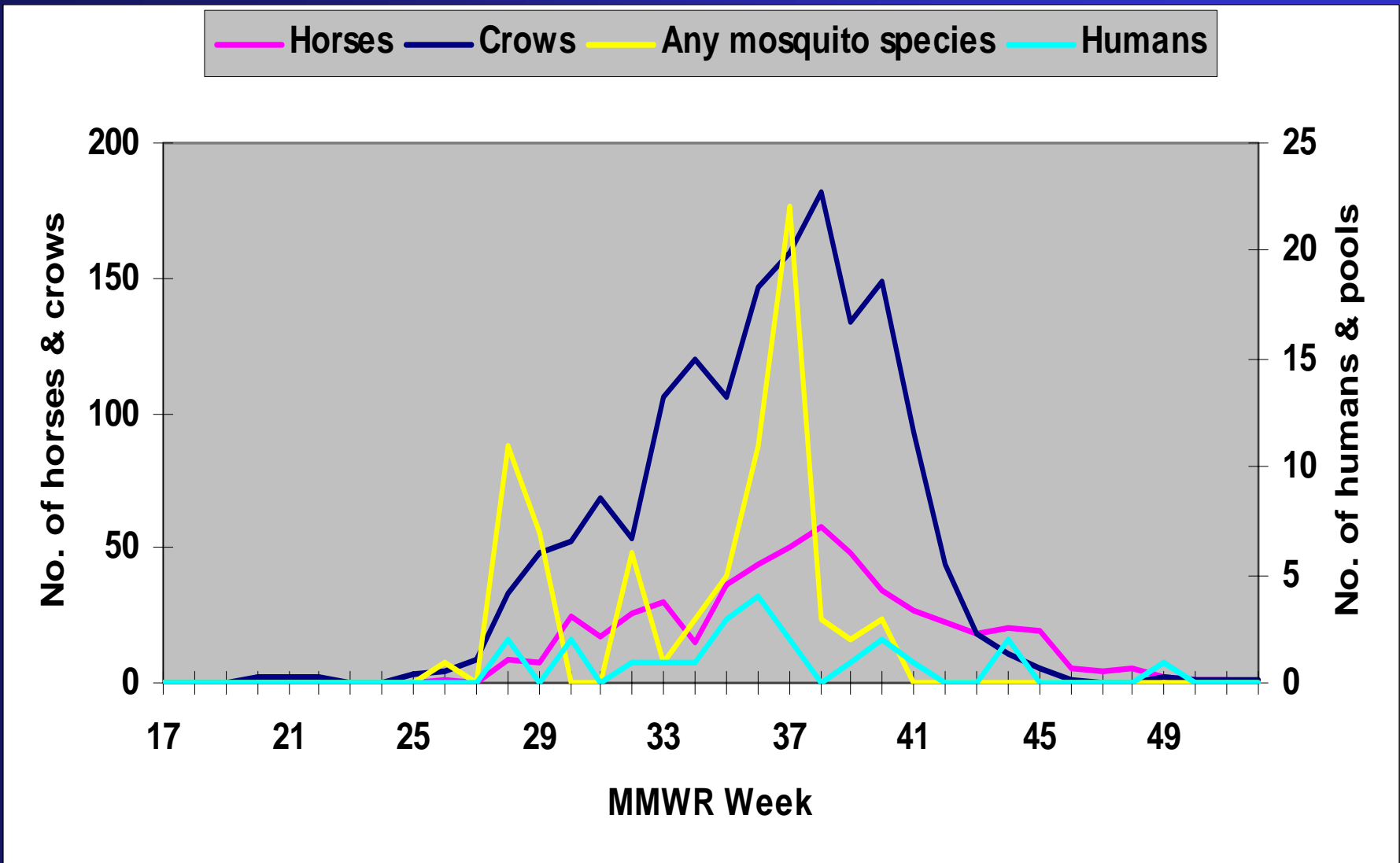
# Southern-Most U.S. Counties Reporting WNV-Positive Bird

2001, 2000, 1999



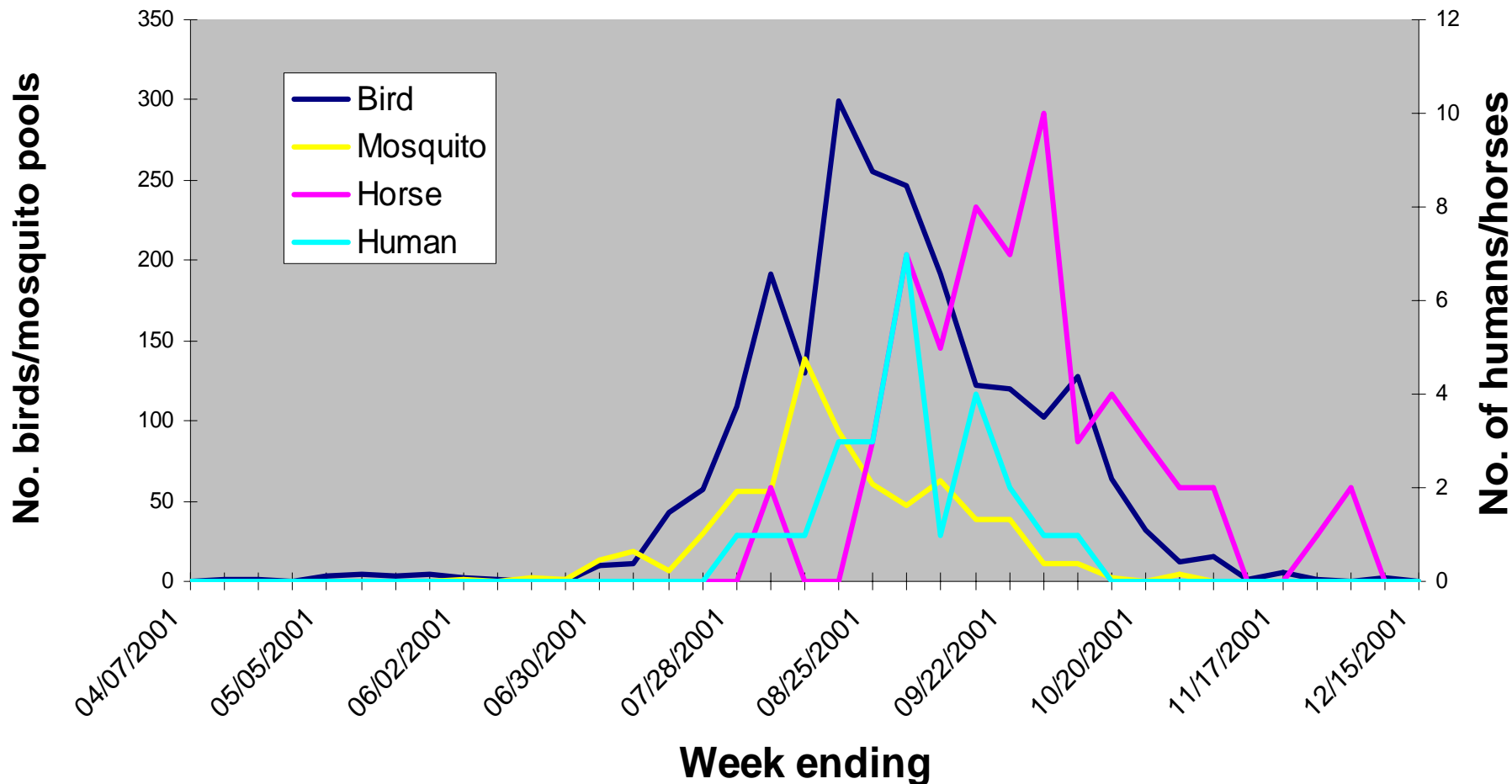


# WNV-Infected Crows, Horses, Mosquitoes, & Humans, South Atlantic Region, U.S., by MMWR Week, 2001\*



\* As of 3/13/2002

## No. of WNV-infected birds, mosquito pools, horses, & humans by week of collection/illness onset, Mid-Atlantic region, 2001



# Lead Time from WNV Surveillance Event to 1<sup>st</sup> Human Case, 39 Counties, United States, 2001\*

“1st positive” before 1st human

	Bird	Horse	Mosquito	Epidemic Vector
<b>Counties</b>	36	11	22	10
<b>Mean (days)</b>	51	34	36	26
<b>Median (days)</b>	50	28	34	25
<b>Range (days)</b>	1 - 118	3 - 85	12-76	6 - 71

\* As of 3/13/2002

# **National WNV Surveillance, 2001: *Conclusions***

---

- **Dramatic southward & westward expansion since 1999**
- **Two major transmission foci in 2001: northeast & southeast**
- **WNV probably entered Florida/Georgia in 2000**
- **Major equine epizootic in 2001, especially in South Atlantic region**
- **Only sporadic human cases despite intense epizootic in some areas**
- **Prolonged transmission season observed**
- **Bird and crow surveillance remain effective**

# Canada:

## Summary of WNV Surveillance, 2001\*

---

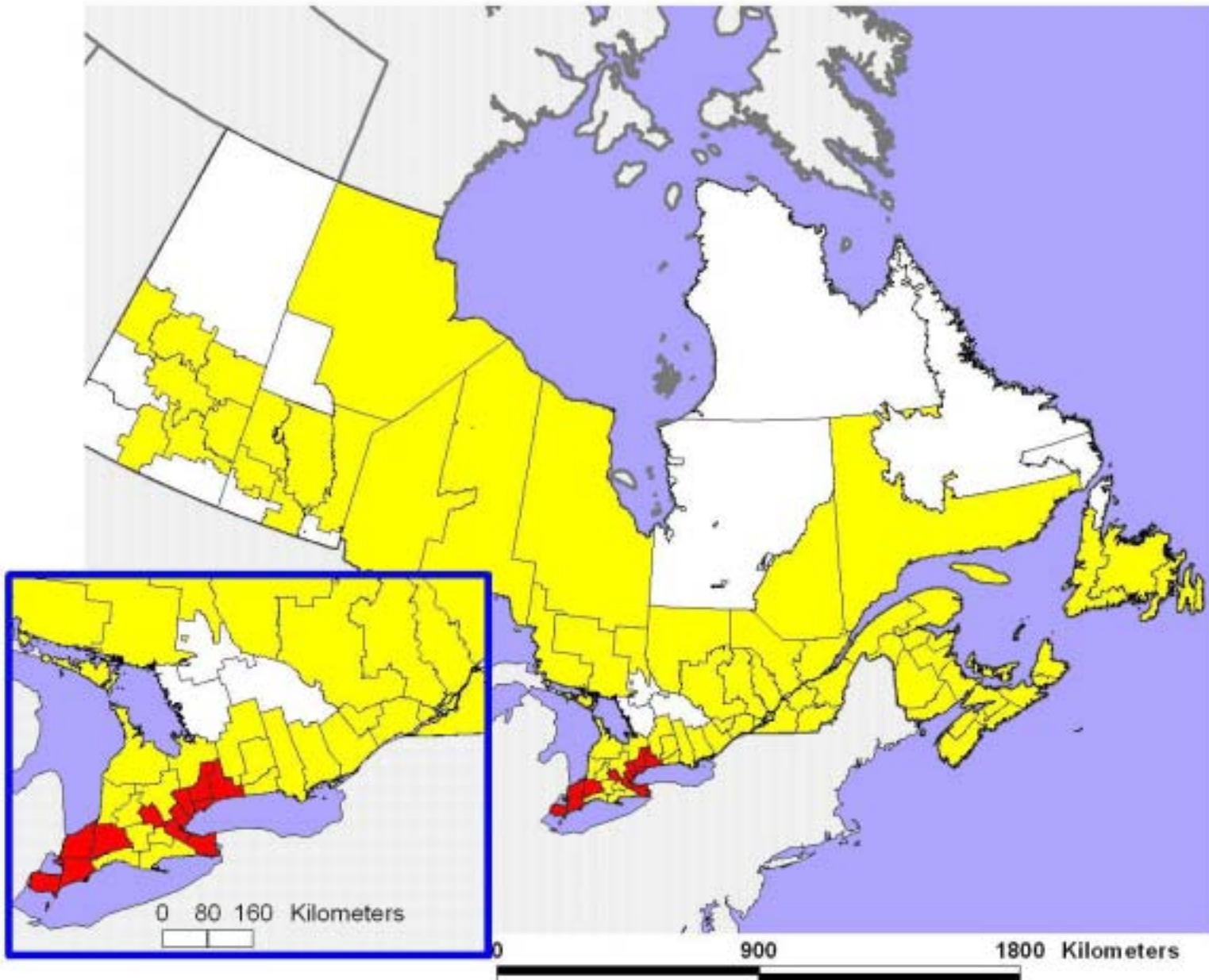
- **Birds collected / tested in 7 provinces (PEI to Saskatchewan)**
- **WNV-positives detected in S.E. Ontario (Windsor, London, & Toronto)**
- **Of 2,592 birds tested, 121 (5%) WNV-positive**
  - **American crow -- 100/1449 (7%)**
  - **Bluejay -- 21/1056 (2%)**
  - **Common raven -- 0/61**
  - **Black-billed magpie -- 0/14**
  - **Other species -- 0/12**
- **No human disease reported**



Health  
Canada

Santé  
Canada

# Dead Birds Submitted for West Nile Virus Diagnosis by Health Region in Canada as of October 31, 2001.



# *Acknowledgements*

- **ArboNET: Scores of partners in state and local health departments**
- **DVBID/CDC:**
  - Jennifer Lehman
  - Aaron Kipp
  - Veronica Elko
  - Kimlea Medlin
  - Dan O'Leary
  - John Jones
  - Roger Nasci
  - Chet Moore
  - Kathleen Julian
  - Mike Bunning
  - Steve Hinten

