

WNV Avian Surveillance and Its Use in Predicting Human Risk

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- USGS Colleagues
 - Susan Price, Lesley Milheim, Dave Norman, Lee De Cola, Bob McLean

WNV National Surveillance Program



Surveillance Mapping on the Web

Florida West Nile Virus Map - Microsoft Internet Explorer

Address: http://cindi.usgs.gov/hazard/event/west_nile/florida/04.html




West Nile Virus - Florida
Cumulative Bird Map



USGS CINDI CDC


West Nile Virus Map - Microsoft Internet Explorer

Address: http://cindi.usgs.gov/hazard/event/west_nile/west_nile.html



CINDI Center for Integration of Natural Disaster Information

West Nile Virus Maps - 2001



[Background](#)
[Links](#)
[Year 2000 Cumulative Reports](#)
[2001 Surveillance Activity](#)

National and State Maps

Note: These maps reflect information that has been submitted and verified to CDC through the last week of December, 2001

Bird	Human	Mosquito	Sentinel	Veterinary
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Background

Since the 1930s, West Nile virus (WNV) has been commonly reported to cause asymptomatic infection and fevers in humans in Africa, West Asia, and the Middle East. But, human and animals infection had never been documented in the Western Hemisphere until 1999. In 1999 and 2000,

USGS CINDI CDC

Geographic Spread of WNV

USGS

CDC

1999



West Nile Virus Activity Reported to Centers for Disease Control and Prevention and Verified (03/15/02)

This map shows all counties in the United States that reported West Nile virus activity in 1999 and 2000, as well as current 2001 status. This surveillance includes positive test results from humans, horses, wild birds, sentinel chickens, or mosquitoes.

2000

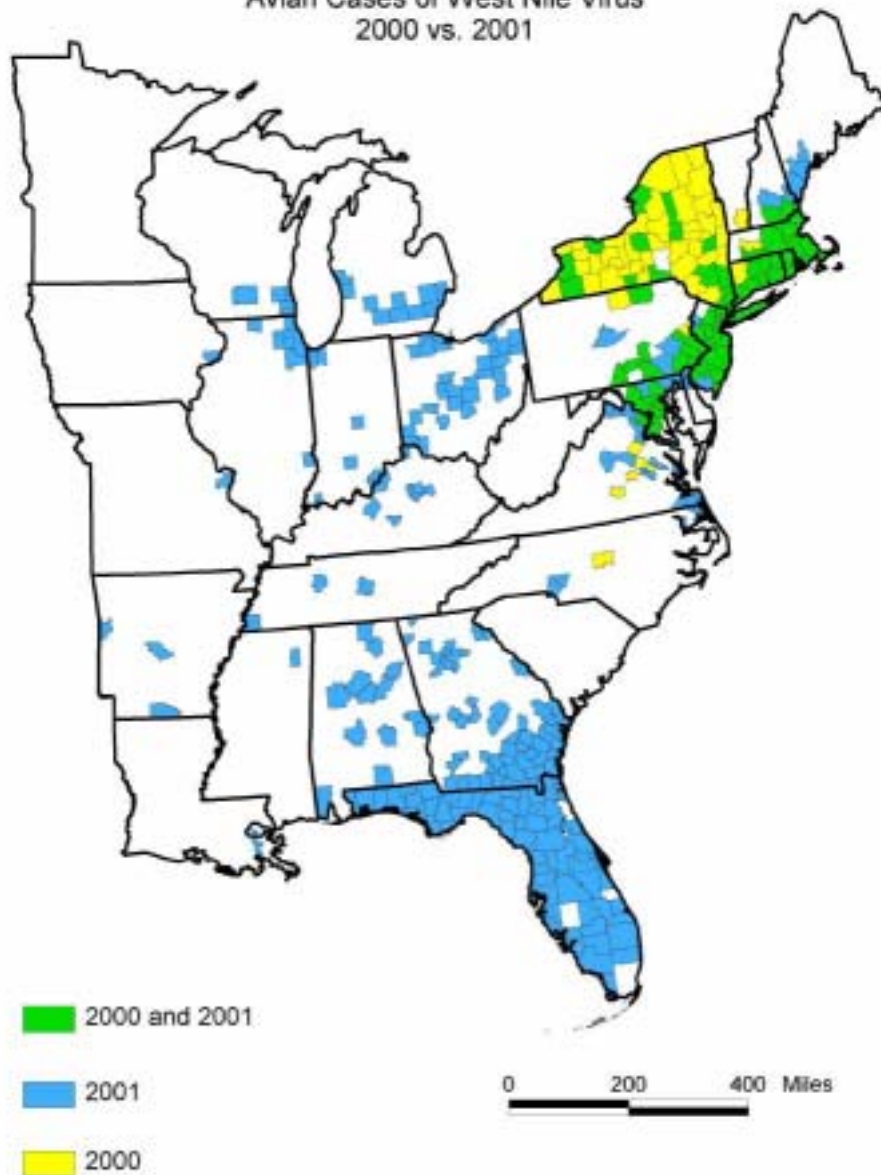


2001 (to date*)



West Nile Virus Activity 1999 - 2001

Avian Cases of West Nile Virus
2000 vs. 2001



Avian Flyways - Pathways of West Nile Virus?



2000

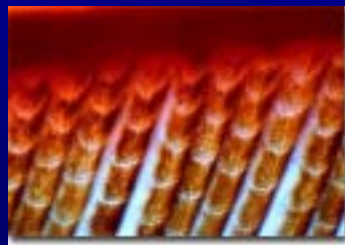


Wild Bird & Mosquito Surveillance Along the Atlantic Flyway



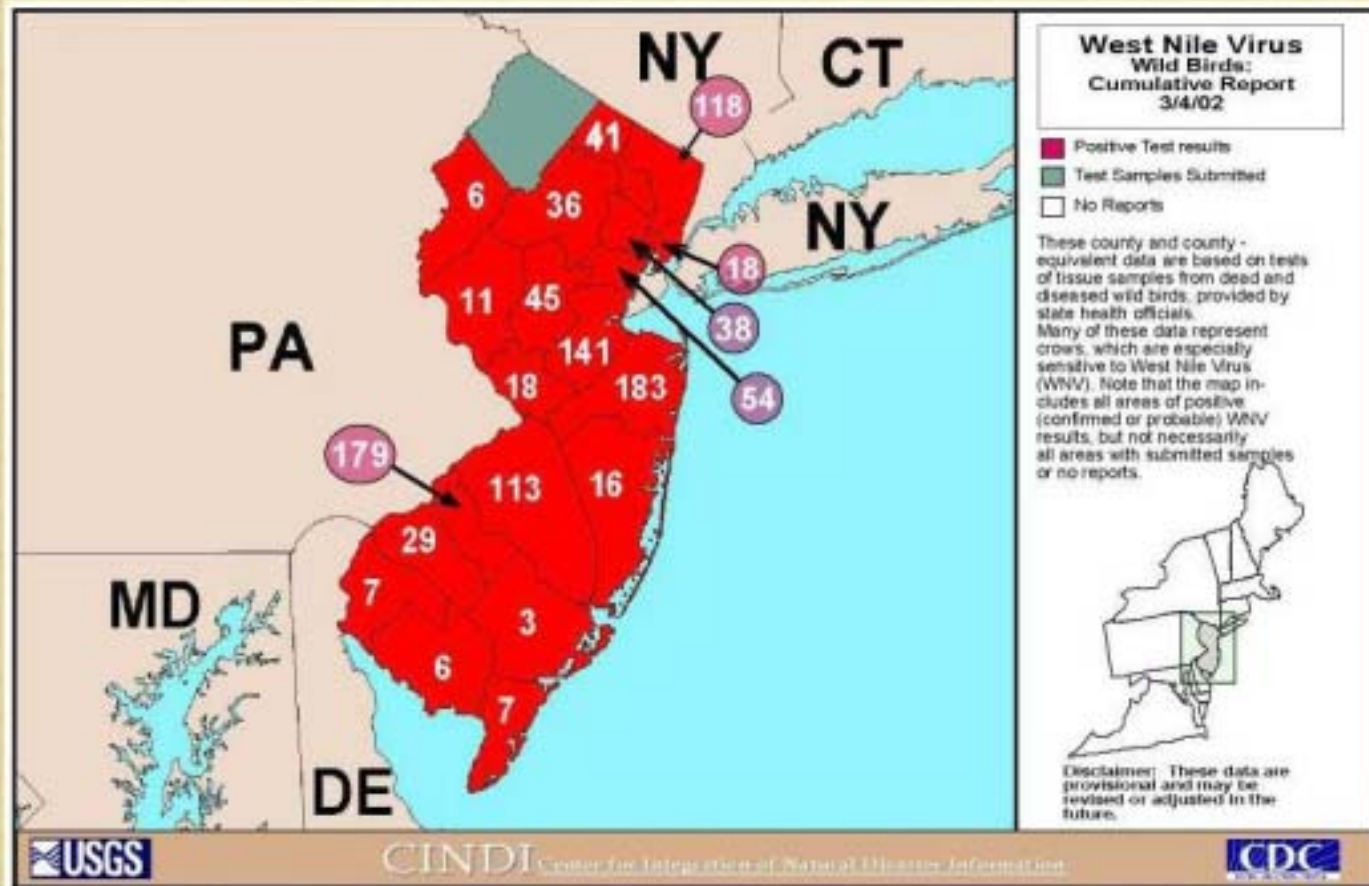
WNV Investigations

- Which bird species are the primary carriers?
- Are mosquitoes spreading virus at stopovers along the Flyway(s)?
- Where are the breeding sites of the suspect birds?
- Can we model (predict) occurrence and spread of WNV?



Avian Surveillance Data for New Jersey

West Nile Virus - New Jersey
Cumulative Bird Map



New Jersey Avian Deaths 2001 Aggregated by Square Kilometer

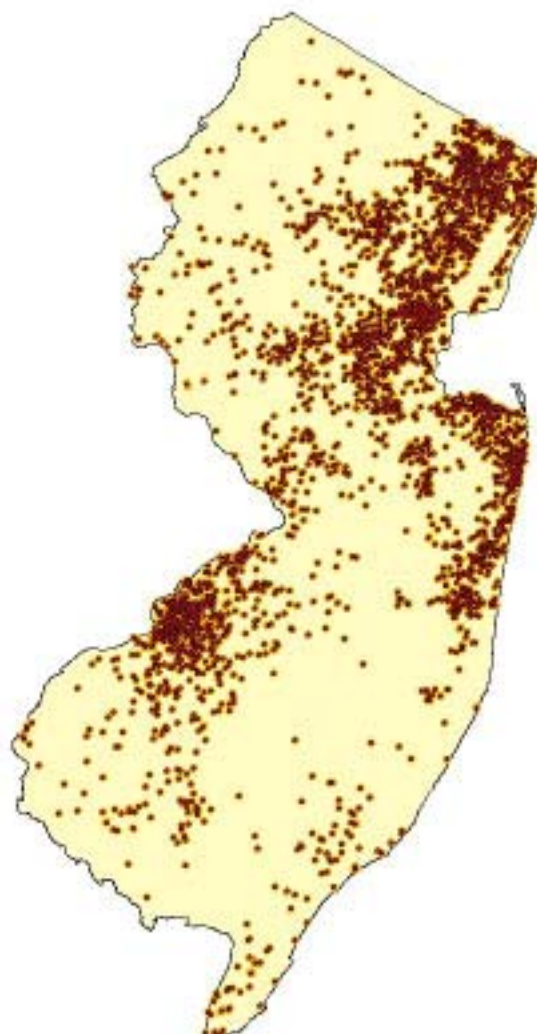
NJ and Avian Deaths

● Avian deaths

■ New Jersey

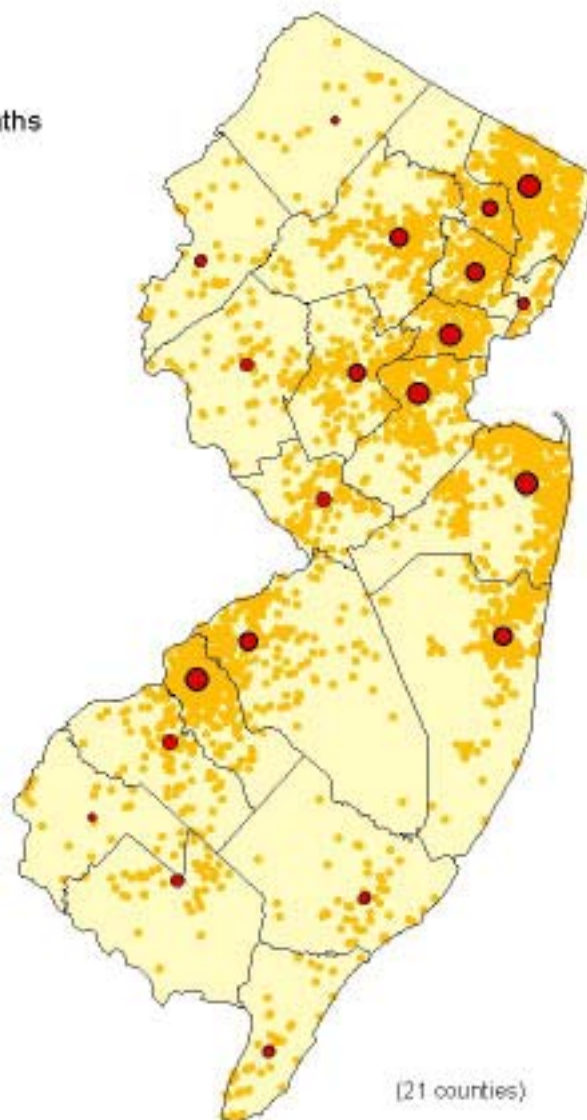
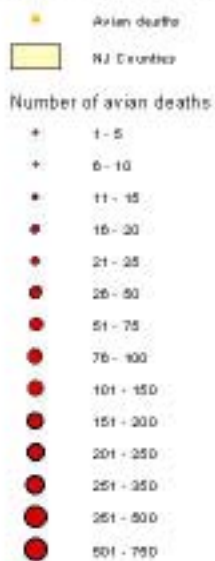
Number of avian deaths:

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 350
- 350 - 500



New Jersey Avian Deaths 2001 Aggregated by County

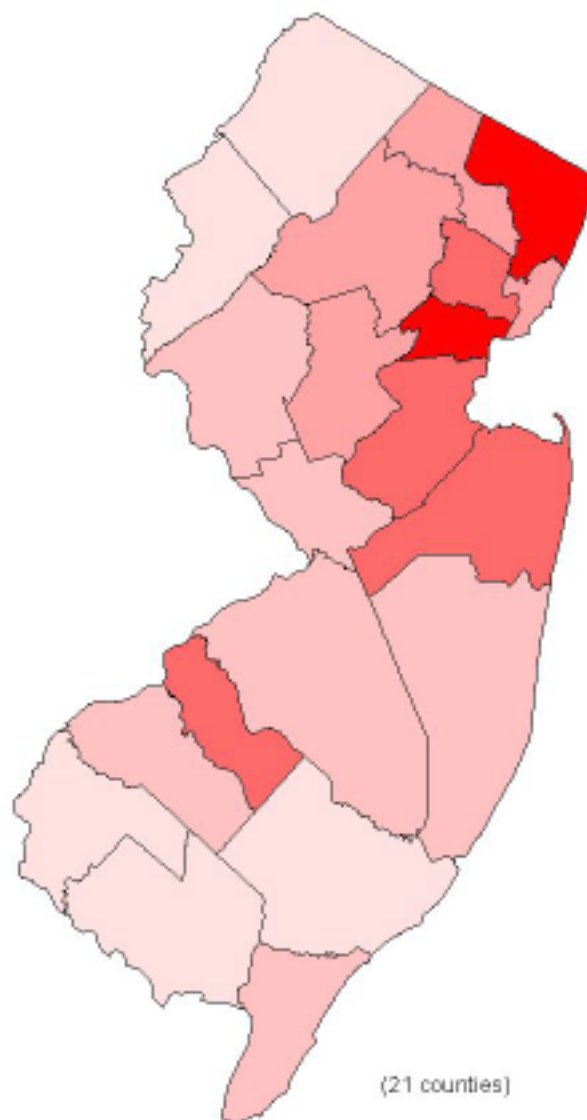
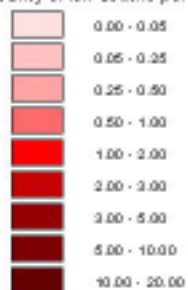
NJ Counties and Avian Deaths



(21 counties)

New Jersey Avian Deaths 2001 Density - Aggregated by County

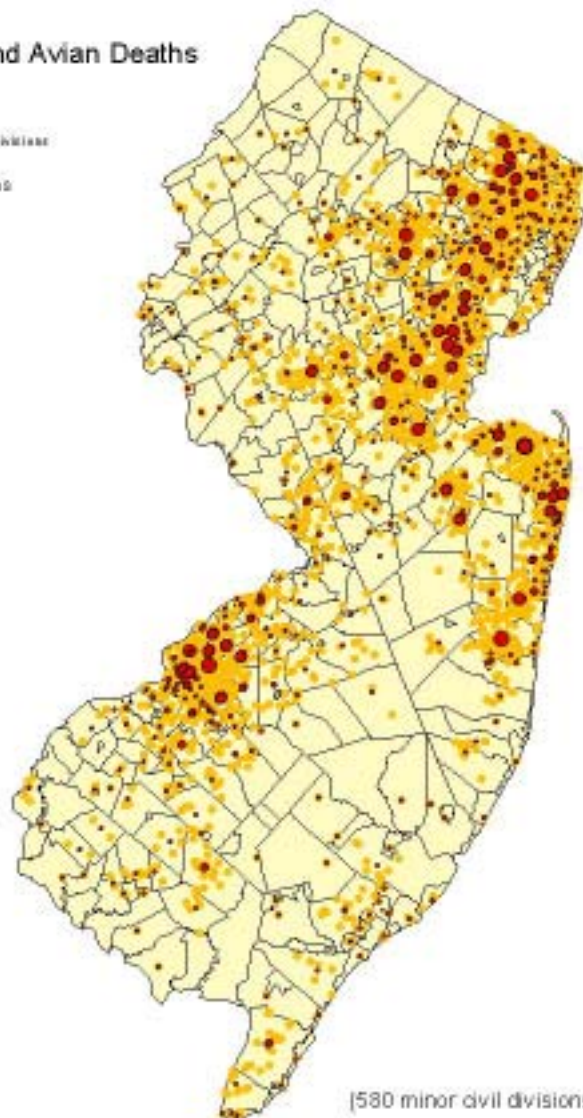
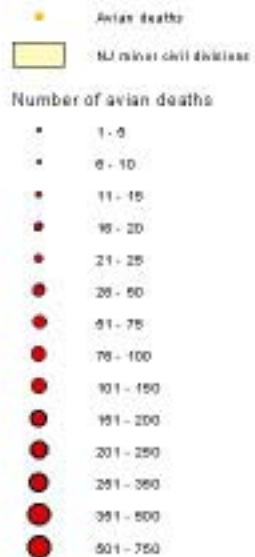
NJ County avian deaths per sq km



(21 counties)

New Jersey Avian Deaths 2001 Aggregated by Minor Civil Division

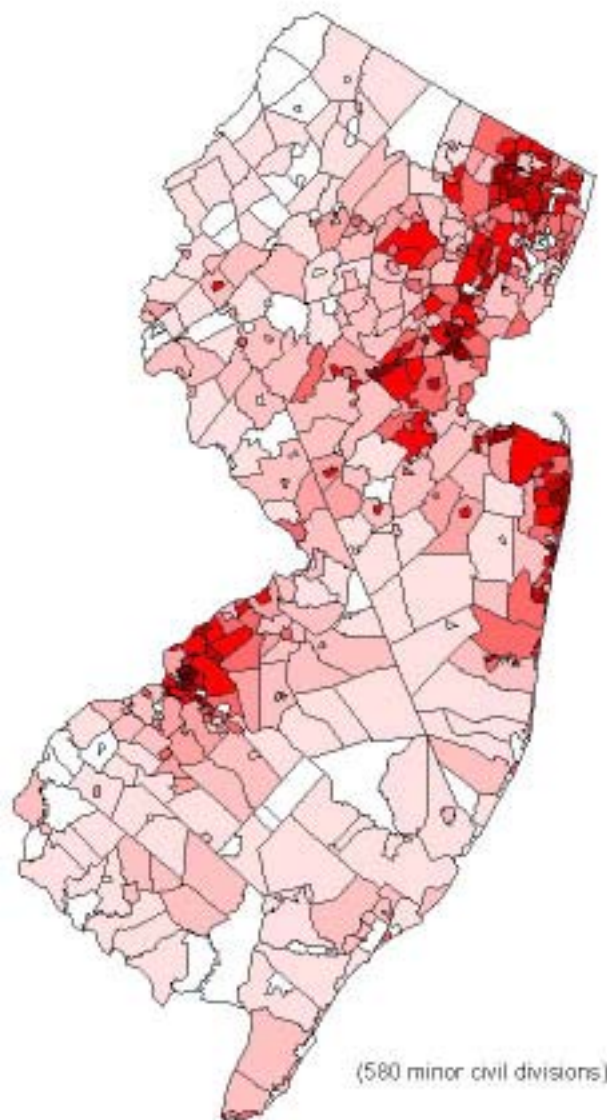
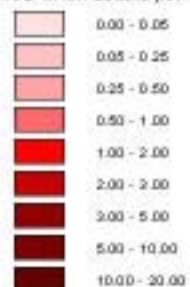
NJ Minor Civil Divisions and Avian Deaths



(580 minor civil divisions)

New Jersey Avian deaths 2001
Density - Aggregated by Minor Civil Division

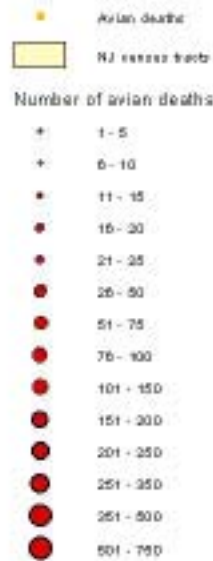
NJ MCD avian deaths per sq km



(580 minor civil divisions)

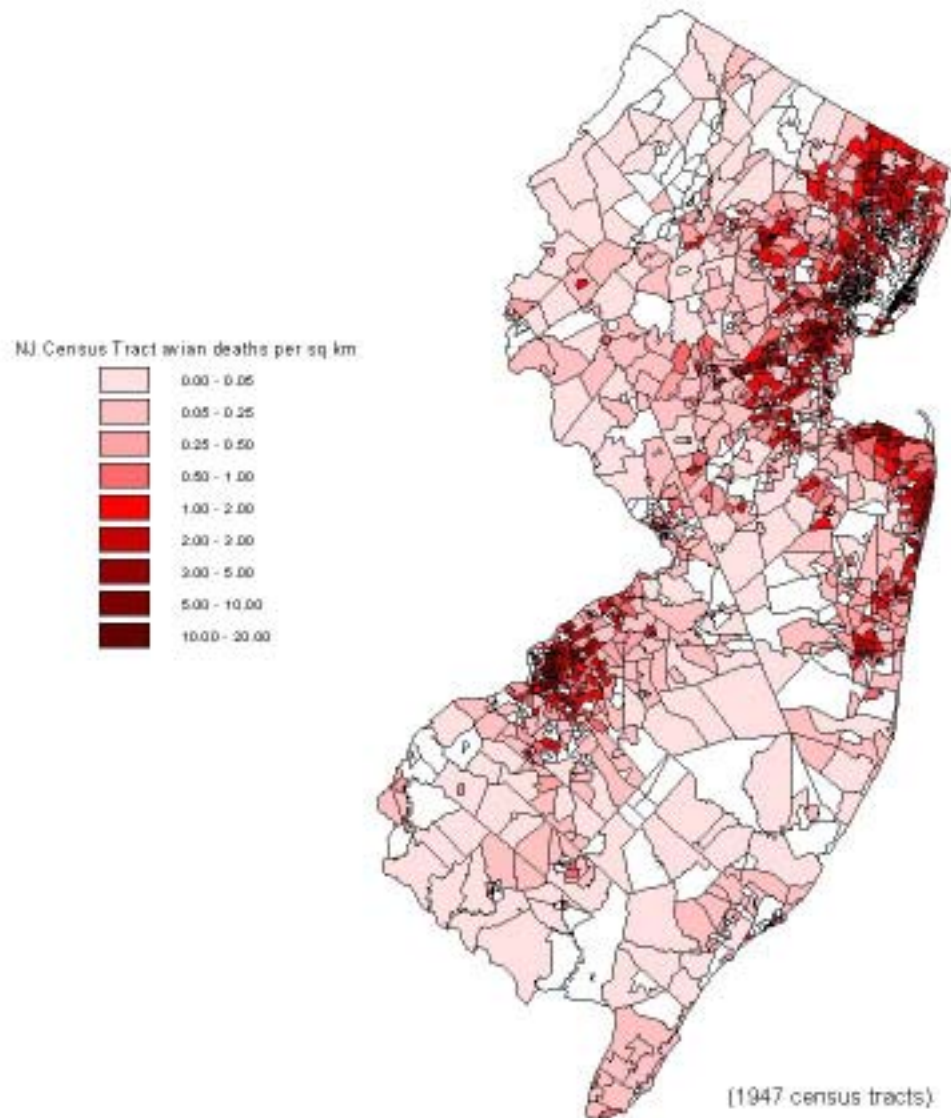
New Jersey Avian Deaths 2001 Aggregated by Census Tract

NJ Census Tracts and Avian Deaths

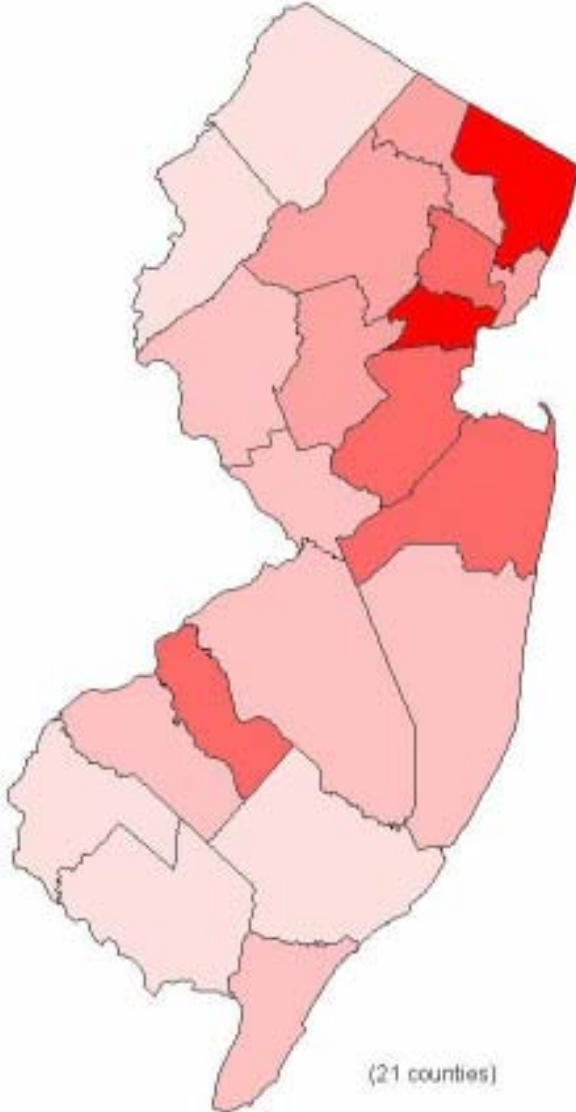
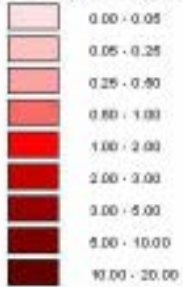


(1947 census tracts)

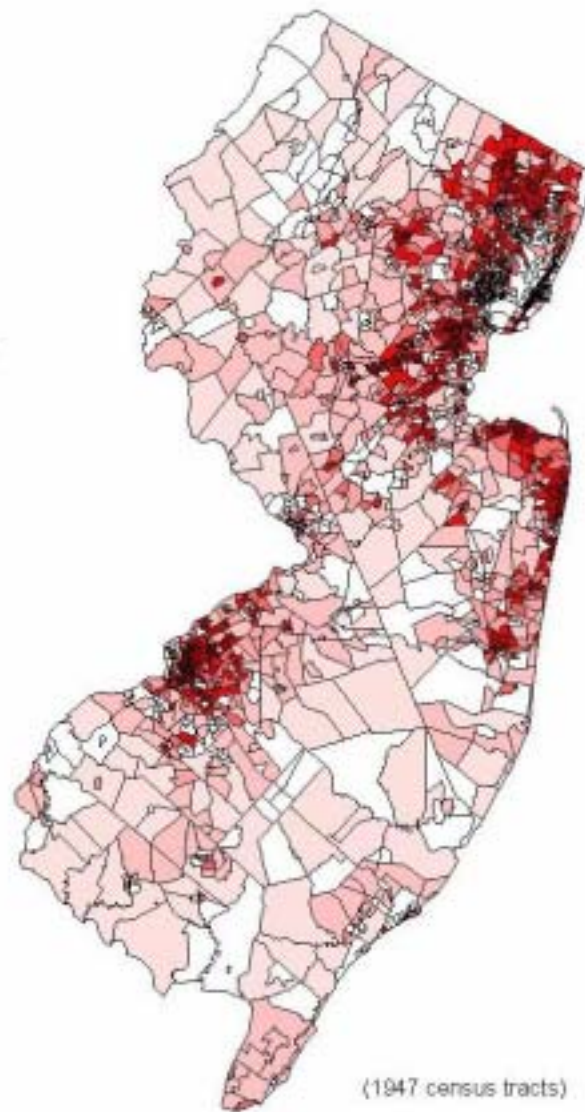
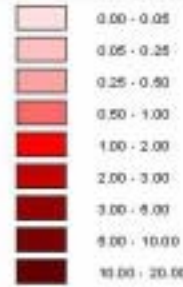
New Jersey Avian Deaths 2001 Density - Aggregated by Census Tract



NJ County avian deaths per sq km



Census Tract avian deaths per sq km



New Jersey Avian Deaths in 2001

Aggregated by County

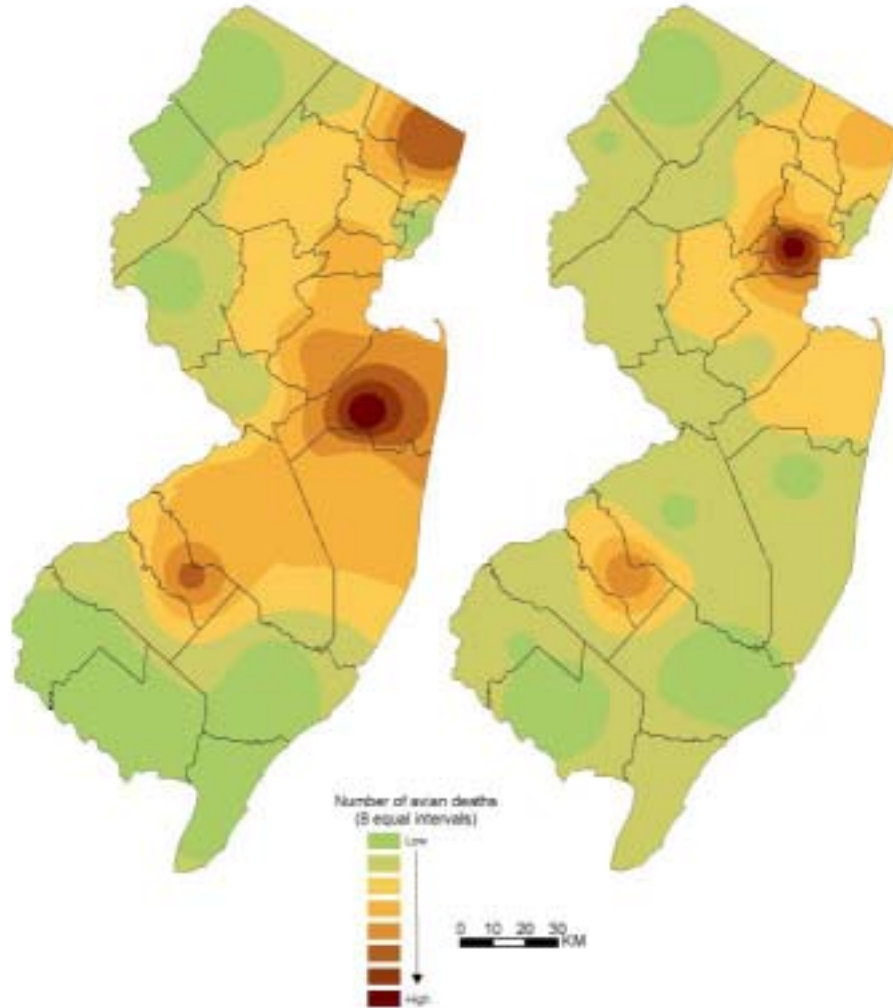
Aggregated by County
Normalized by
Area and Human Population



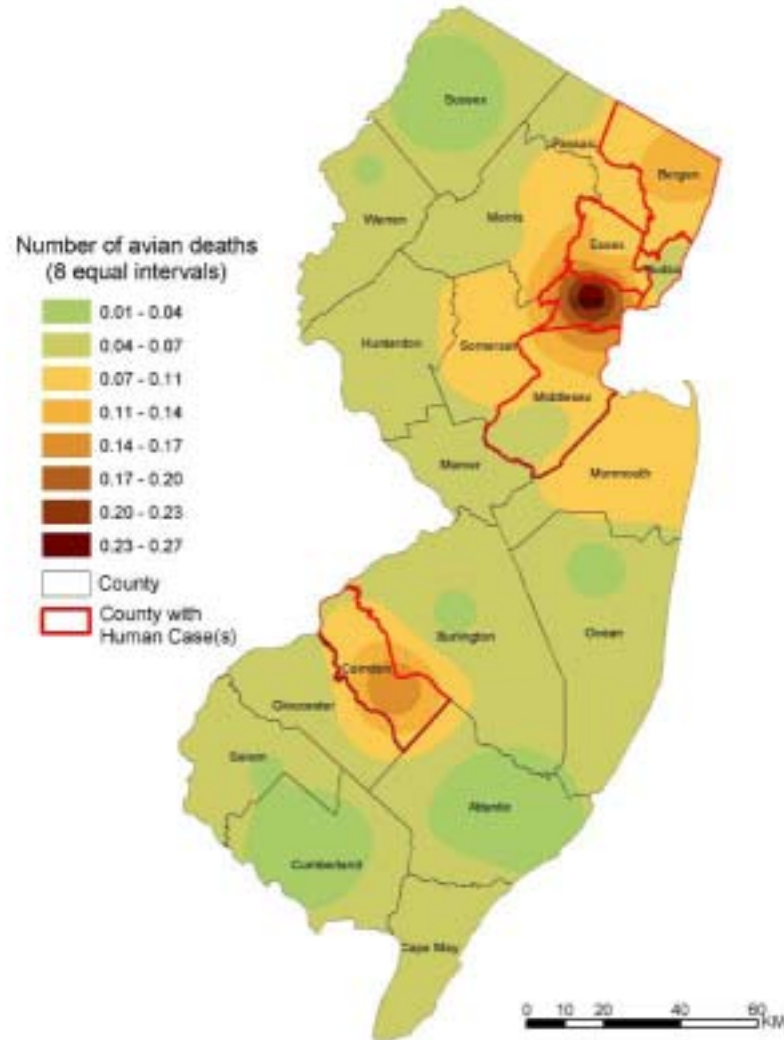
New Jersey Avian Deaths in 2001

Aggregated by County

Aggregated by County
Normalized by
Area and Human Population



New Jersey Avian Deaths in 2001
Aggregated by County
Normalized by Area and Human Population

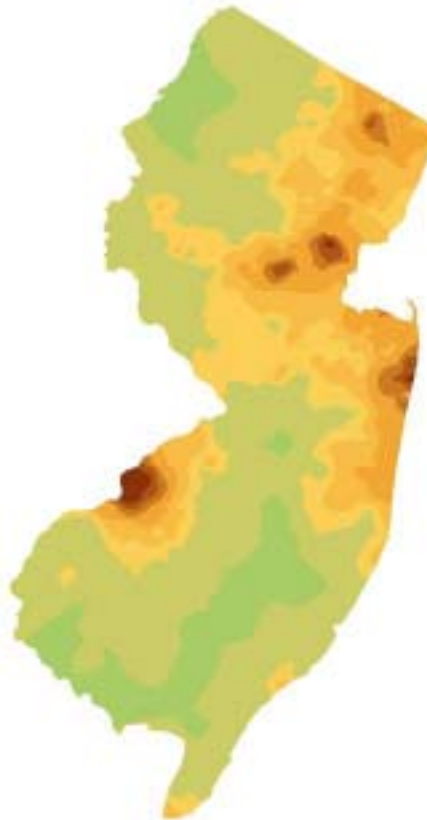


New Jersey Avian Deaths 2001
Surfaces Created from Three Geographies

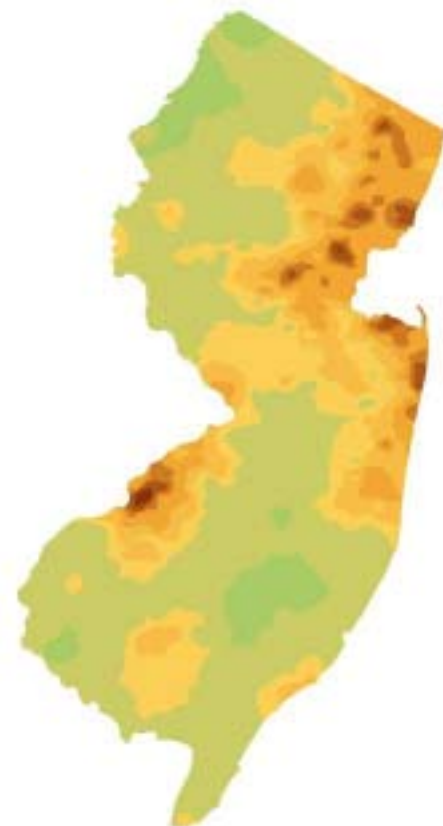
County



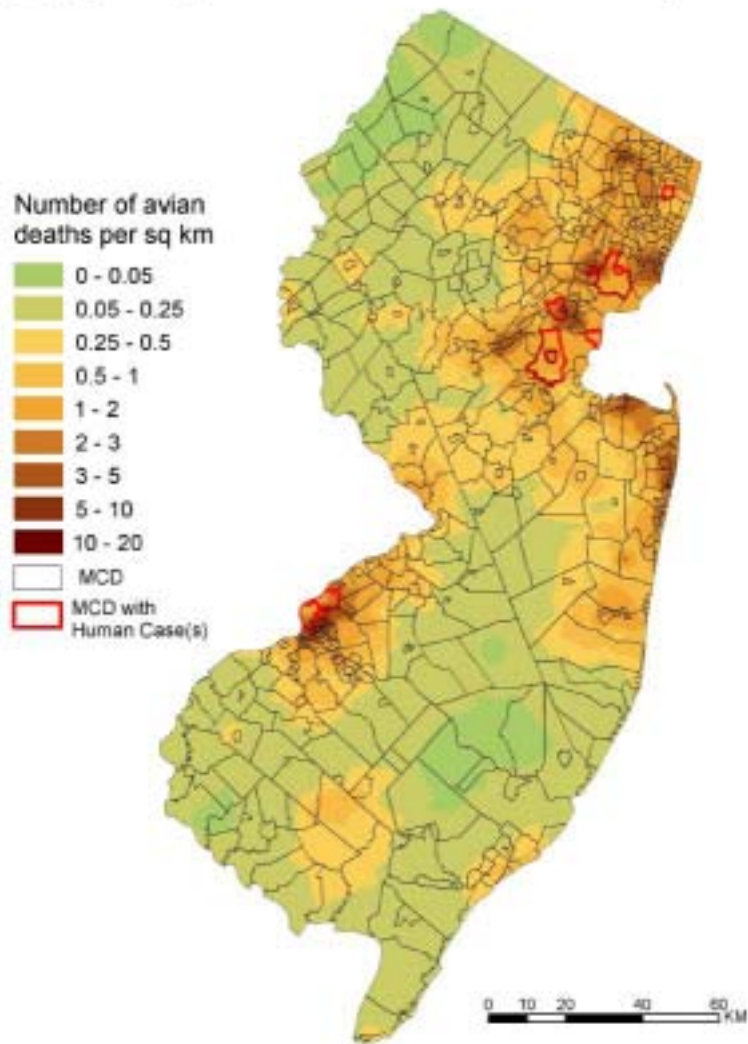
Minor Civil Division



Census Tract



New Jersey Avian Deaths 2001
Aggregated by Census Tract and Normalized by Area



Conclusions

- WNV has spread farther and faster than expected.
- Dynamics of the occurrence and movement of WNV are not well understood.
- More precise geographic locations of WNV birds enables better characterization of WNV activity.

