

(We don't yet know much about)

WNV Impacts on Wildlife

Carolee Caffrey

Audubon Science

www.audubon.org/bird/wnv

Number of species found positive in the United States since 1999

Birds	208
Mammals	29

USGS NWHC/CDC WNV Surveillance Efforts

Number of species found positive in the United States since 1999

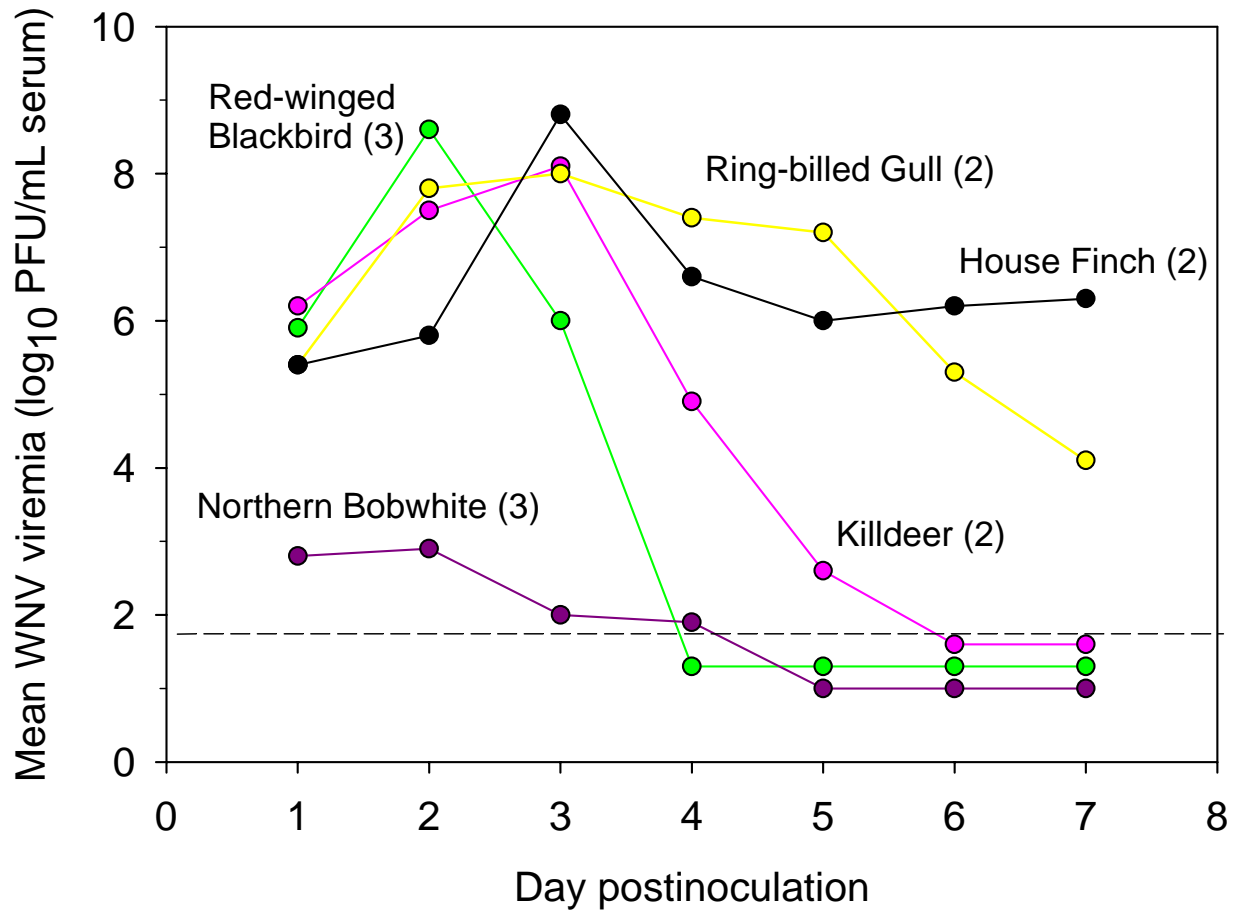
Birds	208
NA residents	155
Mammals	29
NA residents	21

WNV thought to underlie the deaths of more than 2000 farmed alligators in FL, GA, and LA from 2001-2003

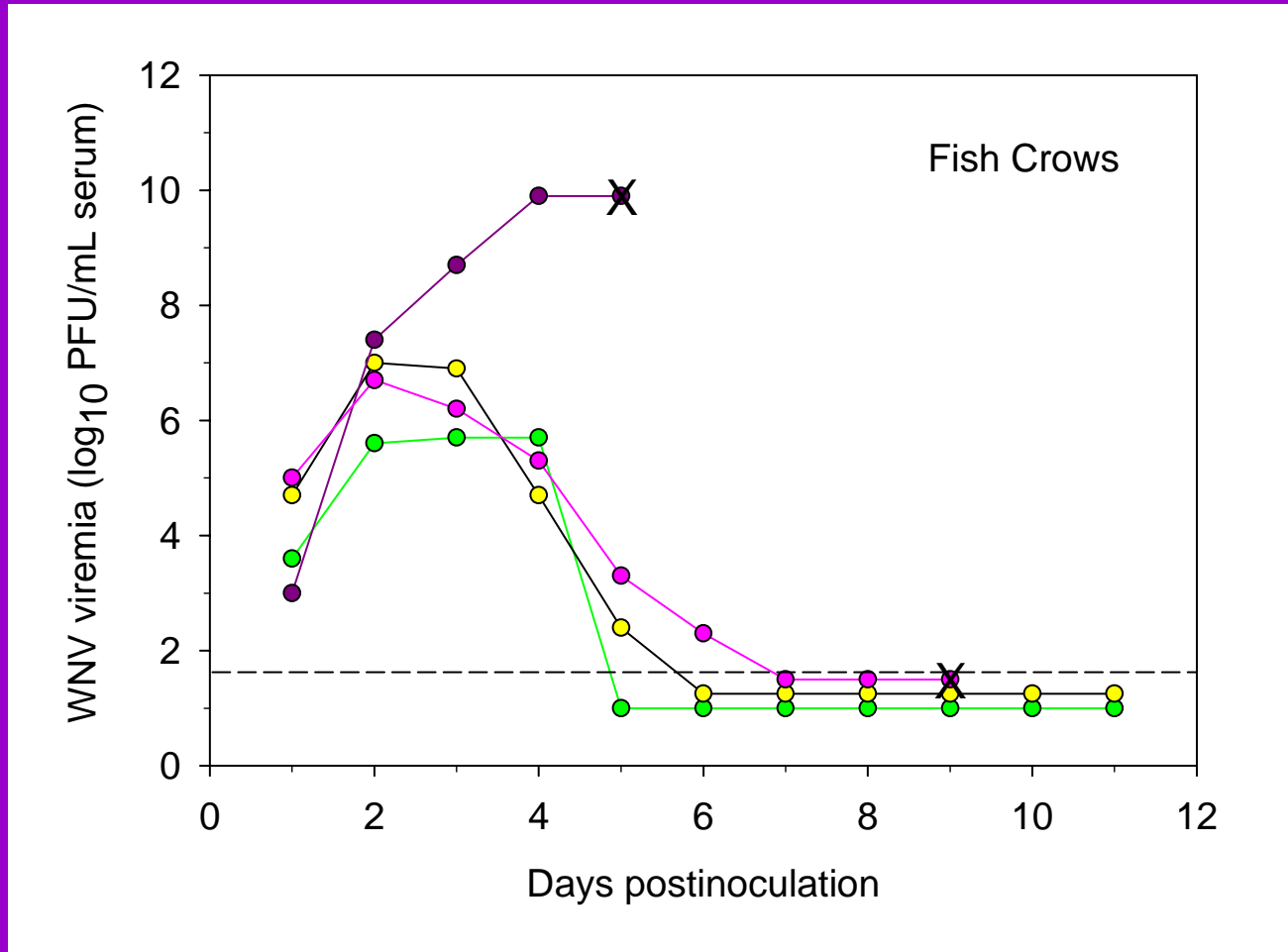
Miller, DL, et al. 2003. EID 9(7): 794-799.
ProMED-mail. 2003; November 20: 20031120.2881.

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Komar, N, et al. 2003. EID 9(3): 311-322.



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potential sources of information

- dead birds reported to authorities
- prevalence of infection in recovered carcasses
- rehab data
- citizen science monitoring programs
- field studies of marked birds

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From 1999-2002,
>57,000 dead crows
were reported to authorities

CDC MMWR. 2002. 51(23): 497-501.

CDC MMWR. 2002. 51(50): 1129-1133.

Eidson, M, et al. 2001. EID 7(4): 615-620.

Marfin, AA, et al. 2001. EID 7(4): 730-735.

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New York State, 1999-2002 highest prevalences of WNV in recovered carcasses

Fish Crows (116) = 34%

Merlins (15) = 33%

Blue Jays (1,284) = 29%

Kestrels (33) = 33%

House Finches (80) = 50%

Great Horned Owls
(63) = 14%

American Crows (5,950) = 44% overall; 0 during
winter months, 78% in September

Kentucky, summer and fall 2002 highest prevalences of WNV in recovered carcasses ($n \geq 10$)

Amer Crows (110) = 87%

E. Bluebirds (21) = 86%

Blue Jays (219) = 80%

N. Cardinals (58) = 59%

House Finches (80) = 50%

Amer Goldfinches (14) = 43%

Cmn. Grackles (124) = 34%

Amer Robins (198) = 28%

Swain. Thrushes (12) = 25%

N. Mockingbirds (14) = 21%

Kentucky, summer and fall 2002 highest prevalences of WNV in recovered raptor carcasses

Red-shouldered Hawks (4) = 100%

American Kestrels (6) = 86%

Red-tailed Hawks (7) = 71%

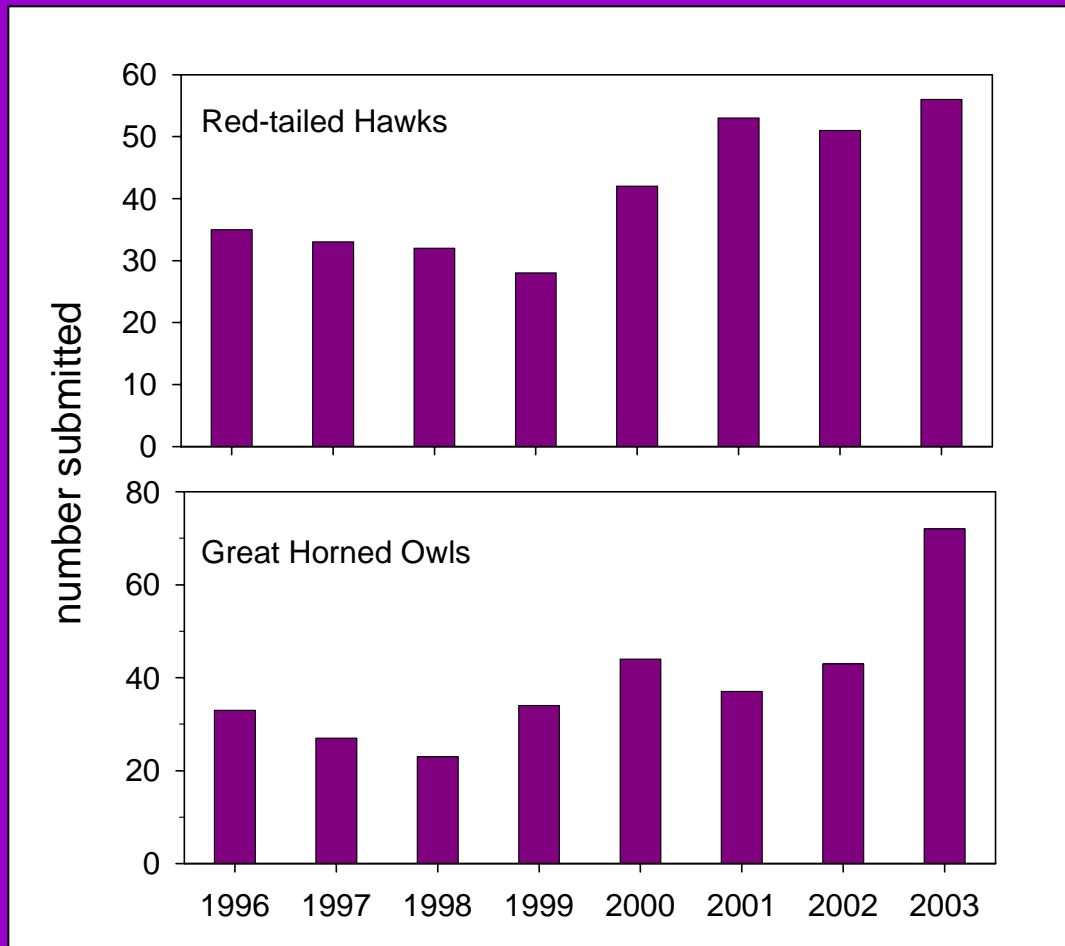
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Roberts, JF, et al. 2003. The Kentucky Warbler 79(2): 53-59.

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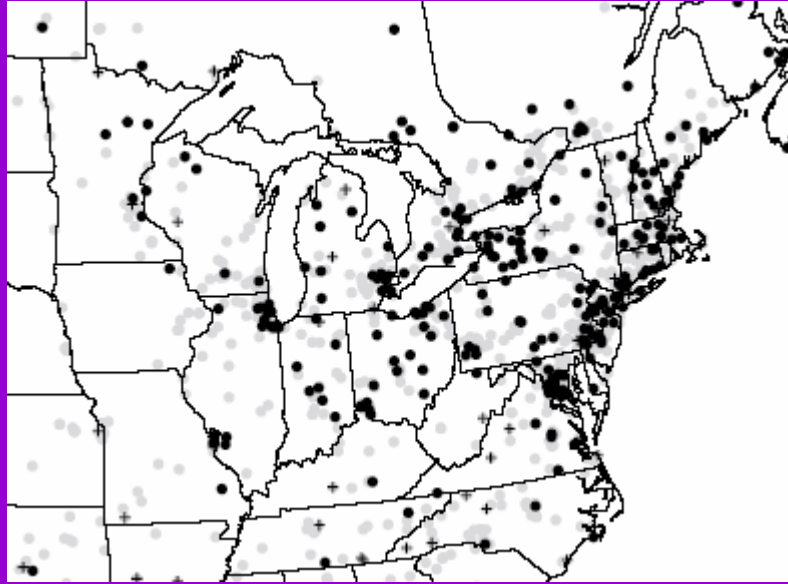
2003: 18/20 RTHA and 37/38 GHOW positive

Tri-State Bird Rescue and Research, Inc. Newark DE

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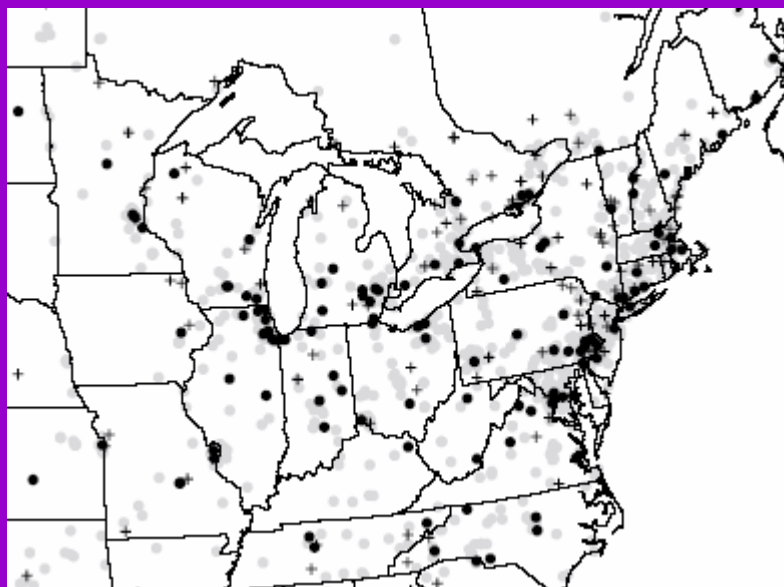
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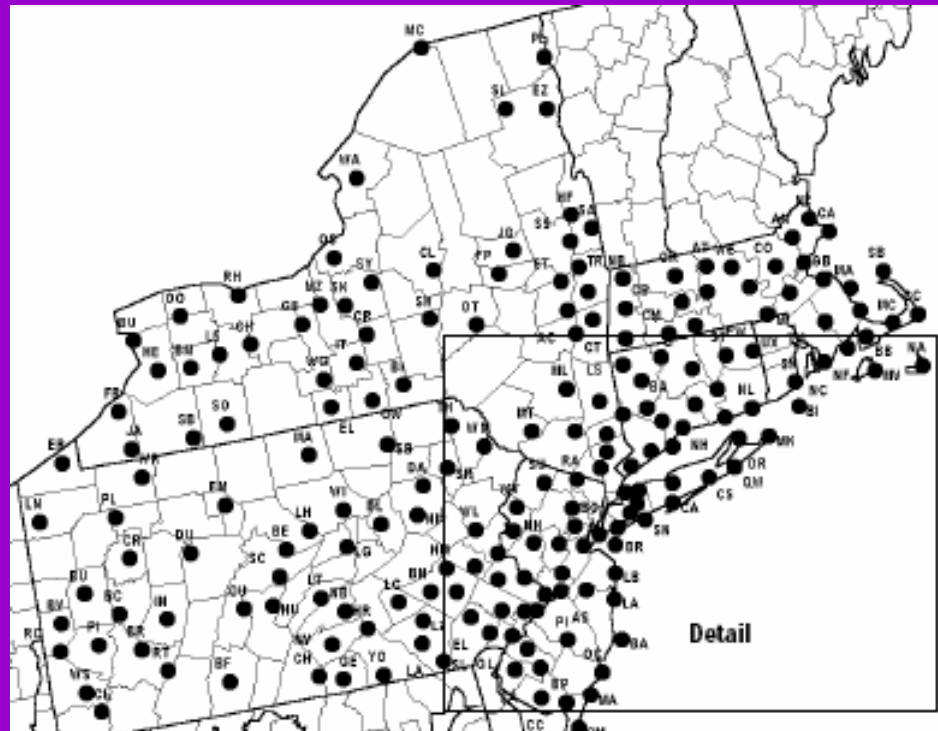
Black-capped and Carolina Chickadees

Bonter, DN and WM Hochachka. 2003. American Birds, 103rd Count: 22-25.



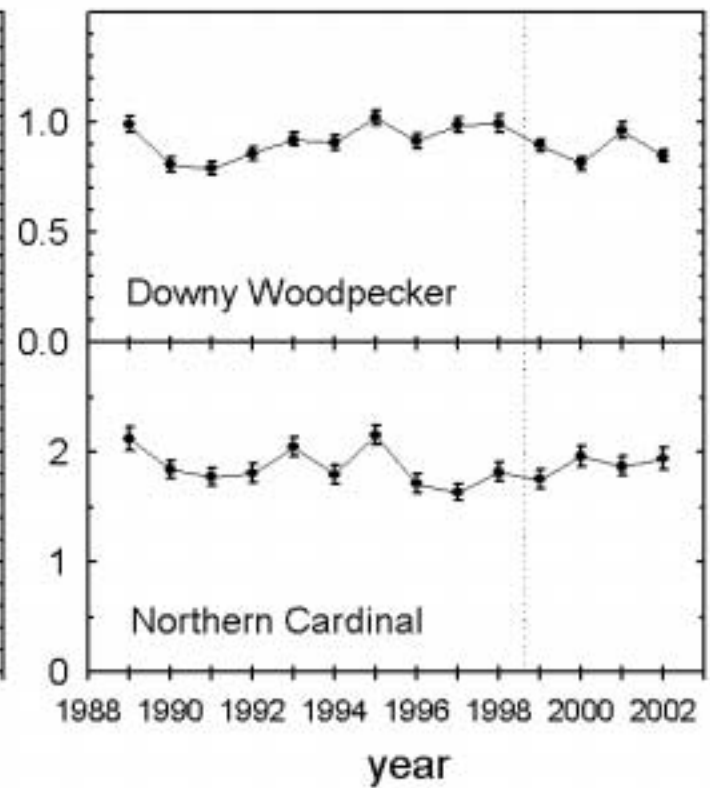
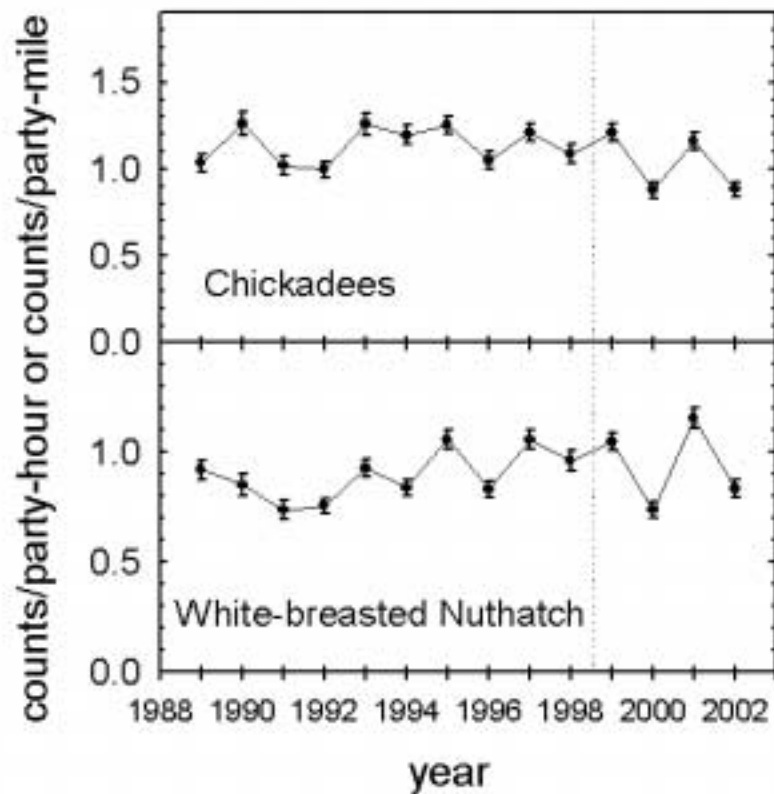
Blue Jays

Bonter, DN and WM Hochachka. 2003. American Birds, 103rd Count: 22-25.

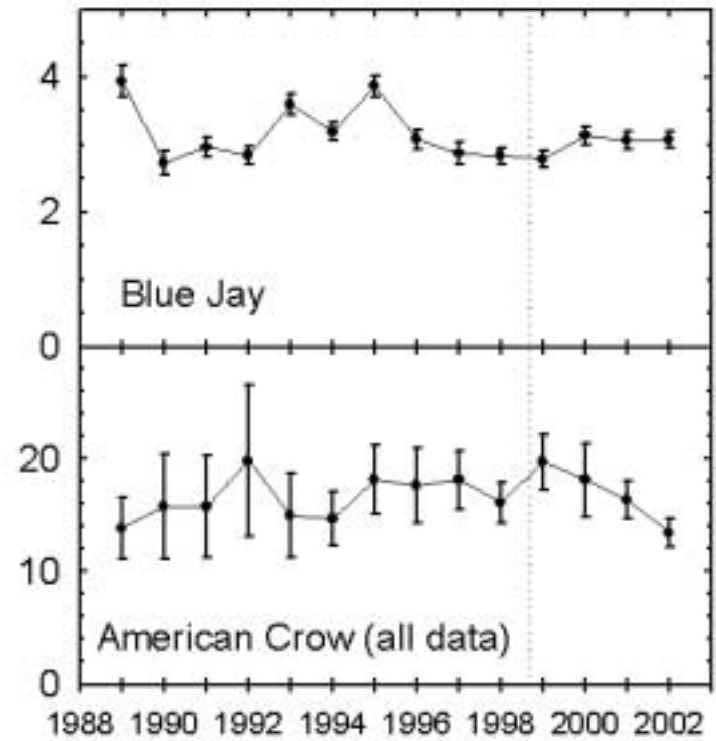
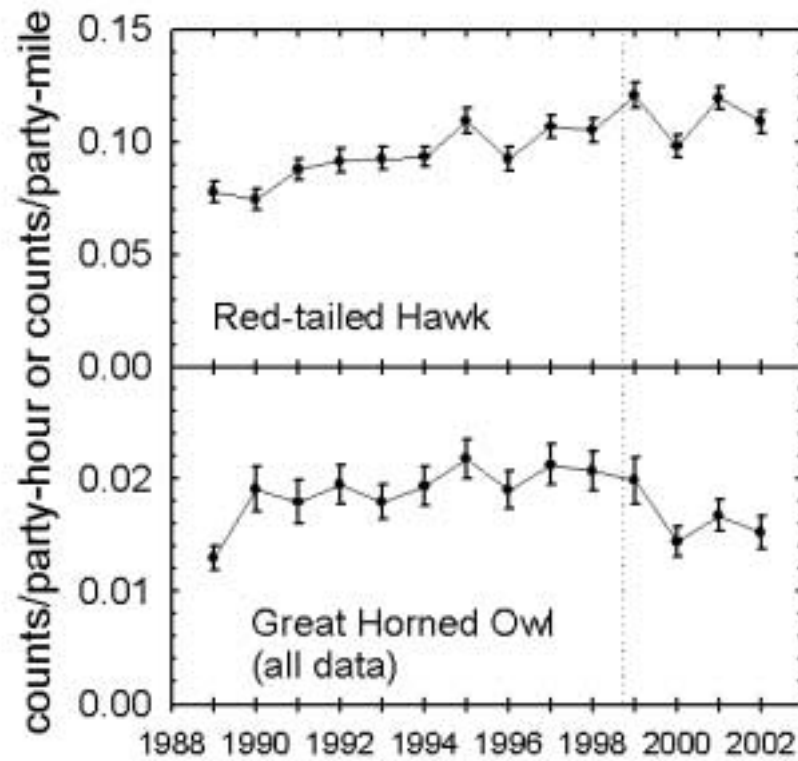


Audubon Christmas Bird Count circles

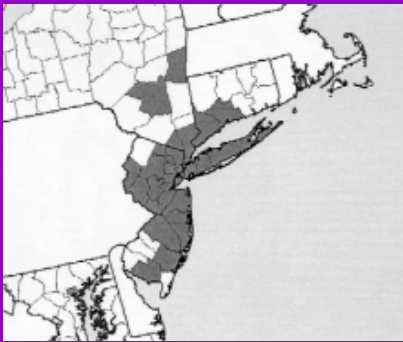
CT MA NJ NY PA RI



Caffrey, C and CC Peterson. 2003. American Birds 103rd Count: 14-21.



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1999



2000

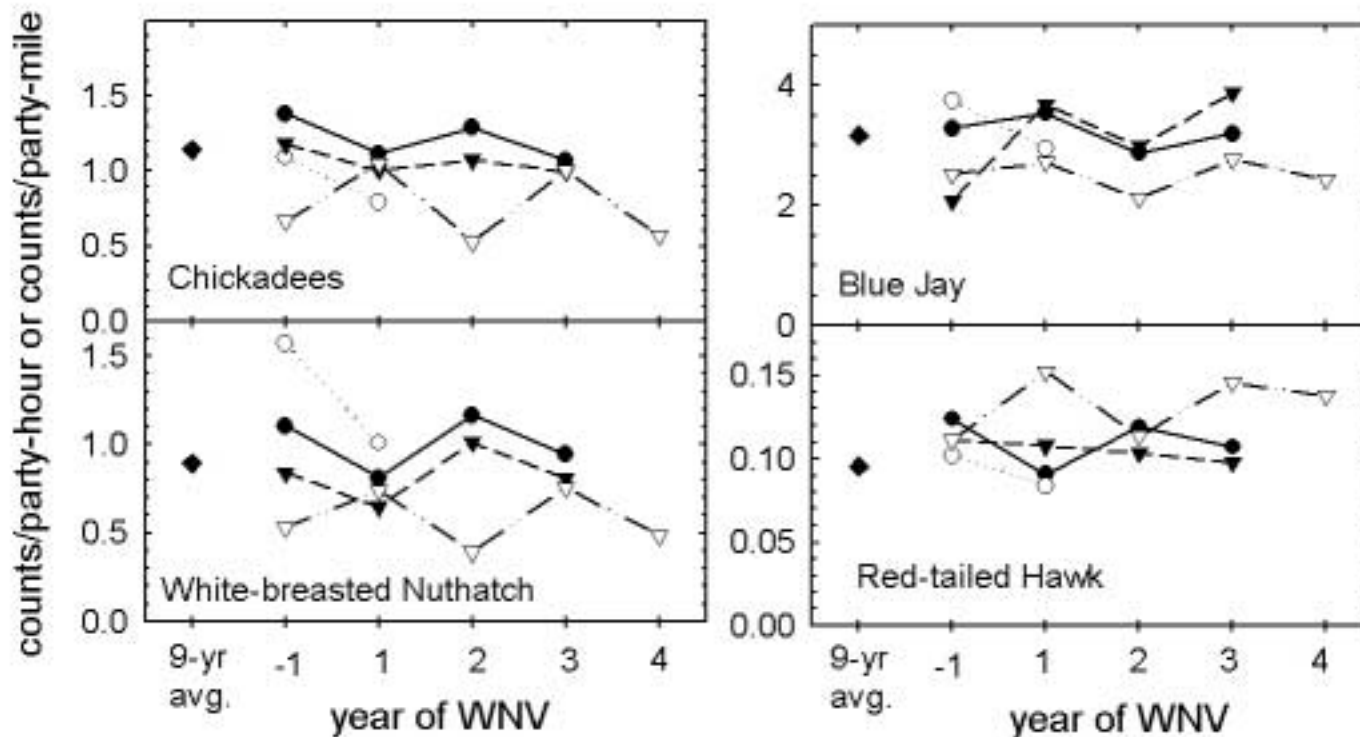


2001



2002

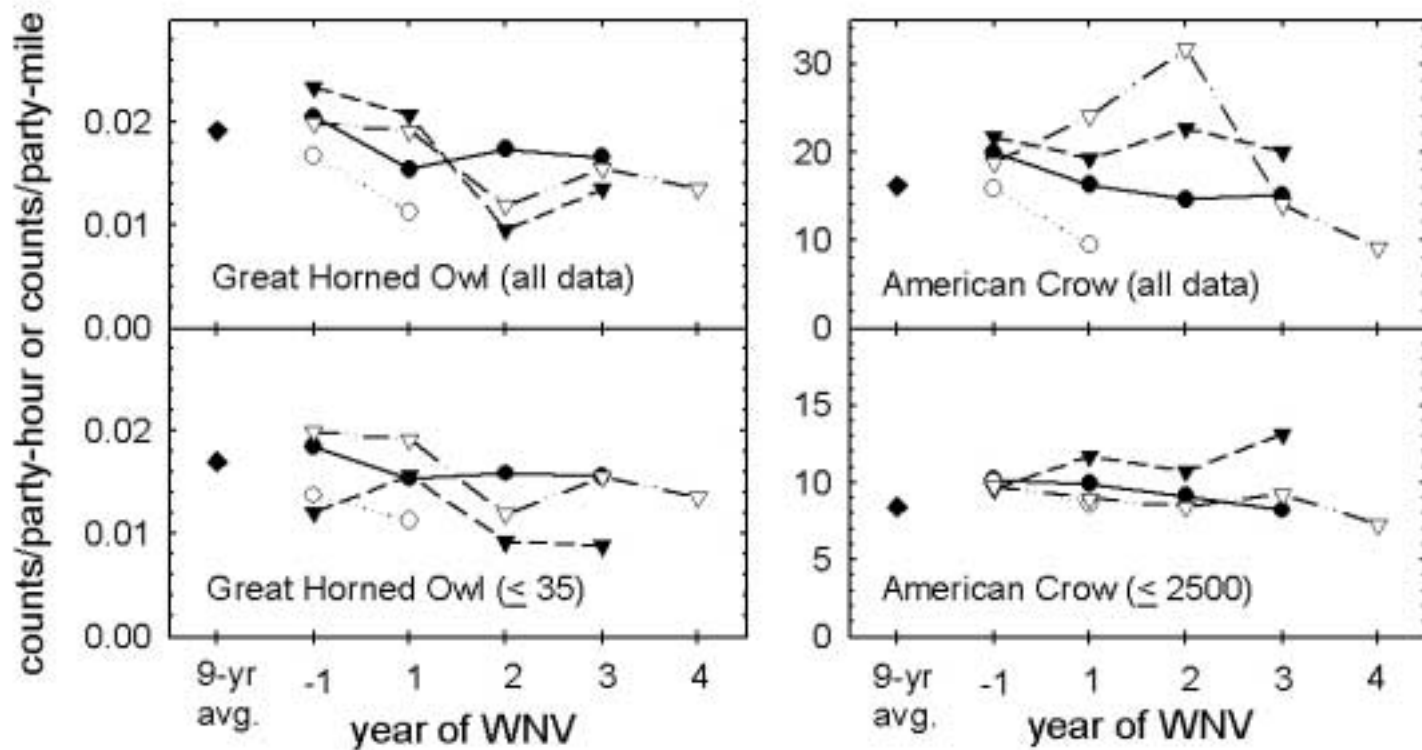
Maps courtesy of USGS.



open circles: 1 year (38)
 filled circles: 3 years (72)

open triangles: 4 years (36)
 filled triangles: yes-no-yes (35)

Caffrey, C and CC Peterson. 2003. American Birds 103rd Count: 14-21



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Distribution of crows in study population

Stillwater OK, 2002

families	individuals	marked individuals
28	145	120

Crow disappearances 2002

	alive 9/1	gone 10/31	%
breeders	44	18	41
auxiliaries	34	15	44
hatch years	26	13	50

Crow disappearances Sept and Oct

	1998- 2001	%	2002	%	predicted 2002
breeders	2/92	2	18/44	41	0.88
auxiliaries	4/08	4	15/34	44	1.36
hatch year	15/84	18	13/26	50	4.68

Crow WNV-related disappearances

September and October 2002 =

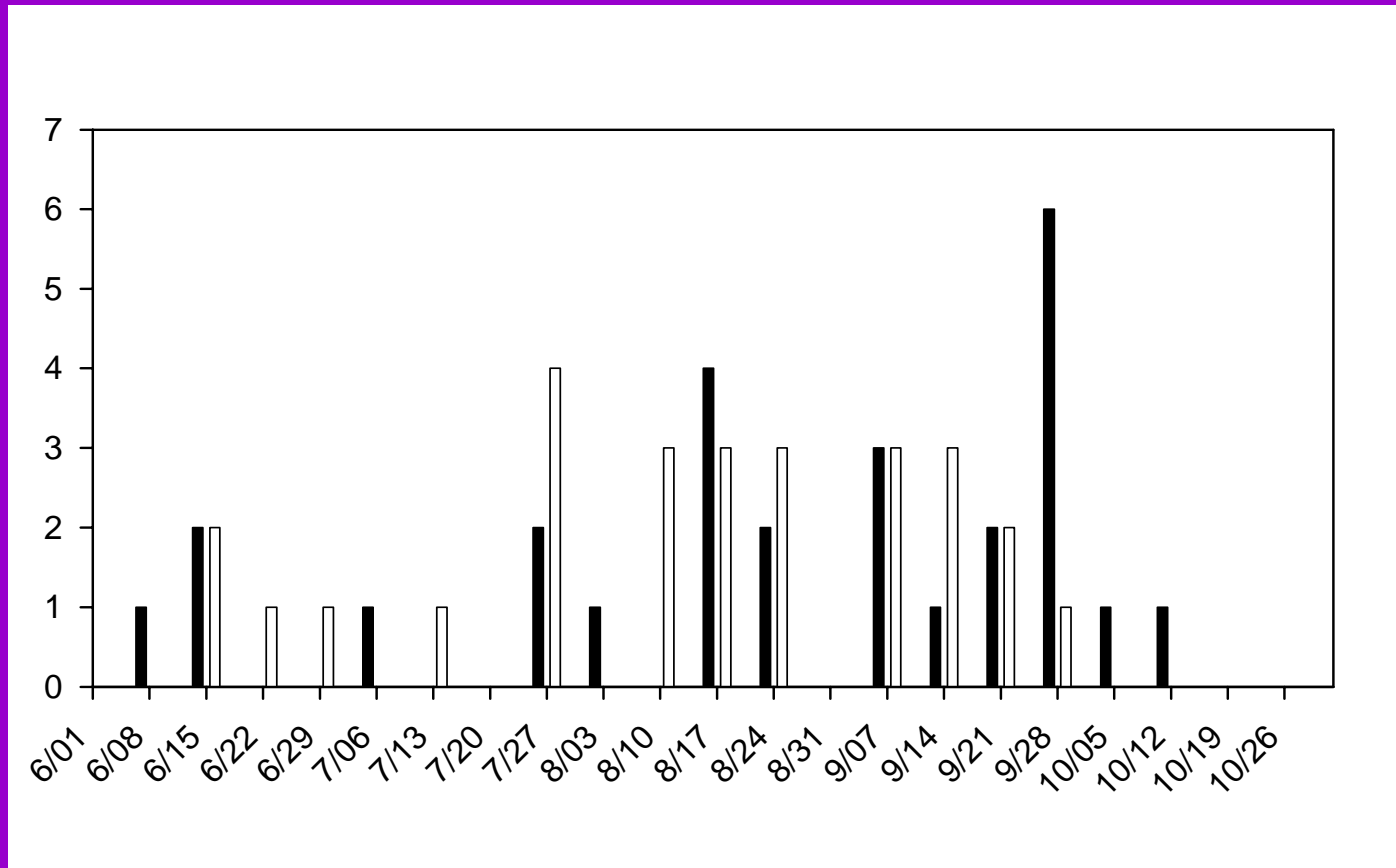
$$46 - 7 = 39$$

$$39/120 = 33\%$$

Distribution of crows in study population

Stillwater OK

	families	individuals	marked individuals
2002	28	145	120
2003	18	56	46



Crow disappearances, 2003

open: males
filled: females

Crow disappearances 2003

	males		females	
	alive 6/1	gone 11/1	alive 6/1	gone 11/1

breeders	19	11 (58%)	17	12 (71%)
auxiliaries	7	4 (57%)	3	2 (67%)
hatch years	15	13 (87%)	17	14 (82%)

Crow disappearances June-Oct

	1998- 2001	%	2003	%	predicted 2003
breeders	2/158	1.2	23/36	64	0.43
auxiliaries	4/156	2.6	6/10	60	0.26
hatch year	33/100	*	28/34	82	<6

Estimated American Crow mortality June-October 2003

	natural causes	WNV	total losses
breeders		23/36	
auxiliaries		6/10	
hatch years	6/34	22/34	
population	= 7.5%	= 64%	57/80 = 71%

Under laboratory conditions, American Crows have become infected with WNV via:

- being bitten by infected mosquitoes
- eating infected prey
- drinking water containing viral particles
- being in physical contact with infected conspecifics

Komar, N, et al. 2003. EID 9(3): 311-322

Only 1/32 experimentally infected American Crows survived

Komar, N, et al. 2003. EID 9(3): 311-322

McLean, RG, et al. 2001. Annals NYAS 951: 54-57