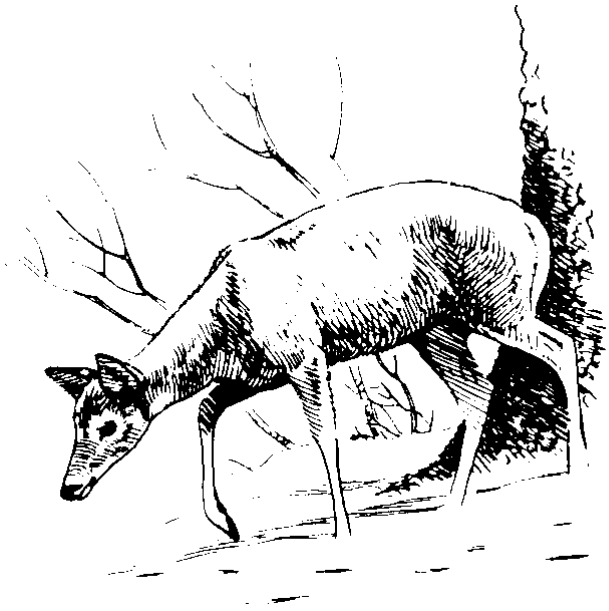
Illinois Chronic Wasting Disease:
2004-2005 Surveillance/Management Summary



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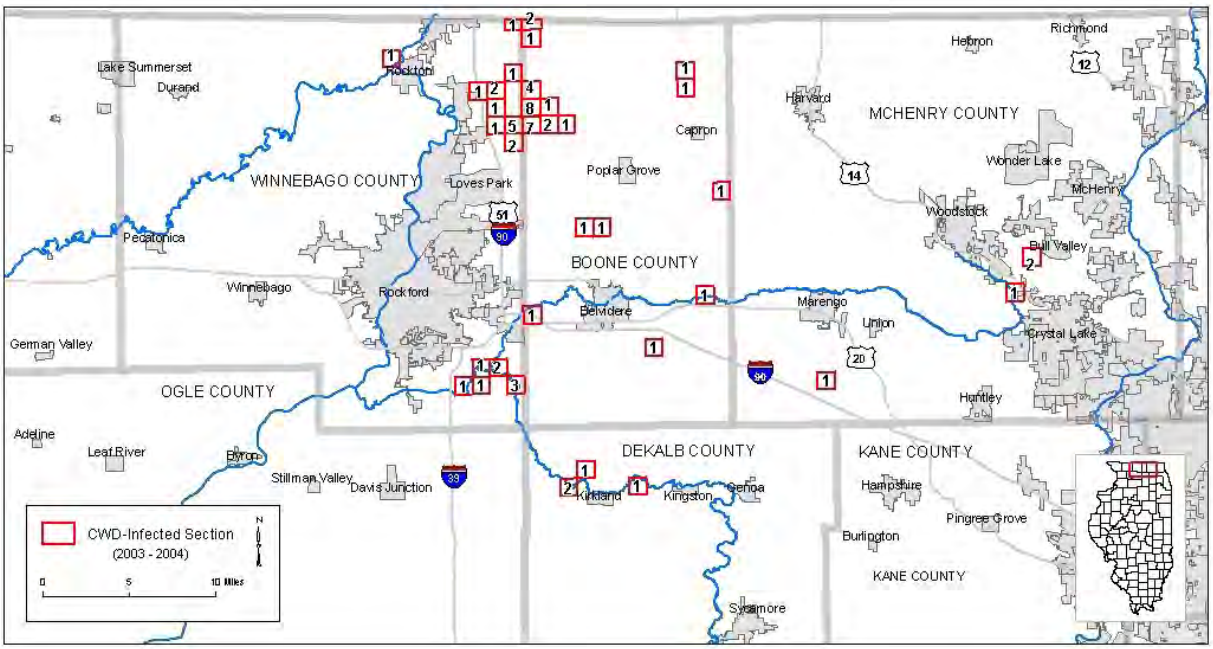
Background:

Illinois' first case of chronic wasting disease (CWD) in wild deer (*Odocoileus virginianus*) was found in fall 2002 northeast of Rockford along the Winnebago-Boone county line. Prior to the 2004-2005 CWD-sampling season (state fiscal year beginning July 1, 2004, hereafter referred to as FY04-05), 65 CWD-positive deer in four northern Illinois counties had been identified from approximately 11,000 surveillance samples tested statewide. The primary focus of infection (40 positive animals) was northeast of Rockford, with smaller clusters of infection or individual infected deer radiating outward several miles, primarily to the east and south (Figure 1). Additional positives associated with this pattern have been found to the north and northeast in Wisconsin, but significant human development to the west (and perhaps other features) has slowed movement of the disease in a westward direction.

CWD Surveillance Activities During FY2004-2005:

All CWD testing was conducted at Illinois Department of Agriculture's Animal Disease Laboratories located at Galesburg and Centralia, Illinois, both of which are certified for CWD testing by USDA. Immunohistochemistry (IHC) was the testing method used. Sampling was accomplished by collecting tissues from (1) hunter-harvested deer during the firearm and archery deer seasons; (2) suspect animals reported to IDNR staff; (3) road-killed deer in known CWD-infected areas; (4) deer taken under authority of urban Deer Population Control Permits and nuisance Deer Removal Permits; and (5) deer taken by IDNR sharpshooters in CWD areas.

Figure 1. Locations and number per section of CWD-infected deer identified in northern Illinois prior to July 1, 2004.

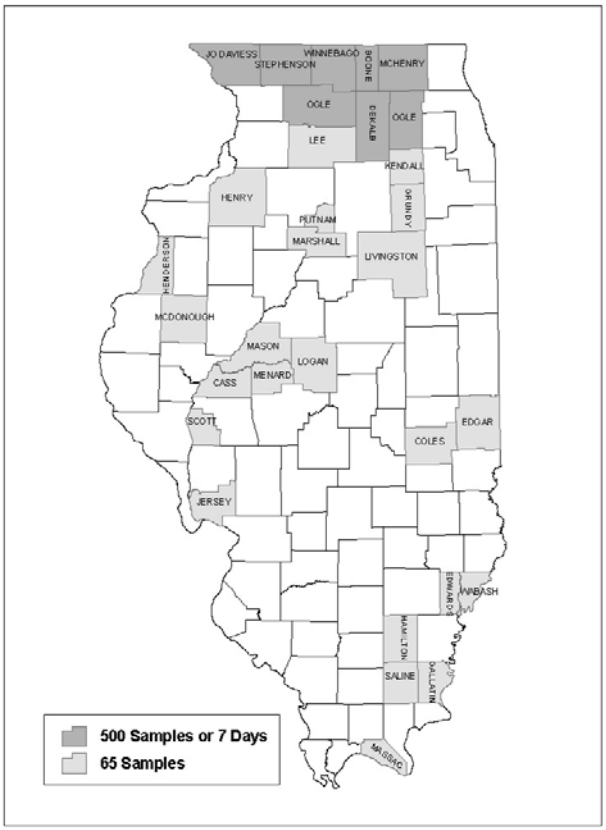


Firearm Deer Season Surveillance. Tissue samples (obex and retropharyngeal lymph nodes) were taken by IDNR staff from hunter-harvested deer at check stations and stored in individually-labeled jars of formalin. Thirty-one counties were surveyed (Figure 2), with sampling intensity dependent upon the risk category assigned to each county. High-risk counties included those counties bordering Wisconsin, or those in close proximity to Illinois counties in which CWD has been found. The high-risk counties open to firearm hunting were JoDaviess, Stephenson, Winnebago, Boone, McHenry, Ogle, DeKalb, and Kane (west of Highway 47). In these counties, our goal was to collect samples either (a) from 500 adult deer, or (b) for the duration of the 7-day season, whichever came first. A sample size of 500 allows 99% confidence of detecting a 1% disease

prevalence rate. In high-risk counties, the location of the deer when harvested was recorded by Township, Range, and Section (e.g., to the nearest square mile according to the government land survey). An additional 23 reduced-risk counties were sampled at lower levels, with a goal of 65 adult deer samples from each (95% confidence of detecting a 5% prevalence rate). Reduced risk counties were chosen from counties not previously sampled, with consideration given to geographic location, deer herd size, and number of captive cervid facilities. Specific harvest locations were not recorded for deer taken in reduced-risk counties.

A total of 4,009 usable samples were collected during the firearm deer season, with 13 CWD-positive individuals identified from four counties (Boone [4], DeKalb [1], McHenry [4], and Winnebago [4]). Appendix A provides a tabulation of the number of usable samples actually taken in each county.

Fig. 2. Illinois counties sampled for CWD during the 2004 firearm deer season.



Archery Deer Season Surveillance. Refrigerated sample collection stations were established in select counties in northern Illinois to allow archery deer hunters to donate samples for CWD surveillance. The stations were "self-serve" – hunters filled out a card to identify themselves and the location from which they harvested the deer, and left the deer head and the completed card in a plastic bag in the provided refrigerator. The sampling stations were advertised to the hunting public in Cook, Lake, Kane, DuPage, McHenry, Boone, Winnebago, and DeKalb counties. IDNR staff checked the stations at least twice a week, removed the tissue samples from the heads, and forwarded the samples to the Galesburg Animal Disease Laboratory for testing. In addition, certain cooperating meat processors were paid to collect samples from archery-harvested deer.

One hundred thirty-four (134) usable samples were taken in this fashion (Appendix A), yielding 2 CWD-positive deer from Boone County. An additional 53 samples were taken in conjunction with a special archery hunt in Piatt County, all of which tested negative.

Urban Deer Population Control Permit (DPCP) Surveillance. Agencies/municipalities participating in urban deer population control programs (sharpshooting) were asked to collect obex/retropharyngeal lymph node samples from a specified number of adult deer. IDNR supplied the necessary training and materials, and arranged for transfer of the samples to the testing laboratories. This provided samples of deer from northeastern Illinois counties not open to firearm deer hunting (Cook, Lake, DuPage), as well as from properties in Winnebago County and JoDaviess County not open to public hunting.

A total of 642 usable samples were taken from five counties (Appendix A). Three CWD-positive deer were identified from forest preserve district properties in southeast Winnebago County.

Suspect ("Target") Deer Surveillance. Upon receiving reports from the public about sick deer, IDNR staff collected samples for CWD testing from deer that exhibited signs/symptoms that could be attributed to chronic wasting disease.

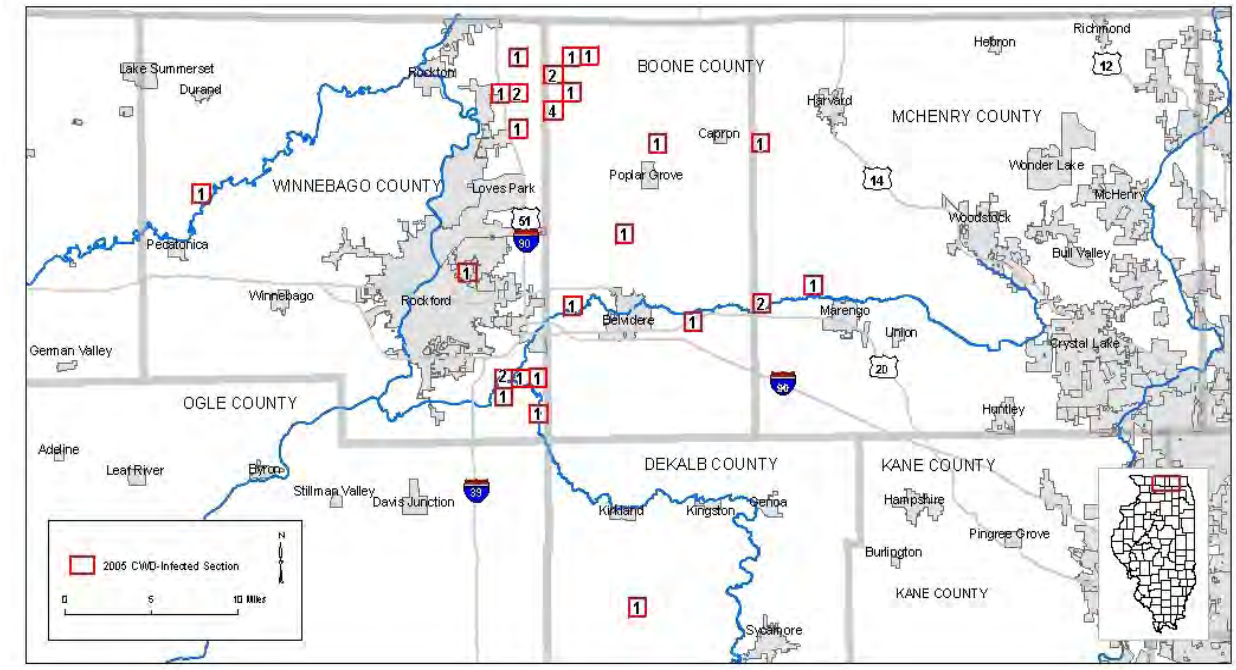
Samples were taken from 18 deer in 13 counties (Appendix A). Four positive deer were found, all from Winnebago County. Three of the four positive deer originated from two adjacent sections in the vicinity of Clayton Andrews Forest Preserve, where an ongoing lawsuit prevents IDNR sharpshooting activities.

Surveillance from Post-Hunting Season Sharpshooting. Sharpshooting was conducted during the period January 12, 2004 - March 31, 2004 by IDNR Wildlife Biologists, IDNR Conservation Police Officers, and USDA Wildlife Services personnel. Generally, sharpshooting locations were confined to those parts of Boone, DeKalb, McHenry, and Winnebago counties from which CWD-infected deer had been identified. More specific details of goals, procedures, and results of the experimental sharpshooting program will be discussed in the management section of this report.

Sharpshooters collected 664 usable samples from the four affected counties (Appendix A). Nine positive deer were found in Boone (7) and Winnebago (2) counties. An additional 23 samples were collected by the Illlinois Natural History Survey in Piatt County during herd reduction efforts at Allerton Park (Monticello), with no CWD-positive deer found.

Discussion of Surveillance Results to Date. A total of 5,550 usable samples were collected statewide during FY04-05, resulting in the identification of 31 CWD-positive deer from four counties: Boone (13), DeKalb (1), McHenry (4), and Winnebago (13). Positive deer had been previously identified from all four counties, but two new locations with a single sick deer were discovered several miles from formerly-known CWD locations. In Winnebago County, an infected deer was found approximately 14 miles southwest of the previous westernmost positive, while in DeKalb County an infected deer was found about 6.5 miles south-southeast of the previous southernmost positive. Given the intensive surveillance conducted since fall/winter 2002-2003, biologists are hopeful that the outlying new locations represent recent movements of infected deer, rather than discoveries of established disease foci. Locations of all positive deer found during FY04-05 are shown in Figure 3.

Figure 3. Locations and number per section of CWD-infected deer found in Illinois during the period 1 July 2004 through 30 June 2005.



The primary focus of the disease continues to be that area northeast of Rockford along North and South Kinnikinnick creeks, with another important focus southeast of Rockford at the confluence of the North Fork and the South Fork of the Kishwaukee River. The North Fork of the Kishwaukee River (and tributaries) across Boone County and into western McHenry County continues to be a concern, with several widely-distributed positives found this past winter.

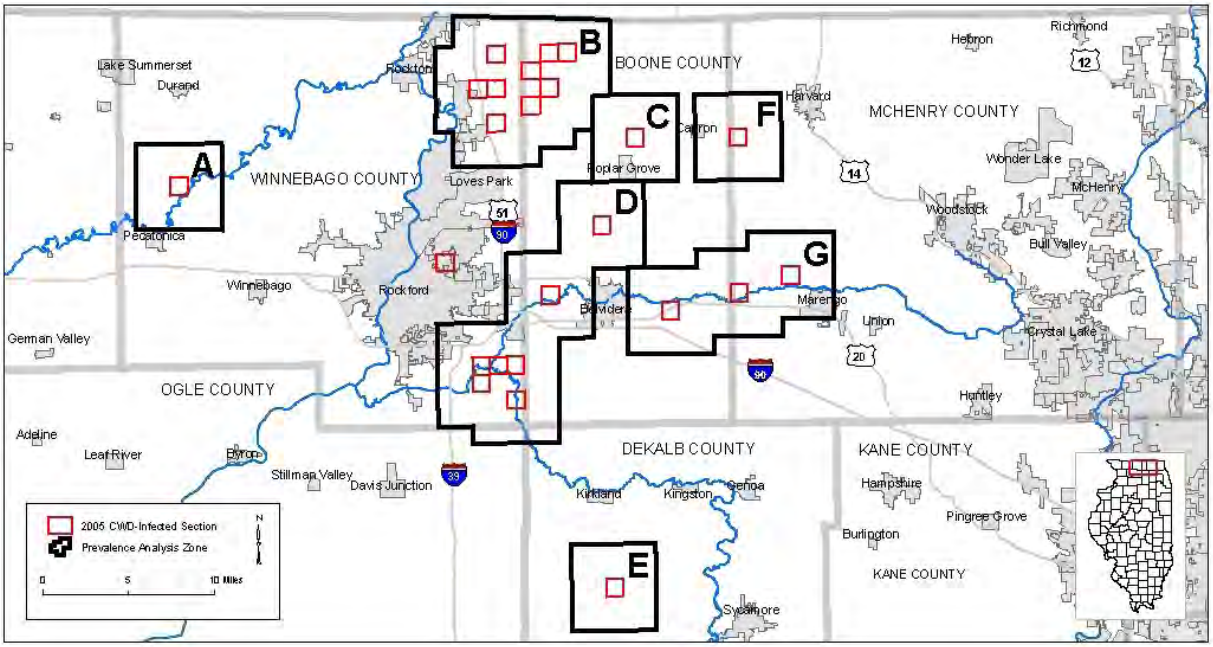
Disease prevalence rates were calculated for the four affected counties from random surveillance data collected during the firearm deer season, and by pooling all surveillance data sets that could be construed as random (i.e., all data collection methods other than suspect animal surveillance). However, while these methodologies did not select for or against sick deer, only collections during the firearm deer season were truly random with respect to location within a county, as all other methods selected for deer that originated from known infected areas. Because of this bias, use of pooled information might result in slightly higher countywide prevalence rates (Table 1), but it is of interest because it includes fawns as well as adults (while firearm season collection was limited to adults only). Adult prevalence rates calculated from firearm deer season data ranged from 2.8% (± 2.7, 95% confidence interval) in Boone County to 0.6% (± 1.1, 95% confidence interval) in McHenry County. Late-winter collections in Boone County identified 3 positive fawns from a sample of 101 individuals, with no infected fawns being found in other counties.

Table 1. Countywide CWD prevalence estimates in northern Illinois for the period 1 July 2004 through 30 June 2005.

County	Source of Samples	Deer Age	# of Samples	# of Positives	Percent Positive	95% Confidence Interval (+/-)
Boone	Firearm season	Adults only	142	4	2.8%	2.7%
	All random	Adults only	269	10	3.7%	2.3%
	All random	All deer	370	13	3.5%	1.9%
	All random	Fawns only	101	3	3.0%	3.3%
DeKalb	Firearm season	Adults only	171	1	0.6%	1.1%
	All random	Adults only	204	1	0.5%	1.0%
	All random	All deer	227	1	0.4%	0.9%
	All random	Fawns only	23	0	0.0%	-
McHenry	Firearm season	Adults only	349	4	1.1%	1.1%
	All random	Adults only	479	4	0.8%	0.8%
	All random	All deer	519	4	0.8%	0.8%
	All random	Fawns only	40	0	0.0%	-
Winnebago	Firearm season	Adults only	372	4	1.1%	1.0%
	All random	Adults only	717	9	1.3%	0.8%
	All random	All deer	1003	9	0.9%	0.6%
	All random	Fawns only	286	0	0.0%	0.0%

We also calculated disease prevalence rates for known CWD areas, by limiting data analyses to those random samples (all methods except suspect animal surveillance) falling within a two-mile buffer around each CWD-positive section identified during FY04-05. One CWD-positive section resulting from a suspect animal within the city limits of Rockford was omitted from this evaluation, because the urban nature of the habitat and the late date at which is was discovered (March 17, 2005) precluded availability of additional samples. Seven discrete geographical areas were identified using the buffering approach (Figure 4). Calculated prevalence rates (with 95% confidence intervals) for these areas are presented in Table 2. Caution should be used in interpreting the results, as small sample sizes preclude a high degree of precision for prevalence estimates in most of the areas.

Figure 4. Zones in northern Illinois for which localized CWD prevalence estimates were made during FY04-05.



Zone B corresponds with the primary focus of CWD in northern Illinois, and is located northeast of Rockford along the Boone-Winnebago county line. This zone has an estimated CWD prevalence rate in adult deer of 4.5% (± 3.0), compared to estimated prevalence rates of 8.6% (± 3.4) and 6.0% (± 4.0) for zones with similar boundaries during FY03-04 and FY02-03, respectively. Fourteen of the 31 positive deer identified during FY04-05 were found in this area.

Zone D includes several forest preserves in southeastern Winnebago County at the confluence of the North Fork and the South Fork of the Kishwaukee River, as well as the North Fork of the Kishwaukee River in western Boone County. This zone was estimated to have an adult prevalence rate of 2.6% (± 1.8), compared to an estimate of 2.5% (± 1.8) during FY03-04 for a similarly-delineated area. Removal of more than 600 deer by the Winnebago County Forest Preserve District during the past two winters from their properties has assisted in reducing deer densities from their initial very high state (see Management Section, following). However, we remain concerned that diseased deer in this zone pose a threat to deer populations to the southwest in Ogle County, where deer populations are larger than those presently affected and occupy larger blocks of more contiguous habitat.

Zone G, consisting of the riparian corridor along the North Fork of the Kishwaukee River in eastern Boone and western McHenry counties, was estimated to have an adult prevalence rate of 3.6% (± 3.4). Sample sizes in this area in past years have been too low to yield a comparable estimate. We will continue to monitor this area closely, as this corridor appears to have been an important means of dispersal for this disease outbreak.

The remaining zones (A, C, E, and F) consist of a single positive deer, often within a matrix of very limited deer habitat that supports very low winter deer population size. It is likely that at least some of the individual positives identified within these zones may be “sparks” (isolated cases of CWD resulting from recent emigration of an infected individual from an established CWD area), but only future sampling efforts will clarify whether disease has become established or not.

Table 2. CWD random surveillance summary for the period 1 July 2004 through 30 June 2005. Samples taken from suspect animals are excluded. Sampling units are those areas defined in Figure 4.

Sampling Unit	Area (sq.mi.)	Age	Number of Samples	Number of Positives	Percent Positive	95% Confidence Interval (+/-)
A	25	Fawn	14	0	0.0%	-
		Adult	63	1	1.6%	3.1%
		Total	77	1	1.3%	2.5%
B	78	Fawn	99	3	3.0%	3.4%
		Adult	179	8	4.5%	3.0%
		Total	278	11	4.0%	2.3%
C	25	Fawn	7	0	0.0%	-
		Adult	20	1	5.0%	9.6%
		Total	27	1	3.7%	7.1%
D	86	Fawn	217	0	0.0%	-
		Adult	310	8	2.6%	1.8%
		Total	527	8	1.5%	1.0%
E	25	Fawn	0	0	-	-
		Adult	7	1	14.3%	25.9%
		Total	7	1	14.3%	25.9%
F	25	Fawn	0	0	-	-
		Adult	16	1	6.3%	11.9%
		Total	16	1	6.3%	11.9%
G	62	Fawn	23	0	0.0%	-
		Adult	112	4	3.6%	3.4%
		Total	135	4	3.0%	2.9%
All Units Combined:						
	326	Fawn	360	3	0.8%	0.9%
		Adult	707	24	3.4%	1.3%
		Total	1067	27	2.5%	0.9%

Experimental CWD Management Activities During FY2004-2005:

Use of regulated hunting for herd control in CWD-affected areas. Permit quotas during firearm and muzzleloading deer seasons have been increased to the point where supply far exceeds demand (hunters may purchase permits essentially without limit), and no limit is in effect for archery hunters. In spite of this, total harvest (all seasons combined) in the 4-county area (Boone, DeKalb, McHenry, and Winnebago) has changed little. Harvests during FY04-05 (3,473) and FY03-04 (3,561) were only slightly higher than during FY02-03 (3,247), and comparable to harvests obtained prior to CWD (3,471 in FY01-02). However, it should be noted that deer densities in much of the CWD area have declined as a result of the combined effects of hunting and sharpshooting (see below), so declines in hunter success must be expected. A special late-winter CWD season will be implemented in January 2006 for Winnebago, Boone, McHenry, and the northern portion of DeKalb counties) to allow for additional deer removals via hunting.

Sharpshooting in CWD "hotspots". Following the close of deer hunting seasons in January, teams of sharpshooters (IDNR staff assisted by USDA Wildlife Services) began culling deer that were wintering in or around known CWD locations. The CWD locations included those discovered during FY04-05, in addition to those identified in past years. An Urban Deer Population Control Permit (DPCP) was issued to the Winnebago County Forest Preserve District to allow their staff to conduct a sharpshooting program on forest preserves in known CWD areas in southeastern Winnebago County. All sharpshooting activities were carried out between January 10 and March 31, 2005.

Objectives of the sharpshooting were: (1) to provide detailed localized surveillance information about disease distribution and prevalence rates within infected areas; and (2) to examine the feasibility/effectiveness of controlling CWD in free-roaming deer populations by [a] removing as many sick deer as possible from known CWD areas; [b] removing/sampling deer that are inaccessible to hunters because of urbanization; and by [c] reducing deer population levels in known CWD locales to lower transmission rates.

All animals (including fawns) removed during the sharpshooting program, except those taken with head shots from which no testable tissue could be found, were tested for CWD to determine disease prevalence in affected areas. Obex and retropharyngeal lymph nodes were removed at DNR processing facilities in the sampling zones, and transferred to IDOA Disease Laboratories for testing. Additional tissues (tongues, tonsils, fetuses) were collected and archived for further research/testing at the University of Illinois Champaign/Illinois Natural History Survey.

Aerial deer surveys were conducted on January 25 and 31, and February 2, 2005 when suitable snow cover was available. Surveys served to identity wintering habitat that contained concentrations of deer, and to provide estimates of deer numbers throughout the affected area. Our goal was to focus sharpshooting activities in deer winter concentration areas that included or were nearby CWD-infected properties, thus maximizing our effectiveness. Deer densities (uncorrected for sightability) derived from the aerial survey are depicted in Figure 5. Densities rarely exceeded 20 deer/mi^2, with highest densities occurring northeast and southeast of Rockford in areas with limited hunting access. Within the 561mi^2 "primary CWD management area" (all known cumulative CWD-positive sections surrounded by a two-mile buffer), deer densities per total land area were 3.2 deer/mi^2, compared to 4.9 deer/mi^2 in the 415 mi^2 primary CWD management area identified during winter 03-04. Deer populations within the 03-04 primary management area declined about 40% between the two winters.

Sharpshooting activities in the CWD zones in the four affected counties resulted in the removal of 1,002 deer, compared to 1,050 during the previous winter. Only six of the deer collected by sharpshooting during winter 2005 were unsuitable for testing. The total consisted of 444 fawns, 556 adults, and 2 for which age was not identified. Sex ratios were 1 male to 1.7 females (377 males: 625 females). County totals were as follows: Boone (198), Dekalb (52), McHenry (151), and Winnebago (601). Twelve CWD-positive deer were removed by these activities. More importantly, the number of deer removed represents a significant impact to population size in the CWD area. Figure 6 presents the number of deer removed by sharpshooters in the various locations in relation to the number of deer counted during aerial surveys. Although obviously a rough comparison due to unknown deer sightability during surveys, these data indicate that roughly 50% (889/1786) of deer observed within a 2-mile buffer of known CWD-positive sections were removed via sharpshooting. The ratio of deer killed to deer counted (expressed as a percentage) ranged from 0.0% to 75% in the ten

identified areas, and was affected by (a) IDNR access to properties providing winter habitat, (b) the importance ranking assigned to the area based on the number of positives and overwintering deer population size, and, in some cases, (c) the date on which an area was identified as being CWD-positive. We believe that continued use of this approach will result in a significantly increased rate of population turnover in the CWD area, and significant reductions in population size.

Summary

Similar numbers of usable surveillance samples were taken in the four CWD counties during FY03-04 and FY04-05 (2,253 and 2,126, respectively), but 39% fewer positives were detected during FY04-05 (31) than in FY03-04 (51). Aerial deer surveys conducted during January-February 2005 also detected about 40% fewer deer in those CWD areas surveyed both years. While it is premature to identify this as a trend, we are optimistic that continued use of presently-employed techniques will result in continuing declines in the number of CWD cases and in deer densities within the affected areas. Experimental herd reductions via late-winter sharpshooting to supplement hunting seasons, when focused in critical winter habitat known to be affected by CWD, appear to offer substantial utility as a potential disease management tool.

Findings of two CWD-positive deer to the south (DeKalb County) and west (Winnebago County) of the previously-known outbreak area serve as a reminder of the necessity of a continued effective surveillance program to allow for early detection and response when the disease spreads. It is also important to note that although discussions in this document focus solely on Illinois, our CWD outbreak is a shared outbreak between northern Illinois and southeastern Wisconsin (Appendix D), so neither state will be successful in eliminating this disease for the long term unless the other state also succeeds. With this in mind, representatives from the two states regularly meet to discuss approaches and findings of surveillance, management, and research programs.

Figure 5. Deer densities from aerial censuses conducted January 25 and 31, and February 2, 2005. A moving average (the mean of all adjacent sections) was used to smooth the density values on the landscape.

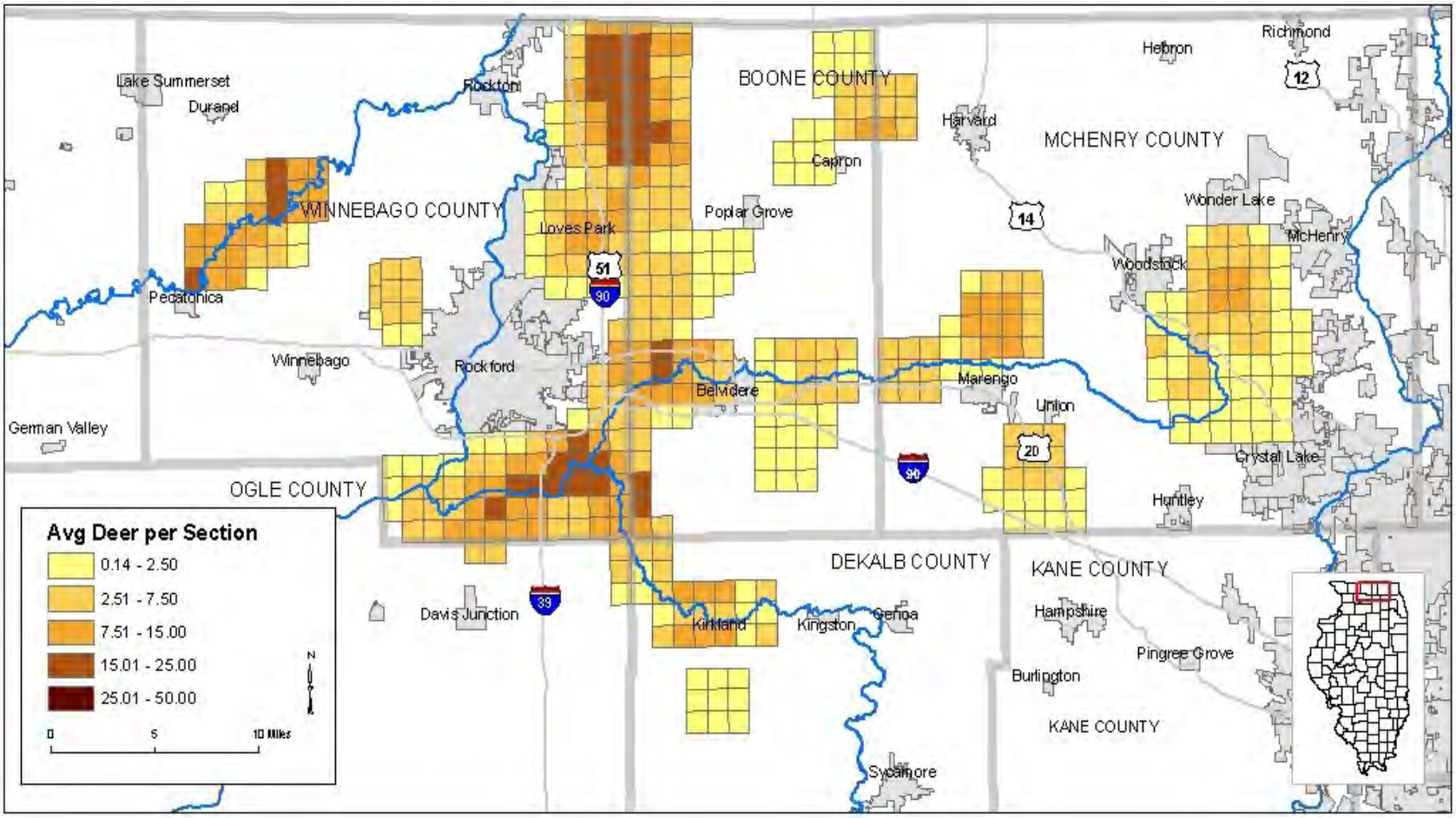
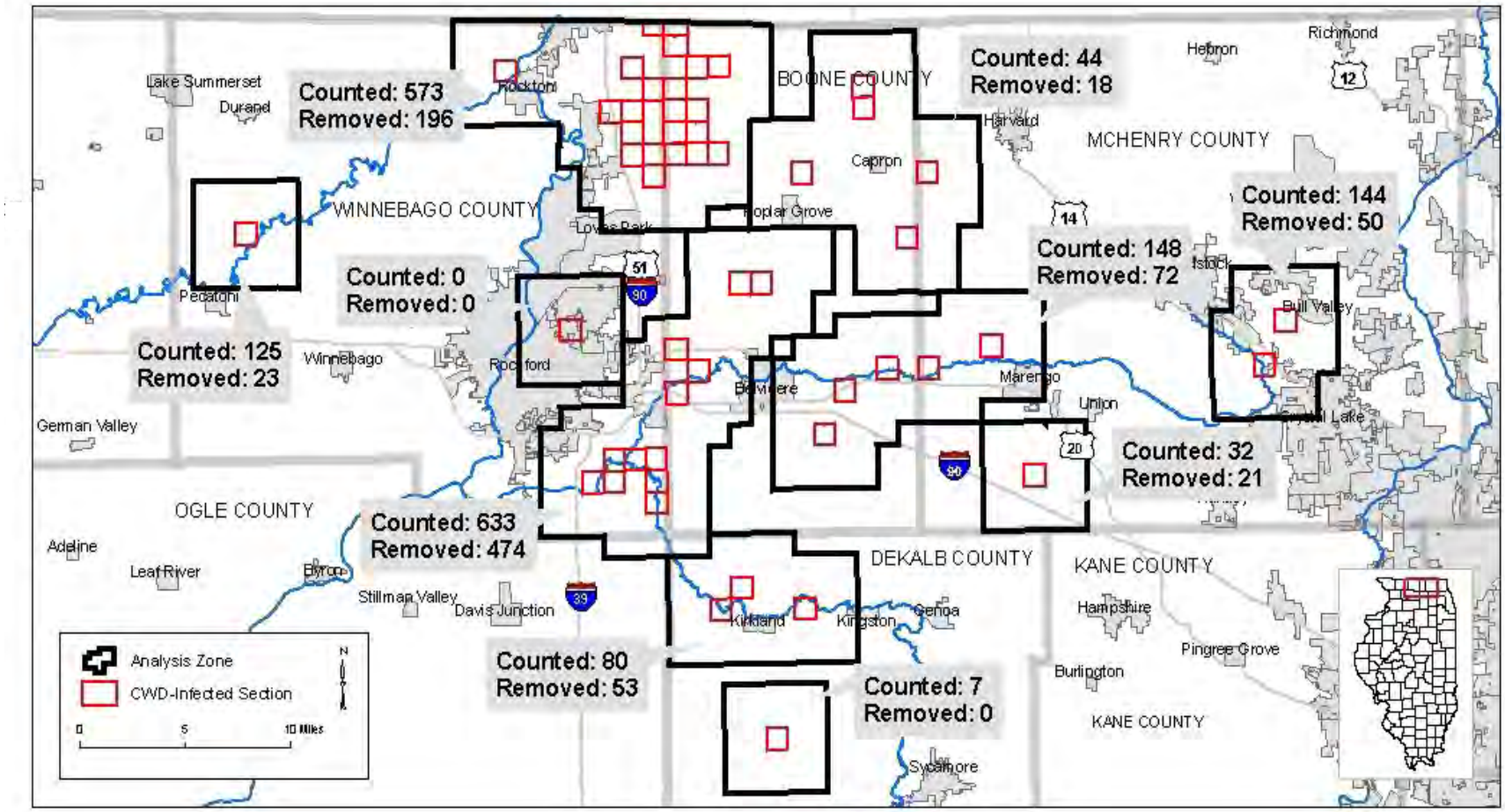


Figure 6. Comparison of the number of deer counted via aerial census versus the number of deer removed by sharpshooters during the period January-March 2005.



Appendix A. Usable CWD samples taken by county in Illinois during the 2004-2005 sampling season.

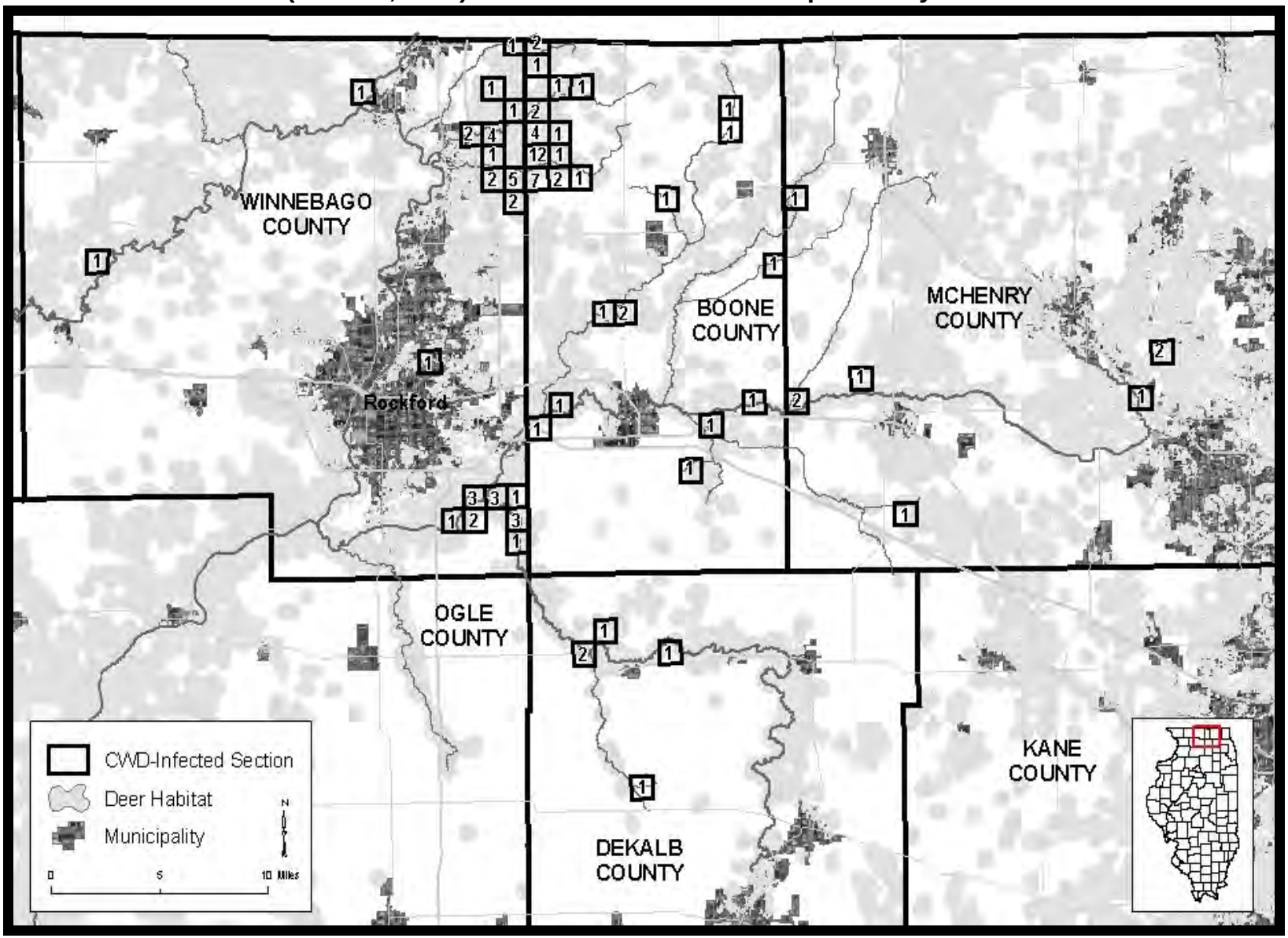
County	Firearm	Archery	DPCP	Roadkill	Sharpshoot	Suspect	Total
BOONE	142	28		2	198	1	371
BUREAU		1					1
CARROLL	14						14
CASS	64						64
COLES	65						65
COOK		1	65				66
DEKALB	171	5			51	1	228
DEWITT	1						1
DUPAGE			139				139
EDGAR	65						65
EDWARDS	31						31
EFFINGHAM						1	1
GALLATIN	64						64
GRUNDY	65	2				1	68
HAMILTON	65						65
HENDERSON	65						65
HENRY	65						65
IROQUOIS						1	1
JACKSON						1	1
JERSEY	64						64
JO DAVIESS	496		11				507
KANE	33	6					39
KENDALL	63						63
KNOX	1						1
LAKE		12	97				109
LEE	78					1	79
LIVINGSTON	65						65
LOGAN	60						60
MARSHALL	65						65
MASON	67						67
MASSAC	65						65
MCDONOUGH	67						67
MCHENRY	349	18		1	151		519
MENARD	67						67
OGLE	522	26				2	550
PIATT*		53			23		76
POPE						1	1
PUTNAM	64						64
RICHLAND	1						1
SALINE	65						65
SANGAMON						1	1
SCOTT	65						65
SHELBY						1	1
STEPHENSON	402	2				1	405
WABASH	35						35
WARREN	64						64
WHITESIDE	1						1
WILL	1						1
WINNEBAGO	372	33	330	4	264	5	1008
TOTALS	**4009**	**187**	**642**	**7**	**687**	**18**	**5550**

* All samples from Piatt County were taken from Allerton Park (west of Monticello) as part of herd reduction efforts on that site.

Appendix B. Summary of CWD-positive deer collected during FY04-05.

Date Collected	County	Township, Range, Section	Sex	Age	Surveillance Method
10/13/04	Boone	344N 3E 29	Female	Adult	Archery Hunter
11/09/04	Boone	346N 3E 17	Female	1	Archery Hunter
11/19/04	Boone	344N 3E 2	Male	2	Firearm Hunter
11/19/04	McHenry	344N 5E 22	Male	1	Firearm Hunter
11/20/04	Boone	346N 3E 29	Male	2	Firearm Hunter
11/20/04	Winnebago	343N 2E 25	Male	2	Firearm Hunter
11/21/04	DeKalb	341N 3E 24	Male	1	Firearm Hunter
11/21/04	McHenry	345N 5E 7	Male	2	Firearm Hunter
12/02/04	Winnebago	343N 2E 22	Female	2	Firearm Hunter
12/03/04	Winnebago	345N 2E 2	Male	2	Firearm Hunter
12/03/04	Winnebago	427N10E 10	Male	2	Firearm Hunter
12/04/04	McHenry	344N 5E 30	Female	1	Firearm Hunter
12/04/04	McHenry	344N 5E 30	Female	3	Firearm Hunter
12/05/04	Boone	345N 4E 7	Male	2	Firearm Hunter
12/05/04	Boone	346N 3E 16	Male	2	Firearm Hunter
01/10/05	Winnebago	346N 2E 26	Female	2	Suspect
01/11/05	Winnebago	343N 2E 15	Female	4	DPCP
01/26/05	Winnebago	346N 2E 27	Female	3	Suspect
01/26/05	Boone	346N 3E 31	Female	2	Sharpshooting
01/27/05	Boone	346N 3E 19	Male	Fawn	Sharpshooting
01/27/05	Boone	346N 3E 31	Female	Fawn	Sharpshooting
02/09/05	Boone	346N 3E 19	Female	4	Sharpshooting
02/10/05	Boone	346N 3E 31	Male	Fawn	Sharpshooting
02/14/05	Winnebago	343N 2E 13	Female	2	Sharpshooting
02/22/05	Winnebago	343N 2E 15	Female	2	DPCP
02/22/05	Boone	344N 4E 33	Male	1	Sharpshooting
02/22/05	Winnebago	343N 2E 14	Male	5	DPCP
02/27/05	Winnebago	346N 2E 26	Female	3	Suspect
03/14/05	Boone	346N 3E 31	Female	3	Sharpshooting
03/14/05	Winnebago	346N 2E 14	Female	4	Sharpshooting
03/17/05	Winnebago	344N 2E 17	Female	2	Suspect

Appendix C. Locations and number per section of all CWD-positive deer identified through the end of FY04-05 (June 30, 2005). Includes deer identified in previous years.



Appendix D. Distribution of chronic wasting disease in southern Wisconsin and northern Illinois as of June 30, 2005. Squares represent sections in which CWD has been detected.