

Reporting Summary Associated with the 2017 EHD Outbreak in Kentucky

I. Overview

In order to gain a better understanding of the extent and severity of the 2017 Epizootic Hemorrhagic Disease (EHD) outbreak in Kentucky, the Kentucky Department of Fish and Wildlife Resources (KDFWR) solicited reports of suspected EHD cases from the public. Reports were received by phone, email, and the KDFWR online reporting portal between 7/19 and 11/21/17.* Reporters were asked to report the number of deer observed, whether deer were dead or alive, whether deer were male, female, or fawn, the condition of the carcass, a description of the location, address/GPS coordinates, and the date that the deer were observed.**

Reports were also received and investigated by regional biologists and other KDFWR employees. When possible, fresh samples of lung and spleen were obtained from suspected EHD mortalities and submitted to the Southeastern Cooperative Wildlife Disease Study (SCWDS) for diagnostic testing. Reports from all sources were compiled into a master list. Reports were checked for discrepancies, duplicate reports were removed, and reports where obvious trauma was the cause of death (e.g. obvious roadkill) were eliminated.

*Observations that occurred between 7/19-11/21/17 were counted as EHD suspects. Seven reports were submitted prior to 7/19. These reports are available for viewing in the master spreadsheet.

**When possible, the observation date was used to inform the following tables and figures. If the report did not include an observation date, the date of report submission was used instead.

II. Extent and severity of the outbreak

A total of 1812 reports were received, representing 4581 suspected EHD cases. Three thousand six hundred sixty-eight (80%) dead deer were reported, and 703 (20%) sick deer were reported. Ninety of 120 Kentucky counties had one or more reports of dead or sick deer due to suspected EHD (Table 1). Over 90% of reported cases occurred in Eastern KY, with 61.8% (2834) of reported cases occurring in the northeast region and 30.4% (1395) of reported cases occurring in the southeast region. For a map of the geographic distribution of reports received, see **appendix A and B**.

III. Time frame of the outbreak

The number of reported cases peaked from 8/23-9/12/17, with over 700 deer reported each week during that period. Reports declined steadily after this point until the online reporting portal was closed on 11/21/17 (**figure 1**). The last reported observation of a sick EHD suspect occurred in Whitley County on 11/6/17, and the last reported observation of a freshly dead EHD suspect occurred in Wolfe County on 11/11/17.

IV. Condition of deer/carcasses*

*Deer/carcass condition was not associated with individual deer, but rather with reports. The following numbers reflect the number of reports of deer in each condition, and not the actual number of deer.

Condition of deer/carcass was reported in 1541 of 1812 reports (85%). 22.7% (412) of reports included a deer that was alive, but sick; 25.1% (455) included freshly dead carcass(es); 29.1% (528) included

bloated, but intact carcass(es); 28.4% (516) included decaying or scavenged carcass(es); and 6.9% (125) included bones and/or skull. 15% (271) of reports did not include a description of carcass condition (**figure 2 & 3**). Observations of live but sick and freshly dead deer peaked during the week of 8/23-8/29. Observations of intact bloated carcasses and decaying carcasses peaked from 8/30-9/5, and observations of bones/skull peaked from 9/6-9/12 (**figure 2 & 3**).

V. Site where deer/carcasses were found*

*Sites were not associated with individual deer, but rather with reports. The following numbers reflect the number of reports of deer at each type of site, not the actual number of deer.

Overall, 58% (1051) of reports described deer that were at or near water; 14% (254) in woods or brush; 12.9% (234) in a field; 11.5% (208) beside a road; and 4.7% (85) in a yard. 21.7% (393) of reports did not have a location description (**figure 4 & 5**).

VI. Results of diagnostic testing

Lung and spleen samples were collected from 43 deer for diagnostic testing (virus isolation, SCWDS). EHDV-2 was isolated from 38 (86%) of these deer. A lung sample was also submitted from a single deer from Marshall county which tested positive for EHDV via PCR (Breathitt Veterinary Diagnostic Lab). Bone marrow samples were collected from 12 radio-collared doe carcasses in Clay County. EHDV was detected by PCR in seven of these 12 samples (58%), although virus isolation was not performed and the specific serotype was not determined (SCWDS) (**table 2**).

VII. Sex/Age ratios

Sex/age was reportable in three categories: male, female, and fawn. 24.9% (1141) of reported deer were male, 62.5% (2865) were female, and 5.5% (254) were fawns. Seven percent (321) of deer did not have associated age/sex data. Number of male and female deer both peaked between 8/23-8/29 and number of fawns peaked between 9/13-9/19 (**figure 6 & 7**).

VIII. Breakdown by County

Pike, Floyd, Morgan, Lawrence, and Carter Counties experienced the highest numbers of EHD reports, and 33 counties had 20 or more sick or dead deer reported (**figure 10**). All 33 counties with the most reports are located in the northeast or southeast regions of KY. Information on the breakdown of carcass condition, site descriptions, sex/age ratios, and sick/dead numbers in the top 33 counties are in **figures 11-14**.

IX. Tables and Figures

Table 1. Number of deer reported dead or sick due to suspected EHD in Kentucky counties (7/19-11/21/17). The total number of deer reported was 4581.

County Name	number of deer reported in county	County Name	number of deer reported in county	County Name	number of deer reported in county
		Franklin	0	Marshall	3
		Fulton	0	Martin	188
Adair	2	Gallatin	0	Mason	1
Allen	4	Garrard	6	McCracken	0
Anderson	0	Grant	0	McCreary	44
Ballard	0	Graves	0	McLean	0
Barren	0	Grayson	1	Meade	1
Bath	19	Green	1	Menifee	58
Bell	71	Greenup	51	Mercer	0
Boone	0	Hancock	3	Metcalfe	1
Bourbon	0	Hardin	0	Monroe	1
Boyd	124	Harlan	11	Montgomery	3
Boyle	6	Harrison	1	Morgan	271
Bracken	3	Hart	6	Muhlenberg	3
Breathitt	110	Henderson	0	Nelson	3
Breckinridge	1	Henry	1	Nicholas	4
Bullitt	1	Hickman	0	Ohio	9
Butler	0	Hopkins	4	Oldham	2
Caldwell	2	Jackson	31	Owen	4
Calloway	0	Jefferson	1	Owsley	104
Campbell	2	Jessamine	1	Pendleton	3
Carlisle	0	Johnson	175	Perry	53
Carroll	0	Kenton	2	Pike	556
Carter	204	Knott	87	Powell	40
Casey	2	Knox	181	Pulaski	74
Christian	3	Larue	0	Robertson	1
Clark	3	Laurel	21	Rockcastle	54
Clay	192	Lawrence	214	Rowan	116
Clinton	1	Lee	140	Russell	1
Crittenden	2	Leslie	105	Scott	0
Cumberland	1	Letcher	99	Shelby	2
Daviess	1	Lewis	14	Simpson	0
Edmonson	0	Lincoln	6	Spencer	2
Elliott	97	Livingston	2	Taylor	8
Estill	17	Logan	3	Todd	0
Fayette	0	Lyon	0	Trigg	2
Fleming	135	Madison	2	Trimble	1
Floyd	435	Magoffin	165	Union	0
		Marion	5	Warren	0

Washington	5	Wolfe	83
Wayne	34	Woodford	0
Webster	1		
Whitley	68		

Table 2. Diagnostic testing results of samples taken from EHD suspect deer. Fifty one deer were tested from 22 Kentucky counties. Lung and spleen samples were tested unless otherwise indicated. EHDV-2 was isolated in all positive cases, unless otherwise indicated below:

[§] Twelve of the 13 Clay county samples were obtained from bone marrow.

[‡] Seven bone marrow samples tested positive for EHDV via PCR, but the serotype was not determined.

^α One lung sample was submitted for PRC testing to Breathitt Veterinary Diagnostic Lab.

County	No. tested	No. positive	No. negative	No. pending
Breathitt	4	4	0	0
Carter	1	1	0	0
Casey	1	0	0	1
Clay	13 [§]	8 [‡]	5	0
Floyd	8	8	0	0
Hancock	2	1	0	1
Harlan	2	2	0	0
Hopkins	1	1	0	0
Jackson	1	1	0	0
Johnson	2	2	0	0
Knott	1	1	0	0
Lawrence	1	1	0	0
Lee	1	1	0	0
Leslie	1	1	0	0
Letcher	2	1	1	0
Marshall	1	1 ^α	0	0
Martin	1	1	0	0
Nicholas	2	0	1	1
Pike	2	2	0	0
Pulaski	2	2	0	0
Taylor	1	0	0	1
Wayne	1	1	0	0
TOTALS	51	40	7	4

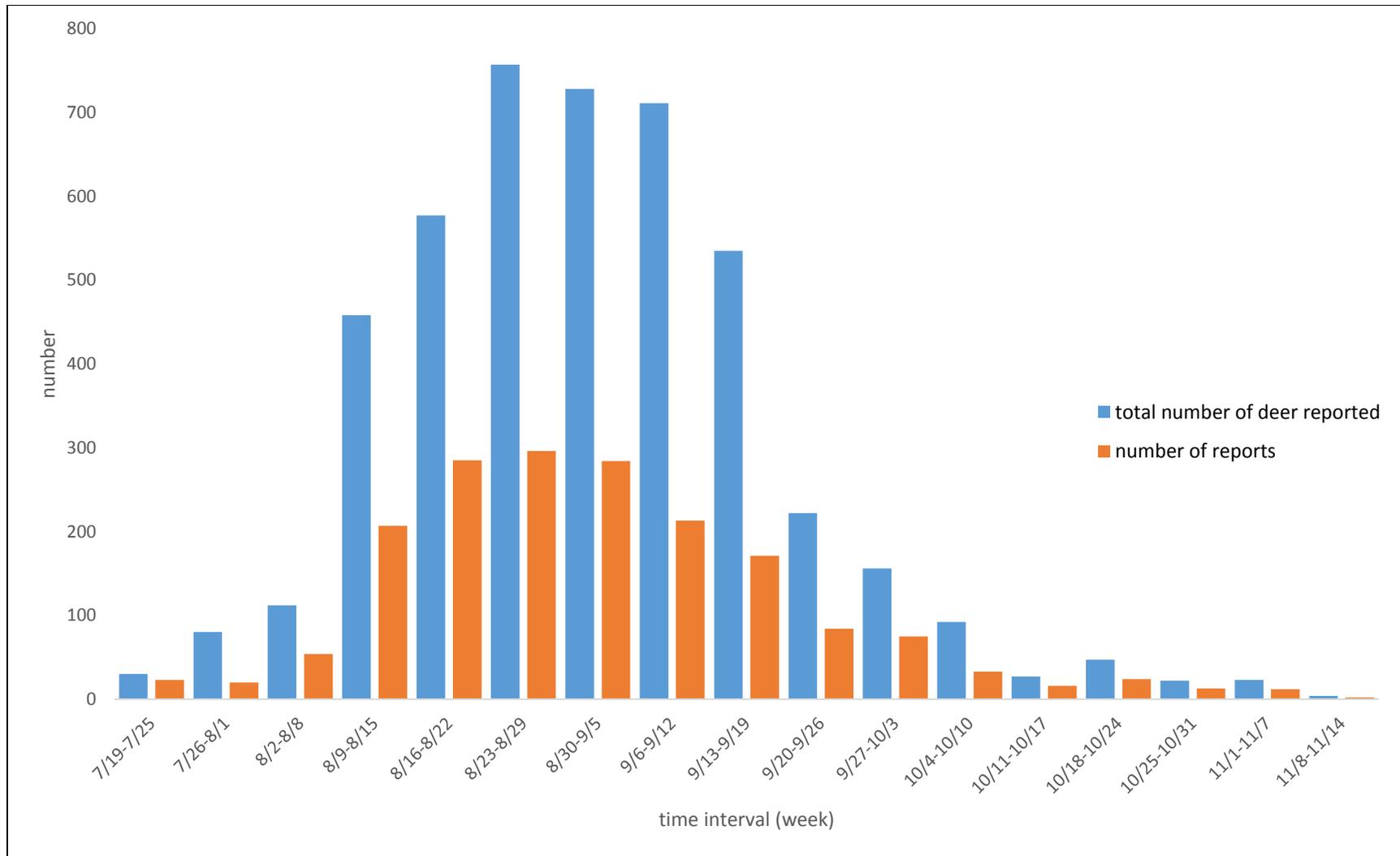


Figure 1. Epidemic curve of 2017 EHD outbreak. Number of reports and total number of deer reported during each week of the outbreak.

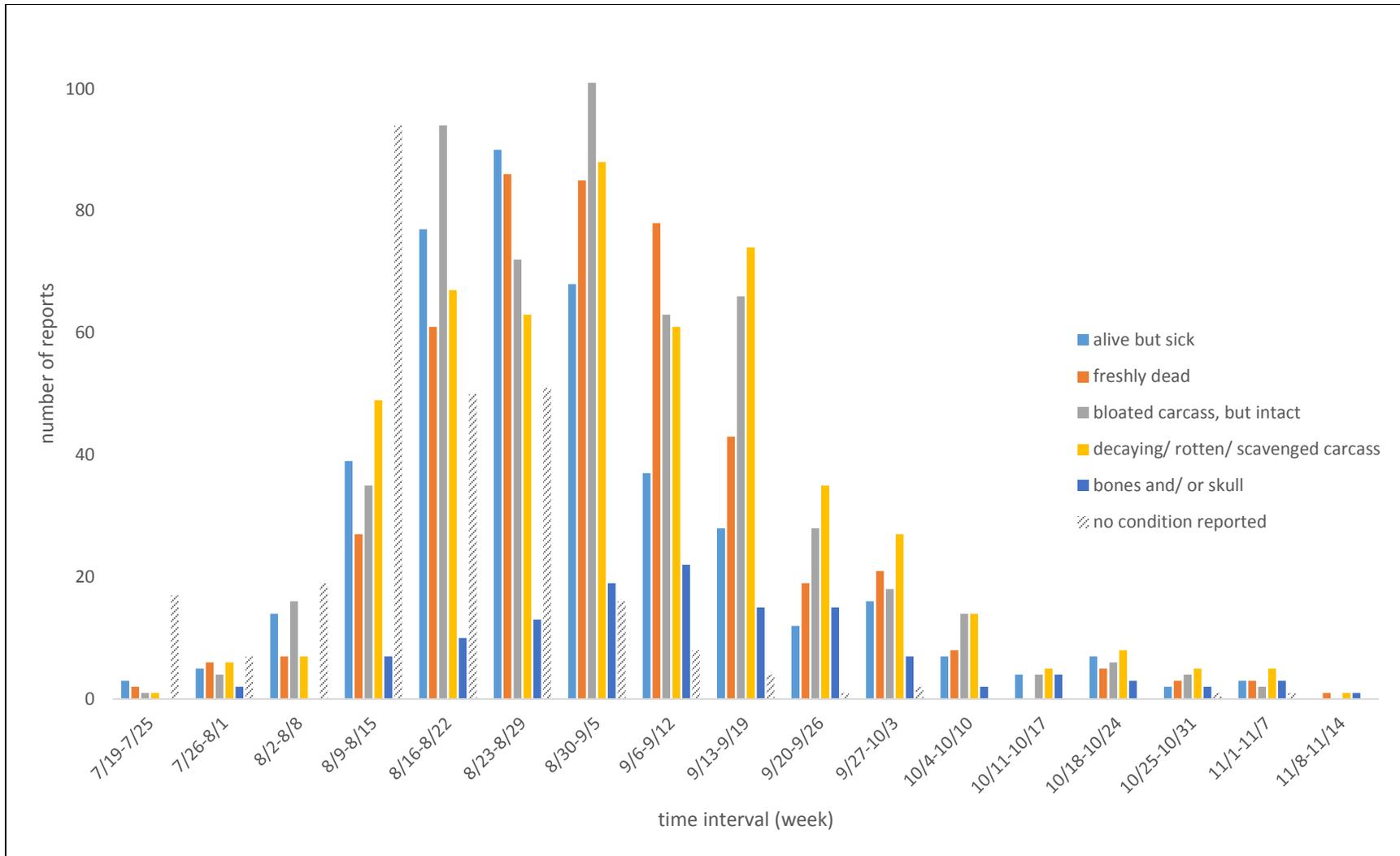


Figure 2. Reported condition of deer/carcasses during each week of the EHD outbreak. Overall, 412 reports indicated live but sick deer, 455 freshly dead, 528 bloated carcass, 516 decaying/ rotten/ scavenged carcass, and 125 bones and/ or skull. Two hundred seventy-one reports did not describe the condition of deer.

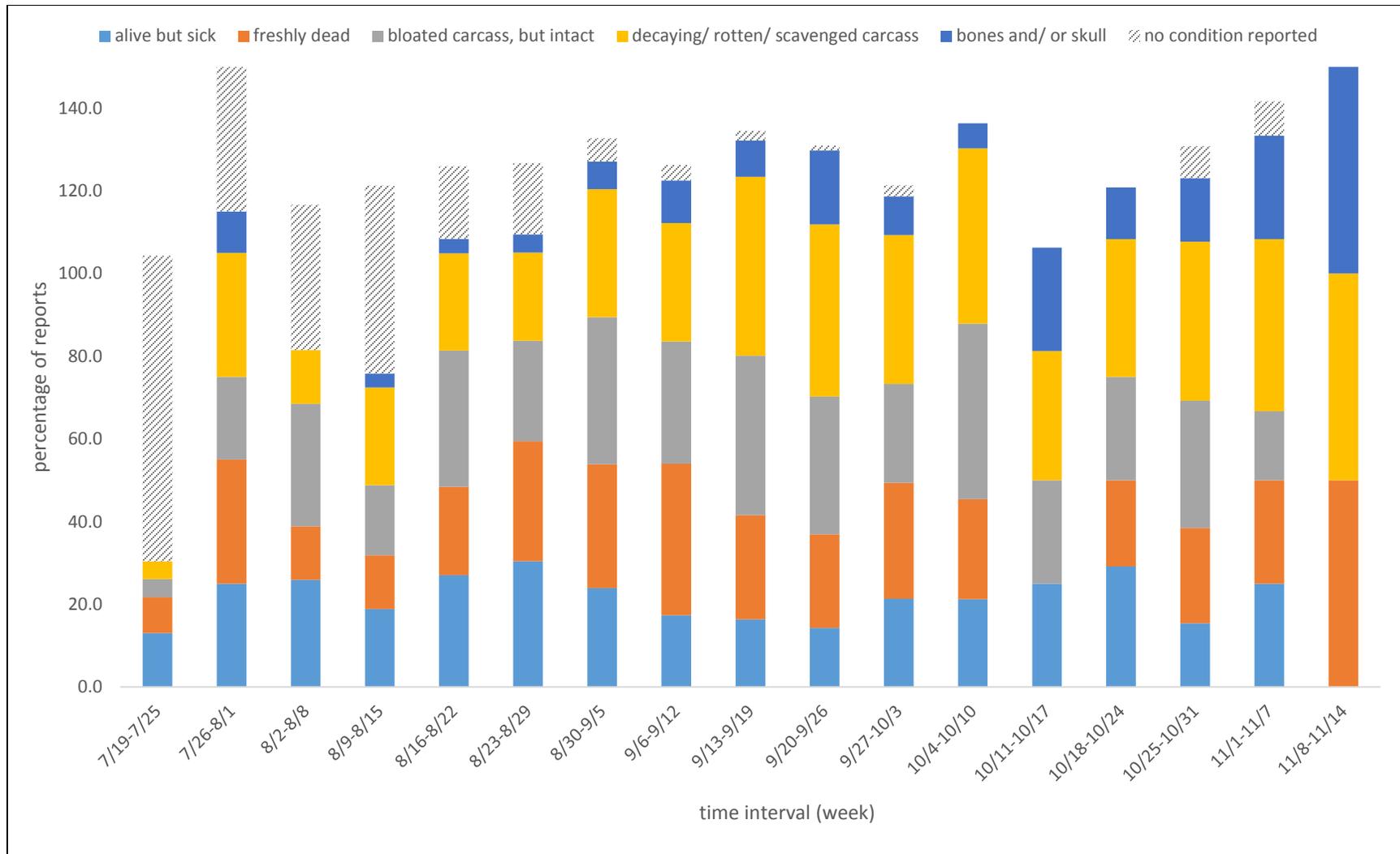


Figure 3. Percentage of reports of deer in each condition category, by week. 22.7% percent of reports indicated live but sick deer, 25.1% freshly dead, 29.1% bloated carcass, but intact, 28.5% decaying/ rotten/ scavenged carcass, and 6.9% bones and/or skull. Fifteen percent of reports did not describe the condition of the deer/carcasses. Cumulative percentages are greater than 100% due to multiple conditions being included in a single report.

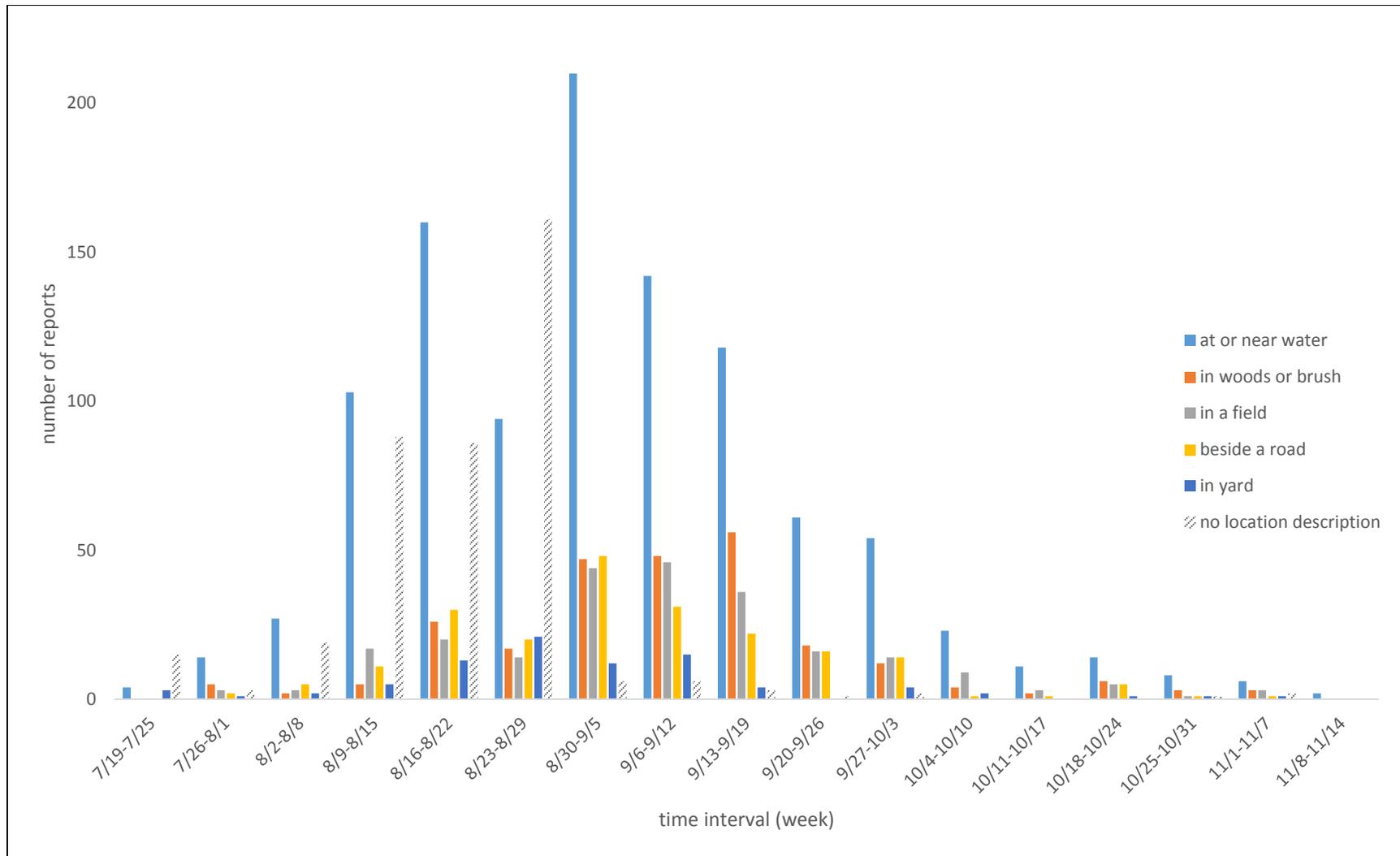


Figure 4. Number of reports of deer found at each type of site per week. There were 1051 reports of deer at or near water, 254 in woods or brush, 234 in a field, 208 beside a road, and 85 in a yard. 393 reports did not include a site description.

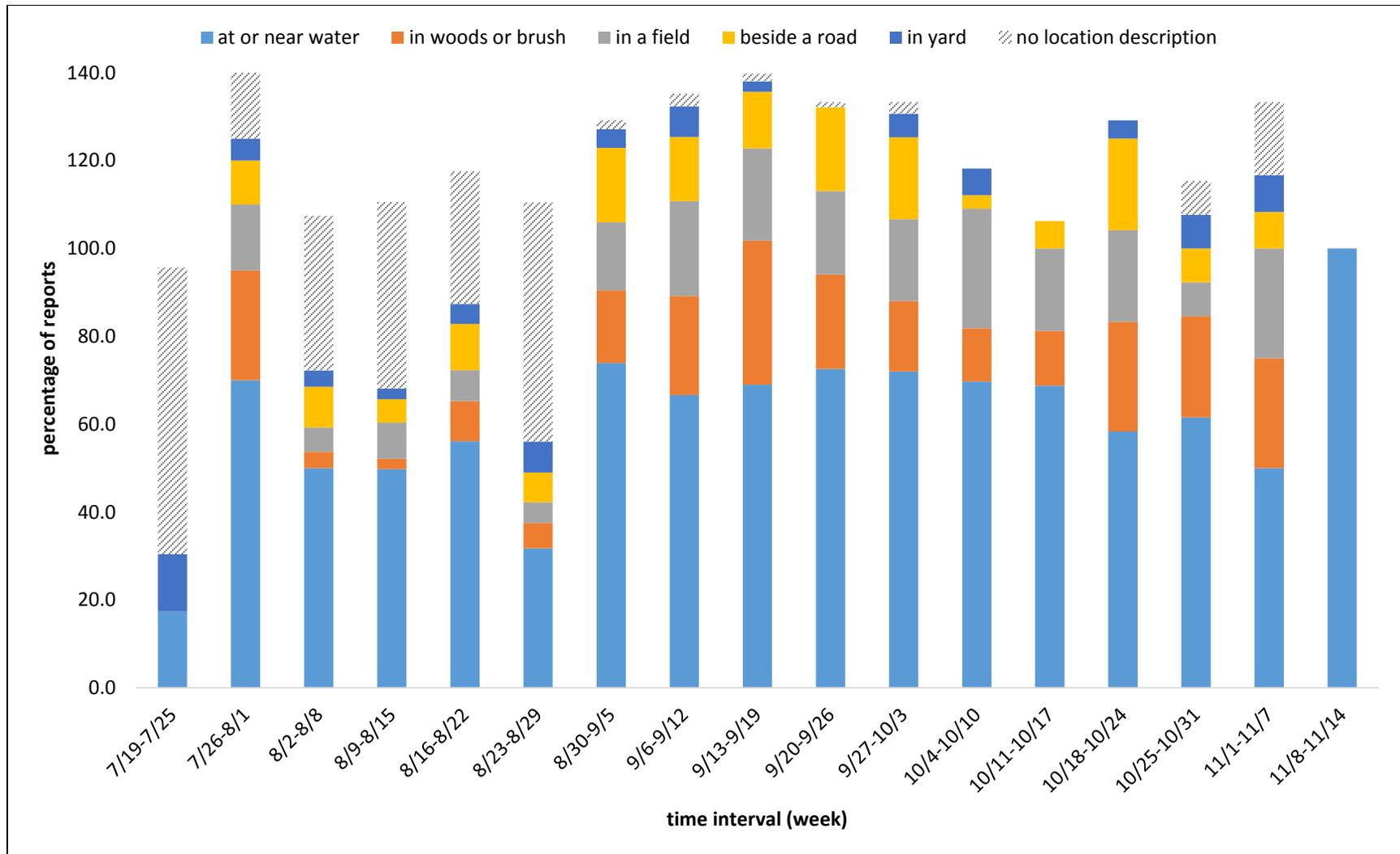


Figure 5. Percent of reports of deer found at each type of site per week. Fifty-eight percent of reports indicated deer were at or near water, 14.0% in woods or brush, 12.9% in a field, 11.5% beside a road, and 4.7% in a yard. 21.7% of reports did not include a location description. Cumulative percentages are greater than 100% due to multiple location categories being included in a single report.

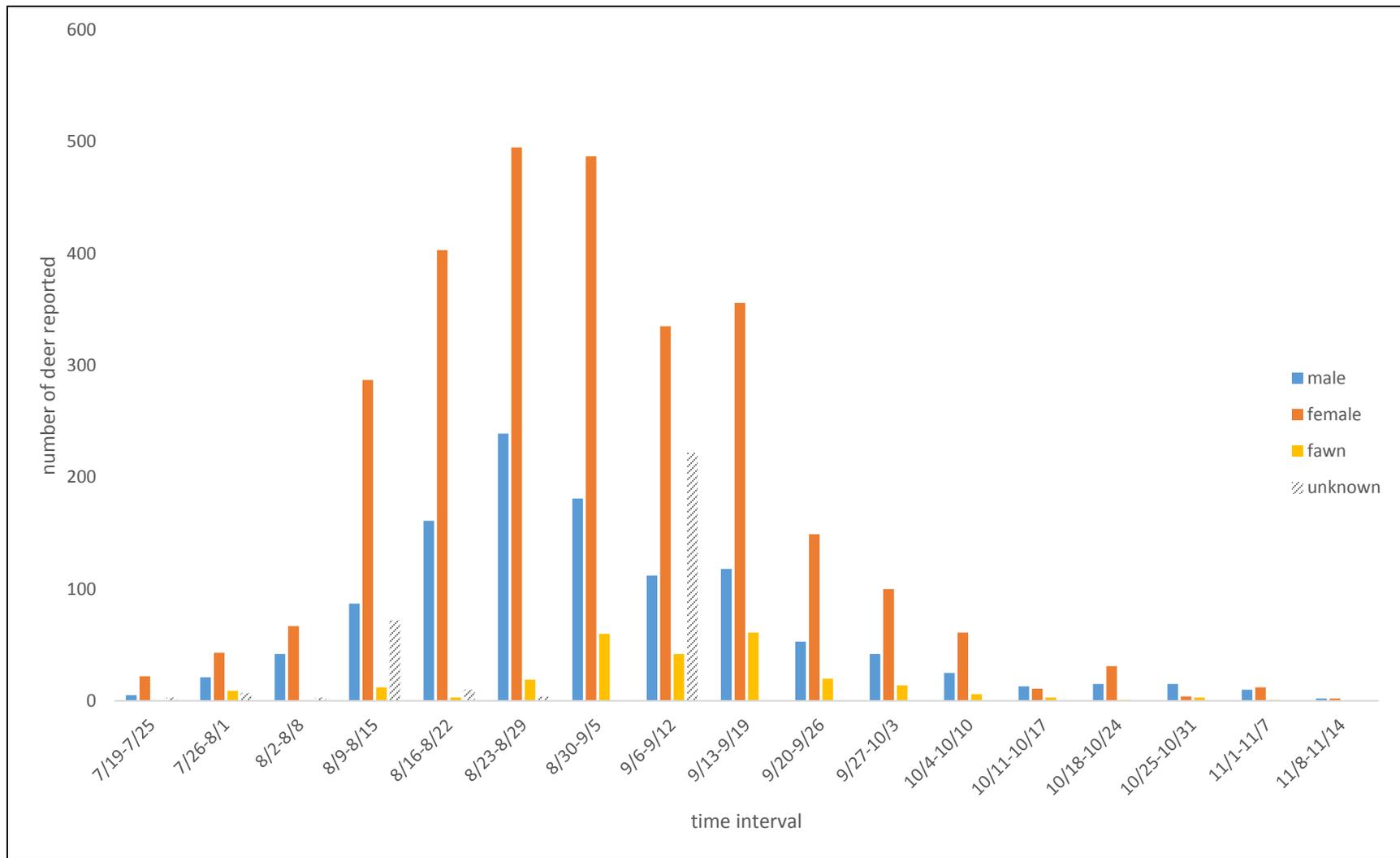


Figure 6. Number of males, females, and fawns reported per week. 1141 males, 2865 females, and 254 fawns were reported. Three hundred twenty-one deer were of unknown age/sex.

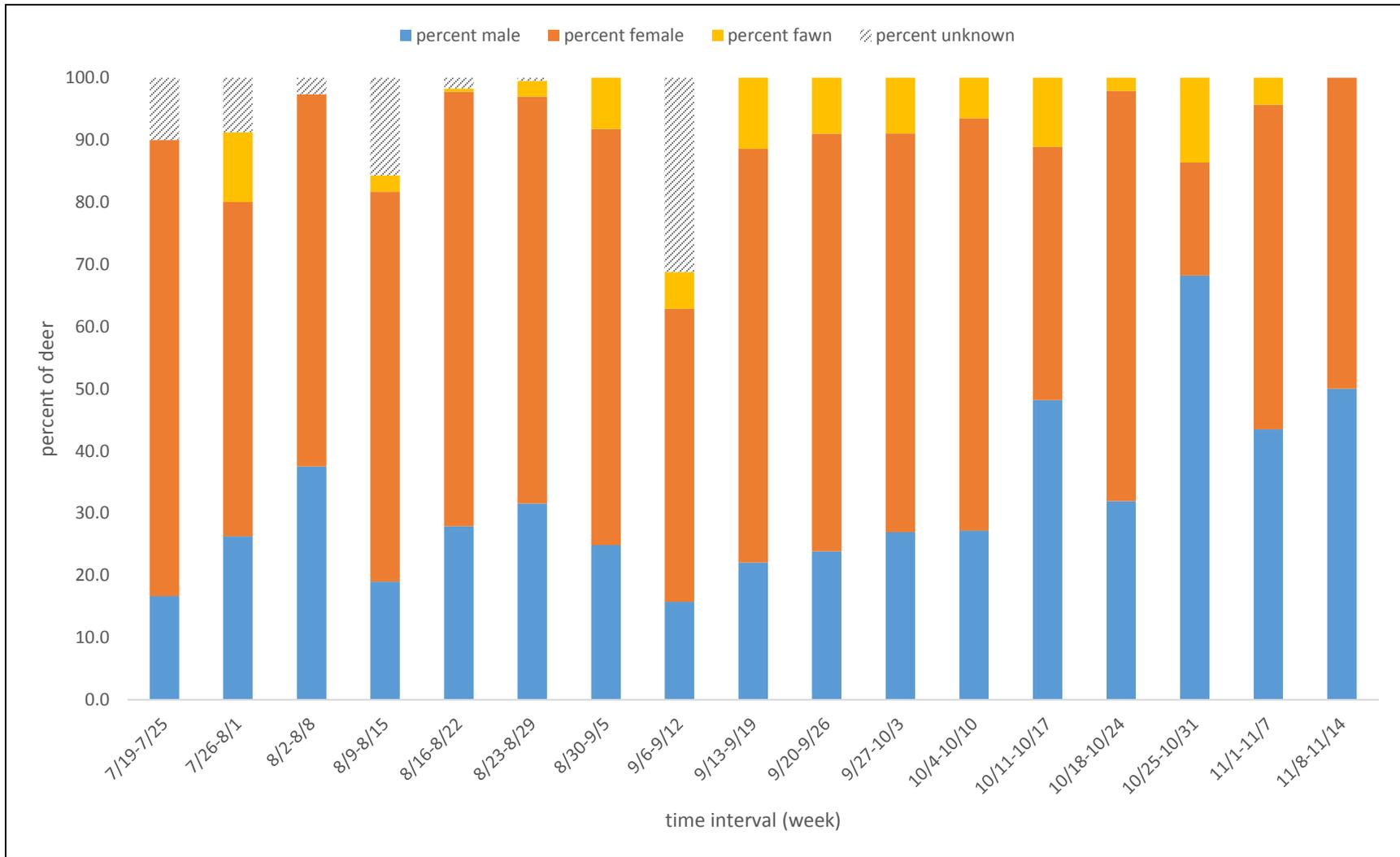


Figure 7. Percent of deer reported that were male, female, and fawn. 24.9% of reported deer were male, 62.5% were female, and 5.5% were fawns. Seven percent of deer were of unknown sex/age.

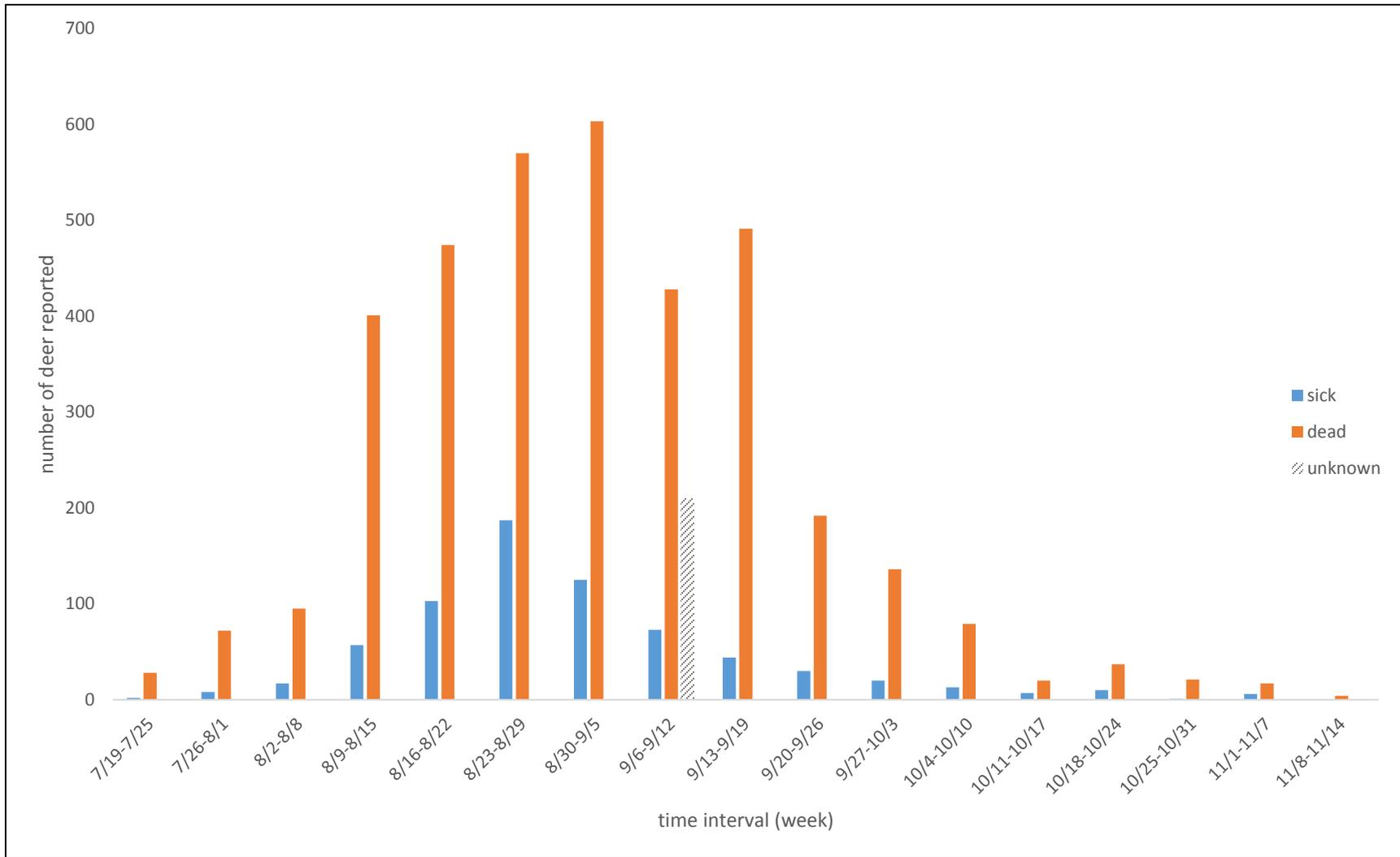


Figure 8. Number of sick and dead deer reported per week. Seven hundred three sick deer were reported, 3668 dead deer were reported, and 210 deer were unknown.

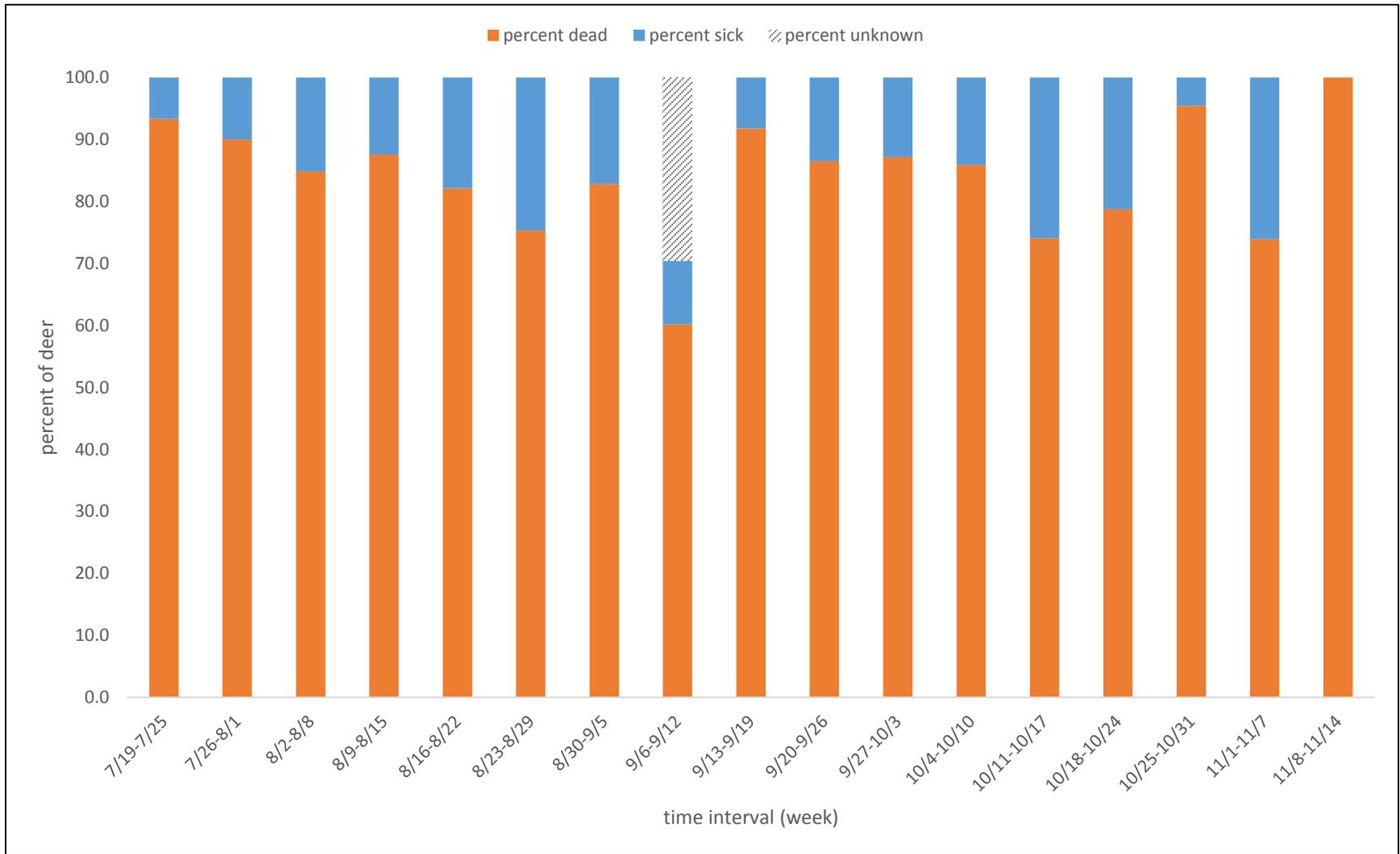


Figure 9. Percent of dead and sick deer reported each week. 15.3% of deer were reported as sick, 80.1% were dead, and 4.6% were of unknown status.

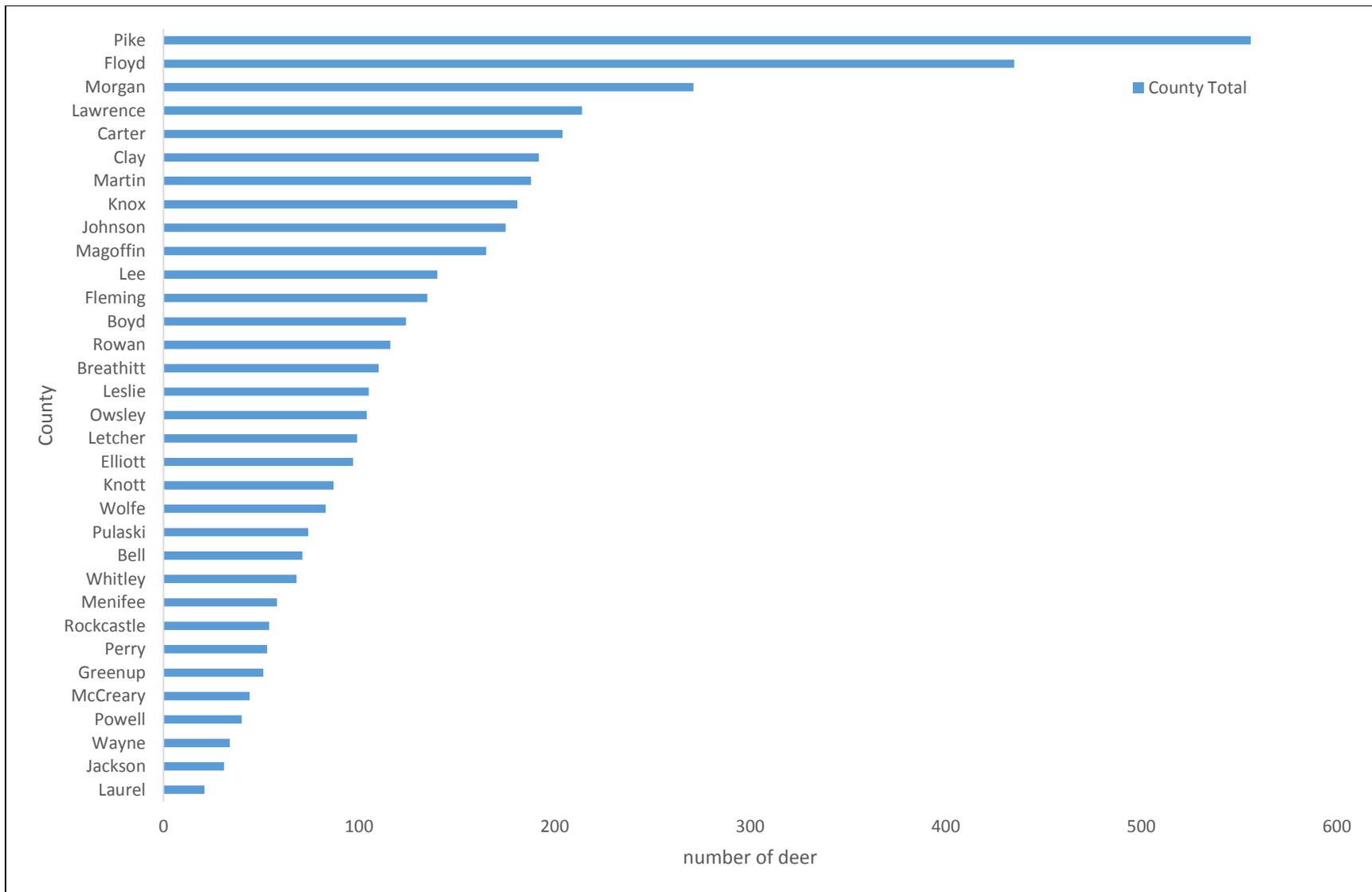


Figure 10. Number of suspected EHD deer reported from each county. Includes counties with reports of 20 or more deer.

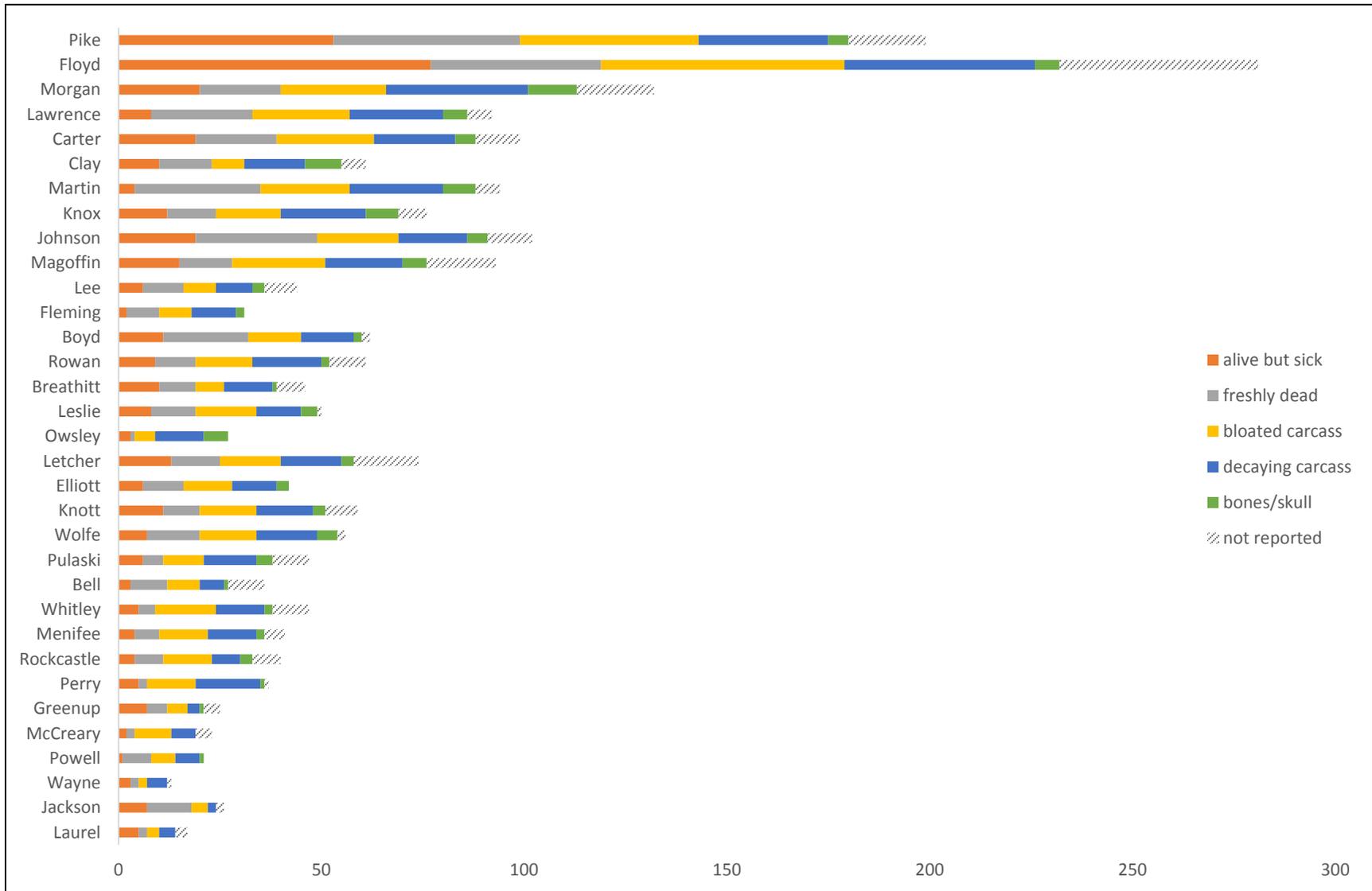


Figure 11. Number of reports of deer/carcasses in each condition class in counties with 20 or more reported cases.

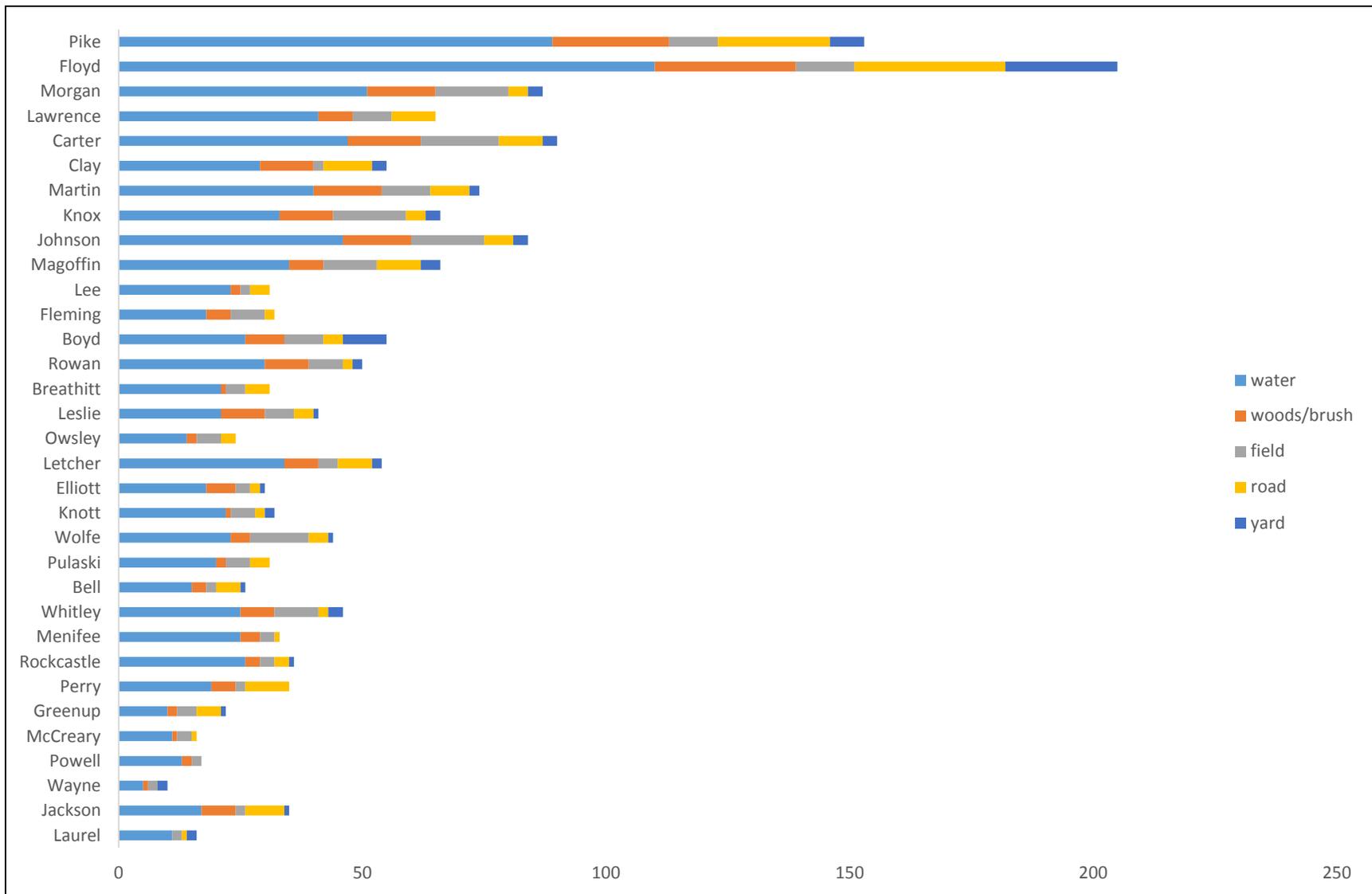


Figure 12. Number of reports of deer/carcasses in each location/site category in counties with 20 or more reported cases.

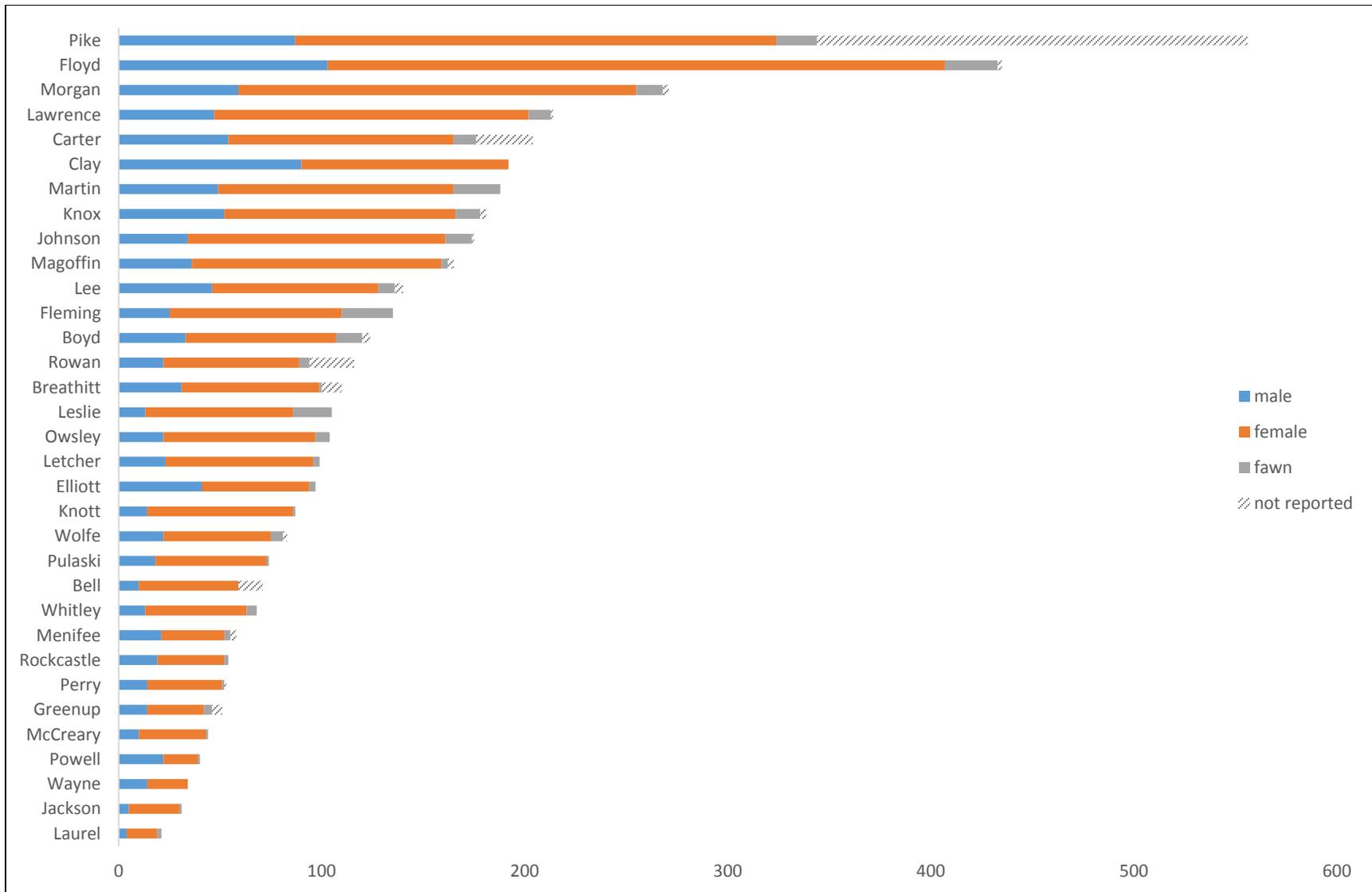


Figure 13. Number of deer reported per county in each sex/age class (male, female, and fawn). Includes counties with 20 or more deer reported.

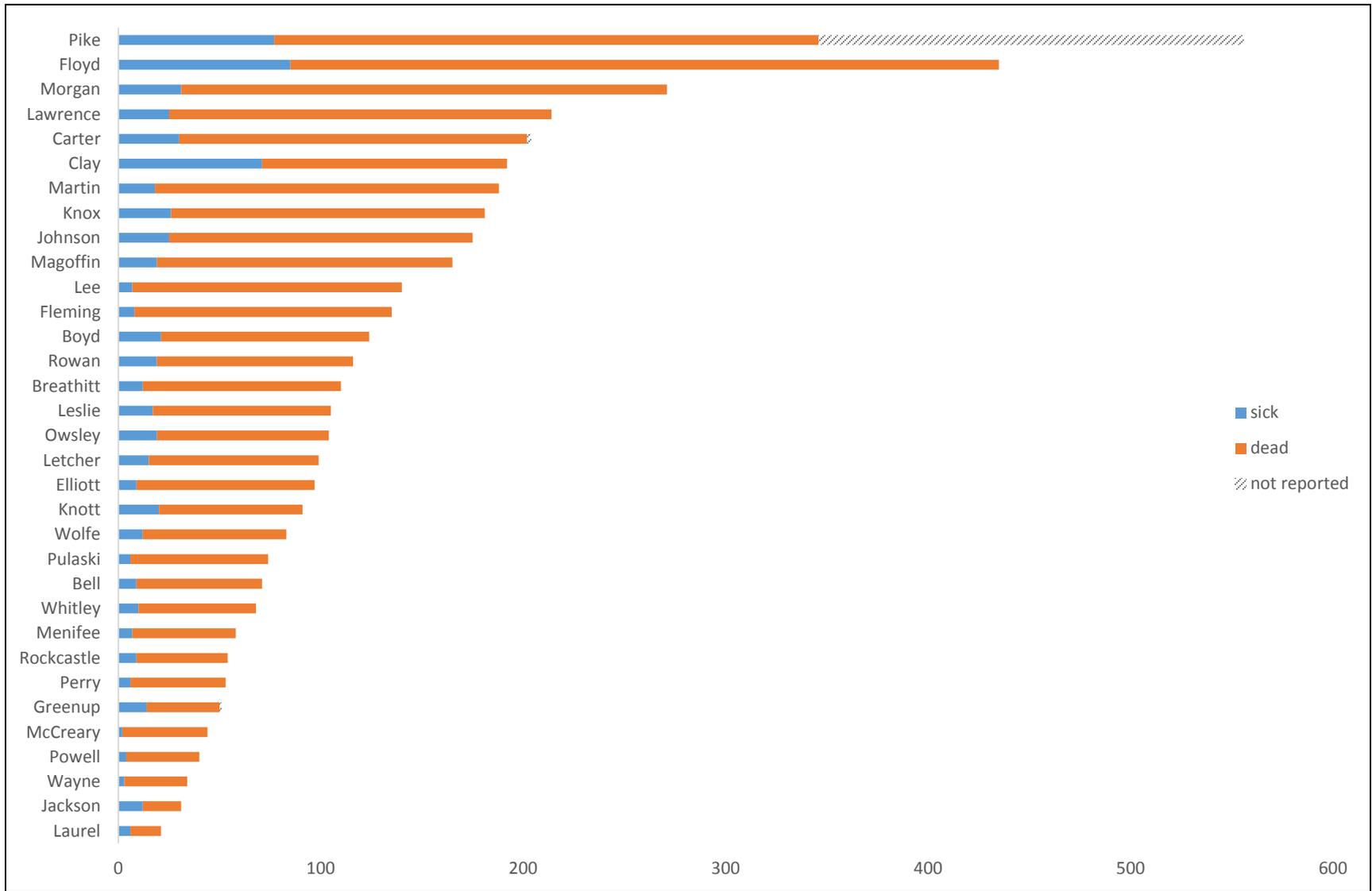


Figure 14. Number of sick and dead deer reported per county. Includes counties with 20 or more deer reported.

