2016 BOVINE TUBERCULOSIS SURVEILLANCE

During the 2016 hunting season, DNR’s goal was to test approximately 2,000 hunter-harvested deer for bovine tuberculosis, with a large proportion of the animals being bucks older than 2.5 years because of their higher value for disease surveillance. The objectives were to 1) determine the apparent prevalence rate of bovine tuberculosis in south Fayette and Franklin counties within a 10-mile radius of the 2016 affected farm where the first wild white-tailed deer tested positive, and to 2) detect the disease at a low prevalence level within a 10-mile radius of the 2011 affected farm in Dearborn County. By the end of the 2016 deer hunting season, 2,047 samples were collected and submitted to the Animal Disease Diagnostic Lab (ADDL) at Purdue University and to the NVSL in Ames, Iowa. All the hunter-harvested deer tested negative for bovine tuberculosis. An additional 23 white-tailed deer were collected after the hunting season had closed. Twelve deer were road-killed and 11 were taken on special disease depredation permits. One road-killed coyote was also collected and tested. All tested negative for bovine tuberculosis.

Calculating apparent prevalence

Because only a sample of the deer population in Franklin County were tested for bovine tuberculosis, we calculated the apparent prevalence rate of bovine tuberculosis for the surveillance zone, which is a best-estimate of the true prevalence (actual number of deer infected) of bovine tuberculosis in the wild deer population. True prevalence is only achieved by sampling every deer in the population, which is impossible in free-ranging white-tailed deer.

To calculate the apparent prevalence, we used the values determined by APHIS Wildlife and Veterinary Services scientists in Fort Collins, Colo., for the Cervid Sample Size Calculator to “discount” deer based on their age and sex (males and females less than 2 years old = 1/9 of bucks greater than 2 years old, females at least 2 years old = 1/3 of bucks at least 2 years old) and how the sample was collected (hunter harvested sample = 0.75; hunter harvested sample with a chest cavity inspection = 0.8; and a deer with a full necropsy = 0.85).

10-mile zone in southern Fayette and Franklin counties

A total of 938 hunter-harvested deer, 16 targeted deer (taken in July 2016), 11 deer taken on special disease depredation permits after the hunting season, and 12 road-killed deer collected after the hunting season were tested within a 10-mile radius of the location where the first infected wild white-tailed deer was found in Franklin County. Samples consisted of 251 deer less than 2 years old, 198 female deer at least 2 years old, and 528 male deer 2 years of age and older. Only one wild white-tailed deer, the wild white-tailed deer removed from the bovine tuberculosis affected farm in northern Franklin County, was positive for bovine tuberculosis.
Adjusting the number of deer using the Cervid Sample Size Calculator, we sampled an equivalent of 479.4 deer within the 10-mile radius, resulting in a bovine tuberculosis apparent prevalence rate of 0.21 percent with a 95 percent confidence interval (-0.51 percent, 0.93 percent) in 2016. Prevalence cannot be negative, so the range of possible rates is 0 percent to 0.93 percent, with 0.21 percent being the most likely. This is the best estimate of the true prevalence of bovine tuberculosis infected deer in the wild deer population in the south Fayette and Franklin counties 10-mile radius sampling area.

We can become more confident in our estimate of the true prevalence of bovine tuberculosis in the wild deer population and narrow the range of possible prevalence rates by sampling more deer in future years. The IDNR asks for continued support of hunters that hunt within 3 miles of the 2016 bovine tuberculosis affected farms to submit harvested deer for bovine tuberculosis testing in future deer seasons.

10-mile zone in Dearborn County

We tested 836 hunter-harvested deer within a 10-mile radius of the 2011 bovine tuberculosis positive farm in Dearborn County. The surveillance was comprised of 217 yearlings and fawns, 166 does that were at least 2 years old, and 453 bucks that were at least 2 years old. All deer sampled tested negative for bovine tuberculosis. Adjusting the number of hunter-harvested deer that were sampled using the Cervid Sample Size Calculator, we sampled the equivalent of 416 deer within the 10-mile radius. Given our sampling effort, the apparent prevalence rate of bovine tuberculosis was 0 percent with a 95 percent confidence interval (-0.67 percent to 0.67 percent) in 2016. Prevalence cannot be negative, so the true prevalence rate with a 95 percent confidence interval is between 0 percent and 0.67 percent, with a greater likelihood of the true prevalence being closer to apparent prevalence (0 percent) than at the far end of the range (0.67 percent) of the confidence interval.

Authorizations to take an additional buck

During the 2016 bovine tuberculosis surveillance effort, DNR offered an incentive for hunters to submit mature bucks for bovine tuberculosis testing. Hunters who harvested a buck at least 2 years old in the surveillance area and submitted it for bovine tuberculosis testing were eligible to receive an Authorization to Take an Additional Buck. The hunter’s second buck also had to be at least 2 years old, taken from the surveillance area, and submitted for bovine tuberculosis testing. DNR issued 819 additional buck tags to hunters and 113 (13.8 percent) of these hunters were successful in harvesting a second mature buck.

The Authorizations to Take an Additional Buck had minimal impact on the deer harvest of Franklin, Fayette and Dearborn counties. The number of bucks harvested in Franklin and Fayette counties increased by 85 antlered deer (7.7 percent) and 27 antlered deer (6 percent), respectively, from the number of bucks harvested in 2015. The antlered harvest in Dearborn County increased by only 10 bucks (less than 1 percent). The increase in bucks harvested in Franklin County was offset by a decrease in antlerless deer harvested by 266 antlerless deer (14.8 percent) from the number of antlerless deer harvested in 2015. Also, 205 fewer antlerless deer (13.8 percent) were harvested in Dearborn County.
Eighteen more antlerless deer (2.8 percent) were harvested in Fayette County in 2016 than in 2015. The total number of deer harvested in Franklin and Dearborn counties decreased by 181 deer (6.3 percent) and 195 (7.6 percent), respectively, from 2015 totals. The deer harvest in Fayette County increased by 45 deer (4.1 percent) from 2015.

Figure 1. Number of hunter harvested deer sampled per square mile for bovine tuberculosis in Fayette, Franklin, and Dearborn counties during the 2016 Indiana deer hunting season.
2017 bovine tuberculosis special permits

As a result of the overwhelming success of the surveillance effort, the DNR canceled previous plans to use sharpshooters to reduce the deer population throughout southern Fayette and Franklin counties in winter 2017. In its place, the DNR used a management plan that allowed landowners to remove a limited number of deer from their property using DNR-issued special disease control permits through March 31, 2017. Permits were issued only to landowners within the core surveillance area established in the 3-mile circles around the bovine tuberculosis-affected sites in Franklin County (see map below). Permits allowed a limited, specified number of deer to be removed for the purposes of reducing disease risk to livestock. As part of the permit application, applicants needed to meet either one of the two conditions: 1) an economic loss of property of at least $500 caused by deer, or 2) the need to protect livestock from the potential disease risk posed by wild white-tailed deer that may be infected with bovine tuberculosis. Permit holders were able to designate the individuals that would be allowed to shoot their specified number of deer on their permit application.

The sampled hunter-harvested deer were evenly distributed throughout the enhanced surveillance area. However, some areas were not adequately sampled and additional deer needed to be tested to verify the low apparent prevalence rate of bovine tuberculosis in high risk areas. Therefore, the heads of all deer taken using these permits were required to be submitted for bovine tuberculosis testing.

A total of 30 permits were issued to landowners to collect deer for disease testing. The number of deer allowed to be taken for each permit ranged from 1 to 5 deer for a possible total take of 114 deer. A total of 11 deer were collected by landowners using these permits.
Figure 3. The bovine tuberculosis Enhanced Surveillance Zone in Franklin and south Fayette counties, Indiana. Landowners within this zone are eligible for special disease permits to remove deer for the purposes of reducing disease risk to livestock.

Ban on feeding wildlife in Fayette and south Franklin counties

The Natural Resource Commission issued an emergency rule that prohibits the intentional feeding of deer in Franklin and south Fayette counties in order to help prevent the spread of bovine tuberculosis to other animals in the area. “An individual must not bait or knowingly or intentionally feed or attempt to congregate deer or any other mammal in Franklin County and Fayette County south of State Road 44. The use of salt and mineral licks and normal agricultural practices, including the use of food plots and the use of mineral or salt licks, are not prohibited” (Emergency Rule, LSA #17-170). This rule is effective through Sept. 23, 2017. More information is available at [www.in.gov/legislative/iac/20160921-IR-312160426ERA.xml.pdf](http://www.in.gov/legislative/iac/20160921-IR-312160426ERA.xml.pdf).

Questions about bovine tuberculosis in Indiana deer

Joe Caudell
State deer biologist
(812) 334-1137

Bovine Tuberculosis Hotline: (844) 803-0002