

# Tracking Deer Health with Kidney Fat

By Kip Adams

Herd monitoring is a crucial Cornerstone of Quality Deer Management. Collecting data from the habitat and deer herd allows managers to determine where the deer herd is with respect to the habitat's capacity to support it. This is how we determine whether we've harvested too few, too many, or the right number of deer. The presence, regeneration success, and browsing pressure on preferred plant and tree species are all indicators of habitat health that provide insight into the quality of deer forage and thus the health of a deer herd. These indicators are useful when you don't have any deer-population data, but they are more meaningful when combined with herd statistics. There are many ways to monitor the health of a deer herd including antler parameters, body weights, lactation status, fetal counts, parasite counts and fat stores. Fortunately, all of these statistics can be collected from harvested deer.

According to The Wildlife Society's *Wildlife Techniques Manual* (a textbook for wildlife research and management), a good index of deer nutrition and health should meet several criteria. It should be sensitive to slight changes in deer health, involve measurements that are easy to collect, measure condition of different age groups and sexes at different times of the year, and it should be objective. Fat storage is one index that meets these criteria, and it is an effective measurement of deer health due to the manner in which deer store and use body fat on an annual basis. In general, whitetails gain weight during late spring and summer, store fat during fall, and lose weight during winter and early spring. While depositing fat, whitetails store it in bone marrow first, followed by the body cavity, and finally just below the skin over the rump and backstraps. The fat is then used up in reverse order. Since fat is stored and used in this predictable manner, we can measure specific fat stores to estimate the amount of fat remaining in an individual deer and use it to monitor herd health.

Measurement of total fat stores is difficult, expensive and not practical for the average QDM practitioner, but

we can sample small areas to serve as indicators of total body fat. The more commonly used indicators include bone marrow and kidney fat. Because bone marrow fat is the last fat source available to depleted deer, this index is widely known and used to assess nutritional status of northern deer in late winter and early spring. Managers can view the marrow inside a jawbone or femur (thigh bone), rate the color and texture of the fat, and estimate the percent body fat remaining in the animal. New Hampshire Fish & Game and many other northern wildlife agencies routinely check femur marrow in dead deer as part of deer wintering-area surveys. This information helps predict the impact of winter severity on deer populations. A visual assessment of femur marrow is subjective (different observers might make different assessments) but it is easy to perform in the field. Chemical tests provide more objective results, but they must be conducted in a laboratory.

The amount of fat surrounding the kidneys is an indicator of abdominal fat reserves, so a kidney fat index (KFI) can also be used to evaluate the physical condition of deer. KFIs are more objective than visual assessments of bone marrow fat, and they have been used to assess nutritional status in whitetails, mule deer, elk, and several other species. This index fulfills the *Wildlife Techniques Manual's* requirements for a good nutritional index, including being easy to measure. KFI data is not necessary for basic herd monitoring in a QDM program, but if it is practical for you to collect this data using the method described below, it can help you closely track herd health.

Collect KFI data when field-dressing deer by removing the kidneys and their surrounding fat. Cut the fat at both ends of the kidneys perpendicular to the main kidney axis and discard the tissue that does not stay attached to the kidney (see the diagram).

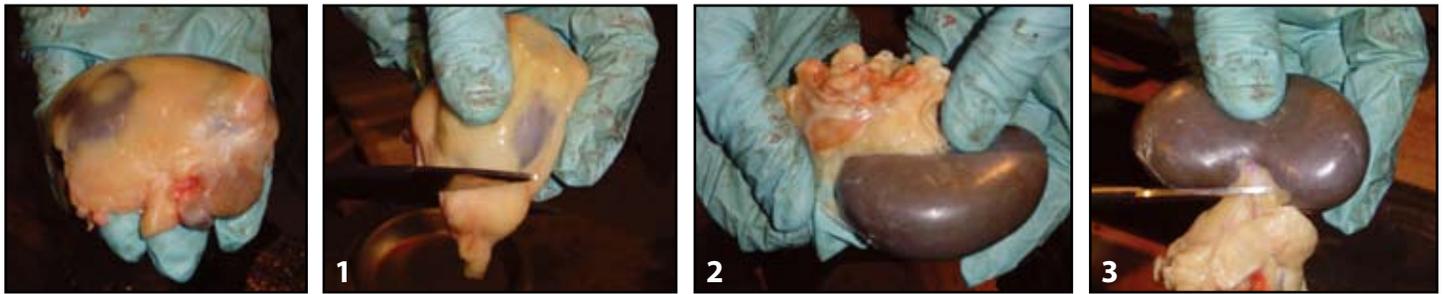


*Most hunters talk about the relative amount of body fat on deer they harvest, but an easy measurement of the fat covering the kidneys gives you solid harvest data to help track deer herd health across years.*



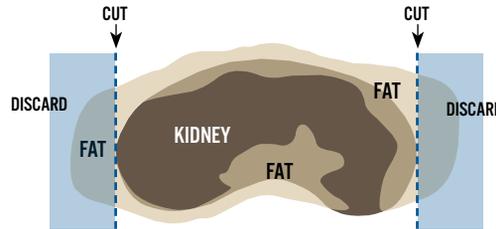
*With a scale and a few knife cuts, you can collect a kidney-fat index to help track deer health from year to year (photos courtesy of Mississippi Department of Wildlife, Fisheries & Parks).*

DEER HERD HEALTH EVALUATION DATA SHEET									
STUDY AREA		SOIL REGION				DATE			
DEER NO.	AGE	SEX	WEIGHT (LBS.)	PAIRED KIDNEYS	PAIRED KIDNEY FAT	FETUSES (NO. & SEX)	FETAL AGE	NO. OF CLS.	
24	3 1/2	F	100	126.8	167.4	2 (2males)	51/52	2	
205	6 1/2	F	110	148.1	196.2	2	44/45	2	
250	1 1/2	F	90	110.5	221.4	2	64/63	2	
259	1 1/2	F	103	134.0	497.4	3	54/54/54	3	
260	5 1/2	F	95	133.4	118.6	2	74/74	2	
268	4 1/2	F	102	117.2	168.2	2	79/80	2	
270	4 1/2	F	115	146.2	183.4	3	49/46/63	3	
279	1 1/2	F	98	148.1	124.5	2	44/49	2	
297	1 1/2	F	90	85.6	107.9	1	67	1	



The pictures above, shared by the Arkansas Game & Fish Commission, show the steps in removing kidney fat to collect a kidney-fat index. Cut through fat at each end of the kidney (1). Discard the fat that falls off. Remove and weigh the fat that remains attached to the kidney by peeling off the thin tissue surrounding the kidney (2) and cutting (3). Refer also to the diagram below (adapted from T. Riney, 1955).

Remove and weigh the remaining fat by cutting the thin tissue covering the kidney and peeling it away. Using a food scale, triple-beam balance (like you used in science class), or similar scale, weigh both kidneys without the fat and record the weight. Then weigh the fat from both kidneys. The KFI is expressed as a percentage and is calculated by dividing the weight of the fat by the weight of the kidneys and multiplying by 100. The higher the KFI value, the healthier the deer. It should be noted that KFI values can easily exceed 100 percent (meaning that the weight of the fat equals or exceeds the weight of the kidneys) in healthy populations and during times of fat deposition. Most biologists collect KFIs in grams, but it's okay if your scale is in ounces or pounds since KFIs are recorded as a percentage.



for specific projects or research purposes.

The beauty of the KFI is it is inexpensive, easy to conduct and can be performed at camp, home or on the bed of your pickup. The KFI is also a great site-specific index to herd health.

So, this fall when you pull that jaw-bone and record the lactation status or

antler parameters of your deer, take an extra minute to collect the kidneys and freeze them. When the season is over and you have a good reason to get together with the gang at camp, calculate the KFI for the deer herd in your area. 

**About the Author:** Kip Adams of Pennsylvania is a certified wildlife biologist and QDMA's Director of Education & Outreach in the North.

KFIs can vary widely by sex, age class and season, so you should only compare values among animals of the same sex and age class harvested in the same season. For example, it's not useful to compare KFI values from bucks and does shot in September, or for deer shot in October to those taken in January. It's equally incorrect to compare values from buck fawns to adult bucks. However, within a sex, age grouping (fawns, yearlings, 2.5+ year-olds, etc.) and season, KFIs provide a good measure of relative health during a given year and provide meaningful comparisons of herd health across years. And as with any herd monitoring data, the more samples you collect, the better the data.

KFIs can be compared from deer found dead during spring or shot during fall and winter. When collected from deer harvested during fall, they also provide a quantitative estimate of how healthy the deer herd is entering winter.

A few state agencies including the Arkansas Game & Fish Commission and Mississippi Department of Wildlife, Fisheries & Parks conduct large-scale KFI evaluations. Others collect a few kidneys



### About This Article

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