



## Physical Anthropology Section – 2011

### H3 Taphonomy of a Mass Grave in Mid- Michigan: The Case of the Missing Cattle

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Forensic anthropology skills can be applied to a variety of medico-legal situations. The goal of this presentation is to discuss a unique instance of a mass grave site in Mid-Michigan in order to provide future investigators with information about the decomposition, taphonomy, and recovery of deeply buried remains.

This presentation will impact the forensic science community by providing an example of how forensic anthropology expertise, including knowledge of decomposition, skeletal anatomy, and recovery techniques, can aid law enforcement in what may not be a "typical" human remains case.

In August of 2009, the Michigan State University Forensic Anthropology Laboratory (MSU FAL) was called to assist the Livingston County Sheriff's Department with an ongoing legal dispute between two parties over the disappearance of approximately 160 head of beef cattle. The plaintiff in this case claimed the defendant had sold the cattle for profit, while the defendant claimed that these animals had died approximately two years prior and were buried on his farm. In order to settle this dispute, the defendant was required to provide evidence of the buried animals. The excavation was monitored to determine how many animals were present, estimate the time since death, and to interpret the stratigraphy of the burial pits.

This case was atypical in a number of ways: the individuals were cows and steers; they were buried in a mass grave; due to the legal issues surrounding this case, the defendant was responsible for exhuming the animals; and there was little scientific control over the operation of the backhoe during the excavation. Regardless, this unique situation provided important information about the decomposition and taphonomy of a mass grave excavated with a backhoe that could aid future researchers.

The mechanical action of the backhoe dispersed and broke up the cattle remains during the excavation. Some skeletal elements survived this process better than others. During the excavation, skeletal elements were organized by element in order to determine a minimum number of individuals (MNI). This process revealed that skulls and innominates were recovered less often than long bones such as femora, tibia, or humeri. This may be due to the fact that, quite often, skulls were crushed while long bones were more durable. In addition, the animals recovered were young, growing, feeder cattle, and many innominates were still separated into their smaller elements which may have made them more difficult to recover. The MNI was eventually determined by the recovery of 23 left tibias.

The cattle were buried in a large pit where some animals were very close to the surface and others were buried quite deep – up to 3 to 4.5 meters. Time since death estimates were based on the degree of decomposition, taking into account the burial depth where the animals were recovered. Cattle recovered near the ground surface were skeletonized, mainly dry, and had some mummified skin and tendons. Deeply-buried animal bones were wet with black decomposing sludge and had adhering skin, fur, cartilage, and tendons. This would be an expected pattern of differential decomposition due to different burial depths. Age-at-death estimates concluded the animals had most likely died between 2 to 7 years based on these observations.

One of the important questions regarding this case when it went to trial was whether there were any additional animals in the pit when the defendant had finished digging. Decomposition staining of the pit walls was noticeably black, where it made a strong contrast with the surrounding lightly-colored soil. It served as a good indicator of where additional animals were located as the defendant excavated the burial pit. At the conclusion of the excavations, no additional animals were in the pit due to the lack of decomposition staining.

This atypical case is one example of how knowledge of skeletal anatomy and field recovery techniques can assist with a variety of investigations. This mass cattle grave excavated with a backhoe presented special challenges to the interpretation of time since death and MNI.

#### **Taphonomy, Decomposition, Recovery**