H83 Using GIS Technology to Locate Clandestine Human Remains

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Attendees will learn the application of geographical information systems (GIS) technology to locating and predicting the location of clandestine human remains.

This study provides law enforcement and medical examiner personnel with a model and predictive tools to reopen "cold" cases where no remains were located and allow them the opportunity to re-examine and search for these remains.

GIS technology has contributed spatial analysis to the fields of geography, archeology, and epidemiology. Forensic anthropology can benefit greatly by the application of GIS to the location of clandestine human remains and to the mapping of missing and/or unidentified individuals to yield spatial patterns in the data. This paper presents two applications of GIS data to the location and mapping of clandestine human remains.

The first case study involved the use of GIS to locate scattered human remains. An article of clothing was discovered in a wooded area. The clothing matched an item belonging to a missing person who had been missing for three years. A grid matrix was overlain onto a 35 acre plot of land in a rugged hillside terrain. Grid lines were laid out and trained State Police searchers (Special Emergency Response Teams) were employed to cover, in "arm-to-arm" search style, 100% of the wooded terrain. The location of each article of evidence and any skeletal elements were added to the grid matrix using global positioning system (GPS) instruments. As more items were located, the resulting map began to indicate directionally, the source of the skeletal remains, which had been scattered over the hillside by a scavenging carnivore. After a period of three weeks, over 50 acres were covered and the site where the body had initially been deposited on the surface was located. The location of the original "drop" site allowed crime scene specialists to process the site for trace evidence allowing for the potential of linking the crime to a potential suspect. Approximately 40% of the individual was recovered using this location technique and 100% of the grid area was covered.

The second case study involved applying this location and recovery technique to cases of unidentified skeletal remains and missing individuals from the last twenty years in Massachusetts. The locations of unidentified clandestine remains were mapped using GIS and compared to sites where human material was recovered and identified. These data were analyzed using demographic and spatial variables including geographical landmarks, distance to roads, indoors vs. outdoors, buried vs. surface, etc. Interesting patterns in the data emerged that may be useful predictors in "cold" cases. Utilizing trends from previous scenes, a predictive model was developed that missing and abducted individuals could potentially have been deposited within a 5 mile radius of their abduction. Using the abduction site as the center, a five-mile radius was circumscribed and the following sequence of questions was applied: 1) Did the original search cover all of the localities presented in the five mile radius?; 2) What topographic landmarks exist within the 5 mile grid area and are these likely to have been areas where a body was deposited? and; 3) Reopen the "cold" case and implement a 100% grid search of all likely areas within the five mile radius, with special attention to surface scatters of skeletal material, material evidence, soil and ground disturbances, areas of subsidence, and construction that may have occurred in the intervening years.

This type of modeling has allowed researchers to revisit "cold" cases and apply these systematic testing techniques to ascertain if the original deposit of human remains was somehow missed or overlooked by searchers.

Geographical Information Systems, Clandestine Human Remains, Modelling

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