



Anthropology Section - 2015

A70 Utilizing Geographic Information Systems (GIS) to Analyze Geographic and Demographic Patterns Related to Forensic Case Recovery Locations in Florida

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After attending this presentation, attendees will have a better understanding of how GIS can be utilized by forensic anthropologists and the forensic science community at large and how GIS has elucidated patterns of body recovery at the C.A. Pound Human Identification Laboratory (CAPHIL) at the University of Florida.

This presentation will impact the forensic science community by demonstrating how the application of GIS provides a powerful tool for understanding the spatial distribution of case recoveries within specific geographic and cultural areas.

GIS can be used to provide information about the physical and cultural environment that humans inhabit. As such, it is a valuable tool that can be utilized to provide information about overall patterns of body recovery. In the case of this research, this study examines how geographic and demographic factors, such as topography, population density, and crime rates influenced or affected the spatial distribution of the forensic anthropology cases that are analyzed by the forensic analysts at CAPHIL.

In order to look for patterning, 92 cases spanning a five-year period (2007-2012) were selected and geolocated to a map of Florida using the program ArcGIS®. Recovery sites were selected for geolocation based on the following criteria: they contained human remains, they were recovered in the state of Florida, and the data on their recovery location was sufficiently complete for geolocation. Private cases and scene searches that did not yield human remains were excluded. ArcGIS® is equipped with a feature that allows the user to input addresses from a database file and use those addresses to create a point feature class data layer. Thus, each geolocated CAPHIL case appeared as a specific point in an ArcGIS® data layer that could interact with existing data layers collected from the Florida Geographic Data Library (FGDL), which serves as a repository for GIS map data created by state and federal institutions, such as the Florida Fish and Wildlife Conservation Commission and the United States Census Bureau.

The results of overlaying geolocated cases over map layers of physical land cover (swamp, forest, agricultural land, etc.), population density, and crime rate indicate that for the five-year period examined, the majority of cases brought to the University of Florida were recovered from designated urban areas, were found in areas of low population density (less than 300 people per square kilometer), and that the majority of remains were recovered from areas with very low to medium crime rates (a Police Report Index of less than 25,000 reports filed annually; less than 30 murders annually). Seventy-seven percent of geolocated cases were recovered from urban areas. Interestingly, though land cover maps designate these areas as environmentally urban, this does not make them synonymous with densely populated areas due to the fact that 48% of case recoveries were from areas of low population density. Regarding the relationship between crime rate and the selected cases, this study found that 78% of cases were recovered from areas with less than 25,000 police reports filed annually and 75% of cases were found in areas designated medium to low in terms of annual murder rates. Chi-square statistical analysis revealed all results to be significant.

While the results of this study convey important information about the spatial patterning of case recoveries in Florida and indicate how GIS can be employed to aid the forensic anthropology community at large, the lack of proper addresses and/or GPS coordinates from individuals recovered from a few very remote locations, such as the Ocala Nation Forest and open water areas off the Florida Keys, contributes to a certain amount of underenumeration. In many of these cases, issues regarding underenumeration of certain physical environments could be solved by encouraging the individuals conducting the recovery of the remains to take a GPS coordinate of the recovery location when possible. Though underenumeration does occur and not all cases will possess the requisite information for inclusion, GIS remains a powerful tool in regard to understanding potential patterns related to the spatial distribution of case recoveries.

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