A132 Using Satellite Telemetry to Study Vultures and Other Scavengers in Taphonomic Research

Lauren R. Pharr, PhD, 6634 Central Avenue Pike, Ste 102, Knoxville, TN 37912*

After attending this presentation, attendees will better understand the benefits and limitations of using satellite telemetry and Geographic Information Systems (GIS) in forensic contexts and taphonomic research. Satellite telemetry, or the remote Global Positioning System (GPS) satellite tracking of wildlife, provides location and altitude data on animal movements, such as vulture flight patterns.

This presentation will impact the forensic science community by providing new insight concerning: (1) whether or not vultures can be trained, then tracked as a way to locate human remains; and, (2) the methodological limitations of satellite telemetry when applied to studies involving terrestrial scavengers.

The circling vulture is a universal symbol of death, and these obligate scavengers use olfaction to search for fresh decay. In previous instances where individuals were reported missing, anecdotal accounts have suggested that investigators should search the area where circling vultures were seen; however, the circling vulture may be soaring within a wind vortex, or thermal, rather than about to scavenge a set of decaying remains.

To learn if vulture flight patterns can be used to identify vulture-scavenging locations, six vultures were trapped, GPS tagged, then released from the Texas State Forensic Anthropology Research Facility (FARF) in San Marcos, TX. The hourly locations of the vultures were monitored for six months and resulted in more than 15,000 GPS data points that included information on geographic location (distance), altitude, and flight speed. These variables were analyzed using GIS, allowing for the identification of scavenging behaviors in vultures.

Providing the ability to detect likely vulture scavenging locations from GPS tracking, satellite telemetry provides a wealth of information useful for advancing forensic taphonomy research. Nevertheless, limitations of satellite telemetry should be considered before a tracking study begins. These limitations include costs and logistical difficulties with trapping and tagging animals as seen in the examples below.

In 2014, a Medical Examiner (ME) consulted with this research regarding his plan to trap, train, and then release and track a GPS-equipped vulture to locate human decedents. Because vultures travel long distances, the idea of training a vulture to locate a human body in a fixed, small area is not realistic. For example, turkey vultures released from FARF traveled throughout Texas and into Oklahoma. Moreover, rather than a specific human or animal food source, vultures prefer to locate and scavenge fresh carrion by using their sense of smell. The benefits of the ME's proposal did not outweigh the costs in terms of time or finances.

Forensic anthropologists have suggested that the vulture tracking project be repeated using terrestrial scavengers such as coyotes. Based on experience, this could provide new insight concerning the distance a coyote could potentially travel with a bone from a forensic case; however, detecting the scavenging behavior of a coyote within the GPS data is a concern. For each vulture tracking location, GPS transmitters provided altitude and flight speed. Hourly changes in these two values allowed for the detection of possible scavenging locations; however, a coyote is always close to the ground, which makes it difficult to determine if a coyote is resting or scavenging. Therefore, the information that was most helpful in identifying the patterns in vulture behavior will be absent in terrestrial scavengers. Thus, satellite telemetry will not work as well for land scavengers because of the difficulty in identifying their scavenging behaviors.

Despite the limitations associated with GPS tracking research, with careful planning, a GPS study can provide new insight into scavenging behavior and substantially benefit the forensic community in solving cases for years to come.

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The use of migratory birds and other animals for research was conducted with federal, state, and university approval. All vultures were released unharmed and permits are available upon request.

GPS Tracking, Scavenger, Vulture