



Physical Anthropology Section – 2011

H95 Scavenging Impacts on the Progression of Decomposition in Northern New England

Marcella H. Sorg, PhD*, University of Maine, Margaret Chase Smith Policy Center, 5784 York Complex, Building #4, Orono, ME 04469

After attending this presentation, attendees will better understand the potential effects of scavenging on differential decomposition, and how these modifications may influence estimations of postmortem interval (PMI).

This presentation will impact the forensic science community by illustrating how regional ecological variation can affect accurate estimation of PMI.

Many researchers acknowledge the critical role scavengers can play in the scattering of remains and postmortem modification. However, few studies document the impact of scavenging on PMI estimates. Recent research and experimental studies in the Midwest have demonstrated the utility of estimating accumulated degree days (ADD), by assessing of decomposition. Megyesi et al. (2005) and Sheil (2008) have proposed an ordinal scale ("total body score," referred to as TBS) to assess the extent of decomposition in three body zones (head and neck, torso, and limbs) and use the resulting score in a regression formula to calculate an ADD range.

With more than 90 percent of its land covered in forest, Maine's outdoor forensic cases are usually (70 – 80% percent) modified by scavengers, making it an extremely important taphonomic issue. Often, whole regions of the body are consumed, scattered, or missing. Megyesi's methodology was piloted with a small sample of nine forensic cases from Maine with a known PMI and an ADD calculated from nearest weather station data. A recently developed Regional Taphonomy Geographic Information System (GIS) was used to assess the macroenvironmental context and calculate the weather station-based ADD for the PMI dates in each case. Five cases lacked representative elements for one or more of the anatomic regions. When all regions are represented, these preliminary data show that formula-calculated ADD ranges tend to be much lower than the actual ADD range.

Maine's "scavenger guild" includes both mammalian and avian animals, predominantly coyote (*Canis latrans*), black bear (*Ursus americanus*), fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), raven (*Corvus corax*) crow (*Corvus brachyrhynchos*), turkey vulture (*Cathartes aura*) and bald eagle (*Haliaeetus leucocephalus*), as well as smaller mammals. In far southern and coastal areas, as well as during winter months statewide, the scavenger guild is coyote-dominant. In spring, summer and fall, it is potentially bear-dominant in most of the state. Particularly in early spring, bears are more apt to seek protein-rich meals when they first emerge from hibernation. In warmer weather, bears are more likely to be attracted to a carcass by a maggot mass, rather than decomposing flesh. Raptors and corvids participate in the scavenger guild throughout the state. Corvid presence can signal other scavengers, particularly eagles, which lack olfactory capacity, that there is a meat source in the proximity. With their sharp beaks, corvids easily "open up" a body, even when frozen, enhancing access to the viscera for other avian taxa. Coyotes are common throughout the state and are very frequent scavengers, along with other canids.

Similar to canid patterns modeled by Haglund (1997) for the Northwest, limbs are often removed beginning with the upper limbs, which are easier to disarticulate and lighter to carry (if removed from the site). Bones with a thinner cortex and narrower diameter, such as ribs, require little expenditure of energy on the part of the scavenger and are generally consumed on-site early on in the process. The cranium and limb bones are often scattered, and the limb bones and extremities are often completely consumed, missing, or cached. Although most scatter tends to be within a 50 meter radius, it can range up to a mile, creating extreme challenges for search and recovery.

Results indicate that scavenging can both accelerate and decelerate progression towards skeletonization, potentially interfering with

estimates of PMI. In Maine cold temperatures as well as the involvement of large mammalian scavengers can preclude, or considerably diminish, insect infestation. Frequently, one or more anatomic regions are entirely missing, which can also bias decomposition assessment and PMI estimates.

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