H114 California Central Coastal Morphology, Microenvironments, and Human Decomposition

Alison Galloway, PhD, Univ of California, Chancellor's Office, Santa Cruz, CA 95064; and Lauren Zephro, PhD, Santa Cruz Sheriff's Office, 701 Ocean St, Rm 340, Santa Cruz, CA 95060*

The goal of this presentation is to assess the applicability of available temperature data to microenvironment and human decomposition rates.

This presentation will impact the forensic science community by providing guidance as to the methods to interpolate temperature data and uses case studies to show variation in microenvironments.

Accumulated degree days, and consequently decomposition, vary widely within seemingly homogenous environments as seen in case studies and associated temperature data.

The coast of California encapsulates a series of microenvironments in which the average temperatures vary considerably throughout the day and by season. Along the Central Coast, approximately from San Francisco in the north to Santa Barbara in the south, the Santa Cruz and Santa Lucia Mountain Ranges form a coastal barrier with only intermittent gaps. These ranges also block much of the action of the cooling sea breezes, confining much of their action to the narrow bands along the coasts.

In addition to the complication of the mountain barrier, summer months are accompanied by dense coastal fogs which keep the average daily temperatures lower. These thick marine layers form in the late afternoon, remain inland throughout the night, and often only burn off in the late morning of the next day. This fog is a vital ingredient for the thick redwood forests that characterize the coastal regions, providing shade in much of the area.

Inland, including in the valleys between the ridgelines of the mountains, temperatures rise dramatically during the summer, but are also subject to lower temperatures and heavy frosts in the winter months. The summer fogs penetrate less deeply and the redwoods are gradually replaced by larger numbers of scrub oaks. Seasonal variation in average daily temperatures is more extreme in these areas than along the coast.

Analysis of human decomposition in this area has depended primarily on extrapolating from studies elsewhere, the experience of the anthropologists, and on some retrospective studies. The latter have largely been confined to the marine environments. Suggested postmortem intervals are often long, reflecting the lack of comparative information. While additional experimental studies may be helpful in providing guidance, the variation in microenvironments presents an extremely difficult set of parameters.

Using case studies of remains found within various microenvironments in coastal California, the accumulated degree days are shown, along with the total body score, to highlight the importance of localized data on decomposition. Proximity to the coast, position with regard to mountain ridges, local vegetation, and season all present complications. This variation holds even when the interference of local scavengers is excluded. Animals known to consume human remains in these areas include coyotes, raccoon, opossum, wild boar, and rodents.

To utilize accumulated degree days and total body score, relevant data from the recovery area is needed. Weather station data, while distributed throughout California, is rarely adequate for the types of forensic reconstructions needed for presentation in court. Interpolation from known sources can be accomplished and it provides one line of evidence to assist the anthropologist. Recording data from the recovery site in order to compare to the known historical data from a weather collection site is also possible, but here seasonal variation requires long-term comparisons.

Taphonomy, Degree Days, Decomposition

 ** Presenting Author*