Preliminary results from a late Pleistocene to Holocene paleoclimate study of the lake sediment cores, northern New Mexico

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The geography of the Las Vegas National Wildlife Refuge (LVNWR) and surrounding region has changed dramatically since the late Pleistocene in response to the expansion and contraction of alpine glaciers activity and associated climate change. During the late Pleistocene, we hypothesize that the area just east of the Sangre de Cristo Mountains at the latitude of Las Vegas, NM consisted of several or a network of interconnected lacustrine systems. Following the end of glacial activity, these lacustrine systems shrank to their current condition of minor low-volume isolated lakes and numerous playas and pluvial bodies. Preliminary data from an integrated, paleoclimatic study of sediment cores collected from three playa lakes provide insight into late Pleistocene to Holocene paleoclimatic variations in northeastern NM. Sedimentologic, midge fossil, and rock magnetic data acquired from the sediment cores is used to characterize the materials, identify stratigraphic changes, document shifting lake levels, assess temperature changes, and infer paleoclimatic conditions. Data collected from McAllister and Wallace Lake are encouraging and reveal depth dependent changes in fossil assemblages, grain size, and rock magnetic properties that have been interpret to reflect climatic driven variations impacting the depositional system. Bulk low-field magnetic susceptibility decreases by an order of magnitude from the surface to the base of the measured core suggesting a change in detrital magnetic influx into the lacustrian system. Curie point estimates indicate that the dominant magnetic mineral in all samples is cubic, low-Ti titanomagnetite phase. An environmental magnetism study of sediment from the LVNWR and surrounding plays can help provide invaluable and untapped record of late Pleistocene to Holocene climatic change. Additional data are being collected which will aid with interpreting the evolution of the lacustrine system. We postulate that concurrent with alpine glacial activity during the Pleistocene, the LVNWR and the transitional Great Plains region to the northeast was an expansive single lake or interconnected lake system, analogous to the Pleistocene lakes of the Estancia Basin (Lake Estancia) and the Tularosa Basin (Lake Otero) of central and southern NM.

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paleoclimate, climatology, lacustrine systems, sediment cores, playa lakes

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