Some Considerations Regarding the Possible Geological Origins of the Peconic River Headwaters

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Fuller (1914, p. 183) ascribed the origin of the wetlands that drain southward into the headwaters of the Peconic River to partial blockages of outwash channel streams that "were obstructed by drift left by ice in an advance after their formation, and surface waters have accumulated behind the obstructions, forming ponds or marshes." An alternate origin for these features is here suggested which attempts to explain geological and biological phenomena particular to the area as resultant of both glacial and postglacial processes. The wetlands in the Peconic River's headwaters - sometimes collectively called the Calverton Ponds - appear to be surface expressions of the regional groundwater table and may share a common but more complex genesis than that envisioned by Fuller.

While the biota of these wetlands includes a unique, apparently relict floral and faunal assemblage that could be interpreted as being of an immediate post-Late Wisconsinan age, the absence of significant peat accumulations within these wetlands appears to contradict this possibility. Their uniformly shallow depth - typically less than two meters - does not fit easily into either Fuller's "blockage" concept or the notion that the generally oval, open water, vegetated edge, sandy bottomed ponds have persisted without undergoing significant vegetative debris infilling during

the 15,000 or so years that some workers have approximated as the interval since the final retreat of glacial ice from Long Island.

While periodic droughts could lower the water table frequently enough for wildfires from the surrounding Pine Barrens fire climax ecosystem to burn away most accumulating peat, another possibility is that the ponds are too geologically youthful to have experienced such organic accumulations. In this interpretation the ponds formed only relatively recently as the post glacial eustatic rise of sea level gradually elevated the regional water table until it intersected the bottoms of the depressions now occupied by the Calverton Ponds.

The distinctive "pie pan" cross sectional shape of these basins was apparently created by processes other than those that established the modern wetlands now occupying them. A thermokarst environment similar to that described by Nieter et. al. (1975, p. 142) for the Scuttlehole depression on Long Island's south fork seems to best explain both their individual shapes and overall spatial distribution.

The origin of the basins now occupied by the Calverton Ponds is here interpreted as resultant of the melting and subsequent collapse of lense-like accumulations of ice shaped like the masses depicted by Fuller (1914, figs. 30-31, p. 42) except that instead of the ice being of glacial origin it is seen here as having been

the refrozen seasonal melt groundwater of a periglacial outwash plain. Within this context, tundra environment ground ice would have preferentially accumulated at the more permeable triple junctions of ice wedge polygons and along the courses of south flowing ice-wedge controlled meltwater streams. When the climate ameliorated and the underlying permafrost thawed, it is likely that what may have been "patterned ground" tundra wetlands became dry dimples on the land, as the regional water table of ten to fifteen thousand years before present established itself many meters below the surface in hydrogeological response to the relatively low sea level stand of that time (Bloom and Stuiver, 1963).

Some of the Calverton Ponds are now characteristically "beaded" together with surface water streams that exhibit a series of straight segments and angular bends. Because beaded drainages are a common feature of tundras, their presence here appears to support a periglacial origin for these landforms. In addition, while most of the Peconic River's headwaters is forested, "ghosts" of what may be a "patterned ground" fabric of polygons can be observed in some aerial photographs of nearby farm fields.

The apparent antiquity of the fauna of the Calverton Ponds is explained here as the consequence of forced recolonization by species that previously occupied similar now drowned sites within the Peconic River estuary. This freshwater pond and stream complex comprises, therefore, a time transgressive habitat. These

freshwater wetlands are hydrogeologically both a consequence and part of the postglacial marine transgression that has apparently simultaneously caused numerous other aquatic - though otherwise marine and brackish - habitats to shift landward since deglaciation. If correct, this interpretation has interesting implications for restructuring generally held perceptions of the origins and age - as well as long term public policies for - the other wetlands, ponds, lakes, and streams of Long Island that are directly connected to the main water table.

Bloom, A.L. and Stuiver, M., 1963, Submergence of the Connecticut coast. Science 139: 332-334.

Fuller, M.L., 1914, The geology of Long Island, New York. U.S. Geol. Survey Prof. Paper 83, 231p.

Nieter, W., Nemickas, B., Koszalka, E.J., and Newman, W.S., 1975, The late quaternary geology of the Montauk peninsula: Montauk Point to Southampton, Long Island, New York. In: Wolff, M.P., 1975, Guidebook to field excursions, 47th meeting of the NYSGA, Hofstra University, Hempstead, N.Y. 327p.