SAUNDERS PRESERVE - GEOLOGY

Saunders Preserve is a very significant geologic site because the Honey Hill Fault runs through it. This fault, and its sister faults (Lake Char and Bloody Bluff, Figure 1) were created as all of the continents of the earth came together to form the supercontinent Pangaea (all earth). In eastern north America, this involved the "collision" of Africa and North America and the formation of the Appalachian Mountains in the crumpled-up "fender bender" collision zone.

Figure 1. A map showing the position of the Saunders property relative to the major structural features of Eastern New England. (Adapted from Castle, R. O., and others, 1976, U.S. Geological Survey Bulletin 1410, 38p.)

All of the geologic components of the ocean that once separated Africa from North America were caught up in the collision as the ocean closed. This included sediment from the bottom of the ocean and several volcanic island arcs (Indonesia and Japan are volcanic island arcs). In East Haddam, the major players in this continental collision were ocean bottom rocks of the Merrimack Tectonic Terrane and the Avalon and Putnam Nashoba Island Arc Terranes (Figure 2.). All of these rocks were heated and changed

(metamorphosed) by the heat and pressure associated with the continental collisions that closed an ocean and brought Africa and North America crashing together in a crumple zone we call the Appalachian Mountain Chain.

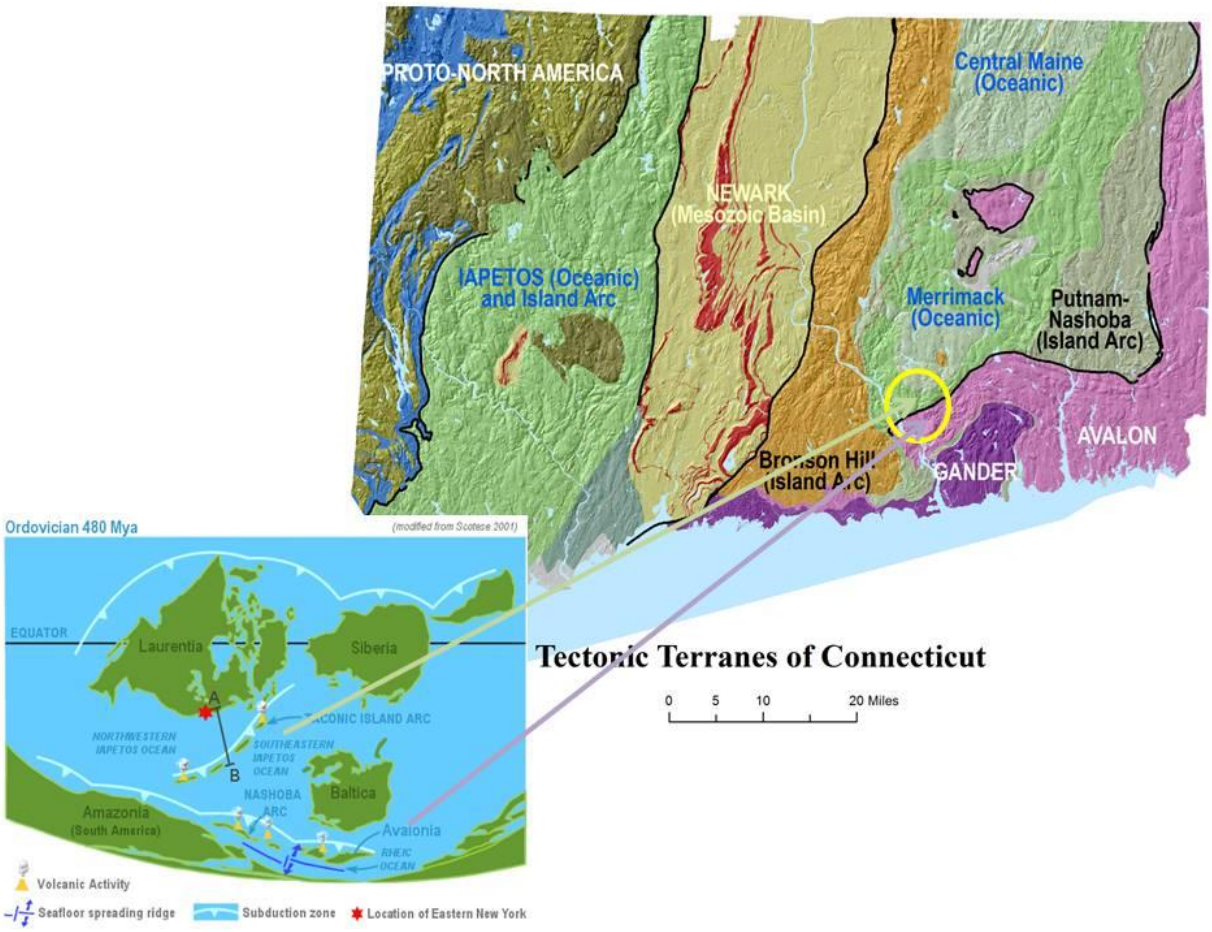
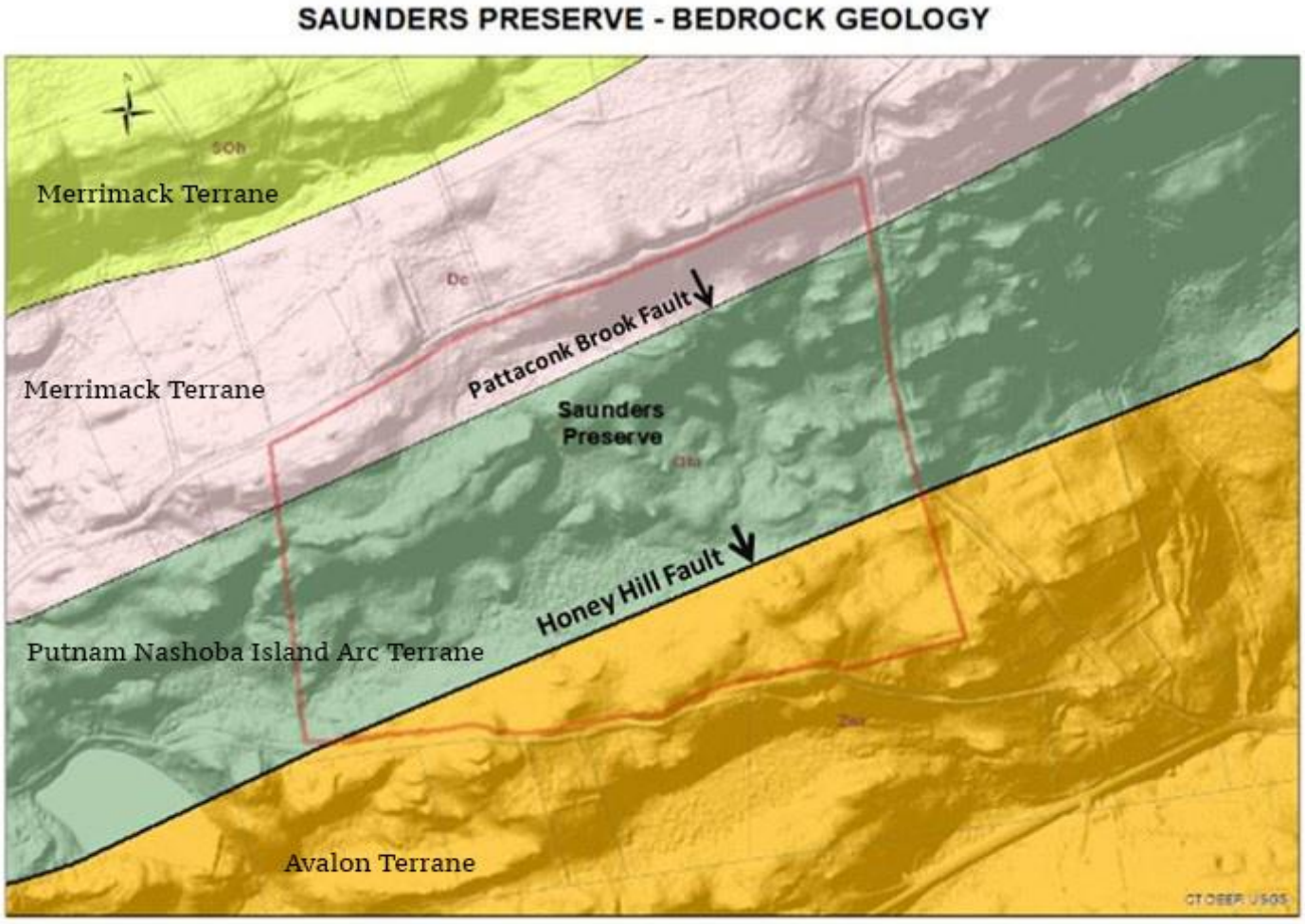


Figure 2. Maps showing the inferred position of the oceanic rocks (Merrimack Terrane) and the Avalon/Putnam Nashoba Island arcs around 480 million years ago (bottom left) and their relationship along the Honey Hill Fault, in East Haddam today (yellow circle, upper right). (Maps courtesy of the State Geologic and Natural History Survey of Connecticut)

Figure 3, below, is a geologic map showing the currently-mapped distribution of the bedrock units that underlie the Saunders Preserve. The red line delineates the boundaries of the preserve. The light green and pink area shows the distribution of the metamorphosed bedrock of the Merrimack Terrane, primarily represented in the Preserve by the ~ 414-million-year-old Canterbury gneiss (pink). The dark green shading shows the distribution of the Putnam Nashoba Island Arc Terrane, locally represented by the ~420-million-year-old Tatnic Hill schist. As shown on Figure 3, the Pattaconk Brook Fault marks the structural boundary between these two terranes.

The black line forming the boundary between the Putnam Nashoba Terrane and the Avalon Terrane (orange shading) marks the mapped position of the Honey Hill Fault. The >610- million-year-old Avalon

Terrane is locally represented by fine-grained, granite gneiss. The structural relationship that we see along the Honey Hill Fault today is inferred to have begun to develop as the Avalon Terrane began its collision with the terranes to the north some 300-400 million years ago.



A final note is that glacial boulders (stones moved by a glacier but coming to rest on bedrock of the same kind) and glacial erratics (stones moved by a glacier to an area with a different bedrock) can be seen in various places in the preserve. For example, on the white trail, which is situated above Avalonian bedrock along the preserve's southern edge, one can find a large Avalonian glacial boulder (lying atop that Avalonian bedrock) as well as glacial erratics of pegmatite and schist representing the bedrock of areas in the preserve's north, which were moved to their current location by glacial activity. Some of the latter rocks also reflect the process of glacial "plucking" – evident throughout much of the preserve, in which rocks were plucked from south-facing formations of foliated stone and moved by glaciers to locations far to the south.

East Haddam Land Trust is grateful to Professors Ralph Lewis and Philip Resor for their substantial assistance in explaining and documenting this site's significant geological history.