Supplementary Information:

Supplementary Note 1

In ascending order, major rock units in the Narragansett Basin include the Pondville Formation, Wamsutta Formation, Rhode Island Formation, and Dighton Formation, the latter two being present only in the Narragansett Basin (Chute, 1964). It is not yet clear how strata in the southern Narragansett Basin, other than the Rhode Island Formation, correlate to the northern area due to intense metamorphism and reduced outcrop area in Rhode Island (See Murray et al., 2004 for discussion of metamorphic grade and deformation history).

The lowermost Carboniferous rock units, exposed near basin bounding faults, is dominated by conglomerates, some with clast sizes over a metre in longest dimension which are known as the Pondville Formation in the Norfolk Basin (Supplementary Fig. 1). Our work describes fossil material recovered from near the basin margin in the northern Narragansett Basin, exposing the Wamsutta Formation at what is known as the Lantern North (LN) site (Supplementary Fig. 1). The rocks here have escaped the most intense deformation and metamorphism of latest Carboniferous-Permian Alleghanian orogenic events. While the sedimentary sequence at LN is heavily covered by soil, vegetation, and built surfaces (i.e., parking lots, buildings, etc.), commercial development has exposed a correlatable portion of the sequence in a nearby parking lot (Supplementary Fig. 2). The most abundant rock type (by percent of total thickness) in the study area is a pale, gray to green pebble and cobble conglomerate with clasts ranging from 5 to 15 cm (Supplementary Figs. 2A and C). The geometry of conglomeratic units is sheet-like with a high width-to-thickness ratio, similar to that found in the Wamsutta Formation of the Norfolk Basin (Cazier, 1987). Interbeds of red, medium to fine-grained sandstone with rounded, moderately sorted grains, often containing small scale cross bedding and asymmetric ripple marks are present. Thin, poorly sorted, coarse-grained sandstone and units with angular gravel containing erosional bases occasionally interrupt the sandstone units. Scoured surfaces are found, both on the outcrop and unit scale, throughout the area. Evidence of sediment loading, in the form of flame structures, occurs at the conglomerate–sandstone interfaces. Within the section there are several distinct sequences of stacked, undulose, 5-20 cm thick sandstone units with siltstone and shale partings (Supplementary Fig. 2B). Plant impressions and trace fossils are abundant on these rare shale partings. Fossiliferous units composed entirely of red shale are occasionally interbedded with the sandstones. One laminated shale unit at LN reached 25 cm total thickness.

The Wamsutta Formation in the Narragansett Basin was first described in detail in the USGS monograph ‘Geology of the Narragansett Basin’ (Shaler et al.,1899). Crosby and Barton (1880) had discovered some Carboniferous fossils in the adjacent Norfolk Basin two decades earlier, and Shaler and Foerste (Shaler et al., 1899) described the discovery of *Calamites* and *Cordaites* impressions, placing the Wamsutta Fm., and Narragansett Basin, fully within the Carboniferous. Arthur Cleaves (Brown University M.S. thesis, 1929; Willard and Cleaves, 1930) was the next to explore Wamsutta Fm. fossils. Cleaves investigated in detail stratigraphic relationships of the Wamsutta Fm. to other units within the Narragansett Basin when he, too, came across fossil *Calamites* and “small twigs or grasses” (Cleaves, 1929). An additional slab was also discovered that had a series of small amphibian tracks and trails, raindrop impressions, and mud cracks. This fossil slab indicated that the Wamsutta Formation had the potential to contain a greater quantity of fossil organisms than had yet been recovered (and was the impetus for the current survey of the Wamsutta Fm. nearly 65 years later). The amphibian track was formally described and named *Parvipes minutus* (Willard and Cleaves, 1930). Fourteen years later, Knox (1944) increased the number of fossil plants recovered from the Wamsutta Fm. to twelve. Knox (1944) noted the abundance of *Calamites* and *Cordaites* specimens in the formation and suggested that the nearly complete nature of the fossils, particularly ferns, was evidence that they had not been transported far from where they grew. As a result, Knox, unlike Shaler et al. (1899), interpreted the Wamsutta to represent a piedmont deposit with ephemeral ponds and wetlands characterised by occasional flood events.

Through the 1970s, Paul Lyons, in the process of reconnaissance and mapping for the USGS in both the Narragansett and Norfolk Basins, re-sampled some of the original Narragansett Wamsutta Fm. sites of Knox (1944), as well as a number of sites in the Rhode Island Fm. and Pondville Fm. (Lyons et al., 1976; Lyons, 1977; Lyons and Darrah, 1977). These sites and collections formed the basis for later synthetic correlation with the Appalachian Basin, Canadian Maritimes, and western European floras (Lyons, 1984; Wagner and Lyons, 1997; Lyons and Sproule, 2018).

Two of the present authors (Knecht and Benner) began researching the Wamsutta Formation as a result of having encountered Cleaves’ 1929 thesis describing the amphibian trackways. In 2007, Knecht and Benner located a new and productive site, referred to here as the Lantern North site. Lantern North contains an abundance of diverse vertebrate tracks and trails (Knecht and Benner, 2008), plant impression fossils, and insect and arachnid full-body impressions and trackways (Knecht et al., 2011; Marden, 2013a; Benner et al., 2013; Marden, 2013b; Benner et al., 2015; Knecht et al., 2023). This work has revealed the palaeoecological and palaeobiological value of the site and established its status as a terrestrial Lagerstätte. Research continues as new aspects of the geology and paleoecology of the urban site are discovered.

Supplementary Note 2
The references used to compile Table 1 are as follows:

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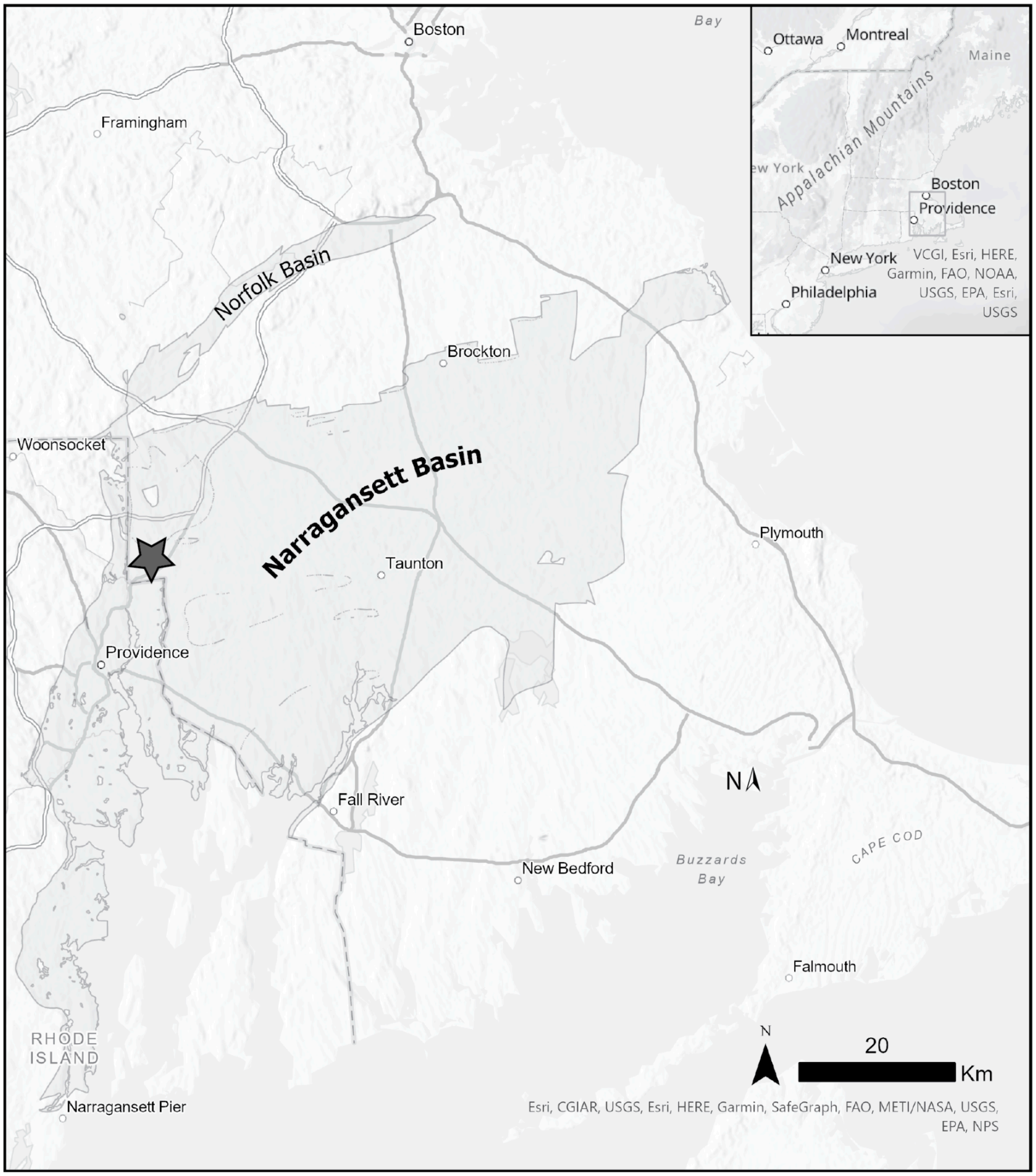
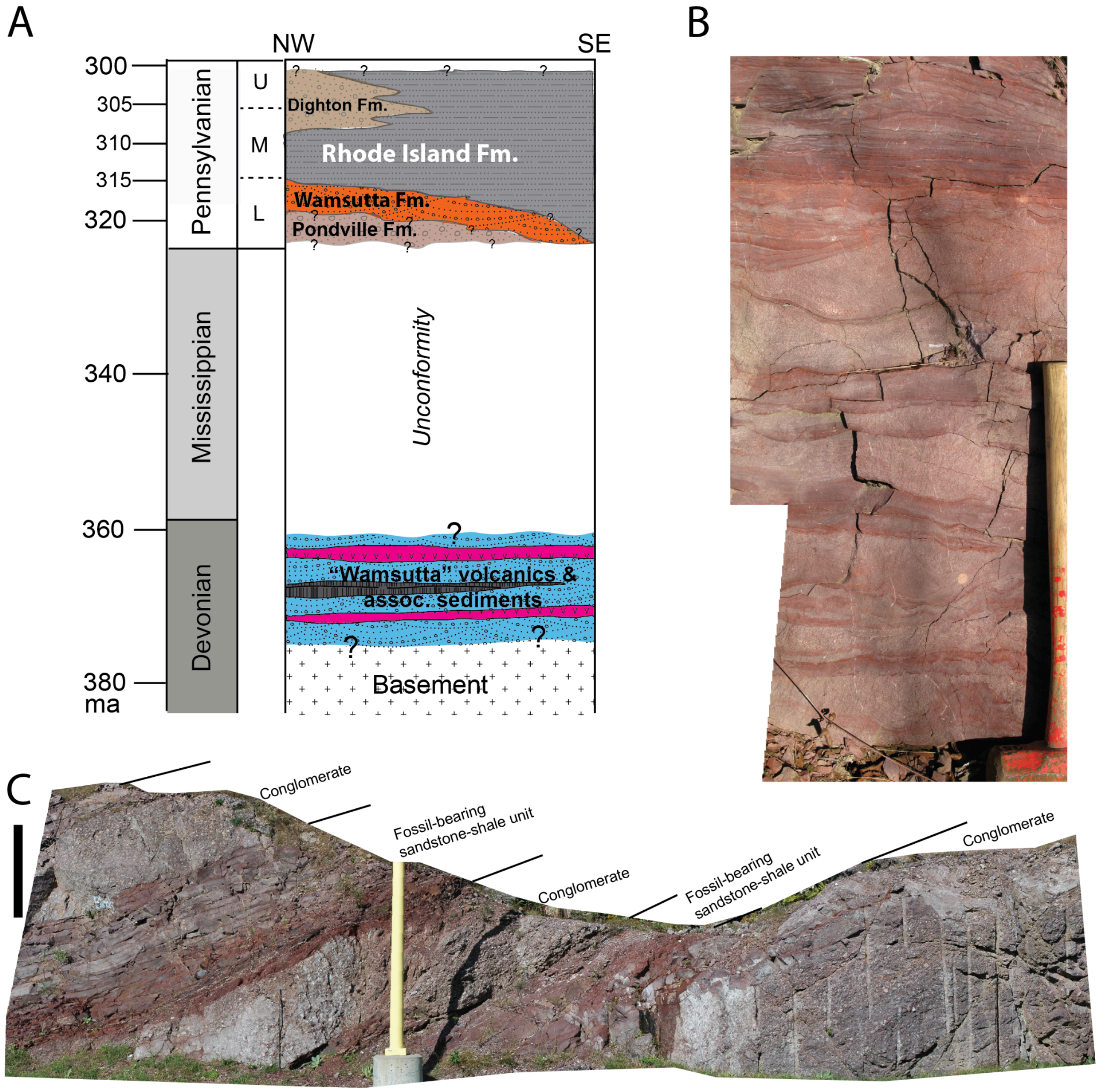
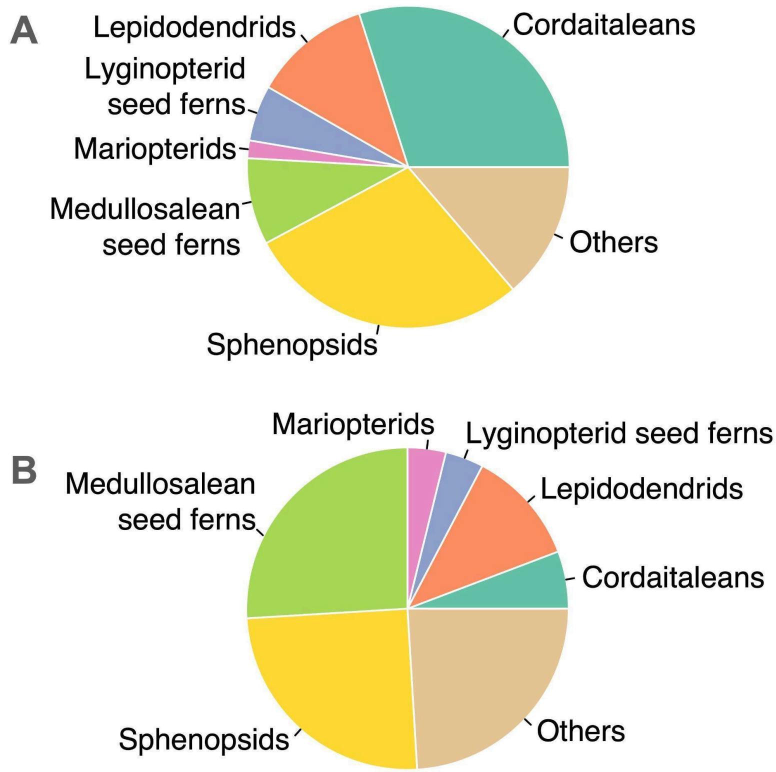
Supplementary Figures



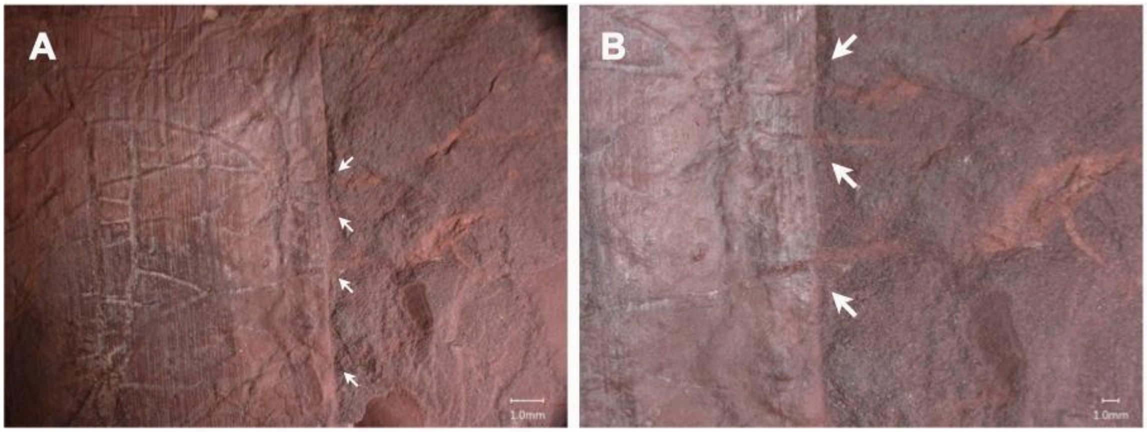
Supplementary Fig. 1. Geography of the site within the Narragansett Basin Map indicating extent of Late Carboniferous sedimentary deposits in the region of interest (gray) with major cities indicated and comprising portions of southeastern Massachusetts and eastern Rhode Island. Star designates approximate location of the LN site. Basemap credits: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, TomTom, Garmin, FAO, NOAA, OpenStreetMap contributors, and the GIS user community; geological units merged from USGS State Geologic Map Compilation (SGMC) geodatabase.



Supplementary Fig. 2. **Stratigraphy and Sedimentology of the Wamsutta Formation** (A) Schematic stratigraphy of northern Narragansett basin, modified with permission from unpublished artwork by A. Gardulski, Tufts University. (B) Sedimentary features of fossil-bearing units include asymmetric ripples and load structures with mudstone intraclasts. Siltstone and shale surfaces of these units and thinner units near the top in this photo are fossiliferous, containing abundant terrestrial vertebrate and invertebrate trace fossils as well as plant impressions. Hammer handle is 35 cm. (C) Cliff exposure captures the upper part of the Wamsutta Formation section in the study area. Fossiliferous units are sandwiched between matrix- and clast-supported conglomerate in sheet-like geometries with scoured contacts. Vertical black bar represents 1 m.



Supplementary Fig. 3. **Pie Charts of Wamsutta Floral Composition** (A) Proportions of total specimen count for major floral categories (n = 678), and (B) fossil-taxa (total number of identified fossil-taxa = 131)



Supplementary Fig. 4. (A) Rhizomorphs on *Cordaites* sp. (MCZ:IP:197310). (B) Shows a close up of A. White arrows indicate where rhizomorphs originating from the leaf surface continue onto the matrix as a branched network, typical of modern forms.

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