Previously, pitch pine studies have emphasized the influence of natural fire (Foereid *et al.* 2015), anthropogenic controlled burns (Carlo *et al.* 2016) and opening of canopies (Neill *et al.* 2007). Here, in addition to fire history, we examine topography, which is known to be an important control over pitch pine populations (Parshall and Foster 2002; Fig. 2).

Pitch pine populations at Mt. Desert exist along topographical and fire history gradients, providing a testbedto untangle the influence of fire and topography on the species. Here, we use four populations (Fig. 3) to examine the effects of fire history and topography on pitch pine leaf, plant, and ecosystem (i.e., soil) traits. The four populations were chosen to represent a factorial combination of elevation (high or low) and fire history (having experienced the 1947 stand clearing fire or not).

First, we characterize differences in topographical features of the four populations, including slope and aspect, given that these are likely important non-elevation topographical drivers of the traits examined. We then explore aspects of the soil environment, including soil carbon as well as macro and micro nutrient concentrations. Following previous studies, we expected to find greater soil carbon (DeBano 1981), alkali cations (Kolden *et al.* 2017), and solubilized minerals (Caldwell and Richards 1989) in soils that had experienced the 1947 fire.We also expected that there would be greater carbon We also measured soil water retention, which we expected to be greater at sites that experienced the 1947 fire, as pyrogenic carbon is known to increase soil water retention (Licht and Smith, 2020). We also expected soil water retention to be greater at low elevations due to

We hypothesized that topographical and fire history-driven changes to the growth environment would manifest in changes in leaf- and plant-level traits. expected that stress induced by topographical features and low soil water retention at high elevation would lead to increased ; Wang *et al.* 2017, as a stress tolerance response. We also expected a reduction in leaf nutrients at high elevation, mimicking expected reductions in the soil. However, we expected that fire history might alleviate these stress indicators, as a result of increased soil nutrients and water retention. At the plant level, we expected to see plants with reduced height, smaller DBH, narrower canopy, and sparser clustering (greater distance between conspecific neighbors) at high elevation, again as a result of the topography- and soil-induced stress. We also expected smaller trees in areas that had experienced the 1947 fire due to age, but that the difference would be less at high elevation due to stress-reducing effects of fire on the soil environment.