are records near Plattsburgh as well. It is also known to occur in sand in the Ottawa region and farther west. So changes in the landscape after glaciation certainly must come into play - but the specifics remain to be worked out!

Voucher collections of these species will be deposited at the Bailey Herbarium, Cornell University.

Close-up of *H. tomentosa*.

Steven Daniel, Anne Johnson, and Dan Spada (left to right) among the *Hudsonia* (photo by Sally Hart).

Patterns of Change in Vegetation and Forest Structure in the Pine Barrens of Long Island, NY - 2020 New York Flora Association Research Award

by Joanna Lumbsden-Pinto, SUNY College of Environmental Science and Forestry

Introduction

The Long Island Central Pine Barrens (LICPB) represents a unique ecosystem embedded in some of the most urbanized landscapes in the US -- Long Island and adjacent New York City. A diverse mosaic of pitch pine and oak forests, coastal ponds, marshes, grasslands, and streams, LICPB overlies Long Island's freshwater aquifers and helps to purify drinking water. LICPB depends on periodic fires for its renewal and is a good example of other pine barrens ecosystems in the Northeastern US (U.S. Geological Survey). Fire is needed to release nutrients, trigger germination of seedlings and eliminate competing species, increase food availability, and provide spaces for a diversity of wildlife to inhabit these areas (Forman & Boerner, 1981; Dovciak et al., 2013; Lee et al., 2018).

Despite fire's importance, LICPB is currently threatened by catastrophic wildfires due to fuel accumulation as forests have become more dense following decades of fire suppression (Olsvig et al., 1979;

Jordan et al., 2003). When fire suppression occurs, the leaf litter and fallen trees become fuel, making the forest liable to ignite and cause irreversible or long-term damage to the forest and to human properties, about $8.6 billion/year in direct property loss in the US (NESEC. n.d; Hiers et al., 2020). Unfortunately, wildfires and forest regeneration failure are expected to increase as the regional climate becomes warmer and drier due to climate change and urban heat island effects associated with urban sprawl (Brown & Johnstone, 2012; Fairman et al., 2018; Stevens-Rumann et al., 2018). At present, the complex relationships between fire, forest structure, and climate in the LICPB and other fire-dependent ecosystems remain poorly understood due to a scarcity of detailed historical information (Marschall et al., 2016). Paying close attention to both fire history and patterns of climate on small areas (microclimate) and the relationship between the two could contribute to understanding vegetation dynamics in the LICPB, as well as inform management, conservation, and restoration strategies for this rare ecosystem.

The main purpose of this research was to: 1) resurvey forty-two forest health monitoring plots and quantify vegetation changes across the LICPB since the first survey in 2005-2006; and 2) monitor microclimate across the LICPB (using sensors) to understand how the forest cover affects local and regional air temperature and how climate may in turn affect the ability of pine barrens forests to maintain themselves in the context of warming climate.

We were able to survey the forty-two monitoring plots and establish ten new plots in burned areas across the LICPB and prepare climate sensors (iButtons) and place them in thirty-eight plots across the LICPB for two months.

Results

The preliminary results indicate that the average temperature recorded by the microclimate sensors across the LICPB from the months of July to September was 21.6 °C (70.9 °F). This result is very similar to the average recorded by the weather station at Brookhaven National Laboratory (BNL Meteorological Services) - 21.7 °C (71.1 °F). The records from BNL were taken from sensors located two meters above the ground, one meter higher than the sensors examined in this study (Figure 1).

Figure 1. Forest types and climate sensors setting (two iButtons per cup, at 1 m and 0.5 m above the ground). From left to right: Coastal Oak, Oak-Pine, Pine-Oak, Pitch Pine-Scrub Oak.

After graphing the average mean values by forest types, we observed a minimal difference between the highest and lowest average temperatures (0.6 °C); Coastal Oak and Oak-Pine forests showed the highest values and Pine-Oak and Pitch Pine- Scrub Oak showed the lowest temperatures. When comparing these values with percent canopy cover in those forests, we observed the same trend. Coastal oak and Oak-Pine forests have the highest canopy cover and Pine-Oak and Pitch Pine-Scrub Oak are characterized as being more open (Figure 3). This result is unexpected, since we would expect that more canopy cover would lead to lower temperatures in the understory and that the more open forests would be warmer, but this is not what these initial results show (Figure 2). A possible explanation could be that pine-dominated forests generally have an evident layer of shrubs between 2 to 5 meters tall, and this might provide a fresher microclimate, meaning lower temperatures near the ground.

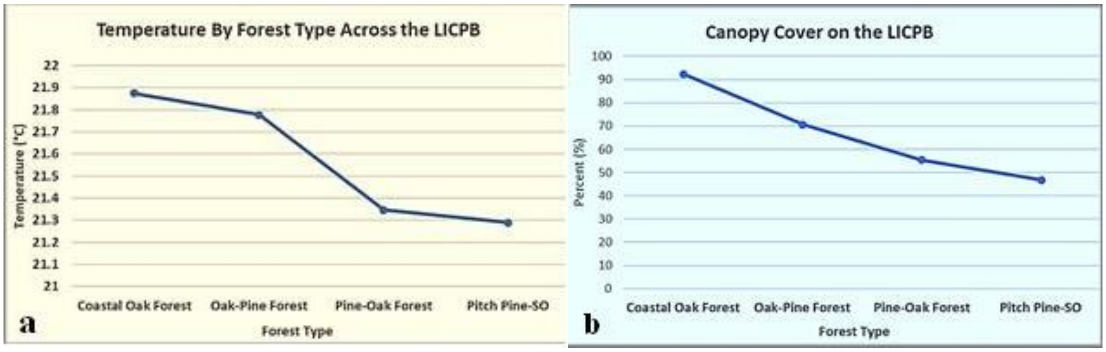

Figure 2. a. Average temperature recorded from sensors and b. Canopy cover percentage.

Conclusion

The results shown in this report are preliminary and will continue to develop as part of my doctoral dissertation. It is important to mention that due to the global pandemic (COVID-19) there were a variety of challenges added to other unknowns we normally face when doing fieldwork. The late start of data collection and adjusting the field work due to COVID-19 guidelines contributed to the field work being finished much later than originally planned. Figure 4 is a photo with me (far right) and the three interns who helped on this work. Perhaps the most important accomplishment of this summer is that we were able to finish the data collection successfully, a work which was done last year with eight interns, in midst of a global pandemic.

Figures 3. Pitch Pine canopy, and Figure 4. Field crew.

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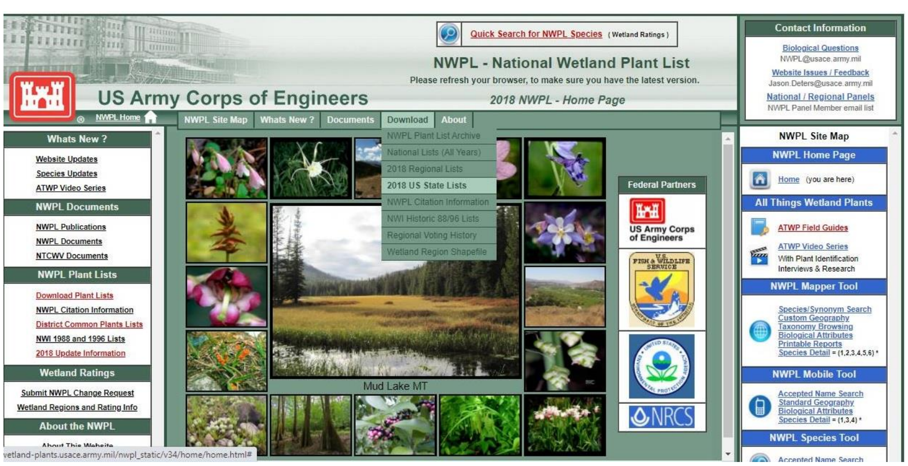
Update to the National Wetland Plant List and Related Changes to New York Flora Atlas

by Joseph McMullen, NYFA Board Member, Joymcmullen2@msn.com

Early last year, the U.S. Army Corps of Engineers (Corps) released an update to the National Wetland Plant List (NWPL), which is a list of the indicator status ratings of plants. This updated list is referred to as the 2018 list (USACE 2018). It became effective on May 18, 2020 and can be obtained at http://wetland-plants.usace.army.mil/. What is nice about this website is that you can view and print out a list of plants by state (e.g., those that specifically occur in New York). Although the newly updated list is an important reference to those performing wetlands delineations and has somewhat updated the plant nomenclature, no indicator status rating changes were made for species in our region.



Screen shot of the NWPL web site.