ANTIOCH UNIVERSITY
NEW ENGLAND

Monadnock Ecological Research and Education Project
MERE
Antioch University New England

Adopt-A-Crevice Community Project 10 Year Results

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Technical Bulletin

Introduction

Mt. Monadnock's summit once was covered by dense red spruce forest, but a combination of intense sheep farming, storms, and fires have resulted in a bald summit. Crevice communities are the small pockets of remaining vegetation that thrive on the rocky terrain on the top of Mt. Monadnock. These pockets of life are often small, and therefore very susceptible to human disturbances, including trampling and climate change. It is important to monitor these communities so we can assess how humans have an impact on the mountain. Data has been collected on five crevice communities around the summit since 2010: Virginia Falls (VF), East of Virginia Falls (EVF), Keene High School (KHS), Pumpelly (Pum), and Marlborough-Dublin (MD). The most recent resampling of these communities occurred during the summer of 2020. The trends and changes of these samples taken in 2010, 2013, and 2020 are detailed in this technical bulletin.

Methods

Each crevice community has three transects that span their width equidistant apart. The percent cover of plant species and substrates were sampled in 0.50m^2 plots placed every meter along the transects to obtain systematic samples assumed to be representative of the communities. Soil depth and vegetation height were measured in the corners of each plot.

Results

Within all five communities, average vegetation height and soil depth increased by a statistically significant amount from 2010 to 2020.

Table 1: Mean vegetation height increased across all crevice communities from 2010 to 2020. A two-tailed t-test resulted in a P-value of 0.023.

Vegetation Height (mm)	2010	2013	2020
EFV	265.81	309.03	333.59
KHS	28.76	28.06	49.23
MD	148.71	189.75	190.38
Pum	109.90	195.96	178.69
VF	36.03	35.56	47.57
Total	**117.84**	**151.67**	**159.89**

Table 2: Mean soil depth increased across all crevice communities from 2010 to 2020. A two-tailed t-test resulted in a P-value of 0.014.

Soil Depth (mm)	2010	2013	2020
EFV	100.83	183.19	153.88
KHS	34.94	46.96	50.34
MD	76.75	139.71	103.21
Pum	118.36	176.37	193.85
VF	54.59	173.19	115.18
Total	**77.09**	**143.88**	**123.29**

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Between 2010 and 2020, the overall percent cover of rock and bare ground decreased by about half while percent cover of shrubs more than doubled.

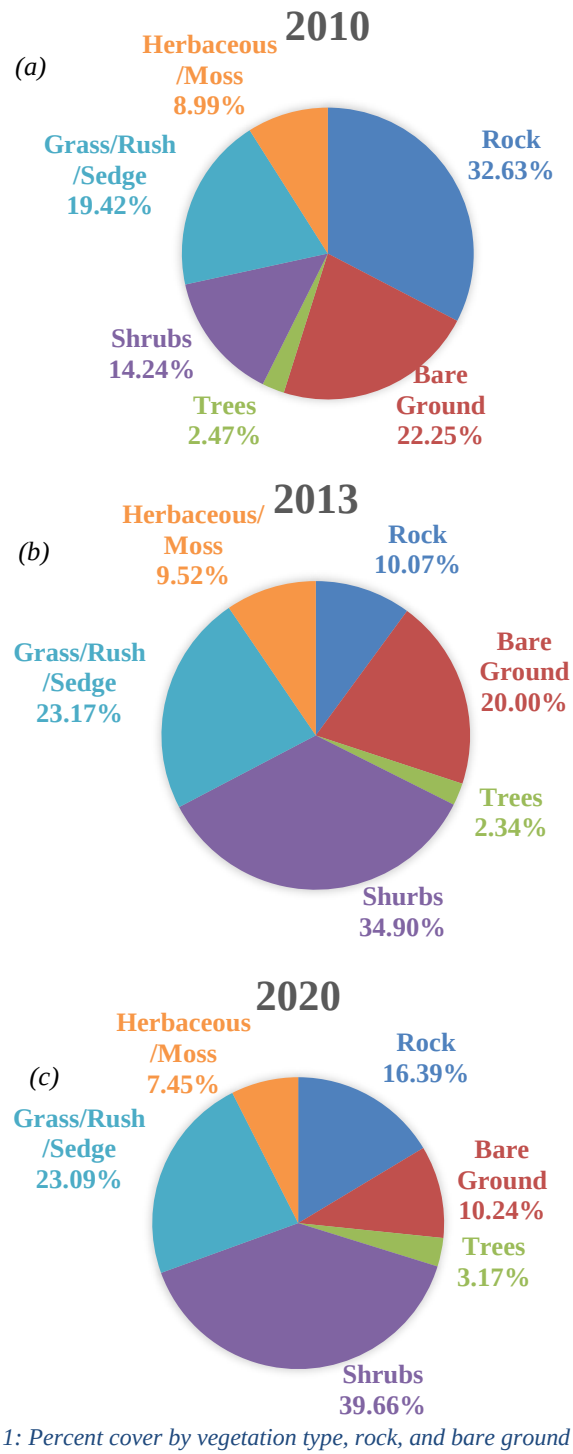

Figure 1: Percent cover by vegetation type, rock, and bare ground in (a) 2010, (b) 2013, and (c) 2020.

Discussion

These data and trends suggest that the summit is beginning to recover some of its historic vegetation. As soil continues to build up and increase in depth within these communities, a greater amount of vegetation can be supported. Limiting hiker foot traffic within the communities is vital towards providing a protected space for these species to grow and flourish. It is also worth noting that there seems to be a slight trend towards sturdier hardwood growth occurring. Although it is currently minimal, there was a 0.80% increase in the total cover provided by tree species. Over time, the process of ecological succession will occur through which different plant communities will prosper. Grasses and sedges will start growing over rock and bare ground and are slowly outcompeted by larger plants and shrubs. Finally, trees will dominate the landscape just as the red spruce once covered Mt. Monadnock. With the number of hikers that explore the mountain, it is unlikely for trees to completely reclaim the summit; however, if hikers are continued to be directed out of the crevice communities with appropriate outreach and educational measures, these pockets of vegetation can thrive and continue to grow.

Figure 2: The crevice communities of (a) Virginia Falls, (b) East of Virginia Falls, (c) Keene High School, (d) Pumpelly, and (e) Marlborough-Dublin.