**Implementation of Flexible Learning Projects into Ecology (BIO 3317) at McDaniel College, Fall 2020**

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The NEON-EREN Flexible Learning Projects (FLPs) were an excellent way to maintain my overall approach to teaching Ecology during the challenging Fall 2020 semester, while allowing students to participate fully regardless of whether they were attending lab in person, working from home, or navigating temporary quarantines. Our Ecology class is an upper-level class that serves as a general introduction to the science of ecology and includes both lecture and lab components. The class also fills part of a requirement for writing in the discipline, and students use the lab projects to develop their scientific writing skills. The class is designed for biology and environmental studies students and is small to facilitate the writing-intensive nature of the course. Labs are structured so that students first learn field and analytical skills through guided class projects; later in the semester, they apply those skills in student-directed Independent Projects, which they can conduct individually or in small groups.

I implemented parts of the Plants in the Human-Altered Environment (PHAE) the Lichens in Diverse Landscapes (LDL) projects during the first part of the semester and provided protocols for the Backyard Beetles + Pollinators project, which we did not have time to do together. For Independent Projects, students were able to design their own projects or build on one of the FLPs to test their own hypotheses. Despite the challenges of the semester, students certainly refined their critical reading skills while learning how to follow the detailed FLP protocols and learned how to collect, manage, and analyze data. They were also able to creatively apply field and analytical skills to address their own hypotheses for Independent Projects. Students used the lichen project field protocols (Module 2 – Lichens in YOUR Local Landscape) to test hypotheses regarding how distance to roads, urbanization (downtown, center of campus, semi-natural areas on campus), and tree species influence lichen abundance or morphotype richness. One student applied the tree survey protocols from the PHAE and Lichen projects to conduct a partial tree inventory of campus and assess whether ecosystem services differed between native and exotic trees (using i-Tree tools, <https://www.itreetools.org/>). Finally, about half the students in the class adapted the Backyard Beetles + Pollinators field protocols to study pollinator abundance and functional group richness and diversity; students examined flower color, flower coverage, flower type richness, impervious surface cover, and management (wild vs flower beds).

Altogether, the Flexible Learning Projects allowed students to engage in authentic and diverse ecological research experiences despite the pandemic. On the slides associated with this narrative, I have outlined my approach to this ecology class, example graphs from student projects, and a few notes and recommendations pertaining to implementation of the Lichen project.