

A Semester-Long Research Problem Approach to Senior Undergraduate Laboratories in Ecology

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Laboratories in biology are geared to periods of designated length and, so, are dependent on reliable methodologies. Reliable means repeatable; surprises are (at least implicitly) not tolerated. Yet, to teach “science,” as a means to acquire new knowledge and not just repeatable results, demands that we ask of students that they appreciate that new knowledge accumulates also when results of experiments *don't* match expectations. Further, labs in ecology that are short in length can be severely constrained with respect to reality.

At the University of Guelph I use a system of municipal parks in a city (“islands” of bird habitat in an urban sea) for students to test various hypotheses about why the number of species varies in isolates of habitat of varying size and vegetational composition. The results of the exercise are “reliable” only in the sense that high-quality data of adequate resolution for robust analysis always result. Whether the results are consistent, even among groups within the same class, doesn't matter. Hence, students better appreciate that hypotheses are theoretical constructs that may stand *or* fall when evaluated against data.