

1. What we did: Flexible Learning Projects for on-campus labs

Implemented FLP's in Ecology (BIO 3317) at McDaniel College.

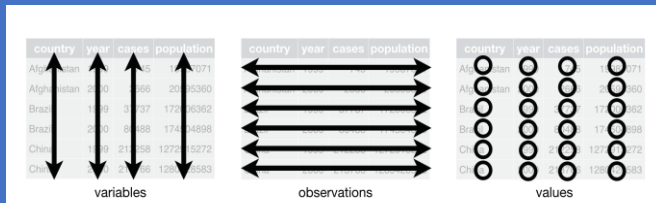
Relevant SLO's:

- Quantitative skills in biology
- Writing research papers

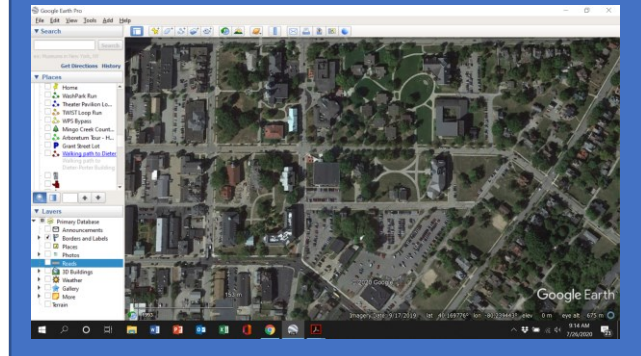
Overall approach to lab:

- **1st half of semester:** Learning how to do ecology together
- **2nd half of semester:** Students develop independent projects in small groups

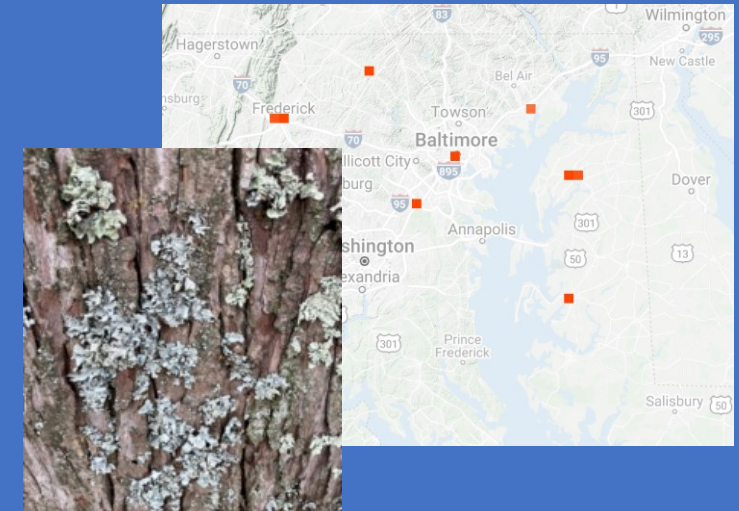
A. Tidy data



B. PHAE Project: Online resources + Field plots



C. Lichens in YOUR Local Landscape: Field data + Analysis + Research Paper

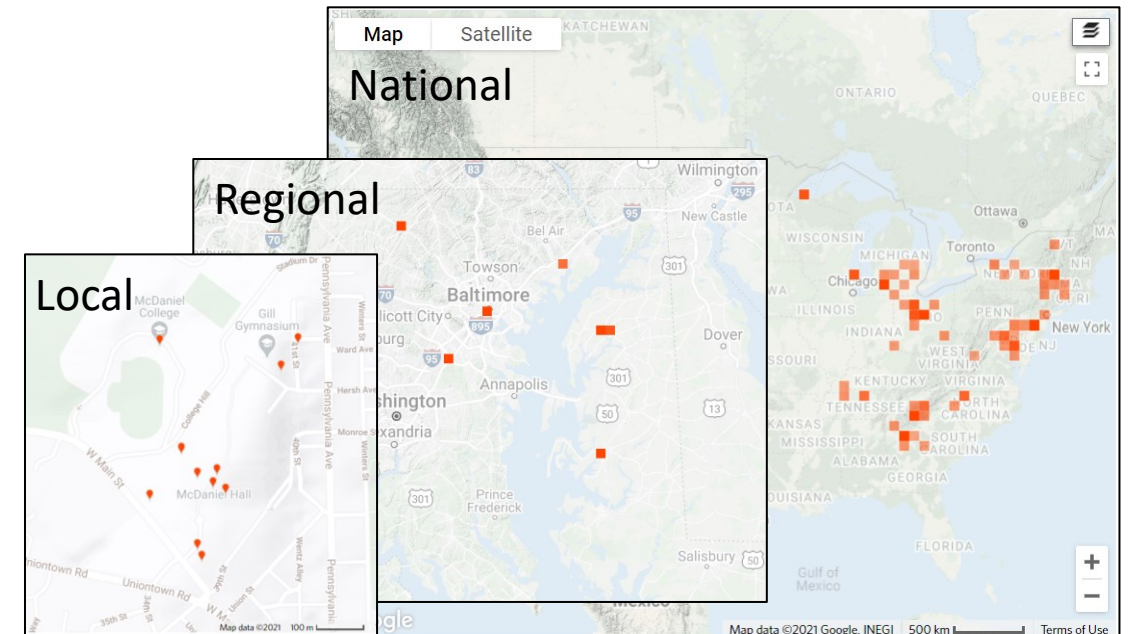


D. Backyard beetles + Pollinators: Behavior + Data collection + Interaction plots



2. What went well: Engagement in authentic science with lichens

1. **Fun in the field** – Simple, flexible, fun
2. **Immediate contribution to ongoing project** – iNat interface much easier now, immediate gratification upon data entry (+ redundant data entry for class grade – data sheet scans, Excel file for class)
3. **Analysis across scales**
Local: Habitat, tree size
Regional: Tree genera (with cleaning)
National: Tree size, Cardinal direction (with cleaning)



3. Future directions: Workflow + Placement of FLP's in curriculum

Extensive pre-lab

- Current state of overwhelm
- Potential to incorporate pre-lab as full lab period

Prep analysis more deliberately

- Tidy data (keep)
- Central tendency & variation (add back in)
- Basic stats practice ahead of time (more explicit)
- Introduce R (add back in)
- Do less, slower

Finding permanent homes for FLP's

- Lichen project as off-season lab with excellent potential for multi-scale analysis framework (advanced, after other analysis)
- Collaboration with intro bio team: Lichens, Pollinators, Phenology
- Botany lab for others

