Temporal-based Biodiversity:

A Day In The Life

Bioblitz 2016 project proposal

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1 Concepts

1. Areal distribution
2. site/situation
3. Environmental determinism

2 Materials

Nature, location: Piney Z lake and surrounding area

2.1 For each of the groups

Clipboard
Data sheet
Flashlights (for night shifts)
Digital camera (for documentation of species)
GPS unit (for tagging approximate location of finds) Guidebooks for identification of organisms, specific to each group first aid equipment (including snake bite kit)

2.2 For microorganism analysis

Table
Microscopes
Petri dishes/ slides and slide covers
Protoslo® or equivalent
Water testing kits (2 for each shift)
Water sampling equipment

3 Time required

1. Pre-field introduction and discussion (in classroom by teacher): ≈ 20-45 minutes
2. Orientation/group division: ≈ 5-10 minutes
3. Exploration/cataloging: ≈ 90 minutes
4. Muster and de-briefing: ≈ 20 minutes

4 Objective

1. The students should be able to identify the differences between plants, animals, fungi and protists in a natural setting and understand the basic spatial and temporal relationships of biotic factors in an environment through small group as well as class discussion and data analysis.

5 Methodology

5.1 Background

See "Teaching Materials" in the appendix.

5.2 General scheme

1. Upon the arrival of the students, split them into the three competing groups each to identify different organisms in the area. The three groups will identify plants & fungi, animals, and microbiota & water analysis.

2. The students will begin identifying organisms, being guided and supported by volunteers/instructors, who will keep a log of what gets identified and photograph it (if able) to be uploaded to iNaturalist (see specific instructions in appendix).

3. After about an hour and a half, gather the students back at the starting point, and discuss the types of organisms they found, and what they might expect to find at a different time of day (e.g. if during middle of the day, what might they see at dusk). Tally the number of species and decide the "winner" of the species identification contest.

4. Repeat this process for each shift.

5. Coalesce and map the data for each time shift separately, creating a temporally conditioned set of data that can be analyzed by students for patterns, such as appearance of certain animals, animal dispersal, location change, etc. (see section 6)

5.2.1 plants & fungi

1. Begin at the microbiota & water testing station, and work a large loop that incorporates the different areas of the location, namely the plants on the lake shore, trail area, and higher pine forest.

2. For aquatic plants that sit on the lake, estimate the boundaries of their expanse

3. For plant taxa with (relatively) large terrestrial ranges, estimate their location based on your observed positions, making sure to take some gps points in order to get more accurate spatial ranges.

5.2.2 animals

1. Begin at the microbiota & water testing station, and work a large loop in the opposite direction of the plants group, but making sure to investigate all the microhabitats for the most accurate data.

2. When looking at the lake, fish are not to easy to spot, so do not worry about them (previously known samples can be researched to make data more robust). Birds can be difficult to obtain an accurate location; for this approximate the distance from the shore or another piece of land that can be located on a map to get positional data estimated.

3. Make sure to flip logs and check other locations animals might be hiding others (but use caution as these locations are favored daytime habitats for snakes) and make sure to put them back in their original condition.

5.2.3 microbiota & water analysis

1. Take a water sample for the identification of the microorganisms.
2. Introduce students to the diversity of these organisms and how to use the microscopes to count the approximate percentages of the biota. Help the students identify microorganisms with the guides and slow them down for easier identification.
3. After this is done for at least an hour, run the water tests and discuss what each component of these tests measures and why this is important.

6 Analysis

1. Get all the data in one place.
2. Create a map that displays the spatial distribution of the occurrences of the three groups' data for each shift. If possible, create a map that displays plants, animals, and microbiota in one map.
3. With these ranges mapped, create a composite map for all taxa across time, preferably with metadata about water quality from the tests performed.
4. Send to classes in order for them to draw conclusions about the temporal patterns of biodiversity; some questions that might need to be answered (depending on what the data shows): Do the spatial distributions of any forms of life change? How?Are there any large patterns of locational differences correlated with what time it is?