EEB313: Group Project Proposal
Group G

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Option 1: Hypothesis-Driven Project

Topic: Emerald Ash Borer (EAB)

Research Questions:

- How are the abundance of Emerald Ash Borer populations changing through time?
- Are populations evenly distributed amongst communities?
    - EAB is often spread via contaminated firewood being moved outside of regulated areas. Exploring whether there's a correlation between cottage country/camping regions and EAB outbreaks/spread
- Are there any environmental factors, such as temperatures, influencing outbreaks?

Hypotheses:

- #1: Differences in temperature impact the abundance of emerald ash borers in various communities of Ontario.
- #2: Human presence and intervention impact the abundance of emerald ash borers in different communities of Ontario and play a role in the changes in abundance over the years.

Variables:

- Independent: Years (2002 - 2020), communities (in Ontario)
- Dependent: Temperature, Abundance

Predictions:

- If differences in temperature impact the abundance of emerald ash borers in various communities of Ontario, we can expect to see larger increases in emerald ash borer abundance in communities with higher yearly temperatures.
    - It is expected that warmer temperatures may facilitate more reproduction, development, and survival, leading to population growth of emerald ash borers.
- If human presence and intervention impact the abundance of emerald ash borers in different communities of Ontario, we can expect a larger abundance in areas with a lot of green space that are often frequented by people.
    - Urban areas have less green space, providing less opportunities for emerald ash borers to invade.
    - Human intervention could also play a role in spreading emerald ash borers to new locations where they otherwise would not have reached.

Dataset:
Link to dataset: https://open.canada.ca/data/en/dataset/69f4ecd8-9761-4d40-b0f9-e186f2fcce5b

We plan to use a dataset found on the Government of Canada website called “Emerald Ash Borer (*Agrilus planipennis*) Surveillance Data 2002 to 2020” which includes observations for the population of emerald ash borers across the entire country between the years 2002 and 2020. It also contains information regarding the latitudinal and longitudinal position of the site of observation as well as its location (community and province). The results column specifies whether the presence of emerald ash borers was detected or not detected. We couldn’t find any information on how the data was collected outside of the dataset being published by the Canadian Food Inspection Agency. The record was released on 2017-12-21 and modified 2022-04-15, with the maintenance and update frequency being annually. The author listed for the excel file is Thierry Poiré, who is a Survey Biologist.

We will be using this dataset by subsetting to just the Ontario communities due to time constraints and feasibility. In addition, we will be looking at the year, community, and results columns of this dataset for our analysis. We plan to create a new column to specify whether the community is an urban or rural area to analyze the impact of population size and green space on the abundance. We will use a separate weather dataset collected from Statistics Canada to observe temperature differences across the communities in Ontario over the years and compare them with the results of our primary dataset.

Lastly, we are considering using ranges of latitude and longitude to group communities that are close to each other, as well as observing the mean and median data for the latitudinal and longitudinal positions where emerald ash borers were detected.

Citation:
Government of Canada. 2017b. CFIA Observations of EAB: Government of Canada, Emerald Ash Borer Surveillance Data 2002-2020, Canadian Food Inspection Agency. [online] https://open.canada.ca/ data/en/dataset/69f4ecd8-9761-4d40-b0f9-e186f2fcce5b. [accessed 1 October 2023].