Multiple Stressors and the Effect on Beaver Stump Mortality

By Olivia Eng,
Westlake High School, 12th Grade
Introduction

- American Beaver (Castor canadensis)
Introduction

- Beaver Stump

Stress Factors
- Bugs
- Deer
- Fungi
Research Question: How does stress affect the mortality rates of beaver stumps?

Hypothesis: Stress factors like bugs, disease, and fungi will increase the mortality rates of beaver stumps.
Methodology

+ Entirety of Lakeside Trail

+ Portion of Twin Lakes Loop
### Methodology:

<table>
<thead>
<tr>
<th>Tree #</th>
<th>Treatment</th>
<th>Species</th>
<th>Browse</th>
<th>Bugs</th>
<th>Fungi</th>
<th>Alive/Dead</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chewed</td>
<td>Beech</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Dead</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
<tr>
<td>2</td>
<td>Undam</td>
<td>Beech</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Alive</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
<tr>
<td>3</td>
<td>Chewed</td>
<td>Unknown (#1)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Alive</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
<tr>
<td>4</td>
<td>Undam</td>
<td>Unknown (#1)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Alive</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
<tr>
<td>5</td>
<td>Chewed</td>
<td>Beech</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Alive</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
<tr>
<td>6</td>
<td>Undam</td>
<td>Beech</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Alive</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
<tr>
<td>7</td>
<td>Chewed</td>
<td>Oak</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Alive</td>
<td>7/8/2019</td>
<td>Teatown Lake</td>
</tr>
</tbody>
</table>
**Figure 1:** The Effect of Treatment on the Status of the Trees

-Chewed-
-Undamaged-

<table>
<thead>
<tr>
<th>Treatment</th>
<th># of Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chewed</td>
<td></td>
</tr>
<tr>
<td>Undamaged</td>
<td></td>
</tr>
</tbody>
</table>

Alive  | Dead
Figure 2: Different Types of Stressors on Alive Chewed/Unchewed Trees

- **Fungi**
- **Bug**
- **Browse**

The graph shows the number of alive trees affected by different types of stressors: Fungi, Bug, and Browse. The bars indicate whether the trees were chewed or unchewed.
Figure 3: The Effect of the # of Stressors on the Status of Chewed Beaver Stumps

- **# of Trees**
- **# of Stressors**
- **0 Stressors**
- **1 Stressor**
- **2 Stressors**
- **3 Stressors**

Legend:
- Alive
- Dead
Figure 4: Beaver Preference and Mortality Rates

Graphs
Discussion

- Fungi appeared on trees after they died
  - Did not increase amount of stress

- Deer tend to not eat regenerating saplings
  - Difficult to access
  - Plenty of food

- Bugs the most common stressor
  - Damaged a small proportion of trees
Discussion

+ Many beaver stumps died without any stressor
  + Trees that are older are less likely to regenerate
  + Many other factors such as depending on their type, root health and general growing conditions

This is important because the presence of beavers could lead to deforestation over time
Conclusion

Data did not support hypothesis as the Chi-Squared analysis found no relationship between beaver stump mortality and stressors.
Future Research/Limitations

- Look at other conditions that could have affected regrowth
  - Ex: Soil acidity, sunlight, weather, etc.
- Hikers could have potentially scared away deer
- Human error in identifying trees and deer herbivory
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+ Mr. McIntyre
+ My family

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