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Assessing Wetland Condition Through Plant and Amphibian Community Surveys

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Introduction

Quality assessment of different natural environments is vital to preserving biodiversity and healthy ecosystems. This is especially true with wetlands, which have declined in size and quality for decades. According to the U.S. Fish and Wildlife Service, between 2009 and 2019, 670,000 acres of wetlands across the contiguous U.S. were lost (2024). Previous studies conducted to assess wetland quality were often only conducted once to assess the condition at one specific time and not how the wetlands change over time. By devising a methodology to assess the condition of wetlands that can be repeated easily, we can understand how to better protect and restore wetland environments. We have focused on creating a methodology to assess wetland condition through specific parameters: plants and amphibians.

Methods

- We conducted literature searches into previous studies on wetland quality and found many studies were only conducted once or were specific to one geographical region. Because of our findings, we decided to create methodologies that could be performed multiple times to assess the condition of wetlands over time.
- Local biologists were interviewed to gain insight into effective survey methods for plant and amphibian communities.
- Using the information from our literature search and interviews, and we developed methods for assessing wetland conditions for both plant and amphibian communities. These methods were tested in the field then adjusted.

Percent Cover	0-10%	10-25%	25-50%	50-75%	>75%
Spring Pond	herbaceous groundcover	canopy		midstory	
Spring Pond Uplands		herbaceous groundcover			midstory, canopy
Frog Pond		herbaceous groundcover, midstory, canopy			
Frog Pond Uplands		herbaceous		midstory	canopy

Figure 1: Percent Cover Survey of Spring Pond and Frog Pond at Birdsong Nature Center. 2/22/24

American Bullfrog Juvenile in Frog Pond at Birdsong Nature Center. 2/22/24

American Bullfrog Tadpole in Frog Pond at Birdsong Nature Center. 2/22/24

Frog Pond at Birdsong Nature Center. 2/22/24

Spring Pond at Birdsong Nature Center. 10/19/24

References

Results

Based on our research we identified the following techniques to assess wetland condition at Spring and Frog Ponds.

Plants:

- Estimate percent coverage of vegetation within pond basin as shown in Figure 1.
- Repeat process for vegetation in uplands surrounding the pond.
- Identify dominant plant species found within pond basin using the iNaturalist app and field guides.
- Catalog the plants based on if they were submerged, emergent, or terrestrial.
- Identify any invasive species and how many of each plant species were found.
- Conduct sample twice a year in April/May and September/October to capture seasonal differences during the growing season.

Amphibians:

- Sample the entire perimeter of the pond using 50 one-meter sweeps of a dip net with 3/16” mesh. Record each species and the number of individuals of within each species.
- Employ six minnow funnel traps in each pond, equidistant from one another. Traps should be placed at adequate depth so that only the top portion is above water. This spacing and depth will ensure adequate coverage while minimizing mortality. Traps should be checked no more than 24 hours after they are placed and any animals inside released. Record every species that is found and the number of each species for every trap.
- Repeat quarterly to minimize human disturbance and capture seasonal differences.
- Compare the two species lists to a species list of southeast U.S. wetlands to determine the diversity of Birdsong’s wetlands.
- Use Simpson’s Diversity Index to assess the richness and evenness of all the species.

Conclusion

The percent cover survey shows that the wetlands are covered with predominantly shrubs and canopy. An ideal wetland would have a higher percentage of herbaceous plants, however we cannot definitively conclude the condition of the wetland from this preliminary survey.

The results of this project are preliminary, and we plan on continuing this research in the future. There are many ways in which this research could be expanded upon in the future, including adding other parameters like water chemistry and insects to our methodology. We plan on testing and refining the methodology through multiple trials in different season to acquire the most comprehensive results possible.