

Determining the Efficacy of the Poudre River Restoration Project: A Comparative Analysis



Mykala McClenathan, Maria Serna, Chandler Stephan
University of Northern Colorado

Introduction

Literature Review

River restoration projects are indicated once a disturbance has been identified between the biotic and abiotic factors of the environment in question. We determined a meta-analysis would be necessary to identify whether the river restoration project was a success. A meta-analysis entails compiling data collected that focuses on a determined set of variables in order to analyze the results of the study. Once data is compiled, a comparative analysis is conducted to determine a conclusion regarding the proposed hypothesis.

Purpose

Our project focuses specifically on the efficacy of the river restoration project along the Poudre Trail in Greeley, Colorado. Prior to data analysis, it was hypothesized that the project would result in greater diversity among native plants and macroinvertebrates while also resulting in improved abiotic factors. Our group compiled data sets focusing on different parameters, varying from both plant and macroinvertebrate diversity, and abiotic factors which were each collected from the restored and nonrestored sites. Once each data set was collected, we conducted a meta-analysis in order to identify whether the project was an overall success. It was determined that the efficacy of the restoration project was limited, ultimately due to the restricted time that elapsed between the completion of the project and data collection.

Methods

- Data ranging from plant and macroinvertebrate diversity, and abiotic factors such as temperature and dissolved oxygen levels were obtained from several groups
- Google sheets and excel were utilized to compile each data set into a restored and nonrestored section in order to conduct a meta-analysis
- Calculations were conducted to identify the species richness, evenness, and Shannon index for plants and macroinvertebrates
- A T-test was performed between the abiotic factors to determine whether the values were of significance
- Once values were established for each data set, graphs were produced to illustrate their relationship

Results

Site Type versus Dissolved Oxygen Concentration



Figure 1 - Abiotic factors between restored vs. unrestored site

Site Type versus Macroinvertebrate Species Evenness

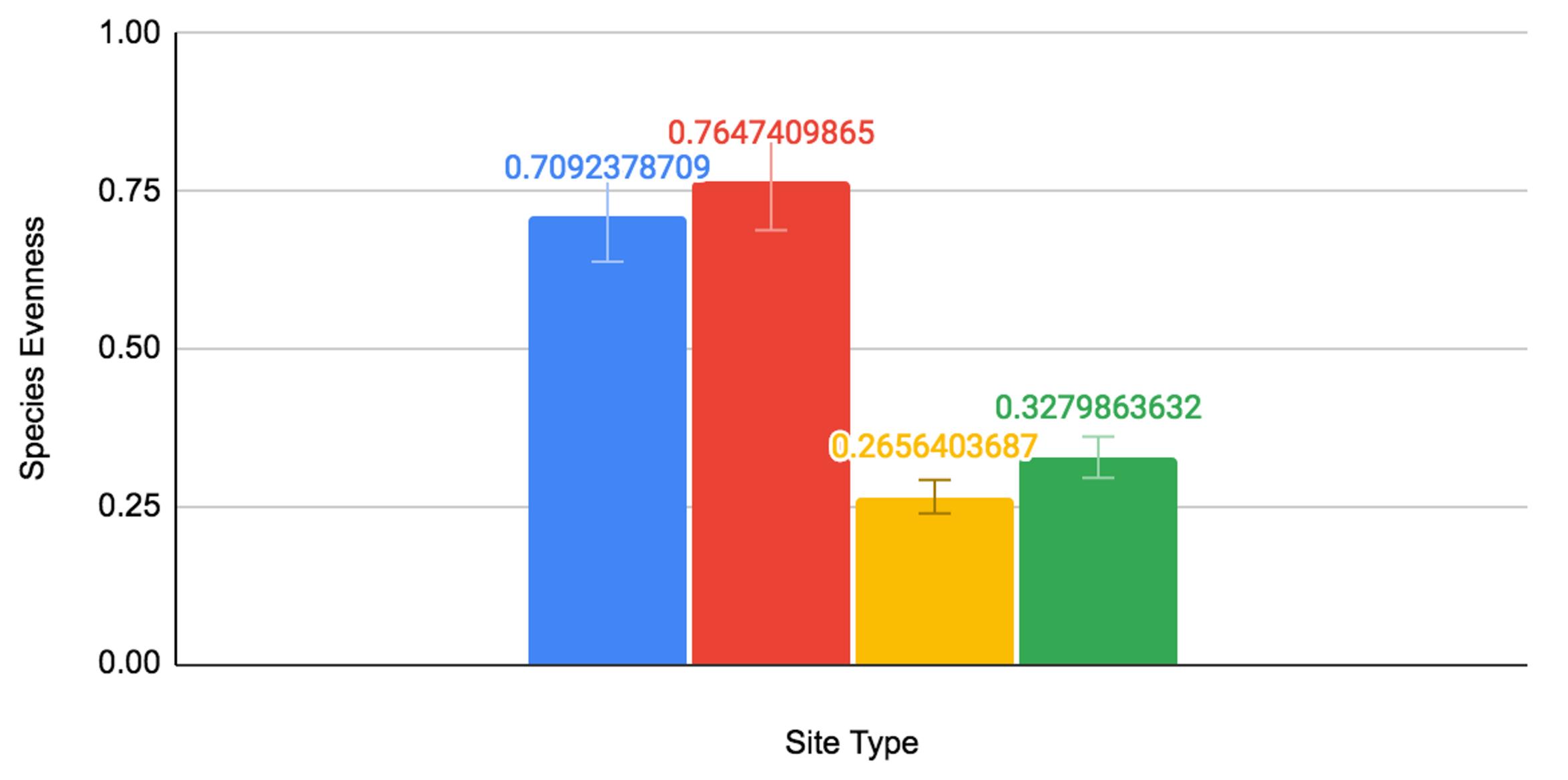


Figure 2- Macroinvertebrate species evenness across various sites

Site Type versus Plant Species Evenness

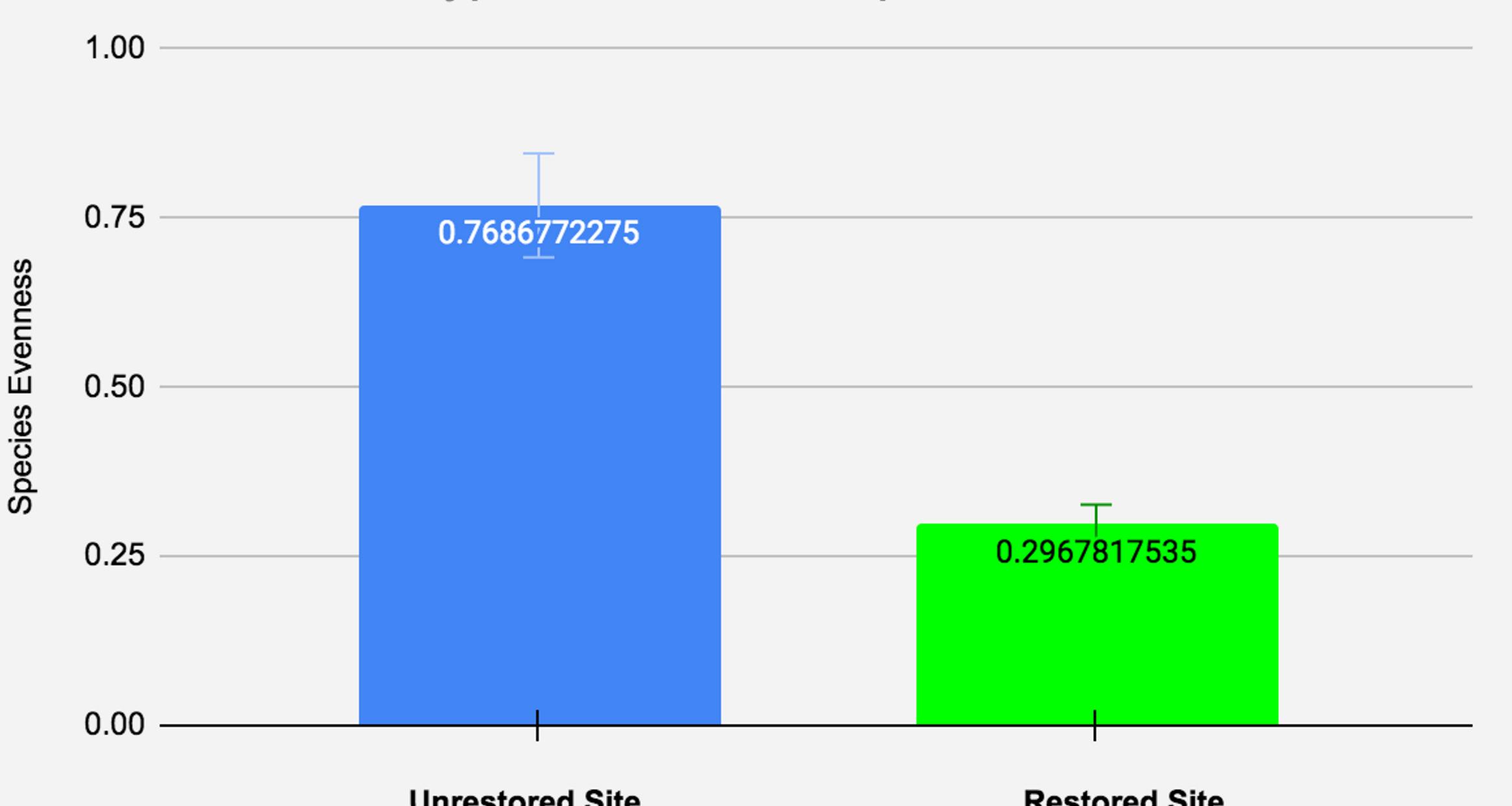


Figure 3 - Species evenness for plants between restored vs. unrestored sites

Discussion

Abiotic Factors

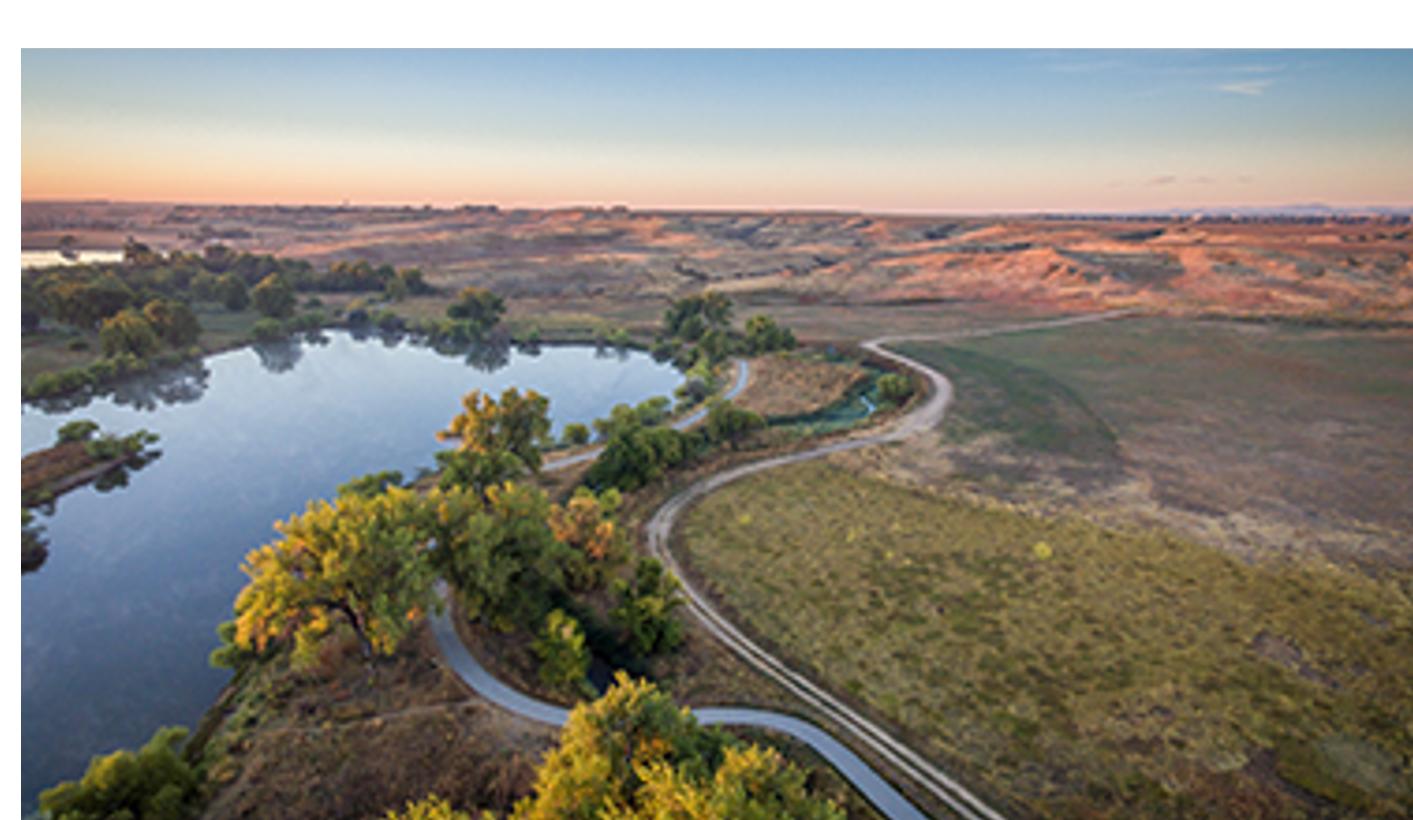
- Oxygen concentration (Figure 1) was greater in the restored sites than in the unrestored sites
- Abiotically, the restoration effort is a success, increasing oxygen concentration and decreasing water temperature

Biotic Factors

- Species diversity and evenness in plants and macroinvertebrates (Figures 2 & 3) are lower at the restored sites than the unrestored sites
- If the results gathered were seen as the final results of the restoration effort, then biotically the project would be a failure

Complications

- Not enough time may have passed since the enactment of the restoration effort (less than a year ago) to compile accurate, final results of the restoration
- The restored ecosystem may naturally have less species diversity and evenness than the unrestored sites



References

