Review of: "Comparison of Vegetation Community Diversity, Biomass, and Sediment Properties among Constructed and Reference Salt Marshes at Deer Island, Mississippi, U.S.A."

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Potential competing interests: No potential competing interests to declare.

Abstract

It was observed that, in the restoration sites was the higher species richness and plant diversity compared to the reference marsh. This suggests that the restoration efforts were successful in fostering the growth of various plant species, contributing to a diverse floristic community. This outcome is encouraging as it indicates the potential for these restoration projects to enhance biodiversity.

However, there were several critical issues identified in the restored areas. Firstly, the below-ground biomass and sediment organic content (SOC) were significantly lower in the constructed sites compared to the reference marsh. Below-ground biomass is crucial for the productivity and stability of the marsh ecosystem, and low values suggest potential limitations in the development and functioning of the restored areas. Similarly, lower SOC content implies a reduced ability to retain nutrients and support organic matter decomposition, which can impact the overall health of the ecosystem.

The sediment composition at the BU sites also differed from the reference marsh, as indicated by dissimilarities in soil bulk density, SOC, and grain size. These differences can affect the physical and chemical properties of the soil, potentially influencing the establishment and growth of vegetation. It is important to note that the specific implications of these dissimilarities are not explicitly discussed in the paragraph, making it difficult to fully evaluate their significance.

The passage does not provide information on the specific reasons for the differences observed between the BU sites and the reference marsh. It would be beneficial to explore the potential factors contributing to the lower below-ground biomass, sediment organic content, and dissimilar sediment composition. Additionally, the passage does not discuss the potential implications of these differences on the overall functioning and resilience of the restored salt marsh ecosystems.

Introduction

While the paragraphs provide a comprehensive overview, there are a few areas that could be further expanded upon. For instance, more information on the specific impacts of anthropogenic activities, coastal development, and climate change on marsh loss would enhance the understanding of the problem. Additionally, it would be helpful to include more details on the challenges and limitations associated with the use of BU for marsh restoration, as well as potential ecological and environmental considerations.

Furthermore, the paragraphs primarily focus on the northern GoM region, and it would be beneficial to include information or examples from other regions to provide a broader perspective on marsh restoration efforts.

Elevation, tides, and field sampling

While, a thorough description of the methodology is discussed, there are a few areas that could benefit from further elaboration. For instance, more details about the specific purpose of the study, the research question(s) being addressed, and the overall objectives would provide a clearer context for the methodology section.

Additionally, it would be helpful to include information about the selection criteria for the study sites and the rationale behind choosing the three marsh zones (low-, mid-, and high marsh) for sampling. This would provide a better understanding of the sampling strategy and its relevance to the research goals.

Vegetation biomass

The procedure lacks clarity and some details that are crucial for understanding the methodology. The description of the biomass core sampling and processing steps is somewhat confusing and could benefit from better organization and explicit explanations.

The methodology does not clearly explain how the replicate vegetation biomass cores were selected within each quadrat. It would be helpful to include information about the randomization process or any specific criteria used for core placement. Without this information, it is difficult to assess the representativeness of the biomass samples.

The methodology mentions the separation of biomass cores into species-specific tissue fractions, but it does not provide any information about how the species identification was conducted. It would be important to mention whether the identification was done in the field or in the laboratory and what criteria were used for species determination.

The methodology does not explain the rationale behind separating the above-ground material (AGM) and below-ground material (BGM) fractions. Providing a brief justification for this separation would help readers understand the scientific basis for the methodology.

The description of the drying process is lacking in detail. It would be useful to include information about the specific methodology used for drying the tissue fractions, such as the type of oven used and any precautions taken to ensure consistent and accurate drying.

Sediment characteristics

The methodology does not provide a clear rationale for the extraction of shallow and deep sediment core samples. It is unclear why these specific depths were chosen and how they relate to the research objectives. Providing this information

would help readers understand the relevance of the sediment core sampling.

The description of the subsampling and analysis of sediment cores is confusing and lacks important details. It is unclear how the subsamples were obtained from the 50 cc sediment cores and how the calculations for bulk density (BD) and sediment organic content (SOC) were performed. Clear step-by-step instructions or references to specific measurement protocols would be beneficial.

The methodology briefly mentions grain size analysis but does not explain its purpose or how it relates to the overall study. Additional information about the importance of grain size analysis in assessing sediment characteristics and its relevance to the research question would improve the clarity of the methodology. Furthermore, the methodology does not clearly state the units of measurement used for the sediment analysis (e.g., percentage, grams, etc.), which is essential for understanding the results.

Statistical analyses

Overall, the methodology needs to be revised to provide clearer explanations of the sampling and analysis procedures. It should include more specific details, such as the equipment used, measurement units, and references to established protocols or methods. Simplifying the language and avoiding unnecessary technical jargon would also enhance the readability of the methodology description.

Overall, the methodology provides a comprehensive overview of the statistical analyses conducted, the software packages used, and the post-hoc tests employed to explore significant effects. The methodology appears solid and well-suited to address the research objectives. However, the methodology lacks detailed information about the specific variables and response variables included in the statistical analyses. It would be helpful to provide a clear explanation of the measured variables and the research questions or hypotheses being addressed. Further, the methodology does not mention the sample sizes or the distributional assumptions considered for the statistical tests. Including this information would help assess the robustness and generalizability of the results.

Discussion

Overall, the paragraph effectively introduces the topic, outlines the research objective, acknowledges the complexities and challenges in wetland restoration, and integrates previous studies for context and comparison.

However, it could benefit from a clearer statement of the specific goals or objectives of the marsh creation project being studied. While the aim of comparing ecosystem indicators to a nearby reference site is mentioned, it would be helpful to explicitly state the research questions or hypotheses being addressed.

The author mentions that there is a shortage of data on the development of single restoration sites over long periods, but it does not explain the implications of this shortage or the potential limitations it poses for drawing conclusions about the success of restoration projects. Providing more context or discussing the potential consequences of limited long-term data would enhance the paragraph's depth.

Additionally, the author includes references to other coordinated studies but does not provide any information about their findings or how they relate to the current study. Including a brief summary of the key findings or explaining the relevance of these studies to the overall research would improve the coherence of the paragraph.

Conclusion

Overall, the sentences provide a clear and informative summary of the study's findings, highlighting both positive outcomes and areas that require further attention for successful wetland restoration. But there is room for improvement in terms of providing more specific details about the measurement methods, elaborating on the absence of Juncus roemerianus, quantifying vegetation diversity and biomass differences, and discussing the ecological implications of sediment composition variations.