Assessing the Impacts of Best Management Practices on Water Quality in the Southwestern United States – Is the Nonpoint Mitigation Strategy Working?

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Introduction

Background

Nutrient pollution, caused by excess nitrogen and phosphorus entering waterbodies, impacts aquatic ecosystems. It can lead to eutrophication, harming fish life and other organisms. **Research Question:** Is the nonpoint mitigation strategy working to reduce nutrient levels?

Best Management Practices (BMPs)

BMPs are a common strategy of non-point mitigation. They are often expensive structural and managerial interventions to restore and maintain the quality of bodies of water. They can target many different types of water qualities. In this project the focus is on nutrient indicators.

Examples

Detention Ponds

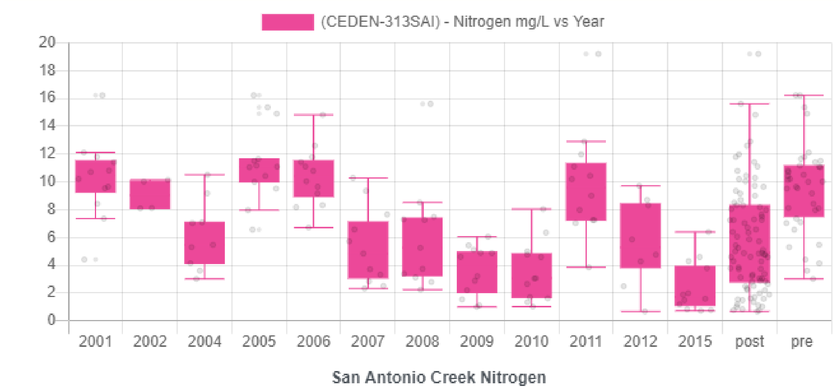
Riparian Buffers

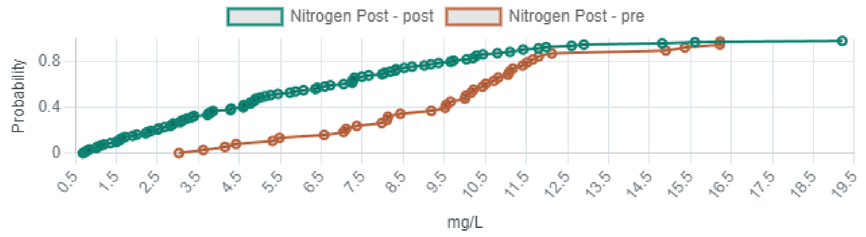
Goal: Identify the most efficient ways to mitigate water quality impacts

Methods

The data was collected from EPA's Water Quality Portal. This portal allowed the team to collect all the nutrient data accessible within a specific location. Using this data, along with a statistical package called "Nondetects and Data Analysis" in R, the team was able to complete a temporal change analysis over decades. This analysis consisted of a pre-BMP and post-BMP analysis along with lag-analysis that looked at changes after BMP establishment. This would allow the team to see if the site improved after BMPs were implemented and how long it took the BMPs to take effect.

Selected Results





Conclusions

Eight sites in the Southwestern US were investigated to help understand water quality changes after BMP development. Limited data was available, even with billions of dollars being spent on developing BMPs. The lack of data was a severe impediment to assessing post-implementation effects. Due to this lack of data, the team determined the data was inconclusive, especially as only 50% of the sites analyzed showed improvement in water quality. Future work on this project could increase the scope and analyze more sites. It could also go into more depth and compare the flow data with the results from each analysis. Finally, increased water quality monitoring would be a benefit to future research in this area and assessing the impacts of investments in nonpoint pollution mitigation.

References

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