

# Vegetation Composition Assessment and Trend Analysis of Forested Mitigation Wetlands in Marquette, MI

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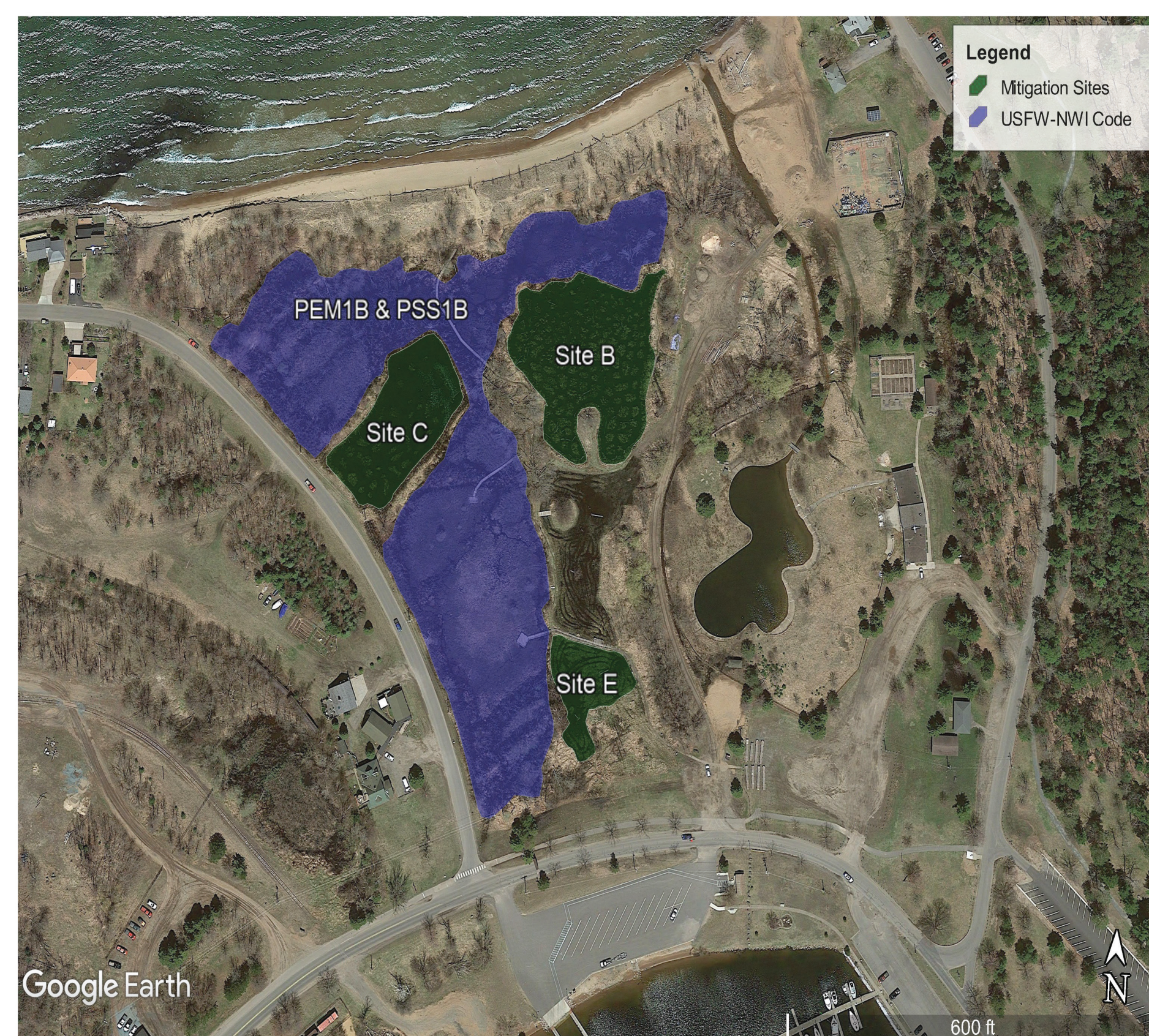
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## Introduction

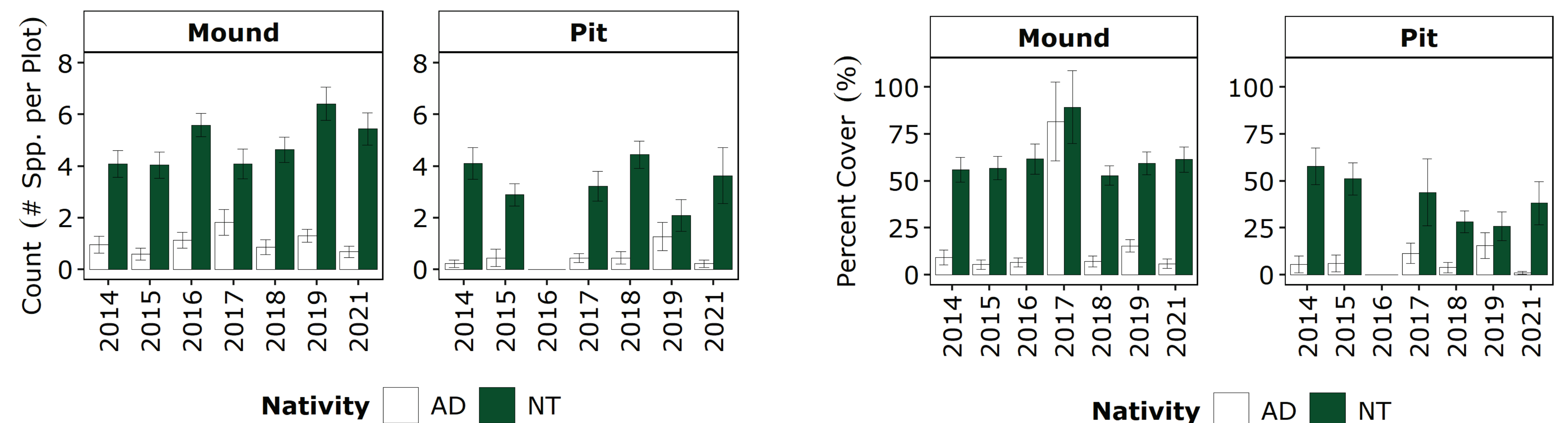
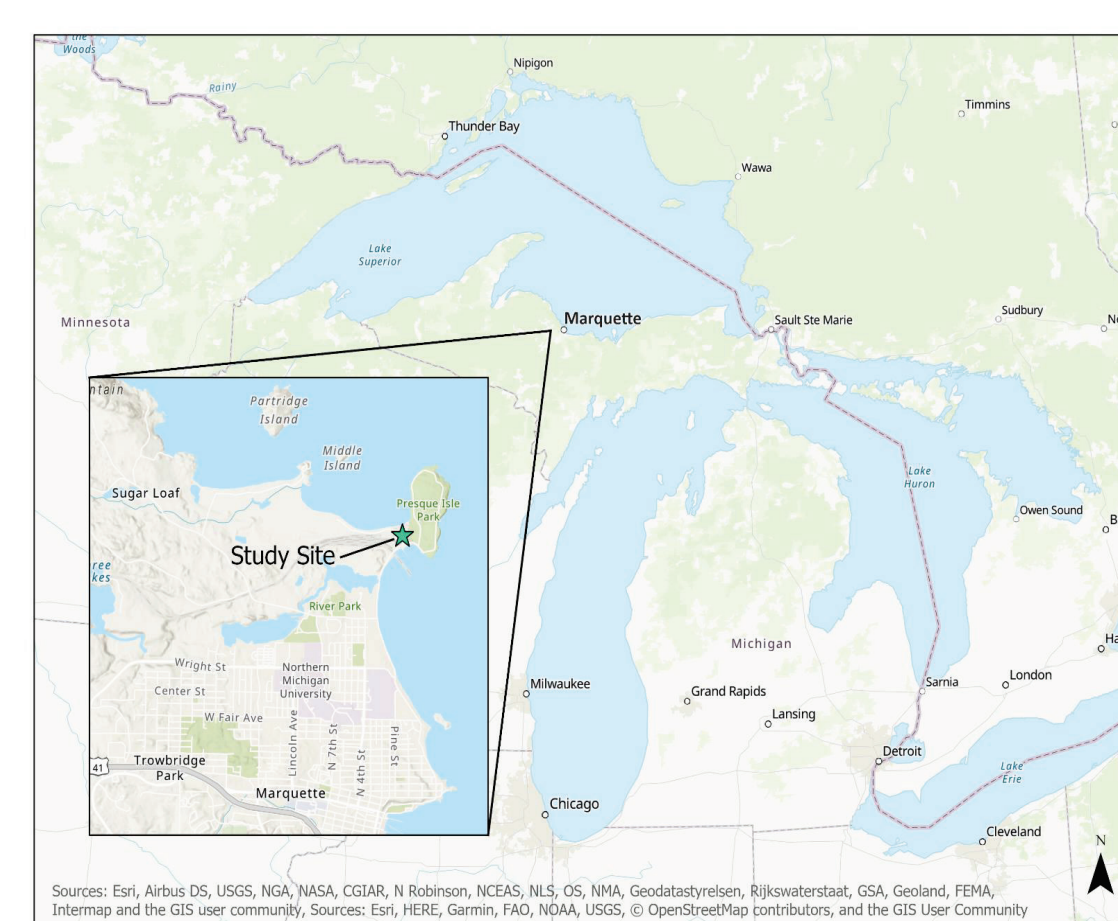
The purpose of this study was to assess vegetation composition and examine vegetation community trends across a several year period of monitoring to evaluate the condition of five separate forested mitigation wetlands. All five wetlands were constructed by the City of Marquette and the Marquette County Conservation District was contracted to monitor vegetation and manage non-native & invasive species to fulfill a MI-EGLE permit to restore 4.74 acres of forested wetlands. Three sites (B, C & M; Figure 1) were used here to examine vegetation community trends between 2014-2021 as sites D & E were established in 2019 and only have one year of monitoring data.

## Methods

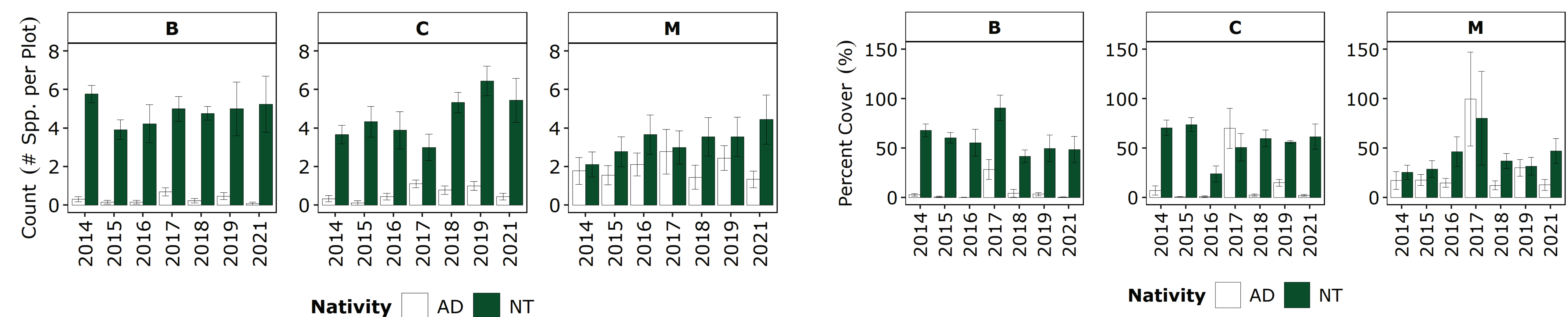
- Repeated quadrat sampling along a transect to monitor vegetation on microtopography features including mounds (n = 8 per site) and pits (n= 5 per site) annually in three mitigation wetlands (Site B, C, M) between 2014 – 2021
- Plant species were identified and percent cover was estimated in each plot annually. Non-native & invasive species management procedures were applied annually to control unwanted species.
- Michigan flora online database used to determine nativity as native (NT) or non-native (AD; adventive) for every species observed.
- Native species richness (the number of unique species per plot) and percent cover (per plot) were summarized for microtopography and nativity each year in each mitigation wetland annually between 2019 – 2021 (Figures 2 - 3).



**Figure 1.** Study area location relative to the Great Lakes region and the City of Marquette (below), and the mitigation wetland study site boundaries (left).



**Figure 2.** The number of species per plot (left) and percent cover (right) were summarized for microtopography (mound & pit) and for nativity – as native (NT) and adventive (AD) – annually between 2014-2021.



**Figure 3.** The number of species per plot (left) and percent cover (right) were summarized for nativity – as native (NT) and adventive (AD) – annually between 2014-2021 for sites B, C, & M, respectively.

## Results

- Native species richness (# spp. per plot) was significantly greater in mounds in 2019 & 2021 when compared to 2014 & 2015 (Figure 2); no significant native species richness differences were detected in pits.
- Native species richness (# spp. per plot) was significantly greater in sites C & M in 2019 & 2021 when compared to 2014 (Figure 3). A significant increase in non-native species percent cover was detected in all three sites in 2017.
- Non-native species management procedures were effective.

## Conclusion

These mitigation sites appear to be moving toward meeting mitigation goals. However, ongoing non-native-species management procedures are recommended to continue beyond the extent of the MI-EGLE permit to address existing issues.

Literature Cited Reznicek, A.A., Voss, E.G. and Walters, B.S., 2011. Michigan flora online. *University of Michigan*. Website: <http://michiganflora.net/genus.aspx>.

