# Restoration of Lake Superior Coastal Wetlands in Michigan's Keweenaw Peninsula

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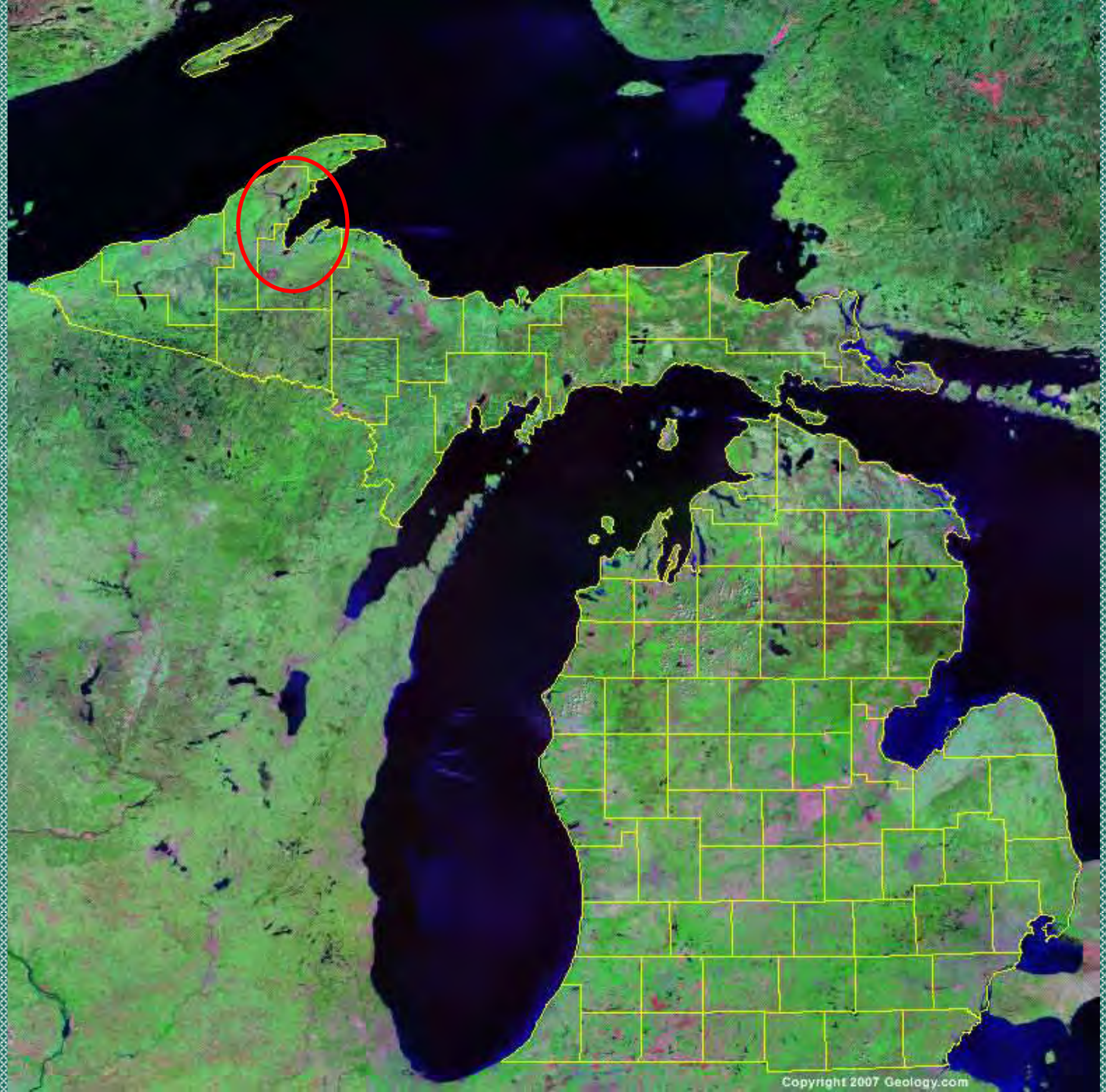
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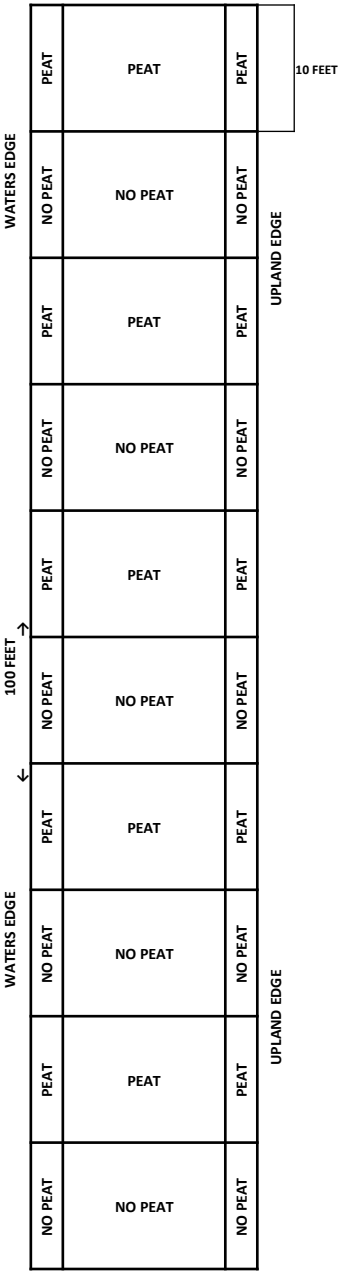
Marsin Center
Sand Point

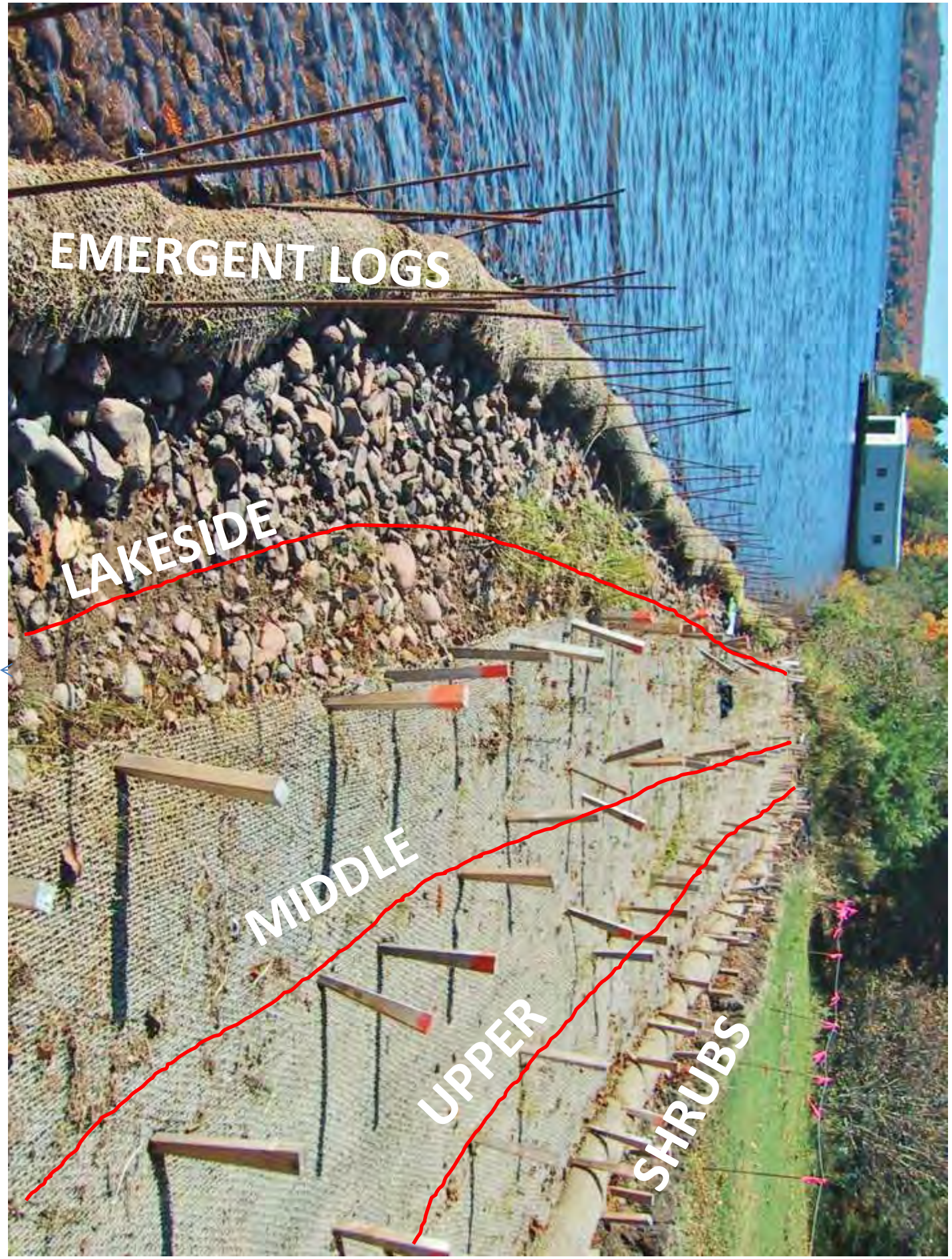
# Figure 1. Diagram of Experimental Design for Coastal Plantings

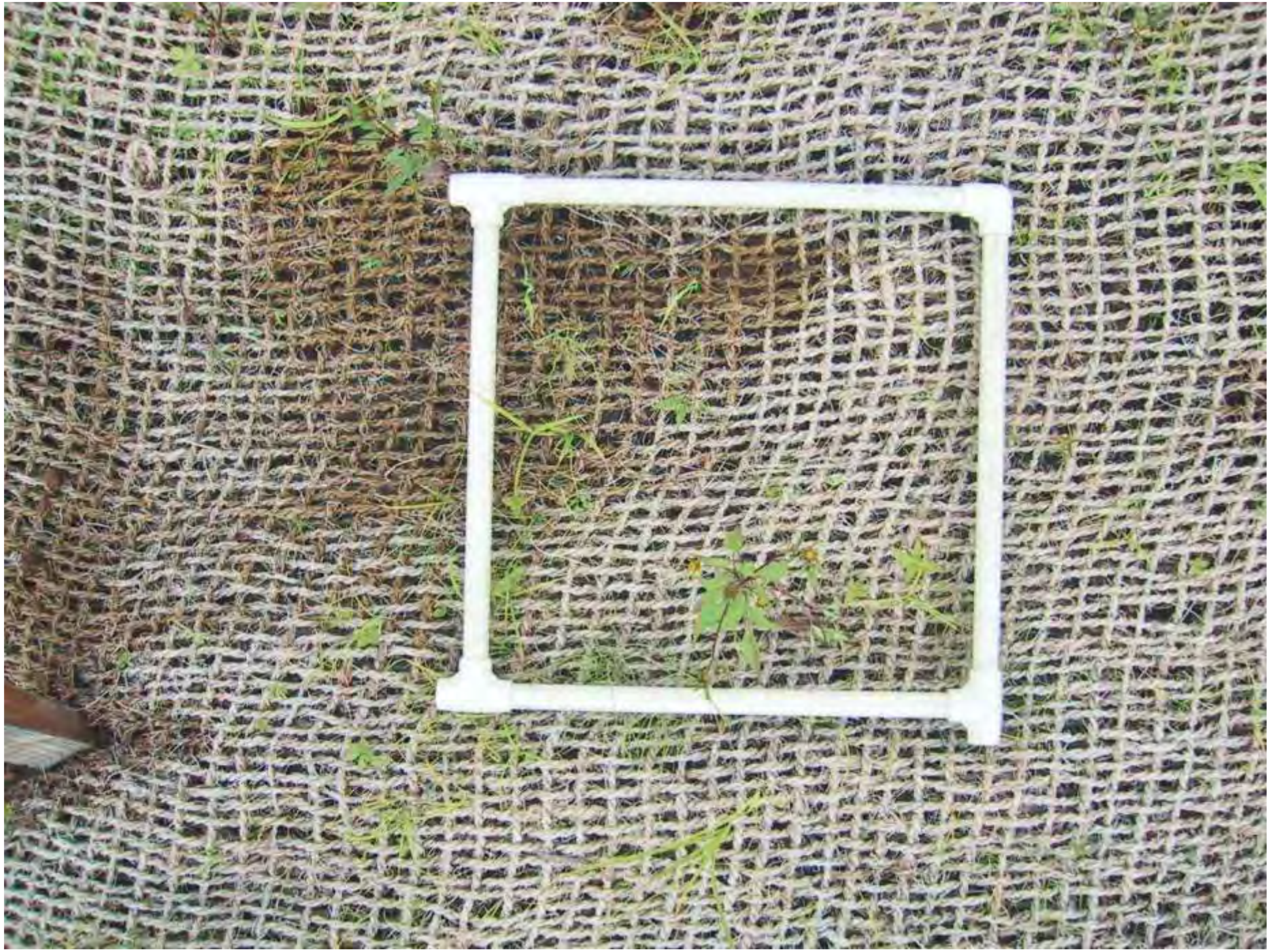


04/30/2010

# Table 1. Seed Mixes Used in Coastal Restoration Project (Marsin and Sand Point).

| | | SEED MIXES | | SEED MIXES |
|---|---|---|---|---|
| | Emergent Logs | Grams per Log | Shrub Zone Logs | Grams per Log |
| 1 | Acorus calamus | 4.0 | Aronia melanocarpa | 0.5 |
| 2 | Asclepias incarnata | 0.5 | Cornus stolonifera | 4.0 |
| 3 | Calamagrostis canadensis | 0.5 | Ilex verticillata | 1.5 |
| 4 | Carex comosa | 4.0 | Larix laricina | 0.9 |
| 5 | Carex crinita | 4.0 | Myrica gale | 4.5 |
| 6 | Carex pseudocyperus | 2.0 | Physocarpus opulifolius | 1.5 |
| 7 | Cladium mariscoides | 5.0 | Rosa palustris | 4.0 |
| 8 | Eleocharis palustris | 4.0 | Sambucus canadensis | 3.0 |
| 9 | Iris versicolor | 5.0 | Thuja occidentalis | 4.0 |
| 10 | Juncus arcticus | 0.5 | Viburnum cassinoides | 2.0 |
| 11 | Juncus effusus | 3.0 | Viburnum trifolium | 2.0 |
| 12 | Juncus pelocarpus | 1.0 | | 28 grams |
| 13 | Juncus spp. mix | 0.5 | | (1 Ounce) |
| 14 | Pontederia cordata | 5.0 | | |
| 15 | Sagittaria latifolia | 1.0 | | |
| 16 | Scirpus acutus | 2.0 | | |
| 17 | Scirpus cyperinus | 2.0 | | |
| 18 | Sparganium americanum | 5.0 | | |
| 19 | Sparganium eurycarpum | 5.0 | | |
| | Totals: | 54 grams | | |
| | | (2 ounces) | | |
| | | | | |
| | Wet Meadow Plots | Grams per Plot | | |
| 1 | Asclepias incarnata | 2.0 | | |
| 2 | Aster umbellatus | 4.0 | | |
| 3 | Bidens mix | 4.0 | | |
| 4 | Calamagrostis canadensis | 2.0 | | |
| 5 | Carex comosa | 4.0 | | |
| 6 | Carex crinita | 5.0 | | |
| 7 | Carex magellanica | 2.0 | | |
| 8 | Carex projecta | 4.0 | | |
| 9 | Carex pseudocyperus | 1.0 | | |
| 10 | Carex retrorsa | 3.0 | | |
| 11 | Carex scoparia | 3.0 | | |
| 12 | Carex vesicariae | 0.8 | | |
| 13 | Cladium mariscoides | 5.0 | | |
| 14 | Eleocharis palustris | 4.0 | | |
| 15 | Eriocaulon aquaticum | 0.5 | | |
| 16 | Eupatorium perfoliatum | 0.5 | | |
| 17 | Eupatorium purpureum | 2.0 | | |
| 18 | Euthamia gramnifolia | 2.0 | | |
| 19 | Iris versicolor | 4.0 | | |
| 20 | Juncus arcticus | 2.0 | | |
| 21 | Juncus effusus | 2.0 | | |
| 22 | Juncus ensifolius | 1.0 | | |
| 23 | Juncus pelocarpus | 1.0 | | |
| 24 | Juncus spp. mix | 1.0 | | |
| 25 | Lycopus mix | 1.0 | | |
| 26 | Pontederia cordata | 5.0 | | |
| 27 | Sagittaria latifolia | 1.0 | | |
| 28 | Scirpus acutus | 2.0 | | |
| 29 | Scirpus atrovirens | 1.0 | | |
| 30 | Scirpus cyperinus | 1.0 | | |
| 31 | Solidago uliginosa | 2.0 | | |
| 32 | Sparganium americanum | 4.0 | | |
| 33 | Sparganium eurycarpum | 4.0 | | |
| 34 | Thalictrum dasycarpum | 4.0 | | |
| 36 | Triadenum frasieri | 2.0 | | |
| | | 87 grams | | |
| | | (3.2 ounces) | | |


EMERGENT LOGS
LAKESIDE
MIDDLE
UPPER
SHRUBS



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05/12/2011

**Figure 2. Percent Cover of Wetland Plant Species at Marsin (2011).**

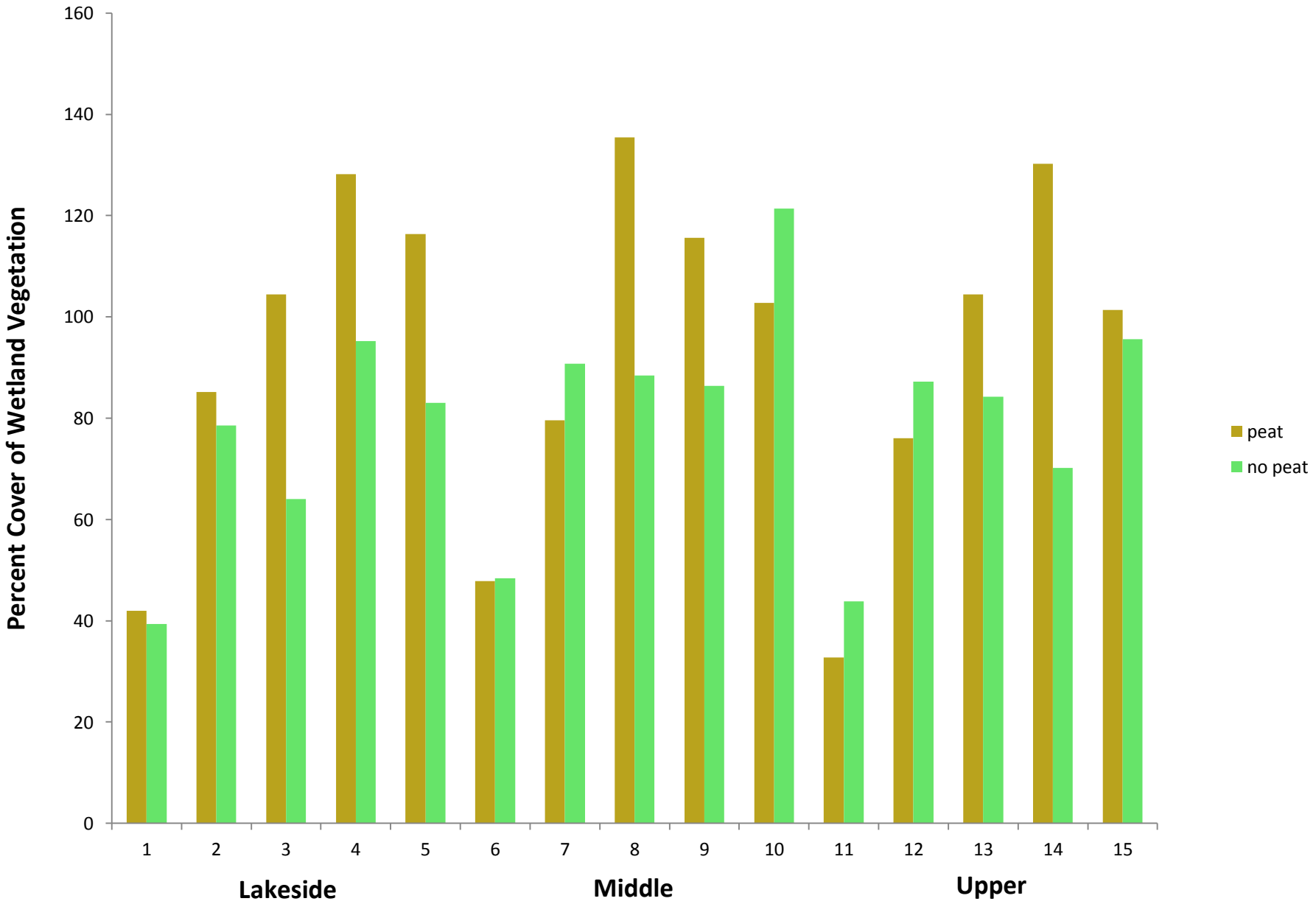


**Figure 3. Diversity of Wetland Plant Species at Marsin (2011).**

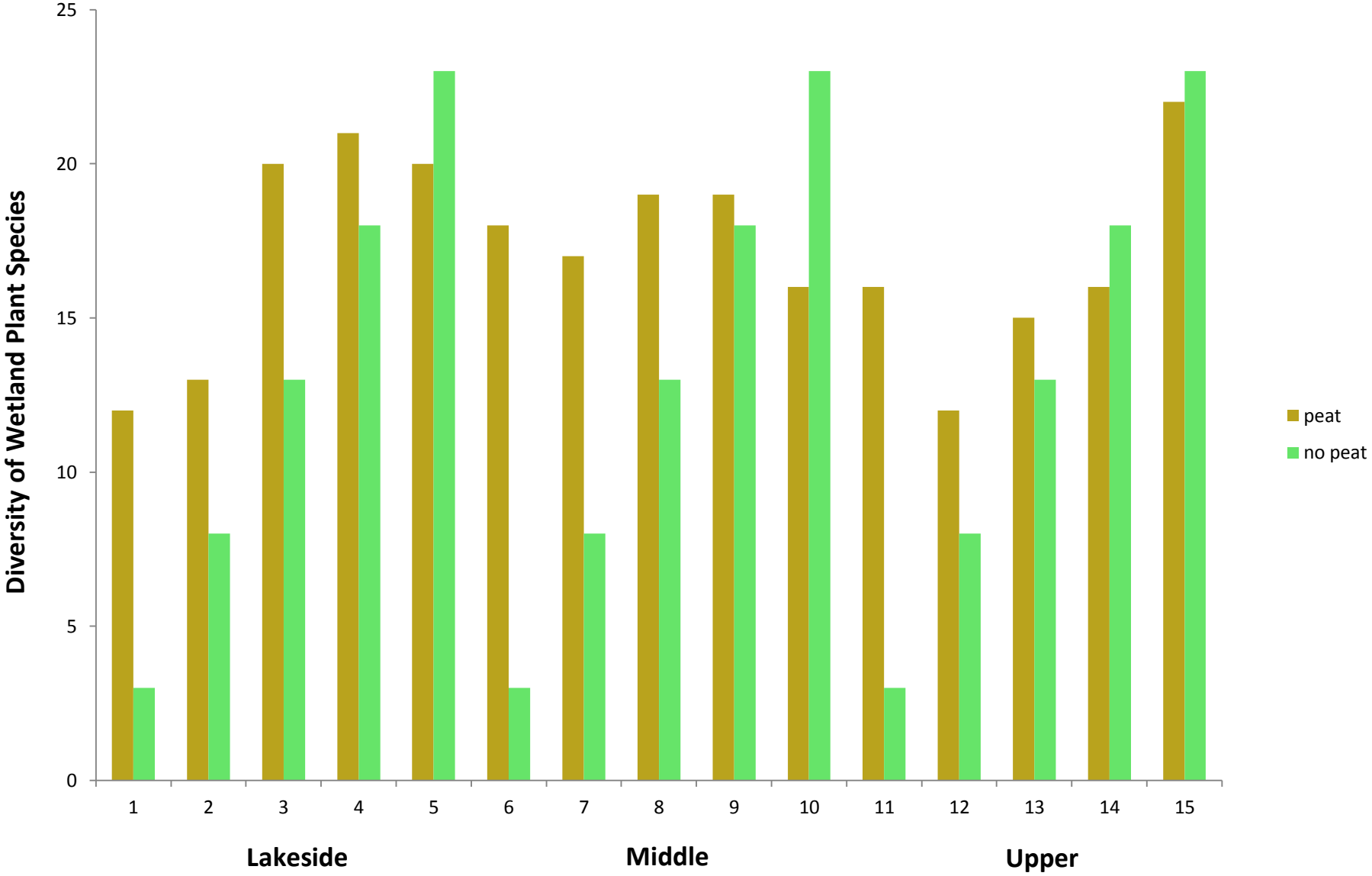


**Figure 4. Percent Cover of Wetland Plant Species at Marsin (2013).**

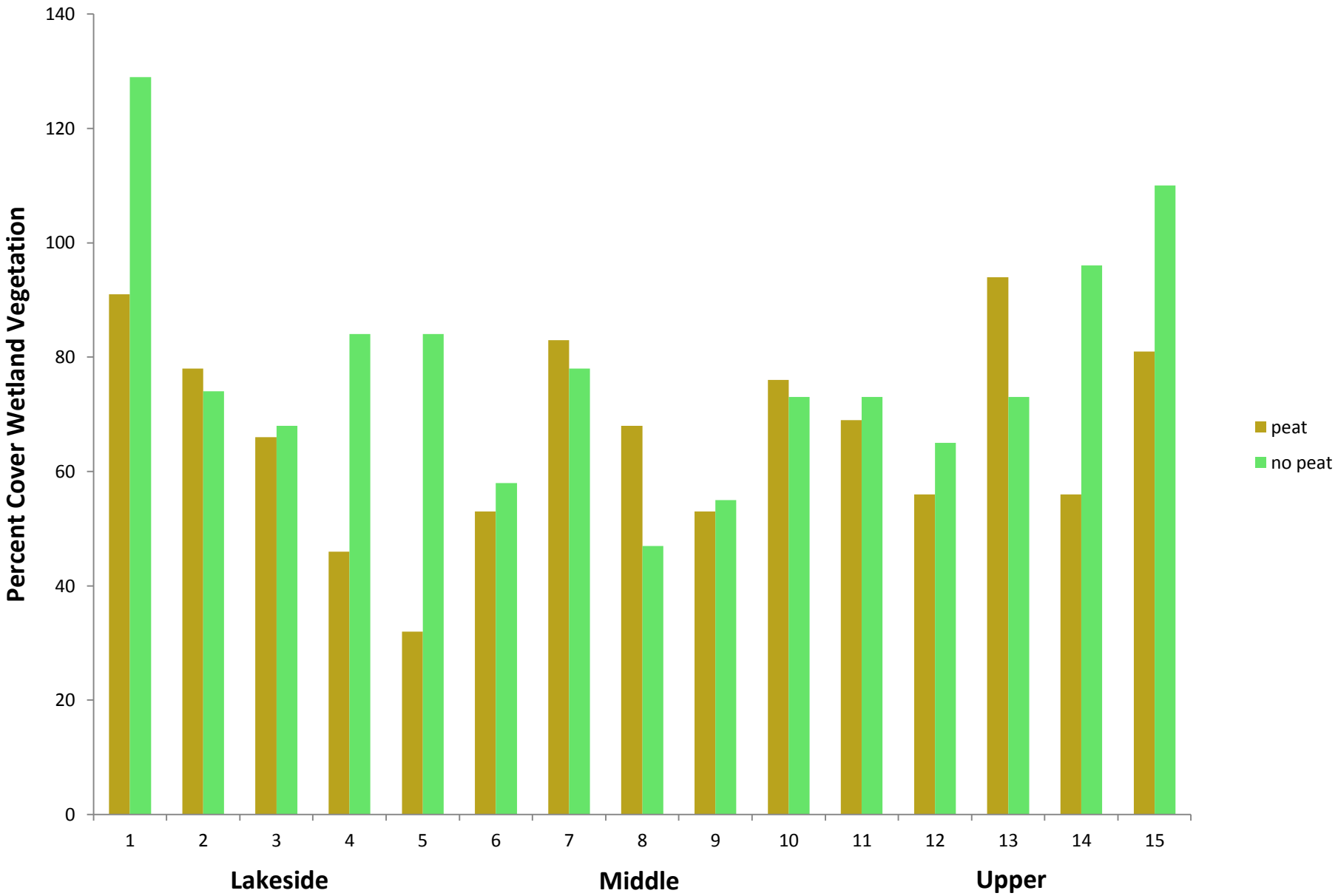
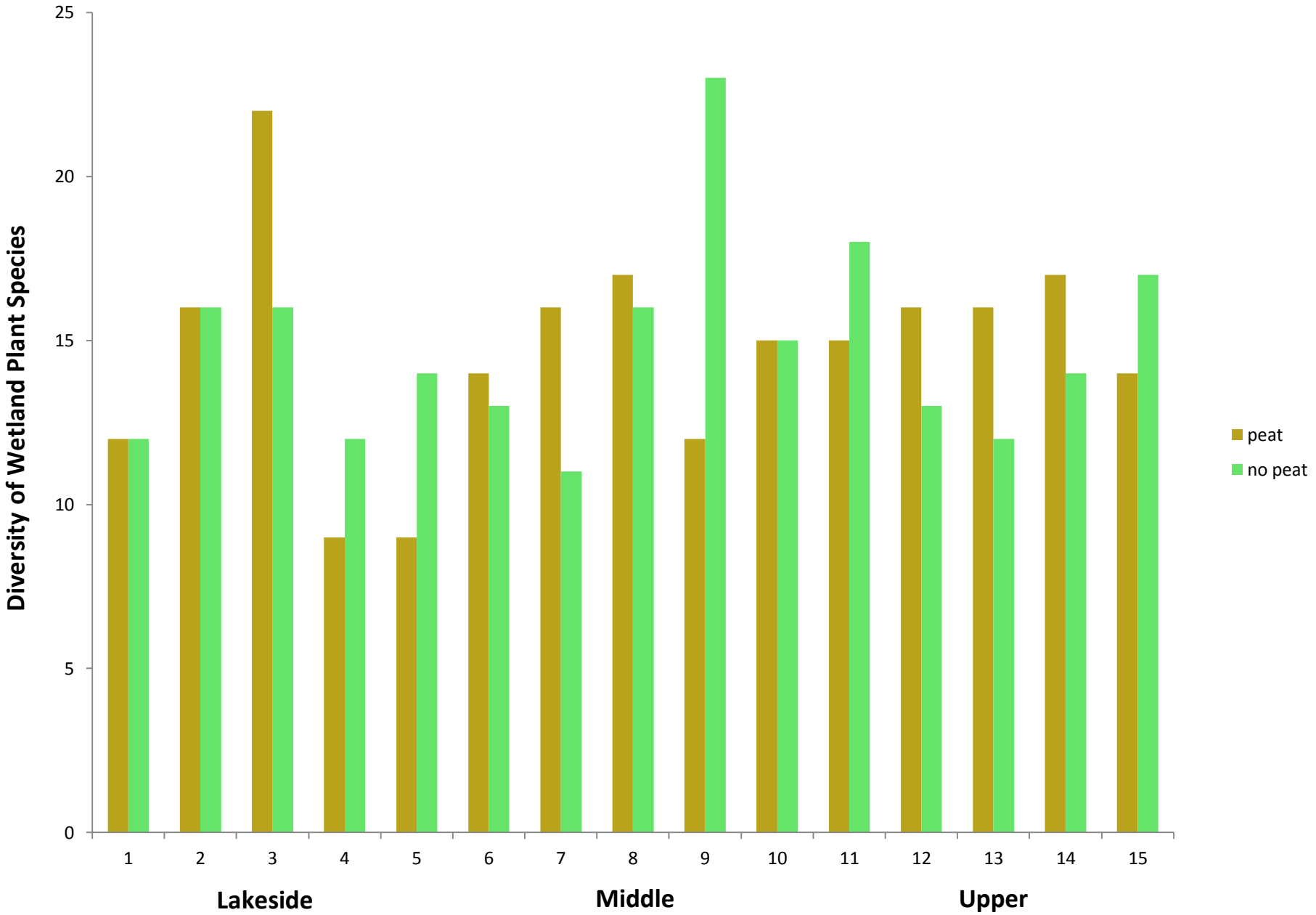


**Figure 5. Diversity of Wetland Plant Species at Marsin (2013).**



Sand Point

06/22/2010

06/22/2010

06/22/2010

06/24/2010

06/24/2010

06/28/2010

**Figure 6. Percent Cover of Wetland Plant Species at Sand Point (2011).**

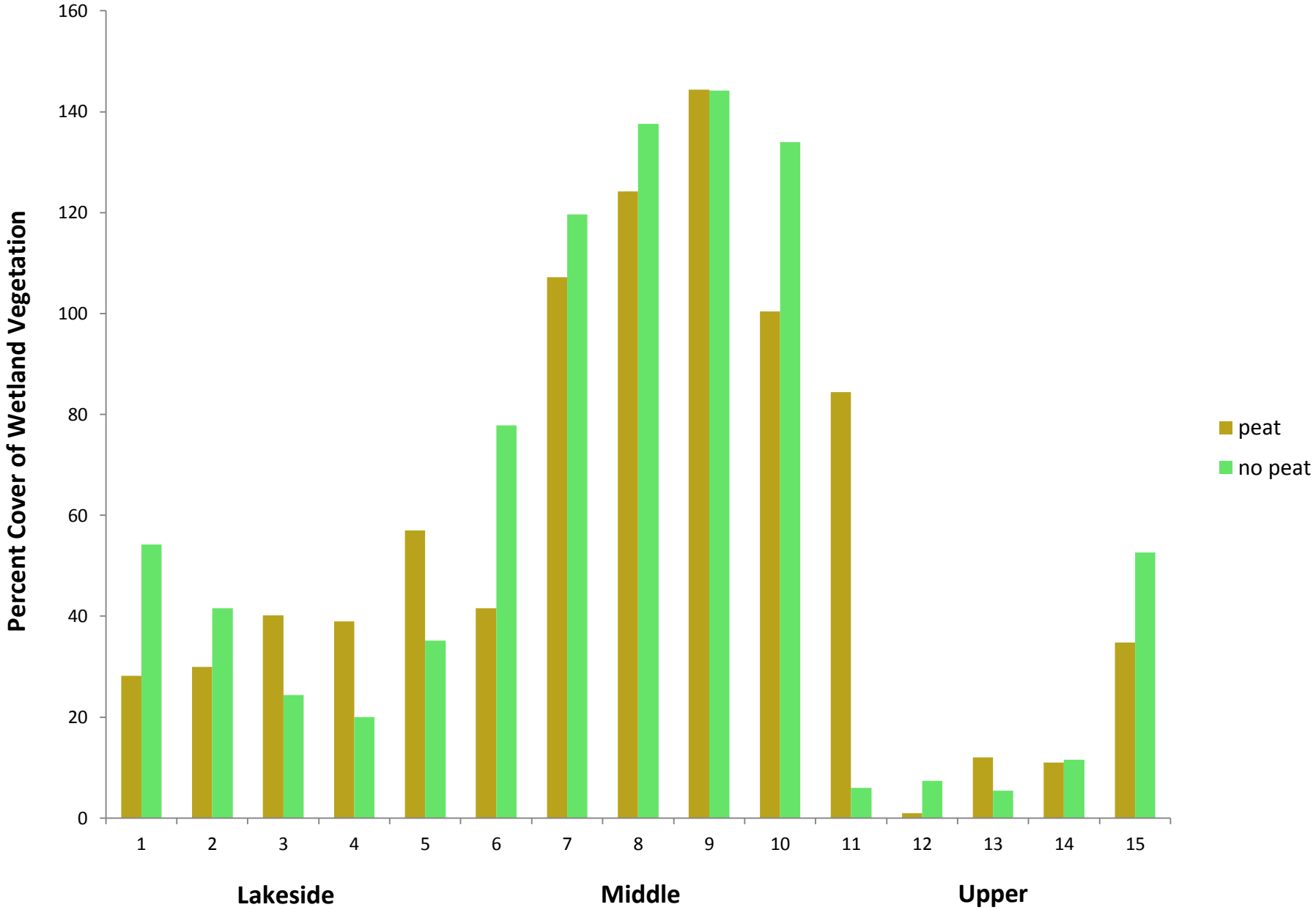


**Figure 7. Diversity of Wetland Plant Species at Sand Point (2011).**

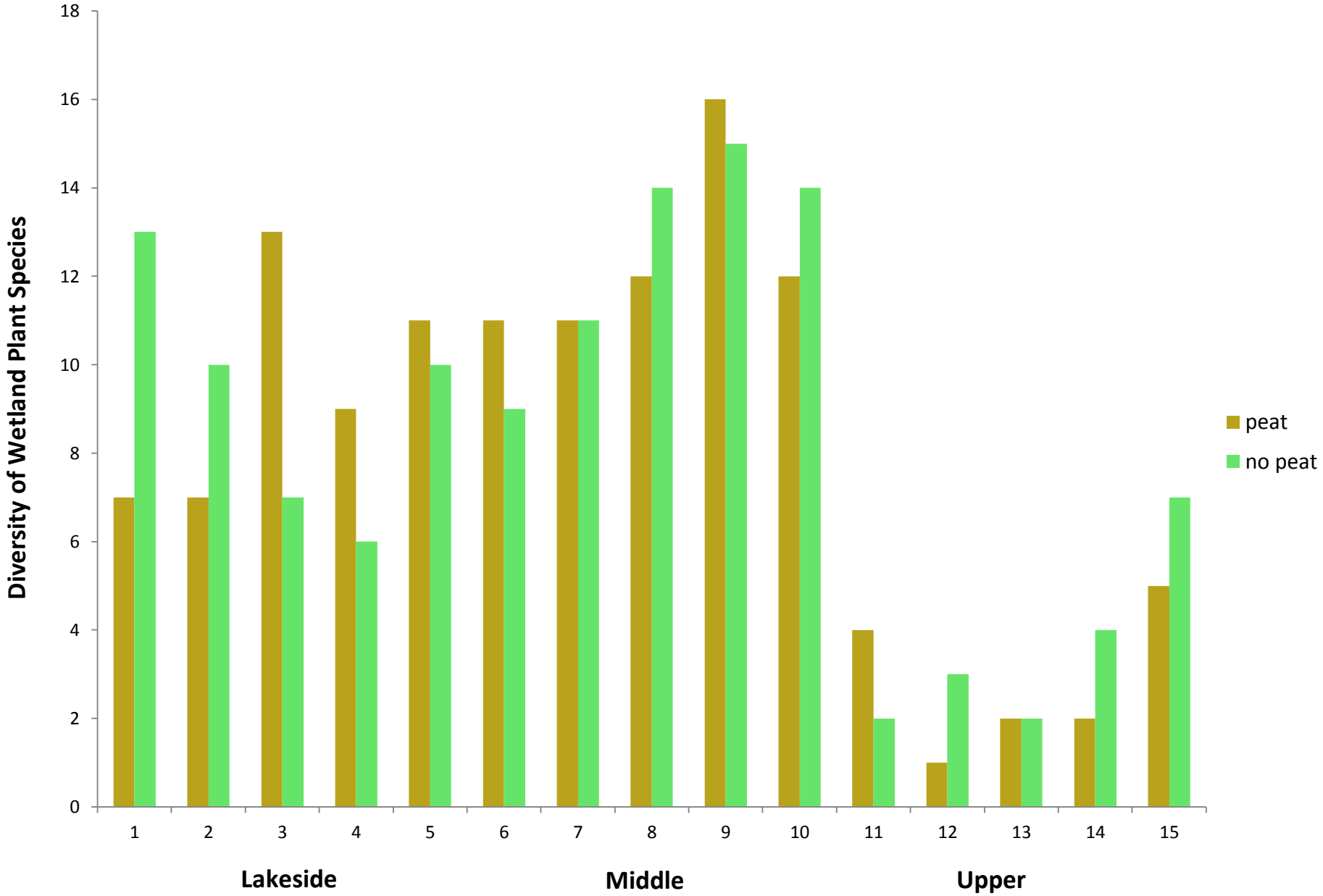
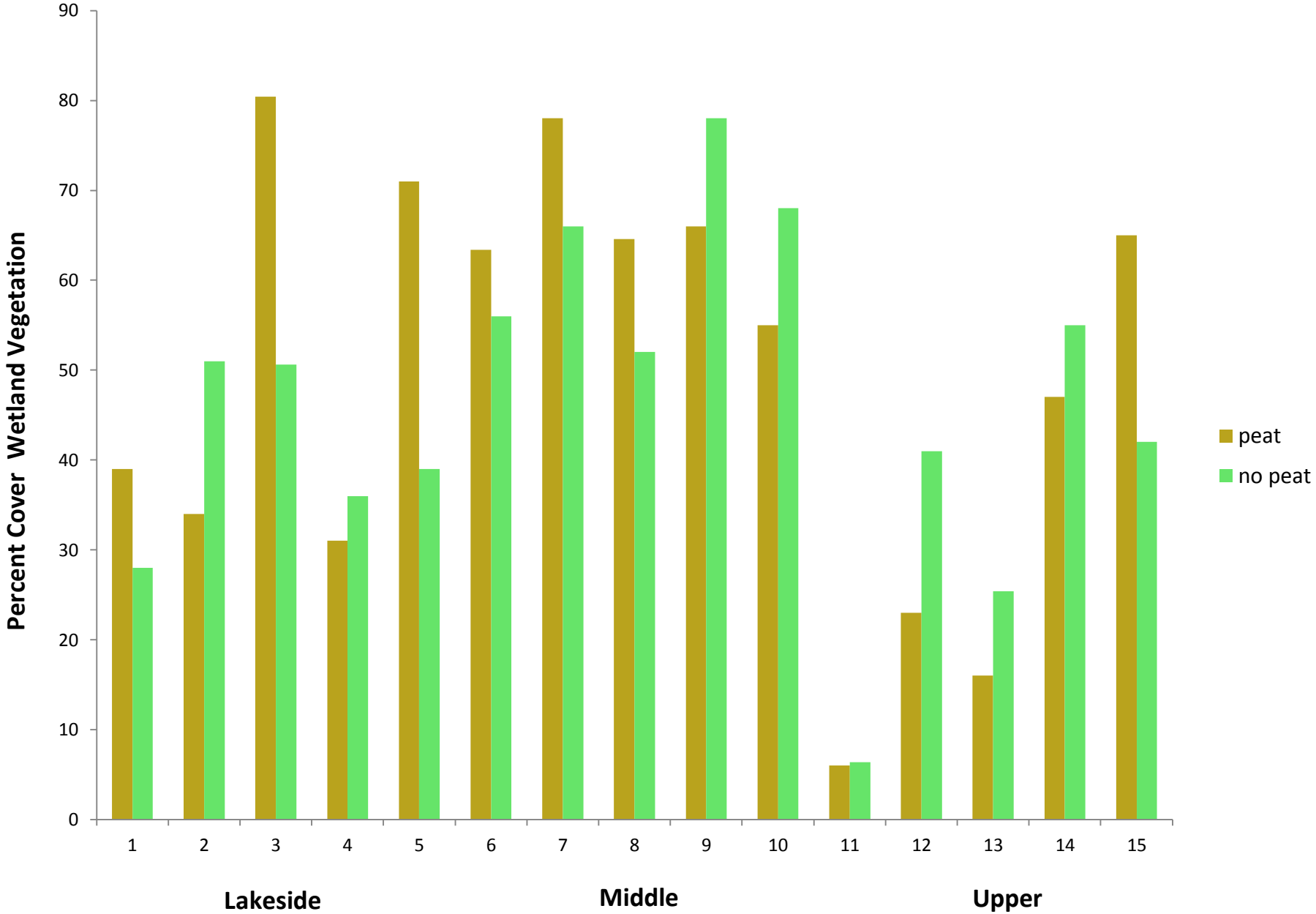
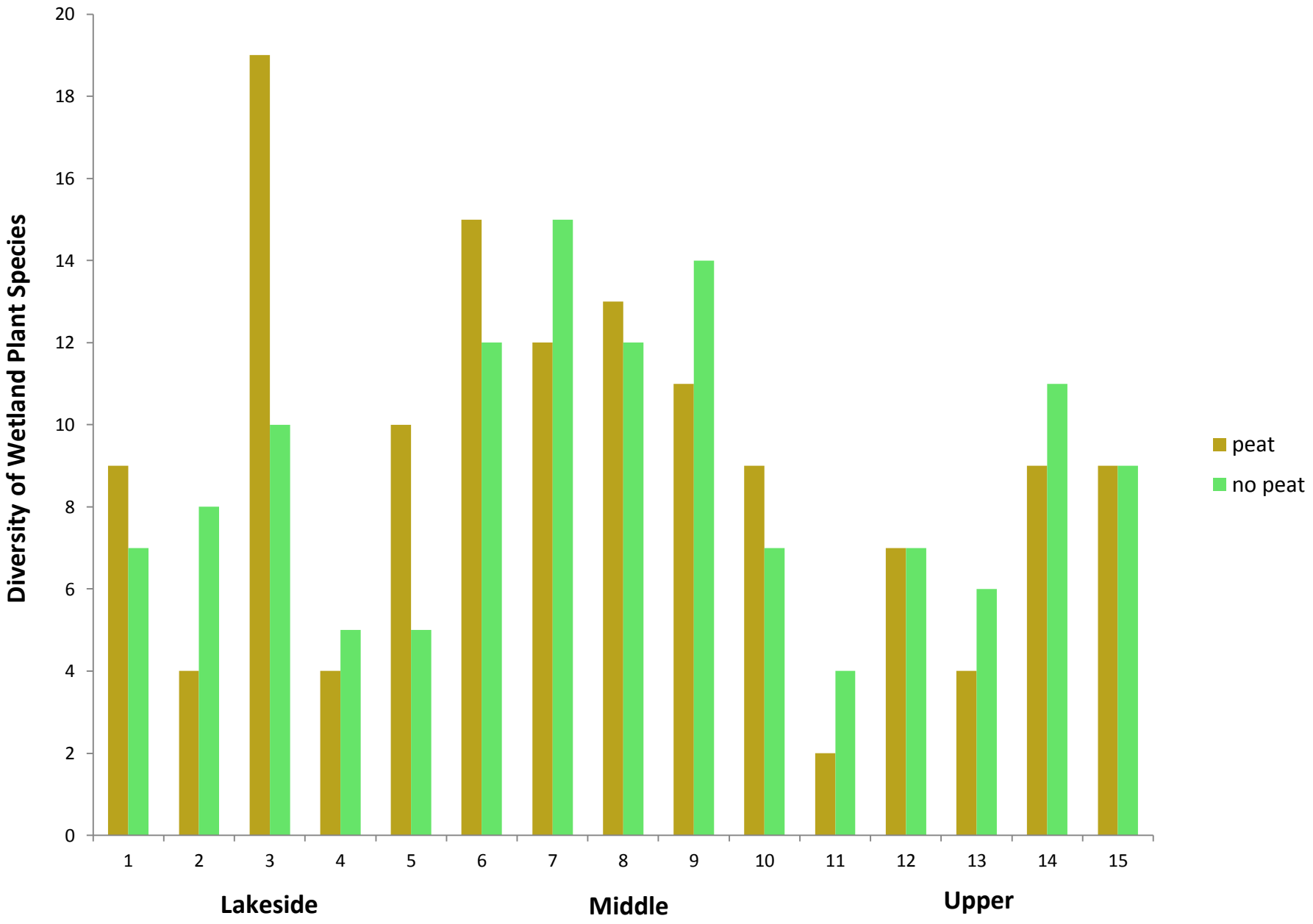


**Figure 8. Percent Cover of Wetland Plant Species at Sand Point (2013).**




Diversity of Wetland Plant Species
20
18
16
14
12
10
8
6
4
2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Lakeside
Middle
Upper
peat
no peat

# Things We Learned

- Seeds Can Be Used for Coastal Restorations, Even in High Wave Action Areas
- Certain Plant Species Work Better than Others in Establishing Vegetation
- Coir and Jute Matting Materials Work Well in Holding Seeds, Peat and Soil in Place
- Coir Logs are Especially Useful in Lessening Wave Action and Reducing Erosion
- Cyclical Lake Level Variation Has Strong Effect on Success of Restoration

# Acknowledgements


- Michigan Technological University for Providing Starting Funds for this Project;
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- Dr. Rodney Chimner for all of His Help and Advice;
- Laura Kangas for all of Her Invaluable Help with Collecting and Preparing Seeds, Sorting and Weighing Seed Mixes, and Installing the Restoration;
- Jennifer Bush, Ellen Beller, Arvo Aljaste, Margus Pessalu and Erin Grupido for their Invaluable Assistance In Moving and Placing Erosion Matting and Collecting Vegetation Data.

# Questions?