Anthropogenic and Natural Variation in Ridge and Slough Pollen Assemblages

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Abstract

We present pollen evidence documenting the response of sawgrass ridge and slough systems of the Florida Everglades to hydrologic changes during the last 3,500 years. Sediment cores and surface samples were collected in three transects across sawgrass ridges and sloughs in Water Conservation Area 3A to determine the age of the features, long-term variability in plant community composition, stability of sawgrass ridge and slough size, and their response to 20th century changes in hydrology. Statistically significant differences in abundance of *Cladium* pollen in surface samples collected throughout the system allow differentiation of these communities in the sedimentary pollen record. Analysis of pollen in cores from the three transects indicates that the general distribution of ridges and sloughs has remained distinct through time. There is evidence the vegetation has responded to past global-scale climate events, such as the Medieval Warm Period, as well as the 20th century anthropogenic alterations to the natural hydrology. The ridge community is more responsive and susceptible to perturbations in hydrology than the slough community. In contrast, the slough plant community is more stable and less likely to demonstrate long-term changes after

perturbations to hydrology. Regardless, these data indicate that the ridge and slough landscape is resilient to changes in hydrology and posses the potential to return to a natural state with the return of natural hydrologic conditions.

Introduction

Compartmentalization of the Everglades ecosystem through the installation of levees, canals, and other water-control structures during the late 19th and 20th centuries has altered the distribution of native plant communities throughout the system. Historically (or pre-drainage), most of the central Everglades was occupied by a ridge and slough landscape, characterized by elongate, dense stands of sawgrass separated by open water sloughs (Fig. 1) and scattered tree islands (McVoy, 1999). The ridge and slough landscape now is restricted to Water Conservation Area 3A (WCA 3A) and Everglades National Park (Fig. 2), with other areas occupied almost entirely by broad expanses of sawgrass or monospecific stands of cattails. These changes have been attributed at least partly to 20th century changes in water management practices as well as nutrient enrichment of surface waters from agricultural activities in the north. In 2000, the Comprehensive Everglades Restoration Plan was enacted to restore the natural hydrology and communities of the Everglades wetland ecosystem. This report presents paleoecological data from Everglades ridge and slough sites that addresses: the age of the features; long-term variability in community composition; stability of sawgrass ridge and slough size; and the response to 20th century changes in hydrology. These data are necessary to accurately predict the response of the ridge and slough plant communities to planned changes in water management.

The Everglades is a freshwater, nutrient-limited, subtropical wetland covering an area of approximately 6,000 km^2 (Davis and others, 1994) in southern Florida. The system consists of a mosaic of vegetation communities, including tree-islands, mangrove forests, cypress domes, marl prairies, sawgrass marshes, sawgrass ridges, and sloughs (Davis, 1943; Loveless, 1959; Davis and others, 1994). The ridge and slough landscape, the focus of this research, consists of dense sawgrass (*Cladium*) stands oriented approximately northeast to southwest, parallel to flow, separated by open-water sloughs dominated by waterlily (*Nymphaea*) (Figure 1). Their distribution, as well as the distribution of all plant communities within the Everglades, is controlled by water depth, hydroperiod (which Lodge 2005 states is the average annual duration of continuous flooding), substrate type, and fire regime (Kushlan, 1990).

In the natural Everglades system, rainfall and the overflow of water from Lake Okeechobee dictated the hydrologic patterns. Water flowed southward from Lake Okeechobee along a gentle slope of 3 cm/km (Kushlan, 1990), eventually reaching Florida Bay and the Gulf of Mexico through Shark River Slough and, to a lesser extent, Taylor Slough. The late 19th through the early 20th century mark the beginning of the intensive drainage efforts to render parts of the Everglades usable for agricultural and urban development (Light and Dineen, 1994). The construction of four drainage canals (the North New River, Hillsboro, Miami, and West Palm Beach) drained 607,100 ha. Alterations continued with the completion of the Tamiami Trail in 1928 (Light and Dineen, 1994), greatly reducing freshwater flow across the wetland. Even more extensive compartmentalization began in the 1950's, when three Water Conservation Areas (WCA) (Figure 2), which are a series of canals and levees, were constructed to control flooding within the northern Everglades (Light and Dineen ,1994). Each WCA was designed for specific purposes regarding the containment and release of water; therefore, hydrologic conditions (i.e. hydroperiods) within each WCA differ. This alteration of the natural hydroperiod resulted in extreme changes of the natural landscape. For example, in Water Conservation Area 2, a combination of altered hydroperiod and nutrient enrichment resulted in the replacement of the discrete ridge and slough vegetation environments by a homogenous sawgrass landscape (McVoy, 1999).

To restore a more natural distribution of plant and animal communities within the Everglades ecosystem, the U.S. Federal and Florida State governments enacted the Comprehensive Everglades Restoration Plan (CERP). CERP aims to achieve flow patterns similar to the historic (or pre-drainage) hydrologic regime through modification and removal of existing water-control structures. For restoration to be successful, it is critical to understand the factors controlling the distribution of specific wetland communities. This requires an understanding of the origin of individual community types, how they have responded to past climatic changes, and how they responded to 20th century hydrologic changes. Such data are needed to determine whether the system has the resilience to return to pre-drainage conditions.

We designed this study to determine how vegetation in the ridge and slough landscape has changed during the 20th century and to assess the stability of ridges and sloughs over centennial to millennial time scales. Results are presented from three transects of cores collected in relatively pristine ridges and sloughs of Water Conservation Area 3A (Fig. 1). The following questions will be addressed through this research: 1) Can sawgrass ridges and sloughs be distinguished from one another in the palynologic record; 2) Have these two environments always been discrete; 3) How have they responded to natural climate variation; and 4) How have they responded to 20th century compartmentalization?

Methods

Core collection methods

Using a 10 cm diameter piston-coring device, we collected 22 cores in 2002 and two cores in 2000 (Appendix A) within a series of transects in the historic ridge and slough landscape (Figure 2). Within each transect, cores were collected based on the distribution of current vegetation types. Typically, we collected one core from the central sawgrass ridge, one in the ridge approximately 10 meters from the ridge-slough transition, one in the transition, and one in the central slough. We sampled the cores in 1 cm increments in the upper 20 cm and in 2 cm increments for the remainder of the core.

Palynological Processing and Analysis

We isolated pollen from both sediment cores and surface samples using standard palynological preparation techniques (Traverse, 1988; Willard and others, 2001a). For each sample, one tablet of *Lycopodium* spores was added to between 0.5 grams to 1.5 grams of sediment. Samples were processed with HCl and HF to remove carbonates and silicates respectively, acetolyzed (1 part sulfuric acid: 9 parts acetic anhydride) in a boiling water bath for 10 minutes, neutralized, and treated with 10% KOH for 10 minutes in a water bath at 70° C. After neutralization, residues were sieved with 149 µm and 10 µm nylon mesh to remove the coarse and clay fractions, respectively. When necessary, samples were swirled in a watch glass to remove mineral matter. After staining with

Bismarck Brown, palynomorph residues were mounted on microscope slides in glycerin jelly. At least 300 pollen grains were counted from each sample to determine percent abundance and concentration of palynomorphs.

Chronology

Chronology of these cores is based on radiocarbon dating, lead-210, and the biostratigraphic indicator *Casuarina equisetifolia* (Australian pine). Radiocarbon dates were obtained on bulk sediments by Beta Analytic (Appendix B) and lead-210 analyses were conducted in the USGS geochronology lab, St. Petersburg, FL (Appendixes C-G). The pollen of *C. equisetifolia,* an exotic species introduced to South Florida about 1900 AD, first occurs in sediments in 1910 +/- 15 years (Langeland, 1990; Wingard and others, 2003) after 1940, *C. equisetifolia* is common. Age models are based off of calibrated years before present (calyr BP) radiocarbon dates and lead-210 (Figure 3).

Statistical Analysis

To determine whether the pollen abundance of dominant vegetation (*Cladium* in ridges and *Nymphaea* in sloughs) significantly differed in sediment from each vegetation type, we used the Mann-Whitney test. The null hypothesis is: regardless of vegetation type the percentage of species specific pollen does not vary in spite of changes in site-specific vegetation (i.e. the amount of *Cladium* pollen is the same in both ridge and slough surface samples).

Reconstruction of past plant communities is based on statistical comparison of fossil and modern assemblages from different wetland communities throughout the Everglades

(Willard and others, 2001a). Using the modern analog technique (Overpeck and others, 1985), we calculated dissimilarity coefficients (d_{ij}) using the squared chord distance formula (SCD):

$$d_{ij}=\sum_k (p^{1/2}_{ik}-p^{1/2}_{jk})^2$$

Down-core samples with dissimilarity coefficients equal or less than the critical value 0.15 are considered to share similar vegetation and environmental parameters with their modern analog (Willard and others, 2001a).

Results

Modern Ridge and Slough Vegetation

Ridge vegetation is dominated by ~2 meter tall *Cladium* (Table 1). Secondary vegetation includes small shrubs (< 2 meters), primarily *Myrica* and *Cephalanthus*. Occasionally, herbaceous plants, such as *Polygonum*, *Sagittaria*, and ferns are present. Peat in sawgrass ridges is thicker, and water depth is shallower than in neighboring sloughs (Figures 4-6).

Sloughs are extensive areas of open water where *Nymphaea* is the dominant species (Table 1). Sloughs lack the *Cladium* and woody vegetation that dominate adjacent sawgrass ridges (Figures 4-6). Subdominant vegetation includes *Eleocharis*, *Panicum*, *Utricularia purpurea, U. foliosa*, and *Bacopa*. Sloughs have greater water depths and thinner peats than sawgrass ridges (Figures 4-6).

A transition zone between the sawgrass ridges and sloughs is distinguishable. Although the boundaries are not clearly defined between the transition zone and the adjacent ridge and slough, the *Cladium* within the transition zone is shorter and has a sparser distribution than in the central ridge (Table 1). Also, herbaceous species such as *Sagittaria* and *Bacopa* are more common. *Crinum* is found primarily in this zone. Peat thickness is slightly less than in the sawgrass ridge; water depths are greater, and there is more open water (Figures 4-6).

Modern Ridge and Slough Pollen Assemblages

Pollen assemblages from sediments collected in sawgrass ridge and slough environment (Appendix H) indicate that these vegetation types can be distinguished in the pollen record (Figures 4-6). *Cladium* pollen is much more abundant than *Nymphaea* pollen in pollen assemblages from sawgrass ridges. Sloughs, on the other hand, are characterized by a low abundance of *Cladium* pollen. A Mann Whitney test confirms these observations ($N=22$; $z=1.79$; $P<0.05$). Changes in *Nymphaea* pollen abundance did not prove to be significantly different between environments. The transition is characterized by the presence of *Crinum* pollen (Figures 4-6). Due to the limited sampling of the transition ($N=6$), the use of the Mann Whitney test is inappropriate.

Analysis of Down-Core Pollen Assemblages

Transect "21"

Pollen Assemblage Zone 1: In cores from the ridge, slough, and transition zone (Figures 7-9), pollen zone 1, representing the base of the cores to approximately 1000 yr BP, is characterized by higher abundance of *Nymphaea* relative to *Cladium* pollen along with a low abundance to near absence of pollen from other plants. In the ridge core (Figure 7), marsh pollen and Chenopodiaceae-Amaranthaceae pollen are more abundant than in the adjacent transition (Figure 8) and slough (Figure 9) cores. In this zone, the pollen assemblages in the transition core are similar to those found in the slough core, rather than the ridge core. Assemblage data for these cores can be found in Appendixes I-K.

Pollen Assemblage Zone 2: In zone 2, representing approximately 1000 yr BP –1900 AD, plant species indicating drier conditions are more abundant throughout the transect. Fern spores, and the pollen of *Cladium*, the Asteraceae, and other marsh plants (including Polygonaceae, Apiaceae, Poaceae, *Justicia*, *Typha*, and *Sagittaria*) are more abundant than in zone 1 (Figures 7-9). In general, *Nymphaea* pollen is less abundant. The ridge and slough cores remain distinct in this zone, with fern spores more common in the ridge. The slough, along with the transition, has a higher abundance of marsh pollen during this interval than the ridge.

Pollen Assemblage Zone 3: Zone 3 encompasses the interval from approximately 1900 AD -present. Increased abundance of fern spores, *Cladium*, *Myrica*, and Asteraceae pollen in conjunction with decreased abundance of *Nymphaea* pollen (Figures 7 and 8), characterize this zone. These increases also occur in the slough core (Figure 9), but *Nymphaea* abundance does not decrease. In general, the establishment of modern vegetation communities occurred midway through zone 3, which is approximately 1950.

Transect “20”

Pollen Assemblage Zone 1: Characterized by high abundances of *Nymphaea* relative to *Cladium* pollen, this zone represents the interval from approximately 2700 yr BP- 1000 yr BP (Figures 10-11). The ridge and slough cores are distinct from one another through this zone (Figures 10-11). Chenopodiaceae-Amaranthaceae pollen and fern spores are more abundant in the ridge core (Figure 10) than in the slough core (Figure 11). Assemblage data for these cores can be found in Appendixes L-M.

Pollen Assemblage Zone 2: Pollen assemblages of zone 2 (~1000 yr BP-1900 AD) are characterized by a greater abundance of fern spores, *Cladium*, and marsh pollen. The onset of zone 2 in the slough core is marked by a spike in the abundance of Chenopodiaceae-Amaranthaceae pollen, as occurred in slough cores from other transects (Figures 9, 11, and 13). The ridge and slough assemblages are distinct from each other throughout zone 2, primarily because of the great abundance of marsh pollen (*Typha*, *Sagittaria*, and Apiaceae).

Pollen Assemblage Zone 3: Pollen assemblages from zone 3 (~1900 AD –present) are characterized by high abundances of Chenopodiaceae-Amaranthaceae, Asteraceae, and woody vegetation pollen (*Myrica* and *Cephalanthus*) (Figures 10-11). *Nymphaea* pollen is nearly absent in the ridge core (Figure 10). In the slough core (Figure 11), *Cladium*, *Myrica*, and Asteraceae pollen are more abundant than in zone 2. Overall, the pollen assemblages in zone 3 indicate the shortest hydroperiod and shallowest water levels of the past 2700 years.

Transect “2000”

Pollen Zone 1: Pollen assemblages in zone 1 (base of core –1000 yr BP) are difficult to characterize because of low diversity of pollen types (Figures 12-13). The ridge core (Figure 12) is characterized by a greater abundance of fern spores. The slough core

(Figure 13) is characterized by a greater abundance of *Nymphaea* than *Cladium* pollen. Assemblage data for these cores can be found in Appendixes N-O.

Pollen Zone 2: Between 1000 yr BP and 1900 AD, pollen assemblages contain greater abundances of ferns spores and marsh taxa than in zone 1. In the ridge core (Figure 12), *Cladium* pollen abundance is greater than in zone 1, and fern spores are more abundant. Pollen assemblages in the slough core (Figure 13) remain dominated by *Nymphaea*, but *Myrica* and Chenopodiaceae-Amaranthaceae pollen are more abundant than in zone 1.

Pollen Zone 3: In both cores, assemblages indicate drier conditions during the 20th century (Figures 12-13). Fern spores comprise about 60-80% of assemblages within the ridge core (Figure 12); in the slough core, *Nymphaea* pollen abundance is noticeably reduced, and pollen from species indicative of dry conditions is more abundant (Figure 13).

Discussion

Floristically, the ridges and sloughs are quite distinctive. Dense *Cladium*, usually over two meters high dominates ridges. Ferns, *Myrica*, *Cephalanthus*, and other wetland plants are sparse occupiers of the ridge environment. *Nymphaea* dominates sloughs, and Poaceae and *Utricularia* are subdominant. The transition, which has no distinct border and occupies the area between the ridge and slough, is composed of short sparse *Cladium*, smaller woody plants (*Myrica* and *Cephalanthus*), marsh plants, and *Crinum*. As our surface sample results have illustrated, the vegetation differences among the ridge, transition, and slough are detectable in the pollen record, allowing the use of pollen collected from sediment cores to interpret the vegetation history of the ridge and slough landscape.

Pollen records from all three transects indicate wetter than modern conditions before 1000 yr BP. These results are consistent with other sediment cores collected in the historic ridge and slough landscape (Willard and others, 2001b). Before 1000 yr BP, the ridge assemblages were analogous to a prairie and marsh-like environment with moderate hydroperiods and water depths. The transition zone and slough sites were analogous to modern sloughs before 1000 yr BP. This indicates that the ridges were narrower with sparser sawgrass vegetation before 1000 BP, with broader *Nymphaea*-dominated sloughs.

Beginning about 1000 yr BP, vegetation characteristic of drier conditions is more common in assemblages from all sites. In ridge assemblages, the greater abundance of fern spores and *Cladium*, Asteraceae, and Chenopodiaceae-Amaranthaceae pollen are analogous to sawgrass marshes, indicating shallower water and shorter hydroperiods. In the transition zone, *Nymphaea* pollen abundance decreases and pollen of *Myrica*, Apiaceae, and Asteraceae and fern spores became more abundant. This indicates a shift from a slough to a drier transition zone. Slough pollen assemblages contain greater percentages of fern spores and *Myrica*, *Cephalanthus*, Asteraceae, and Chenopodiaceae-Amaranthaceae. However, the center of the sloughs were analogous to modern sloughs throughout the interval from ~1000 yr BP to 1900 AD. The expansion of ridges at the expense of adjacent sloughs is consistent with a shift toward shorter hydroperiods and shallower water and may reflect wetland vegetation response to drier conditions associated with the Medieval Warm Period climate anomaly (Willard and others 2001b).

The impact of 20th century and anthropogenic changes on the ridge and slough landscape is notable. Increased abundances of *Cladium*, shrub, and weedy pollen and fern spores indicate substantial drying of the ridges during the early 20th century. These species became more abundant within the transition zone. Although species characteristic of drier conditions increased in abundance slightly in sloughs during the 20th century, pollen assemblages still are analogous to the slough vegetation that persisted throughout the 20th century. Ridge and slough assemblages were virtually unchanged between 1950 and 2002, indicating that the latest rapid vegetation responses were synchronous with the compartmentalization of the Everglades ecosystem.

Conclusions

Pollen assemblages from sediment cores collected in the ridge and slough landscape of the Florida Everglades record their sensitivity to natural and anthropogenic change. Ridges and the transition zone communities are dynamic, while sloughs exhibit little variability in community composition. Climate fluctuations to drier conditions have served as triggers for ridge expansion, enhancing differences within the ridge and slough system. However, ridges and sloughs have been distinctive since at least 2,700 yr BP. This research demonstrates the rapid rate of vegetation change in the ridge and slough landscape in response to compartmentalization, and its resilience in the face of natural climatic changes indicates that degraded ridge and slough sites possess the potential to revert to their pre-drainage states.

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Above Ground Vegetation

Environment	***Nymphaea***	***Cladium* (>2m high)**	***Cladium* (<2m high)**	***Crinum***	***Myrica***	***Utricularia***	***Panicum***	***Cephalanthus***	***Sagittaria***	***Bacopa***
Ridge		X			X			X	X	
Transition			X	X	X			X	X	X
Slough	X					X	X		X	

Table 1. Vegetation distribution. Above details location of major plants in the ridge and slough landscape. Presence is denoted with "X".

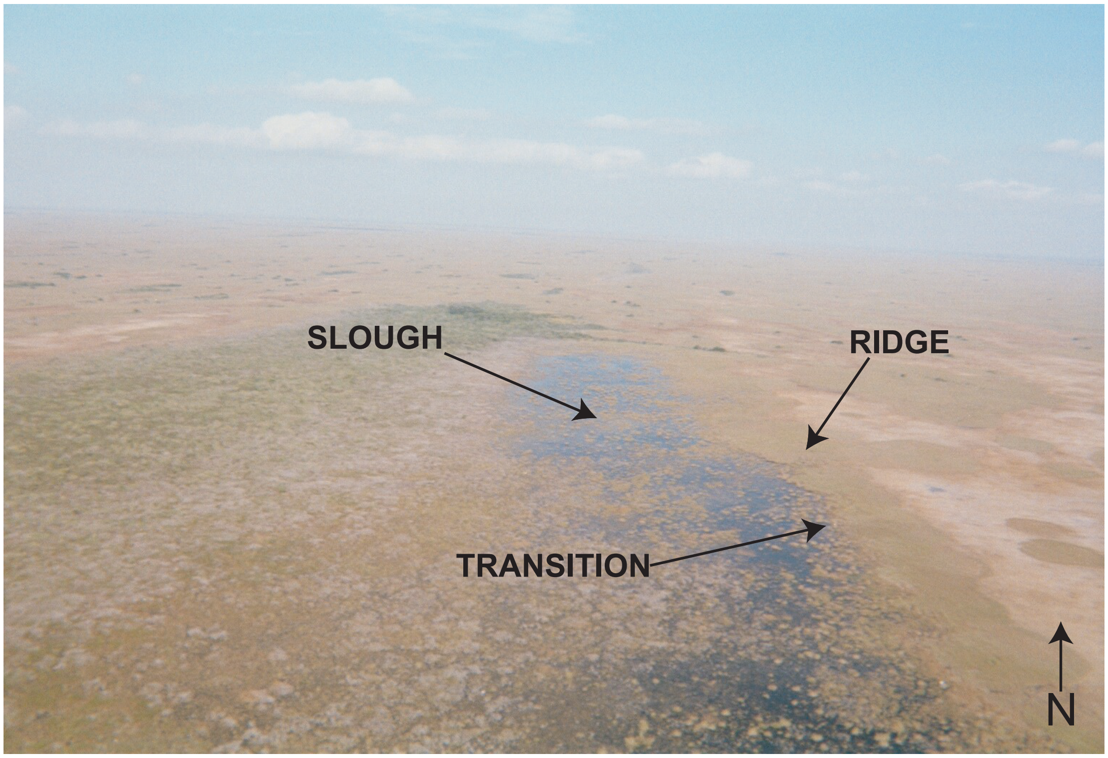

Figure 1. Ridge and Slough Landscape. Photo courtesy of Thomas Smith III (USGS).

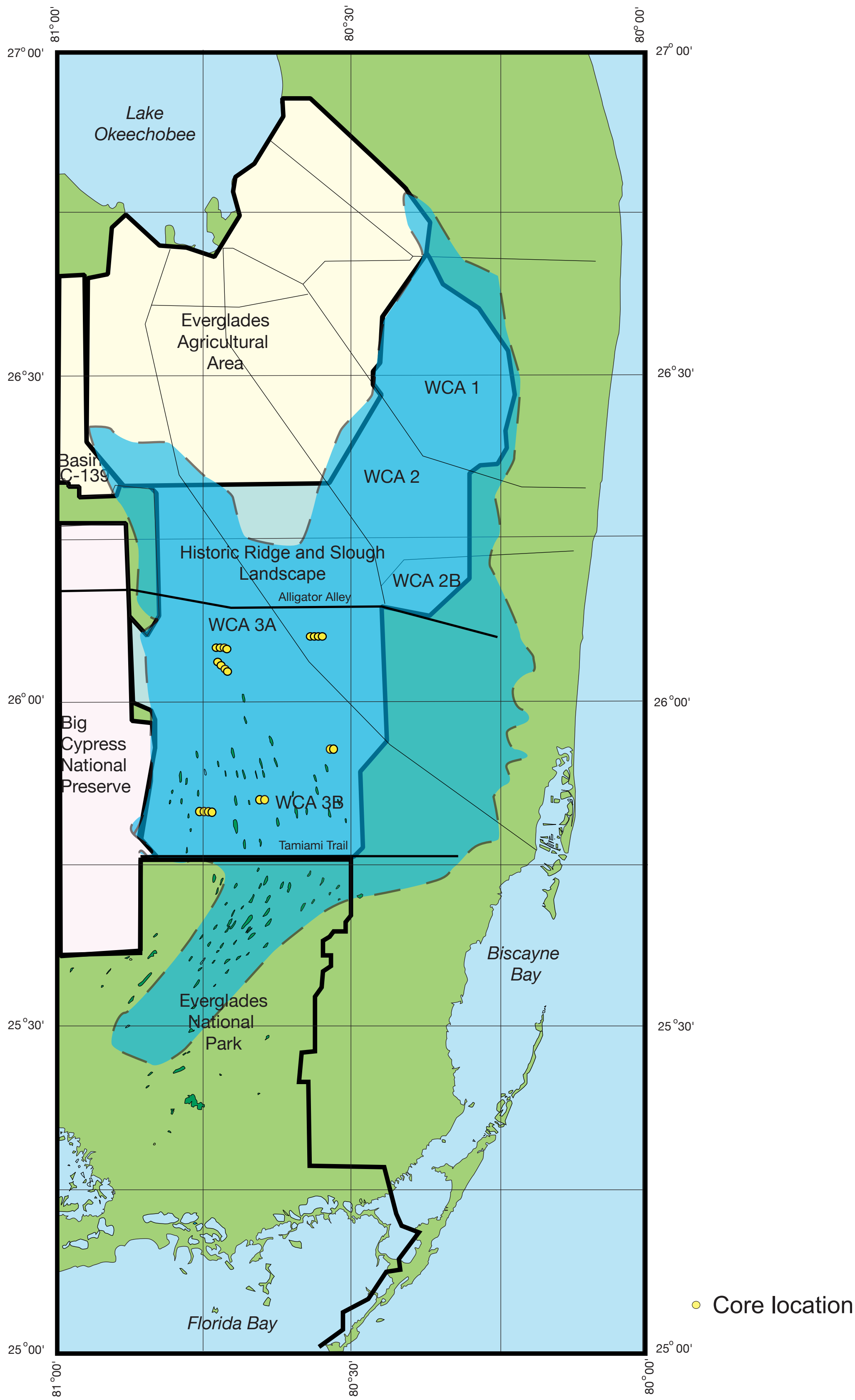

Figure 2. Map of Greater Florida Everglades and Core Locations. The above map illustrates the compartmentalization of the Greater Everglades into Water Conservation Areas. The historical extent of the ridge and slough landscape is represtented by the light blue shading (modified from McVoy, 1999). The core collection locations are marked with a yellow circle.

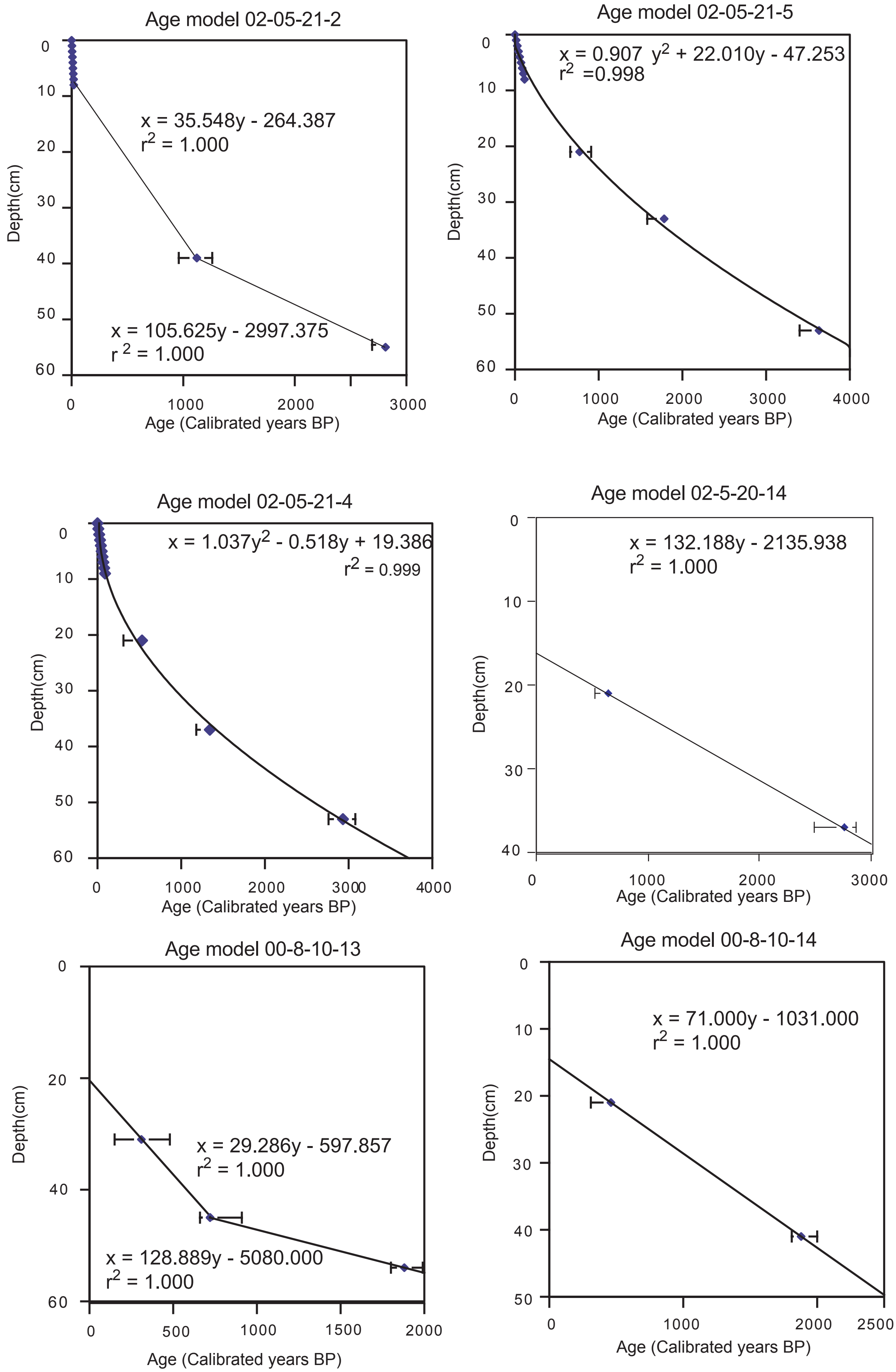

Figure 3. Age Models for Selected Cores.

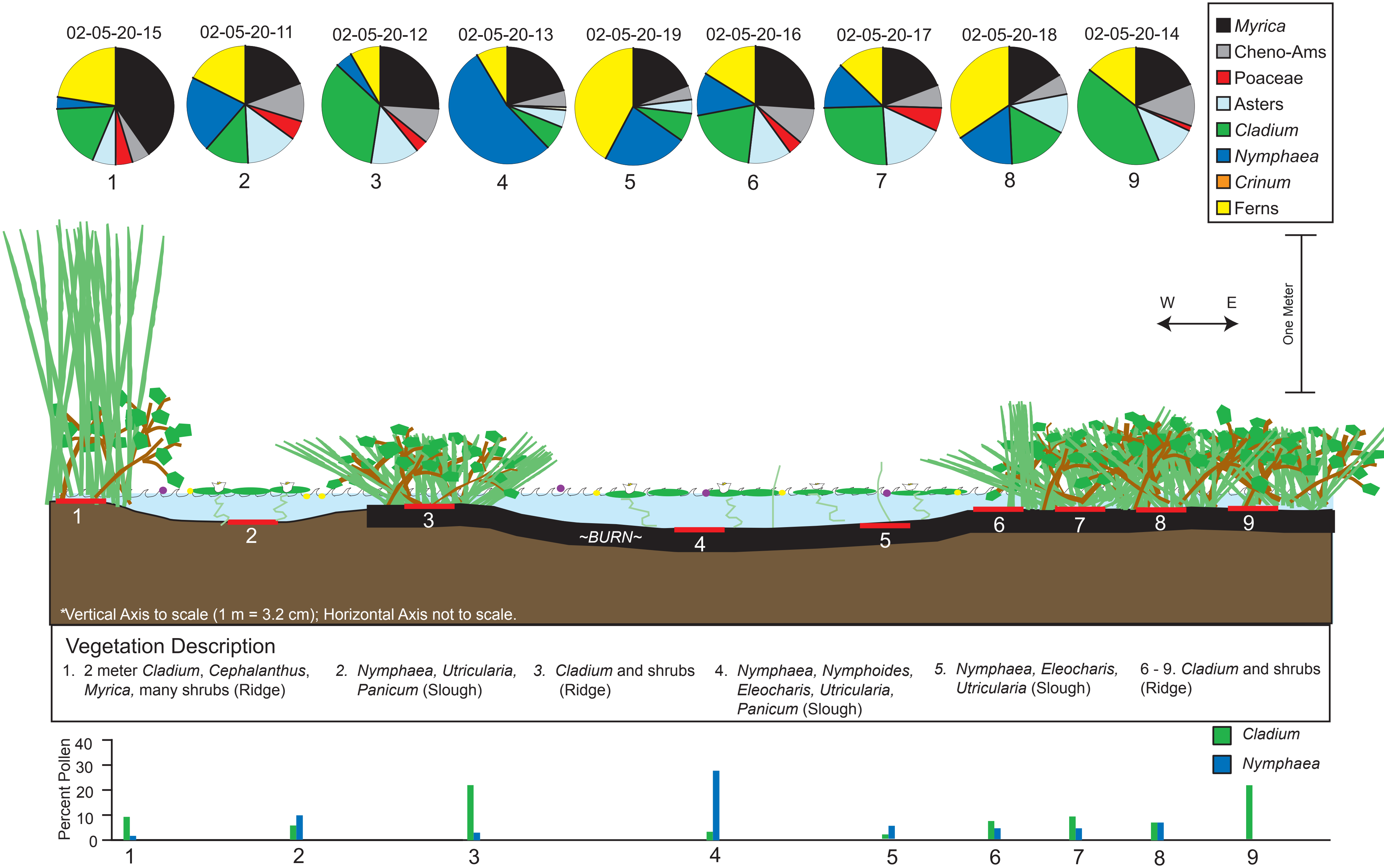

Figure 4. Surface Samples from Transect 02-05-20. Pie charts display pollen assemblage information for surface samples. The cartoon illustrates vegetation types for each environment underlain with a written description. The bar graphs compare *Cladium* vs *Nymphaea* pollen percentages for each surface sample.

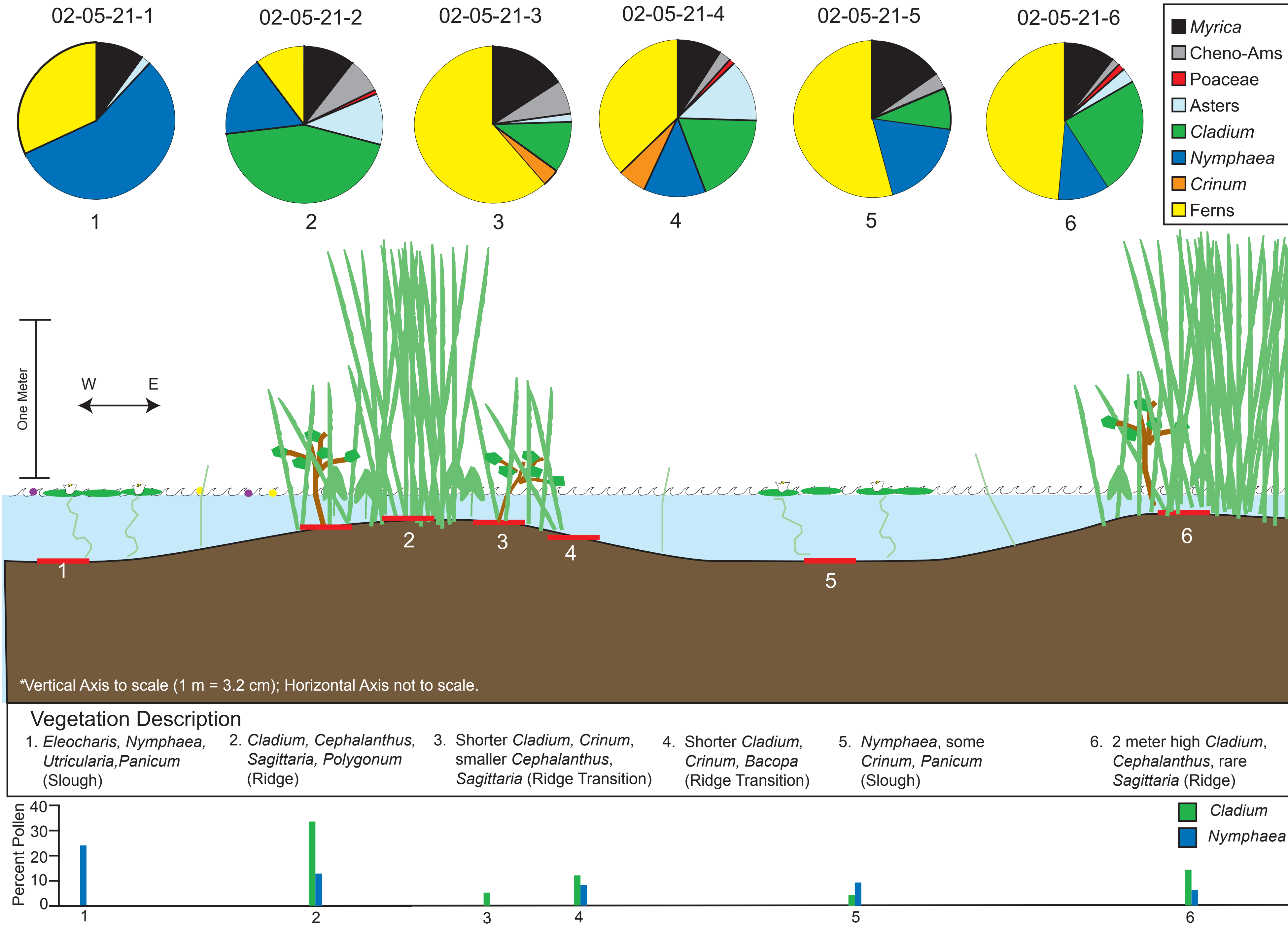

Figure 5. Surface Samples from Transect 02-05-21. Pie charts display pollen assemblage information for surface samples. The cartoon illustrates vegetation types for each environment underlain with a written description. The bar graphs compare *Cladium* vs *Nymphaea* pollen percentages for each surface sample.

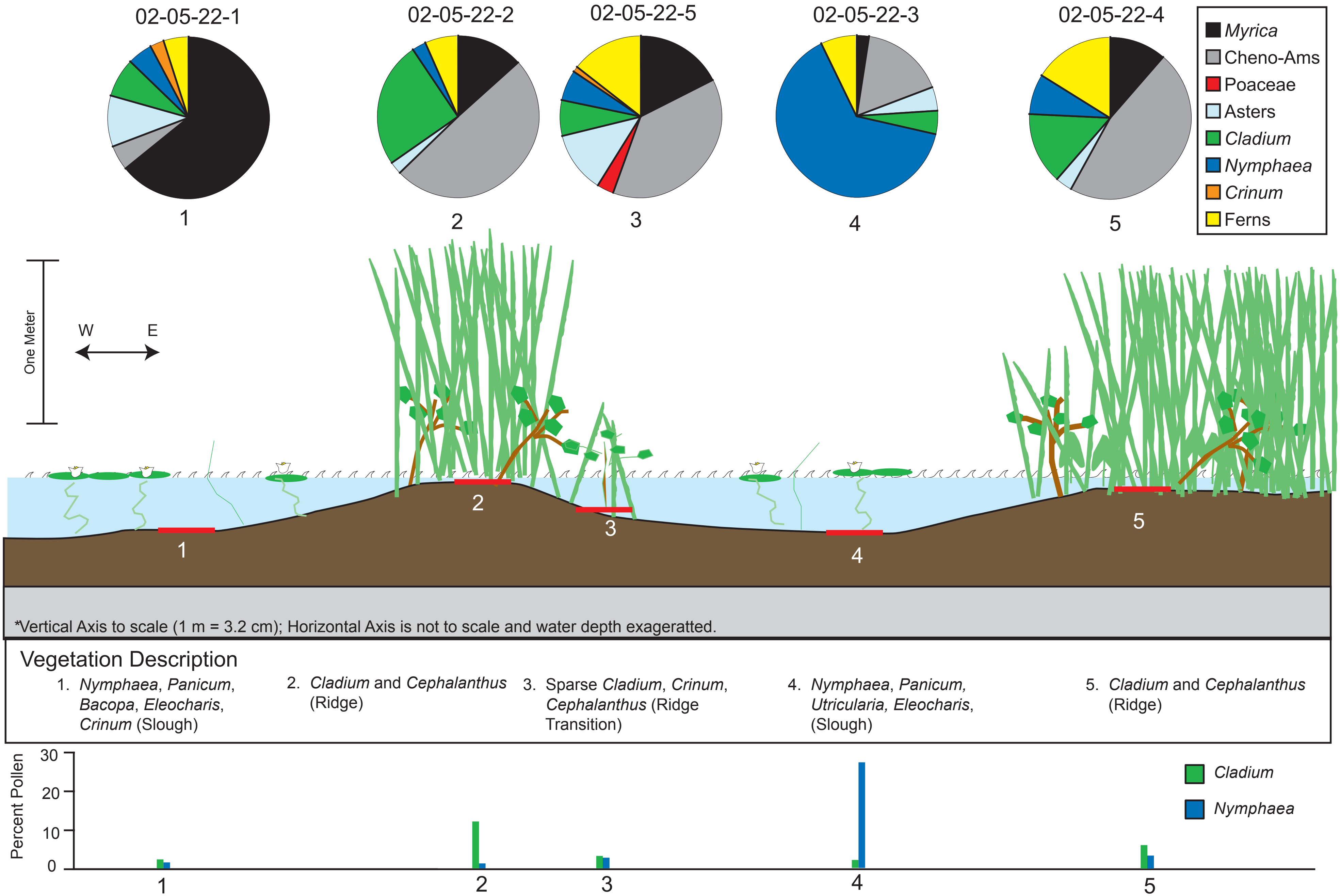

Figure 6. Surface Samples from Transect 02-05-22. Pie charts display pollen assemblage information for surface samples. The cartoon illustrates vegetation types for each environment underlain with a written description. The bar graphs compare *Cladium* vs *Nymphaea* pollen percentages for each surface sample.

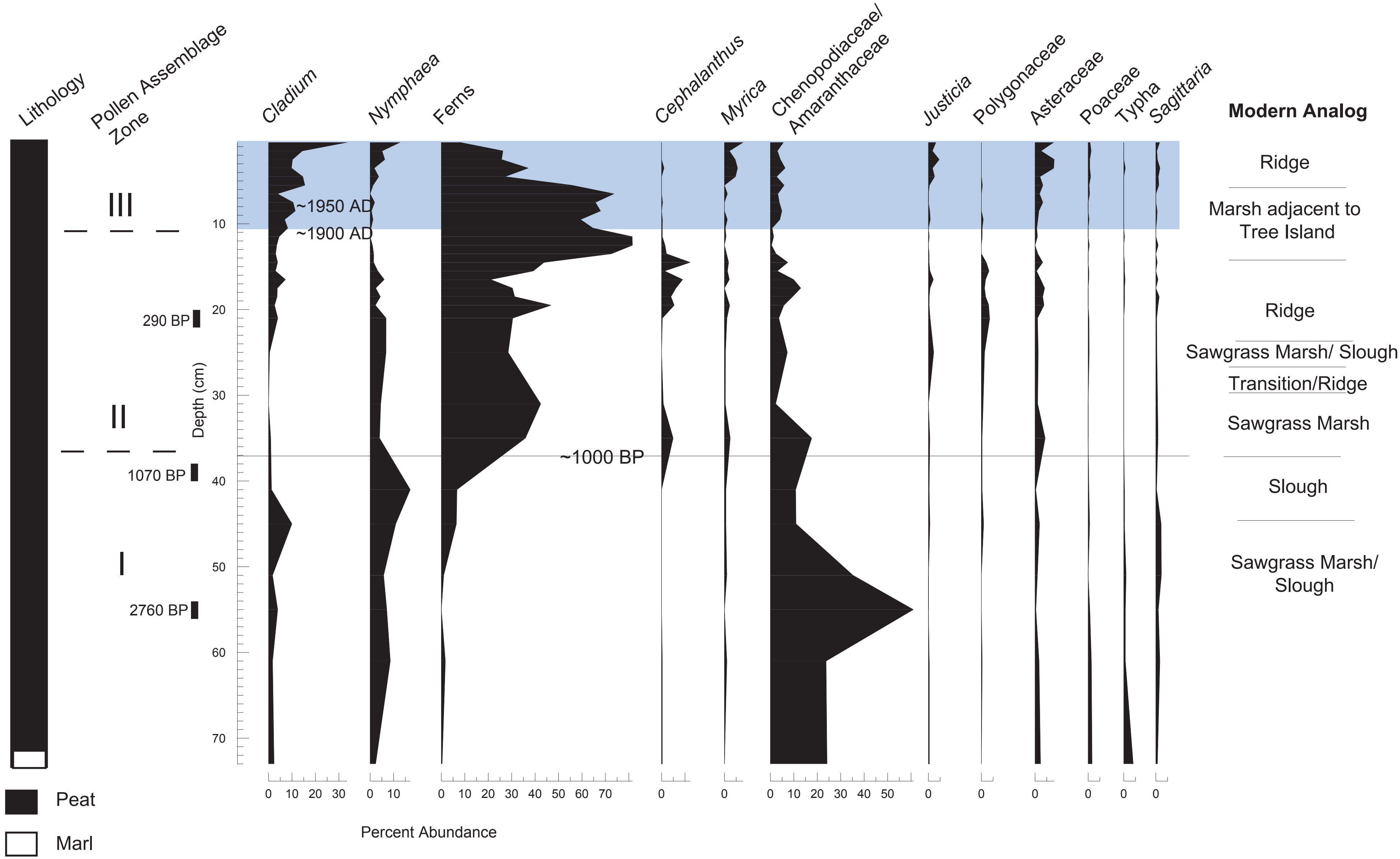

Figure 7. Pollen Profile for Ridge Core 02-05-21-2. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. Lead-210 chronology is marked by the blue box. 1000 calyrBP, solid black line, is calculated using an age model (Figure 3). Pollen Zones are denoted by the dashed line and roman numerals.

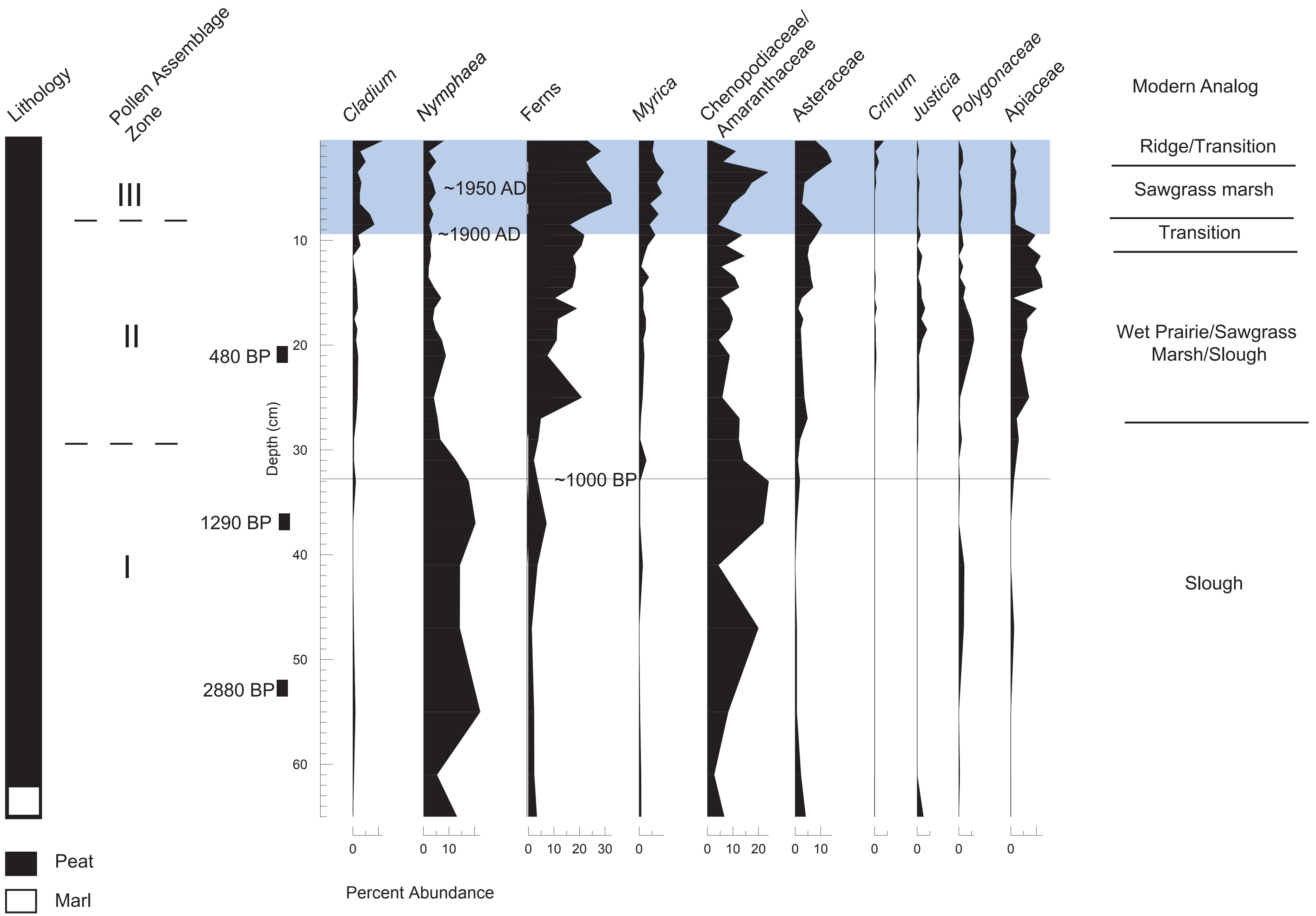

Figure 8. Pollen Profile for Transition Core 02-05-21-4. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. Lead-210 chronology is marked by the blue box. 1000 calyrBP, solid black line, is calculated using an age model (Figure 3). Pollen Zones are denoted by the dashed line and roman numerals.

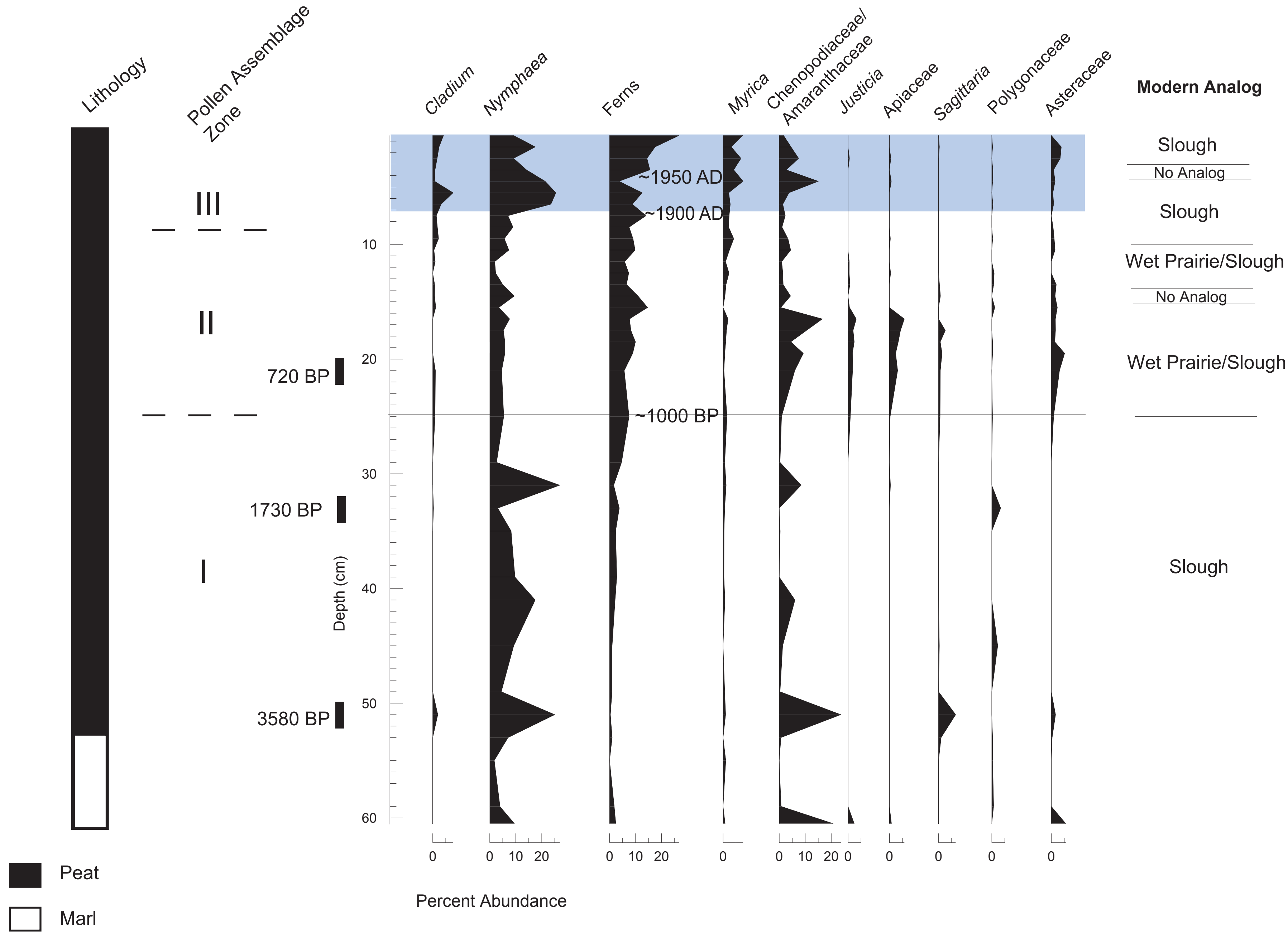

Figure 9. Pollen Profile for Slough Core 02-05-21-5. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. Lead-210 chronology is marked by the blue box. 1000 calyrBP, solid black line, is calculated using an age model (Figure 3). Pollen Zones are denoted by the dashed line and roman numerals.

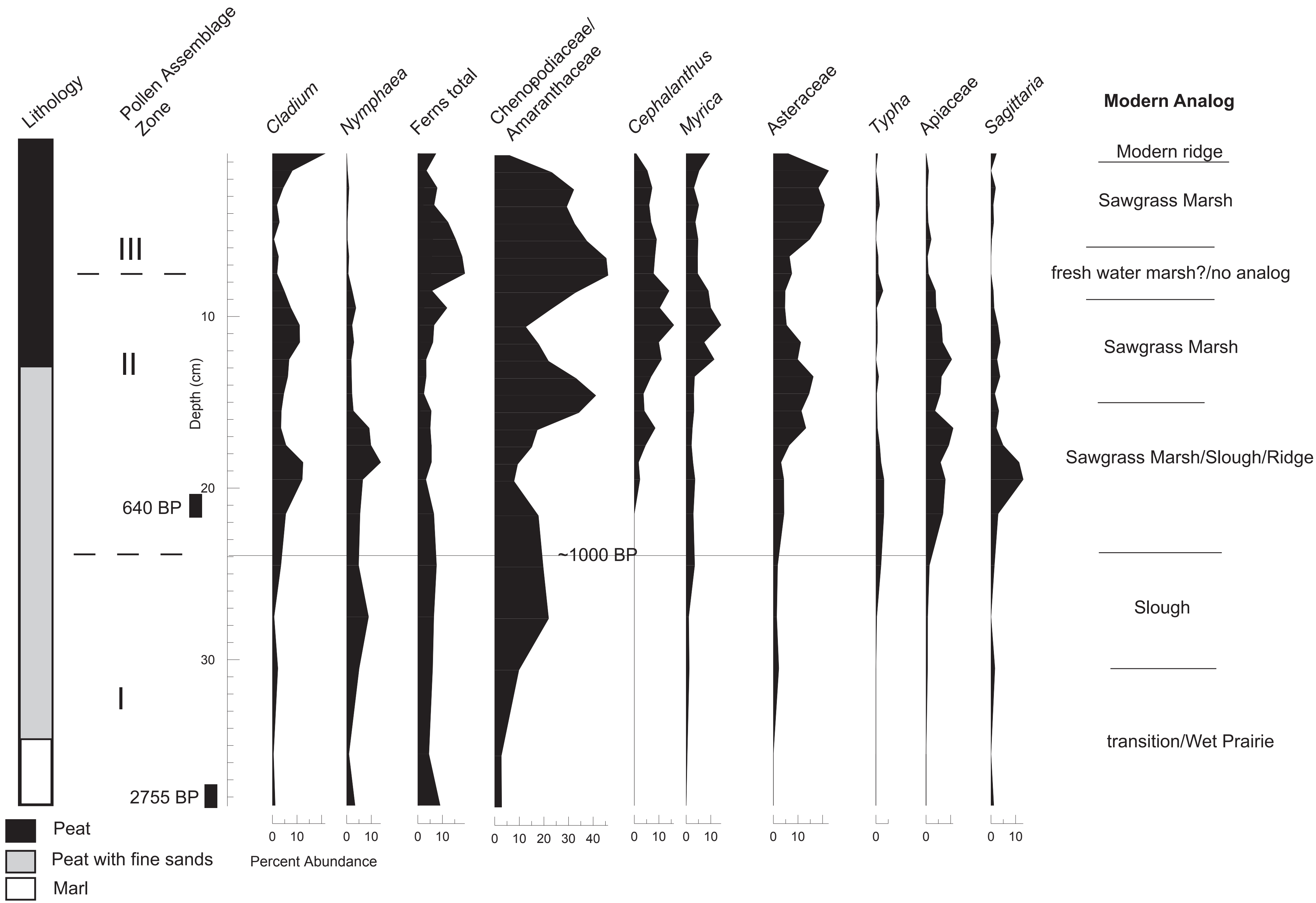

Figure 10. Pollen Profile for Ridge Core 02-05-20-14. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. 1000 calyrBP, solid black line, is calculated using an age model (Figure 3). Pollen Zones are denoted by the dashed line and roman numerals.

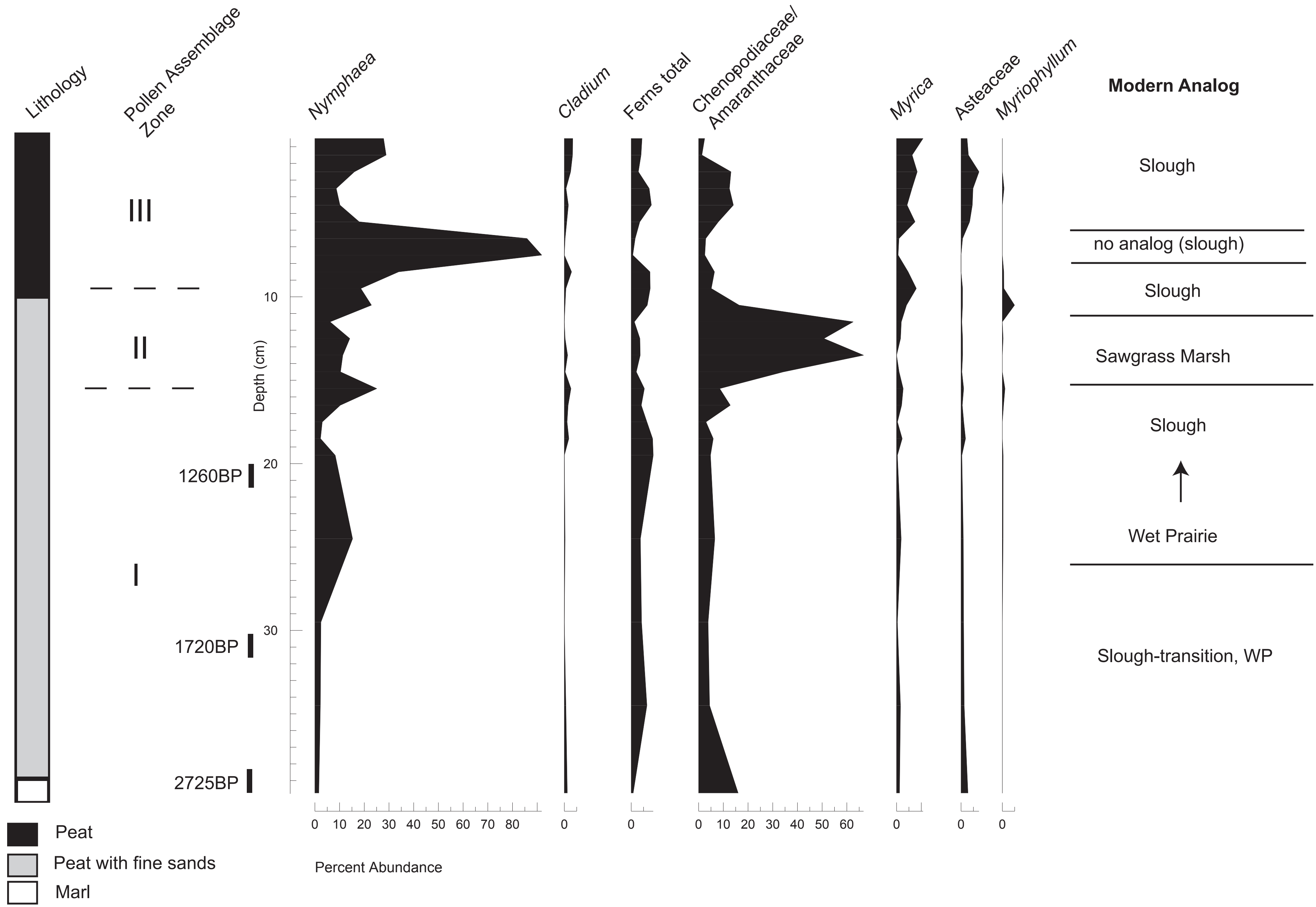

Figure 11. Pollen Profile for Slough Core 02-05-20-13. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. Pollen Zones are denoted by the dashed line and roman numerals.

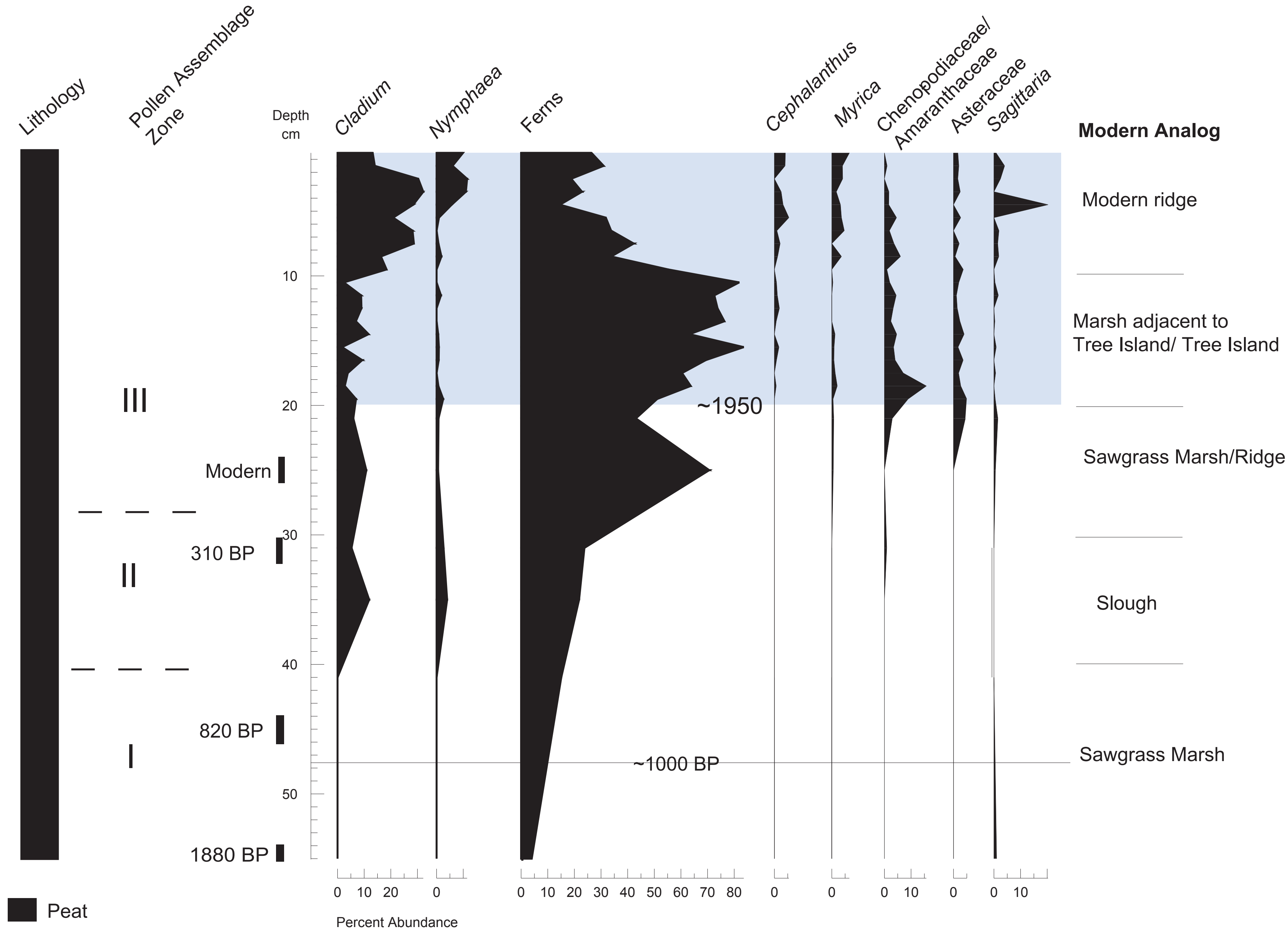

Figure 12. Pollen Profile for Ridge Core 00-8-10-13. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. Lead-210 chronology is marked by the blue box. 1000 calyrBP, solid black line, is calculated using an age model (Figure 3). Pollen Zones are denoted by the dashed line and roman numerals.

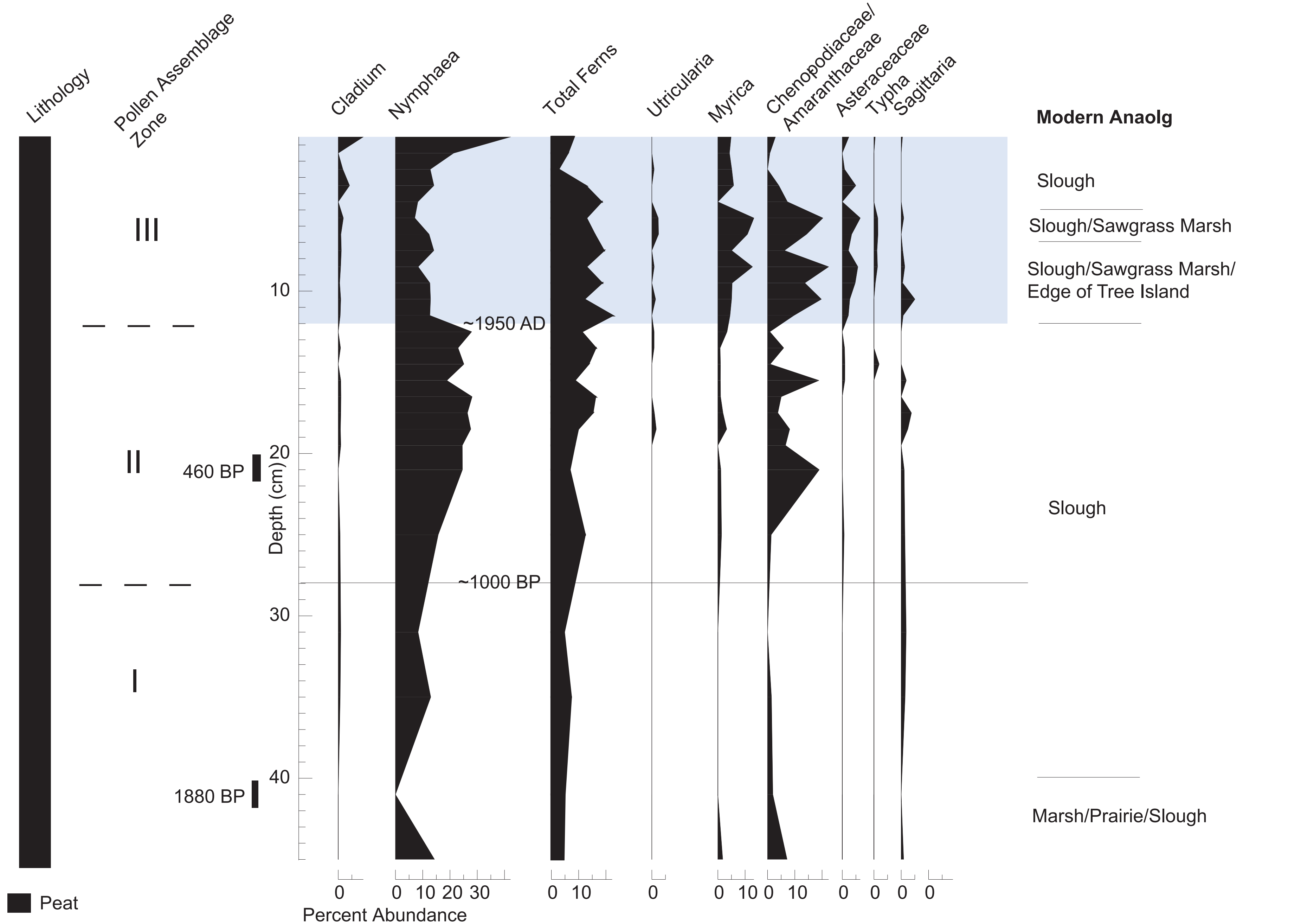

Figure 13. Pollen Profile for Slough Core 00-8-10-14. The above figure displays percent abundance of pollen for the major plant species. A simple lithology is illustrated to the left of the diagram. Modern Analogs are displayed to the right of the diagram. Radiocarbon dates are in calibrated years before present. Lead-210 chronology is marked by the blue box. 1000 calyrBP, solid black line, is calculated using an age model (Figure 3). Pollen Zones are denoted by the dashed line and roman numerals.

APPENDIXES

Core ID	Sampling Date	Latitude	Longitude	Investigators	Vegetation formation	General Location	Site Description	Collector	Coring Device
00-8-10-13	10/8/00	26° 5'21.0"	80° 42' 57.7'	Bernhardt	Sawgrass Ridge	Everglades	Thick *Cladium, Cephalanthus, Osmunda* scattered throughout	Willard/Sheehan	piston core
00-8-10-14	10/8/00	26° 5'23.2"	80° 42'54.2"	Bernhardt	Slough	Everglades	*Nymphaea, Eleocharis, Bacopa, Panicum, Utricularia purperea* and *foliosa*	Willard/Sheehan	piston core
02-05-20-11	20/5/02	26° 06.071'	80° 44.406'	Bernhardt	Slough	Everglades		Willard/McVoy/Sheehan	piston core
02-05-20-12	20/5/02	26° 06.106'	80° 44.331'	Bernhardt	Sawgrass Ridge	Everglades		Willard/McVoy/Sheehan	piston core
02-05-20-13	20/5/02	26° 06.132'	80° 44.261'	Bernhardt	Slough	Everglades	*Nymphaea, Eleocharis, Bacopa, Panicum, Utricularia purperea* and *foliosa, Nymphoides*	Willard/McVoy/Sheehan	piston core
02-05-20-14	20/5/02	26° 06.173'	80° 44.173'	Bernhardt	Sawgrass Ridge	Everglades	Burnt *Cladium* and shrubs	Willard/McVoy/Sheehan	piston core
02-05-20-15	20/5/02	26° 06.023'	80° 44.495'	Bernhardt	Sawgrass Ridge	Everglades	*Cephalanthus,* 2m tall *Cladium, Myrica,* shrubs	Willard/McVoy/Sheehan	piston core
02-05-20-16	20/5/02	26° 06.151'	80° 44.225'	Bernhardt	Transition to Ridge	Everglades	*Cladium, Crinum, Nymphaea*	Willard/McVoy/Sheehan	piston core
02-05-20-17	20/5/02	26° 06.154'	80° 44.220	Bernhardt	Transition to Ridge	Everglades	Burnt *Cladium* and shrubs	Willard/McVoy/Sheehan	piston core
02-05-20-18	20/5/02	26° 06.157'	80° 44.212'	Bernhardt	Transition to Ridge	Everglades	Burnt *Cladium* and shrubs	Willard/McVoy/Sheehan	piston core
02-05-20-19	20/5/02	26° 06.150'	80° 44.228'	Bernhardt	Slough	Everglades	*Nymphoides, Nymphaea, Crinum, Panicum, Bacopa*	Willard/McVoy/Sheehan	piston core
02-05-21-1	21/5/02	25° 49.757'	80° 46.188'	Bernhardt	Slough	Everglades	*Eleocharis, Nymphaea, Utricularia purpurea* and *foliosa, Panicum,* periphyton	Willard/Bernhardt/Sheehan	piston core
02-05-21-2	21/5/02	25° 49.762'	80° 46.105'	Bernhardt	Sawgrass Ridge	Everglades	Thick *Cladium, Cephalanthus, Polygonum, Sagittaria*	Willard/Bernhardt/Sheehan	piston core
02-05-21-3	21/5/02	25° 49.761'	80° 46.091'	Bernhardt	Sawgrass Ridge	Everglades	*Cephalanthus,* short *Cladium, Crinum, Sagittaria*	Willard/Bernhardt/Sheehan	piston core
02-05-21-4	21/5/02	25° 49.765'	80° 46.086'	Bernhardt	Transition to Ridge	Everglades	*Cladium, Crinum, Bacopa*	Willard/Bernhardt/Sheehan	piston core
02-05-21-5	21/5/02	26° 49.755'	80° 46.070'	Bernhardt	Slough	Everglades	*Nymphaea, Utricularia purpurea* and *foliosa, Panicum*	Willard/Bernhardt/Sheehan	piston core
02-05-21-6	21/5/02	25° 49.758'	80° 46.030'	Bernhardt	Sawgrass Ridge	Everglades	2m tall *Cladium, Cephalanthus, Sagittaria*	Willard/Bernhardt/Sheehan	piston core
02-05-21-7	21/5/02	25° 49.640'	80° 40.063'	Bernhardt	Slough	Everglades	*Nymphaea, Utricularia purpurea, Panicum*	Willard/Bernhardt/Sheehan	piston core
02-05-21-8	21/5/02	25° 49.653'	80° 40.027'	Bernhardt	Sawgrass Ridge	Everglades	Thick *Cladium, Crinum,* no shrubs	Willard/Bernhardt/Sheehan	piston core
02-05-22-1	22/5/02	26° 07.643'	80° 35.221'	Bernhardt	Slough	Everglades	*Nymphaea, Panicum, Bacopa, Eleocharis, Pontederia, Crinum*	Willard/Bernhardt/McVoy	piston core
02-05-22-2	22/5/02	26° 07.661'	80° 35.146'	Bernhardt	Sawgrass Ridge	Everglades	2m Tall *Cladium, Cephalanthus, Pontederia*	Willard/Bernhardt/McVoy	piston core
02-05-22-3	22/5/02	26° 07.672'	80° 35.056'	Bernhardt	Slough	Everglades	*Nymphaea, Nymphoides, Utricularia foliosa, Panicum, Eleocharis*	Willard/Bernhardt/McVoy	piston core
02-05-22-4	22/5/02	26° 07.682'	80° 34.983'	Bernhardt	Sawgrass Ridge	Everglades	2m Tall *Cladium, Pontederia*	Willard/Bernhardt/McVoy	piston core
02-05-22-5	22/5/02	26° 07.648'	80° 35.091'	Bernhardt	Transition to Ridge	Everglades	*Cephalanthus, Crinum, Cladium, Pontederia*	Willard/Bernhardt/McVoy	piston core
02-05-22-6	22/5/02	26° 07.645'	80° 35.082	Bernhardt	Transition to Ridge	Everglades	*Cladium, Pontederia,*	Willard/Bernhardt/McVoy	piston core
02-05-22-7	22/5/02	25° 53.406'	80° 34.381'	Bernhardt	Slough	Everglades	*Nymphoides, Nymphaea, Eleocharis, Panicum, Utricularia*	Willard/Bernhardt/McVoy	piston core
02-05-22-8	22/5/02	25° 53.368	80° 34.238'	Bernhardt	Sawgrass Ridge	Everglades	2m tall *Cladium*	Willard/Bernhardt/McVoy	piston core

Appendix A. Ridge and slough cores collected.

Beta #	Core ID	Location	Lat(N)	Long(W)	Sample depth (cm)	Del C13	Conventional Age(yrBP)	error	Calibration intercept(yrBP)	2 sigma plus (yrBP)	2 sigma minus (yrBP)
167339	00-8-10-13	Mid. Ridge	26 5'21.0"	80 42'57.7"	24-26	-26.5	20	60	na	na	na
167340	00-8-10-13	Mid. Ridge	26 5'21.0"	80 42'57.7"	44-46	-26.5	820	60	720	910	660
167343	00-8-10-13	Mid. Ridge	26 5'21.0"	80 42'57.7"	54-56	-26.6	1940	50	1880	1990	1800
175613	00-8-10-13	Mid. Ridge	26 5'21.0"	80 42'57.7"	30-32	-26.5	290	50	310	480	150
167341	00-8-10-14	Slough	26 05'23.2"	80 42'54.2"	20-22	-26.8	370	40	460	510	310
167342	00-8-10-14	Slough	26 05'23.2"	80 42'54.2"	40-42	-26.1	1940	60	1880	2000	1730
172255	02-05-21-2	Ridge	25 49.762'	80 46.105'	20-22	-27.1	240	60	290	450	0
172256	02-05-21-2	Ridge	25 49.762'	80 46.105'	38-40	-26.7	1180	60	1070	1260	960
172257	02-05-21-2	Ridge	25 49.762'	80 46.105'	54-56	-25.8	2630	70	2760	2860	2510
172261	02-05-21-4	Transition	25 49.765'	80 46.086'	20-22	-26.8	390	50	480	520	310
172262	02-05-21-4	Transition	25 49.765'	80 46.086'	36-38	-26.5	1380	60	1290	1380	1180
172263	02-05-21-4	Transition	25 49.765'	80 46.086'	52-54	-26.5	2800	70	2880	3080	2760
172264	02-05-21-5	Slough	25 49.755'	80 46.070'	20-22	-26.7	820	60	720	910	660
172265	02-05-21-5	Slough	25 49.755'	80 46.070'	32-34	-27.0	1820	60	1730	1880	1580
172266	02-05-21-5	Slough	25 49.755'	80 46.070'	50-54	-25.8	3340	70	3580	3720	3400
180443	02-05-20-14	Ridge	26 06.173'	80 44.173'	20-22	-26.8	640	70	640	690	530
180444	02-05-20-14	Ridge	26 06.173'	80 44.173'	35-39	-24.4	2620	80	2755	2865	2485
180445	02-05-20-13	Slough	26 06.132'	80 44.261'	20-22	-26.0	1300	60	1260	1310	1070
180446	02-05-20-13	Slough	26 06.132'	80 44.261'	30-32	-26.4	1810	70	1720	1890	1550
180447	02-05-20-13	Slough	26 06.132'	80 44.261'	36-40.5	-25.9	2530	80	2725	2775	2355

Appendix B. Radiocarbon Dates.

Core Location: 00-8-10-13

Core ID	Depth (cm)	Mean Depth (cm)	Total Pb-210 Activity (dpm/g)	Total Pb-210 Activity Error (+/-)	Cs-137 Activity (dpm/g)	Cs-137 +/- (dpm/g)	Ra-226 Activity (dpm/g)	Ra-226 +/- (dpm/g)	K-40 Activity (dpm/g)	K-40 Activity +/- (dpm/g)	Excess Pb-210 Activity (dpm/g)	Ln Excess Pb-210 Activity (dpm/g)	‡Calc. Ln Exce Pb-210 Activity (dpm/g)	‡‡Calc. Excess Pb-210 Activity (dpm/g)	†Calc. Excess Pb-210 Activity (dpm/g)
00-08-10-13	0-1	0.5	14.51	0.285	0.21	0.13	0.95	0.24	Tr	--	13.55	2.61	--	--	--
00-08-10-13	1-2	1.5	16.81	0.306	--	--	--	--	--	--	15.95	2.77	2.81	16.68	--
00-08-10-13	2-3	2.5	17.61	0.385	--	--	--	--	--	--	16.75	2.82	2.80	16.37	--
00-08-10-13	3-4	3.5	16.67	0.393	0.40	0.09	0.77	0.15	6.88	0.83	15.90	2.77	2.78	16.06	--
00-08-10-13	4-5	4.5	17.30	0.448	0.46	0.07	0.65	0.11	3.98	0.59	16.65	2.81	2.76	15.76	--
00-08-10-13	5-6	5.5	16.52	0.423	0.55	0.07	0.73	0.12	5.04	0.64	15.78	2.76	2.74	15.46	--
00-08-10-13	6-7	6.5	15.61	0.318	0.69	0.09	0.63	0.14	4.56	0.74	14.98	2.71	2.72	15.18	--
00-08-10-13	7-8	7.5	14.88	0.495	0.88	0.08	0.45	0.10	4.20	0.60	14.44	2.67	2.70	14.89	--
00-08-10-13	8-9	8.5	15.77	0.422	1.06	0.12	0.43	0.14	Tr	--	15.34	2.73	--	--	15.78
00-08-10-13	9-10	9.5	14.30	0.948	1.21	0.10	0.53	0.12	4.11	0.61	13.77	2.62	--	--	14.08
00-08-10-13	10-11	10.5	12.21	0.398	1.28	0.11	0.54	0.14	2.13	0.60	11.68	2.46	--	--	12.57
00-08-10-13	11-12	11.5	13.21	0.381	1.07	0.07	0.84	0.10	3.27	0.47	12.38	2.52	--	--	11.21
00-08-10-13	12-13	12.5	10.62	0.481	0.96	0.09	0.57	0.12	3.46	0.60	10.05	2.31	--	--	10.01
00-08-10-13	13-14	13.5	10.55	0.406	0.81	0.08	0.51	0.10	2.64	0.48	10.04	2.31	--	--	8.93
00-08-10-13	14-15	14.5	10.13	0.404	0.80	0.09	0.51	0.14	2.35	0.64	9.62	2.26	--	--	7.97
00-08-10-13	15-16	15.5	7.64	0.287	0.65	0.06	0.56	0.10	2.31	0.42	7.08	1.96	--	--	7.11
00-08-10-13	16-17	16.5	7.05	0.248	0.57	0.09	0.60	0.14	2.04	0.59	6.46	1.87	--	--	6.35
00-08-10-13	17-18	17.5	5.62	0.163	0.52	0.08	0.61	0.12	2.35	0.56	5.02	1.61	--	--	5.67
00-08-10-13	18-19	18.5	4.53	0.165	0.61	0.06	0.63	0.10	2.29	0.43	3.90	1.36	--	--	5.06
00-08-10-13	19-20	19.5	4.19	0.144	0.62	0.06	0.78	0.11	2.07	0.45	3.41	1.23	--	--	4.51

ND = Not detected
Tr = Trace quantity, too low to quantify

Average Sediment Accumulation Rate (2-8cm) = 1.65 cm/yr
Linear best fit of Ln excess Pb-210 activity (2-8cm).
‡‡Calc. Ln Excess = (-0.01889 * z) + 2.8425 r^2 = 0.76

Average Sediment Accumulation Rate (8-20cm) = 0.27 cm/yr
Single decay best fit curve of excess Pb-210 activity (8-20cm).
†Calc. Excess = 11.3333 * exp((11.4077 - z) / 8.7877) r^2 = 0.94

Appendix C. Lead-210 for 00-8-10-13.

Core Location: 00-8-10-14

Core ID	Depth (cm)	Mean Depth (cm)	Total Pb-210 Activity (dpm/g)	Total Pb-210 Activity Error (+/-)	Cs-137 Activity (dpm/g)	Cs-137 Activity +/- (dpm/g)	Ra-226 Activity (dpm/g)	Ra-226 Activity +/- (dpm/g)	K-40 Activity (dpm/g)	K-40 Activity +/- (dpm/g)	Excess Pb-210 Activity (dpm/g)	Ln Excess Pb-210 Activity (dpm/g)	‡Calc. Ln Exces Pb-210 Activity (dpm/g)	‡‡Calc. Excess Pb-210 Activity (dpm/g)	†Calc. Excess Pb-210 Activity (dpm/g)
00-08-10-14	0-1	0.5	21.51	0.304	--	--	--	--	--	--	20.83	3.04	--	--	--
00-08-10-14	1-2	1.5	27.57	0.493	--	--	--	--	--	--	26.89	3.29	3.28	26.67	--
00-08-10-14	2-3	2.5	25.42	0.447	--	--	--	--	--	--	24.74	3.21	3.23	25.30	--
00-08-10-14	3-4	3.5	25.97	0.426	--	--	--	--	--	--	25.29	3.23	3.18	24.00	--
00-08-10-14	4-5	4.5	23.05	0.319	--	--	--	--	--	--	22.37	3.11	3.13	22.77	--
00-08-10-14	6-7	6.5	19.42	1.748	6.11	0.16	0.78	0.12	3.30	0.55	18.64	2.93	3.02	20.49	--
00-08-10-14	7-8	7.5	21.74	0.747	6.87	0.15	0.82	0.11	2.90	0.46	20.93	3.04	2.97	19.44	22.75
00-08-10-14	8-9	8.5	19.05	1.032	7.98	0.18	0.85	0.12	2.65	0.53	18.20	2.90	--	--	17.73
00-08-10-14	9-10	9.5	16.22	0.567	8.15	0.19	0.82	0.13	3.17	0.55	15.39	2.73	--	--	13.82
00-08-10-14	10-11	10.5	14.27	0.247	--	--	--	--	--	--	13.59	2.61	--	--	10.77
00-08-10-14	11-12	11.5	9.96	0.363	6.98	0.18	0.85	0.15	4.44	0.70	9.11	2.21	--	--	8.39
00-08-10-14	12-13	12.5	6.23	0.321	5.00	0.15	0.79	0.12	2.50	0.51	5.45	1.69	--	--	6.54
00-08-10-14	13-14	13.5	4.34	0.180	3.19	0.11	0.50	0.10	2.08	0.42	3.84	1.34	--	--	5.10
00-08-10-14	14-15A	14.5	3.95	0.098	2.50	0.11	0.47	0.10	2.04	0.49	3.48	1.25	--	--	3.97
00-08-10-14	14-15B	14.5	3.89	0.109	--	--	--	--	--	--	3.43	1.23	--	--	3.97
00-08-10-14	15-16	15.5	2.69	0.168	2.21	0.11	0.59	0.12	2.06	0.50	2.09	0.74	--	--	3.10
00-08-10-14	16-17	16.5	1.97	0.115	2.93	0.10	0.75	0.11	2.25	0.46	1.22	0.20	--	--	2.41
00-08-10-14	17-18	17.5	1.79	0.083	2.76	0.10	0.54	0.10	2.43	0.44	1.25	0.22	--	--	1.88
00-08-10-14	18-19	18.5	1.82	0.072	2.20	0.09	0.55	0.10	2.00	0.40	1.27	0.24	--	--	1.47
00-08-10-14	19-20	19.5	1.86	0.096	1.59	0.08	0.58	0.09	2.08	0.43	1.28	0.25	--	--	1.14

ND = Not detected

Average Sediment Accumulation Rate (2-7cm) = 0.60 cm/yr
Linear best fit of Ln excess Pb-210 activity (2-7cm).
‡‡Calc. Ln Excess = (-0.05272 * z) + 3.3626 $r^2 = 0.90$

Appendix D. Lead-210 for 00-8-10-14.

Core Location: 02-5-21-5

Core ID	Depth (cm)	Mean Depth (cm)	Total Pb-210 Activity (dpm/g)	Total Pb-210 Activity Error (+/-)	Excess Pb-210 Activity (dpm/g)	Calc. Excess Pb-210 Activity (dpm/g)
02-05-21-5	0-1	0.5	9.88	0.266	8.32	11.93
02-05-21-5	1-2	1.5	12.71	0.201	11.15	7.60
02-05-21-5	2-3	2.5	8.90	0.146	7.34	4.84
02-05-21-5	3-4	3.5	3.23	0.128	1.67	3.08
02-05-21-5	4-5	4.5	1.73	0.098	0.17	1.96
02-05-21-5	5-6	5.5	3.12	0.093	1.56	1.25
02-05-21-5	6-7	6.5	3.44	0.198	1.88	0.80
02-05-21-5	7-8	7.5	2.51	0.100	0.95	0.51
02-05-21-5	8-9	8.5	1.22	0.054	-0.34	0.32
02-05-21-5	9-10	9.5	0.90	0.032	-0.66	0.21
02-05-21-5	10-11	10.5	1.25	0.054	-0.31	0.13
02-05-21-5	11-12	11.5	1.41	0.048	-0.15	0.08
02-05-21-5	12-13	12.5	1.43	0.059	-0.13	0.05
02-05-21-5	13-14	13.5	1.53	0.039	-0.03	0.03
02-05-21-5	14-15	14.5	1.56	0.063	0.00	0.02
02-05-21-5	15-16	15.5	1.88	0.070	0.32	--
02-05-21-5	16-17	16.5	1.71	0.054	0.15	--
02-05-21-5	17-18	17.5	2.08	0.061	0.52	--
02-05-21-5	18-19	18.5	2.33	0.065	0.77	--
02-05-21-5	19-20	19.5	1.35	0.058	-0.21	--
			1.56			

Average accumulation rate 0-8 cm = 0.07 cm/yr

Estimated Ra-226 activity = 1.56 dpm/g, average of Total Pb-210 activity 8-20cm.
Exponential best fit of Excess Pb-210 data (0-15cm).
*Calc. Excess = 14.9565 * exp(-0.4514 * z)   r2 = 0.78

Appendix E. Lead-210 for 02-5-21-5.

Core Location: 02-5-21-2

Core ID	Depth (cm)	Mean Depth (cm)	Total Pb-210 Activity (dpm/g)	Total Pb-210 Activity Error (+/-)	Excess Pb-210 Activity (dpm/g)	*Calc. Ln Exc. Pb-210 Activity (dpm/g)
02-05-21-2	0-1	0.5	26.14	0.489	24.78	3.31
02-05-21-2	1-2	1.5	28.30	0.465	26.94	3.22
02-05-21-2	2-3	2.5	23.36	0.620	22.00	3.14
02-05-21-2	3-4	3.5	21.25	0.737	19.89	3.06
02-05-21-2	4-5	4.5	25.13	0.616	23.77	2.98
02-05-21-2	5-6	5.5	19.24	0.514	17.88	2.89
02-05-21-2	6-7	6.5	21.60	0.505	20.24	2.81
02-05-21-2	7-8	7.5	13.38	0.341	12.02	2.73
02-05-21-2	8-9	8.5	5.97	0.279	4.61	--
02-05-21-2	9-10	9.5	7.02	0.137	5.66	--
02-05-21-2	10-11	10.5	4.07	0.104	2.71	--
02-05-21-2	11-12	11.5	2.50	0.091	1.14	--
02-05-21-2	12-13	12.5	1.24	0.055	-0.12	--
02-05-21-2	13-14	13.5	1.17	0.048	-0.19	--
02-05-21-2	14-15	14.5	1.17	0.049	-0.19	--
02-05-21-2	15-16	15.5	1.37	0.059	0.01	--
02-05-21-2	16-17	16.5	1.37	0.057	0.01	--
02-05-21-2	17-18	17.5	1.71	0.072	0.35	--
02-05-21-2	18-19	18.5	1.33	0.079	-0.03	--
02-05-21-2	19-20	19.5	1.51	0.049	0.15	--
			1.36			

Average accumulation rate 0-8 cm = 0.4 cm/yr

Estimated Ra-226 activity = 1.36 dpm/g, average of Total Pb-210 activity 12-20cm.
Linear best fit of Ln Excess Pb-210 data (0-8cm).
*Calc. Ln Excess = (-0.08295 * z) + 3.3468 r^2 = 0.80

Appendix F. Lead-210 for 02-5-21-2.

Core Location: 02-5-21-4

Core ID	Depth (cm)	Mean Depth (cm)	Total Pb-210 Activity (dpm/g)	Total Pb-210 Activity Error (+/-)	Excess Pb-210 Activity (dpm/g)	Calc. Excess Pb-210 Activity (dpm/g)
02-05-21-4	0-1	0.5	29.38	0.56	27.18	29.51
02-05-21-4	1-2	1.5	25.92	0.32	23.72	21.42
02-05-21-4	2-3	2.5	17.52	0.37	15.32	15.55
02-05-21-4	3-4	3.5	19.72	0.53	17.52	11.29
02-05-21-4	4-5	4.5	6.89	0.41	4.69	8.19
02-05-21-4	5-6	5.5	8.37	0.17	6.17	5.95
02-05-21-4	6-7	6.5	4.14	0.13	1.94	4.32
02-05-21-4	7-8	7.5	4.41	0.21	2.21	3.13
02-05-21-4	8-9	8.5	3.70	0.10	1.50	2.27
02-05-21-4	9-10	9.5	2.69	0.10	0.49	1.65
02-05-21-4	10-11	10.5	2.26	0.05	0.06	1.20
02-05-21-4	11-12	11.5	2.33	0.06	0.13	0.87
02-05-21-4	12-13	12.5	2.46	0.12	0.26	0.63
02-05-21-4	13-14	13.5	2.06	0.09	-0.14	0.46
02-05-21-4	14-15	14.5	2.19	0.09	-0.01	0.33
02-05-21-4	15-16	15.5	2.14	0.08	-0.06	0.24
02-05-21-4	16-17	16.5	2.29	0.12	0.09	0.18
02-05-21-4	17-18	17.5	2.05	0.13	-0.15	0.13
02-05-21-4	18-19	18.5	2.42	0.11	0.22	0.09
02-05-21-4	19-20	19.5	1.32	0.05	-0.88	0.07
			2.20			

Average accumulation rate 0-9 cm = 0.1 cm/yr

Estimated Ra-226 activity = 2.20 dpm/g, average of Total Pb-210 activity 9-20cm.
Single decay best fit of Excess Pb-210 data (0-20cm).
Calc. Excess = 5.8389 * exp((5.5569 - z) / 3.1212) $r^2 = 0.97$

Appendix G. Lead-210 for 02-5-21-4.

	Anus	*Annona*	*Celtis*	*Cephalanthus*	*Ilex*	*Myrica*	*Pinus*	*Quercus*	*Salix*	Taxodiaceae/Cupressaceae/ Taxaceae	*Ulmus*	*Ambrosia*	Asteraceae	Cheno-Ams	*Cladium*	*Crinum*	Cyperaceae	Ericaceae	*Justicia*	*Myriophyllum*	*Nymphaea*	Onagraceae	Poaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	PO3	PC3	PC0	SCO	SAO	*Osmunda regalis*	TOTAL	Unknown	Crumpled	Exotics	Sediment Dry Weight (g)
02-05-21-1	0	0	0	0	0	5	68	0	0	0	0	0	1	0	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	11	5	118	0	0	121	0.28
02-05-21-19	0	0	0	0	0	5	84.5	2	0	0	0	1	0	1	2	0	0	0	0	0	6	0	0	0	0	1	0	2	1	0	2	9	0	116.5	0	0	229	0.08
02-05-21-18	0	0	0	0	0	9	50	7	0	0	0	5	1	3	9	0	3	0	0	1	9	0	0	0	0	4	0	6	0	0	5	12	2	126	0	0	none counted	0.07
02-05-21-16	0	0	0	0	0	13	78	3	0	0	0	5	1	5	10	0	1	0	0	0	6	0	2	0	1	0	0	4	1	0	1	6	1	138	0	0	none counted	0.32
02-05-20-17	0	0	1	0	0	9	63	3	0	0	0	7	1	3	12	0	2	0	0	0	6	1	3	0	0	2	1	2	3	2	1	5	0	127	0	2	214	0.18
02-05-20-15	1	0	0	3	0	25	40	5	0	0	0	2	2	3	11	0	0	0	1	0	2	0	3	0	0	1	0	2	1	2	0	7	7	118	1	2	289	0.26
02-05-20-14	0	0	0	1	0	13	51	6	0	0	0	6	2	8	29	0	1	0	0	0	0	0	1	0	3	1	0	3	0	0	0	9	1	135	0	2	118	0.26
02-05-20-13	0	0	0	0	0	22	73	20	0	0	0	4	1	5	7	0	1	0	0	0	57	0	1	0	0	0	1	2	1	1	0	8	1	205	1	3	199	0.15
02-05-20-12	0	0	0	1	0	22	32.5	9	0	1	0	10	1	8	29	0	1	0	0	0	4	0	3	0	0	1	1	1	0	0	0	5	2	131.5	1	1	170	0.18
02-05-20-11	0	0	0	0	0	11	60.5	2	0	0	0	6	2	6	7	0	0	0	0	0	12	0	3	0	0	1	1	0	1	1	2	5	3	123.5	1	1	181	0.15
02-05-21-2	0	0	0	0	0	10	14.5	5	0	0	0	7	3	7	42	0	2	0	4	0	16	0	1	0	2	0	0	1	1	0	1	6	3	125.5	0	2	202	0.08
02-05-21-3	0	0	0	0	1	9	49.5	2	0	0	0	0	1	4	6	2	1	0	2	0	0	0	0	0	2	0	1	0	0	0	6	19	10	115.5	0	3	136	0.17
02-05-21-4	0	0	0	0	0	8	46	3	0	0	0	6	5	2	16	5	3	0	0	1	11	0	1	0	0	0	0	0	0	0	4	18	10	134	0	1	227	0.13
02-05-21-5	0	0	0	0	0	9	59.5	0	0	0	0	0	0	2	5	0	0	0	0	0	11	0	0	0	0	0	0	1	0	0	3	11	18	119.5	0	2	92	0.31
02-05-21-6	0	0	0	0	0	7	42	1	1	0	0	2	0	1	16	0	1	0	2	0	7	0	1	0	0	0	0	0	0	0	5	15	12	113	1	1	173	0.19
02-05-21-7	0	0	0	0	0	4	24.5	0	0	0	0	2	0	1	1	0	0	0	0	0	71	0	0	0	1	0	1	0	0	0	2	7	2	116.5	1	1	120	0.17
02-05-21-8	0	0	0	0	1	10	64.5	5	0	0	0	11	3	9	15	0	0	1	0	0	6	0	0	0	1	0	2	4	1	0	3	5	0	148.5	2	5	105	0.022
02-05-22-1	0	0	0	3	0	25	69.5	8	0	0	0	3	1	2	3	1	0	0	0	0	2	0	0	0	2	1	3	4	1	0	1	1	0	130.5	1	0	235	0.18
02-05-22-2	0	0	0	0	0	10	73	2	0	0	0	1	1	37	19	0	1	0	0	0	2	0	0	1	4	0	0	2	0	0	1	4	0	158	0	2	192	0.24
02-05-22-3	0	0	0	0	1	1	51.5	1	0	0	0	1	1	7	2	0	1	0	0	0	27	0	0	1	0	0	1	0	1	0	0	3	0	99.5	0	0	58	0.18
02-05-22-4	0	1	0	0	0	7	65	2	0	0	1	0	2	29	9	0	0	0	0	0	5	0	0	1	15	1	0	2	0	0	1	9	0	150	0	3	151	0.24
02-05-22-5	0	1	0	0	0	17	85	5	0	0	0	9	3	37	7	1	0	0	0	0	6	0	3	2	22	3	1	2	2	0	4	7	3	220	1	4	233	0.25

Appendix H. Pollen assemblage data for surface samples.

02-05-21-2	*Alnus*	*Casuarina*	*Carya*	*Celtis*	*Cephalanthus*	*Ilex*	*Juglans*	*Liquidambar*	*Myrica*	*Pinus*	*Quercus*	*Salix*	*Ambrosia*	Apiaceae	Asteraceae	Cheno-Ams	*Cladium*	*Crinum*	Cyperaceae	Ericaceae	Euphorbiaceae	*Fabaceae*
0-1cm	0	0	0	0	0	0	0	0	10	14.5	5	0	7	0	3	7	42	0	2	0	0	0
1-2cm	0	0	1	0	0	0	0	0	5	101	0	0	6	0	0	7	34	0	0	0	0	0
2-3cm	0	4	0	0	0	1	0	0	14	91.5	2	1	21	0	4	13	31	0	0	0	0	0
3-4cm	0	4	0	0	3	1	0	0	16	58	3	0	7	0	16	18	28	0	0	0	0	0
4-5cm	0	7	0	0	0	1	0	1	9	61.5	1	0	3	0	0	5	28	0	0	0	0	1
5-6cm	0	1	1	0	0	0	0	0	0	35	0	0	0	0	8	14	37	0	0	0	0	0
6-7cm	0	0	0	0	0	0	0	0	2	23.5	1	0	1	0	2	5	6	0	0	0	0	0
7-8cm	0	0	0	0	1	0	0	0	0	29	0	0	0	0	7	8	22	0	0	0	0	0
8-9cm	0	0	0	0	0	1	0	0	0	22	0	0	0	0	3	9	21	0	0	0	0	0
9-10cm	0	0	0	0	1	1	0	0	3	55.5	0	0	0	0	3	10	17	0	0	0	0	0
10-11cm	0	0	0	0	1	0	0	0	1	63	0	0	0	0	2	2	22	0	0	0	0	0
11-12cm	0	0	0	0	1	0	0	0	2	26.5	1	0	0	0	3	4	13	0	0	0	0	0
12-13cm	0	0	0	0	3	0	0	0	0	20	0	0	0	0	0	1	7	0	0	0	0	0
13-14cm	0	0	0	0	7	0	0	0	3	46.5	0	0	0	0	4	8	10	0	2	0	0	0
14-15cm	0	0	0	0	41	0	0	0	6	63.5	1	0	0	5	11	25	13	0	0	0	0	0
15-16cm	0	0	0	0	4	0	0	0	4	126	0	0	0	4	2	9	9	0	0	2	0	0
16-17cm	0	0	0	0	30	0	0	0	7	108	0	0	0	6	8	33	24	0	0	0	0	0
17-18cm	0	0	0	0	18	1	0	0	0	103	1	0	0	0	12	38	11	0	0	0	0	0
18-19cm	0	0	0	0	11	0	0	0	3	88	1	0	0	2	9	26	10	0	0	0	1	0
19-20cm	0	0	0	0	17	0	0	0	7	60	1	0	0	5	12	18	8	1	0	0	1	0
20-22cm	0	0	0	0	1	0	0	0	3	126	0	0	0	5	3	10	11	0	0	0	0	0
22-24cm	0	0	0	0	14	1	0	0	0	56.5	0	0	0	2	5	21	4	0	0	0	0	0
24-26cm	0	0	1	0	0	0	0	0	1	107	0	0	0	1	3	16	1	1	0	0	0	0
26-28cm	0	0	0	0	3	1	0	0	1	152	0	0	0	2	4	12	9	0	0	0	0	0
28-30cm	1	0	1	0	3	0	0	0	4	175	2	0	0	3	1	15	17	0	0	1	0	0
30-32cm	0	0	0	0	2	0	0	0	1	119	0	0	0	0	3	6	0	0	0	1	0	0
34-36cm	0	0	1	0	16	1	1	0	8	77.5	0	0	0	1	14	57	3	0	1	0	0	0
38-40cm	0	0	0	0	4	0	0	0	1	174	1	0	0	0	1	37	4	0	0	0	0	0
40-42cm	0	0	0	0	0	0	0	0	2	189	1	0	0	0	1	34	4	0	0	1	0	0
44-46cm	0	0	0	0	0	0	0	0	2	163	0	0	0	0	6	34	31	0	0	0	0	0
48-50cm	0	0	0	0	3	0	0	0	0	191	0	0	0	0	5	28	2	0	0	0	0	0
50-52cm	0	0	0	0	0	0	0	0	3	145	0	0	0	0	3	104	5	0	0	0	0	0
54-56cm	0	0	0	0	0	0	0	0	0	69	1	0	0	0	1	172	11	0	0	0	0	0
56-58cm	0	0	1	0	0	0	0	0	0	232	1	0	0	0	1	41	0	0	0	0	0	0
60-62cm	1	0	0	0	1	0	0	0	3	159	2	0	0	0	5	69	5	0	0	0	0	0
64-66cm	0	0	0	0	0	0	0	0	0	116	1	0	0	0	1	27	6	0	0	1	0	0
68-70cm	0	0	0	0	1	0	0	0	2	113	0	0	0	1	2	182	3	0	0	0	0	0
72-74cm	0	0	0	0	1	0	0	0	0	179	1	0	0	0	7	72	7	0	0	0	0	0

02-05-21-2	*Iva*	*Justicia*	*Lemna*	*Ludwigia*	*Nymphaea*	*Nuphar*	Poaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	Triporate Pollen	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete Spores	Osmunda regalis	TOTAL	Unknown	Crumpled	Exotics	grams
0-1cm	0	4	0	0	16	0	1	0	2	0	0	1	1	0	1	6	3	125.5	0	2	202	
1-2cm	0	4	0	0	12	0	3	0	1	0	0	0	0	0	3	32	27	236	0	0	27	1.15
2-3cm	0	14	0	0	19	0	2	0	2	0	0	5	1	0	0	47	31	303.5	0	2	45	1.21
3-4cm	0	5	0	1	5	0	2	0	5	2	0	3	2	1	1	54	51	286	0	1	55	1.1
4-5cm	1	5	1	0	7	0	2	0	2	0	0	4	0	0	2	33	17	191.5	0	0	31	1.32
5-6cm	0	1	0	0	3	0	1	1	3	0	0	0	0	1	2	26	105	239	0	0	36	1.02
6-7cm	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	21	95	157.5	0	0	28	1.17
7-8cm	0	0	0	0	4	0	0	0	0	0	0	0	0	1	2	23	113	210	0	1	16	1.33
8-9cm	0	1	0	0	1	0	0	0	1	0	0	0	0	0	1	33	91	184	0	2	37	1.19
9-10cm	0	2	0	0	3	0	1	2	1	0	0	0	1	0	2	113	32	247.5	0	0	60	1.28
10-11cm	0	0	0	0	1	0	0	1	0	0	0	0	2	0	6	78	90	269	0	0	40	1.51
11-12cm	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	216	20	289.5	0	0	31	1.19
12-13cm	0	0	0	0	2	0	1	0	2	0	1	0	0	0	2	133	29	201	0	0	25	1.87
13-14cm	0	1	0	0	5	0	0	0	0	0	0	0	4	1	0	236	5	332.5	0	0	34	1.15
14-15cm	0	1	0	0	5	0	0	7	2	1	1	0	6	0	0	130	17	335.5	0	6	59	1.7
15-16cm	0	2	0	0	10	0	1	10	0	1	1	1	0	0	4	101	15	306	0	3	53	2.14
16-17cm	0	7	0	0	20	0	1	6	3	2	0	2	5	1	0	56	14	333	0	3	79	1.29
17-18cm	0	2	0	0	7	0	0	4	0	1	0	1	5	1	0	60	29	293.5	0	3	57	1.19
18-19cm	0	1	0	0	12	0	0	5	4	1	1	2	8	4	0	40	46	275	0	5	48	1.68
19-20cm	0	1	2	0	7	0	0	10	3	1	1	3	7	2	6	66	75	314	0	6	42	1.61
20-22cm	0	2	0	0	19	0	1	10	1	0	0	0	1	1	1	69	15	279	0	4	89	1.12
22-24cm	0	4	1	0	7	0	2	3	4	0	0	2	4	1	0	35	62	228.5	0	2	60	2.15
24-26cm	0	5	0	0	15	0	1	3	1	0	0	0	1	1	1	38	24	221	0	0	49	1.51
26-28cm	0	3	3	1	16	0	1	1	3	1	1	2	3	0	3	23	25	270	0	2	58	1.08
28-30cm	0	1	1	0	21	0	1	0	3	0	2	1	1	0	2	30	10	296	0	5	45	1.45
30-32cm	0	0	3	0	12	0	0	2	2	0	1	2	0	0	3	22	88	266.5	0	3	36	1.28
34-36cm	0	2	1	0	13	0	0	1	3	0	0	0	6	1	1	35	80	323.5	0	6	41	1.22
38-40cm	0	0	0	0	47	0	0	1	1	0	2	1	0	0	10	27	10	321	0	4	44	1.11
40-42cm	0	1	1	0	54	1	1	1	1	1	1	0	1	0	1	18	2	315.5	0	1	50	1.14
44-46cm	0	2	1	0	34	0	2	3	7	1	3	0	2	0	0	12	8	311	0	4	44	1.6
48-50cm	0	0	0	0	38	0	0	2	3	1	1	1	0	1	3	6	2	286.5	1	1	45	1.44
50-52cm	0	0	1	0	17	0	0	0	7	3	2	1	1	0	0	3	0	295	0	3	26	1.89
54-56cm	0	0	0	0	20	0	2	0	3	2	0	1	0	0	0	0	0	282	0	1	17	1.4
56-58cm	0	0	0	0	27	0	0	0	2	2	0	0	0	1	0	3	0	310.5	0	0	42	1.38
60-62cm	0	1	0	0	25	0	4	1	5	2	0	0	1	2	0	5	0	290.5	0	3	35	1.61
64-66cm	0	0	1	0	20	0	0	0	1	2	1	1	2	0	0	4	0	184	0	3	28	2.24
68-70cm	0	1	0	0	20	0	4	0	4	7	0	1	1	1	0	2	0	345	0	0	14	1.73
72-74cm	0	1	0	0	7	0	5	0	2	12	0	0	1	2	0	1	0	298	0	0	25	2.61

Appendix I. Pollen assemblage data for 02-05-21-2

02-05-21-4	*Alnus*	*Carya*	*Casuarina*	*Cephalanthus*	*Ilex*	*Myrica*	*Pinus*	*Quercus*	*Salix*	Apiaceae	*Ambrosia*	Asteraceae	Cheno-Ams	*Cladium*	*Crinum*	Cyperaceae	Ericaceae	Euphorbiaceae	*Justicia*	*Lemna*
0-1cm	0	0	0	0	0	8	46	3	0	0	6	5	2	16	5	3	0	0	0	0
1-2cm	0	0	0	1	1	15	82	3	0	6	4	32	32	8	1	0	0	0	2	0
2-3cm	0	0	0	2	0	16	63	5	0	2	4	31	15	12	4	0	0	0	0	0
3-4cm	0	0	0	7	0	32	50.5	0	0	7	0	28	78	6	1	8	0	0	0	0
4-5cm	0	0	2	2	2	23	81.5	0	0	5	0	12	58	11	2	4	0	0	3	0
5-6cm	0	0	0	4	0	17	44	2	0	4	0	6	28	5	0	0	0	0	1	0
6-7cm	0	0	0	4	0	8	69.5	2	0	4	0	5	18	5	0	0	0	0	1	0
7-8cm	0	0	0	5	0	16	70	1	0	3	0	15	16	14	0	0	0	1	1	0
8-9cm	0	3	1	4	0	13	140	0	0	6	0	34	13	27	0	0	0	0	1	0
9-10cm	0	0	0	6	0	19	74.5	2	0	29	0	25	41	6	0	1	1	2	4	0
10-11cm	1	1	1	1	0	9	112	0	1	18	0	15	20	8	0	1	1	1	0	0
11-12cm	0	0	0	0	0	2	40	1	0	12	0	5	15	0	0	0	0	0	2	0
12-13cm	0	0	0	2	0	2	118	0	0	23	0	14	13	1	0	1	1	0	3	0
13-14cm	0	0	0	3	0	10	97	1	0	31	0	16	28	3	1	0	0	0	1	1
14-15cm	0	0	0	4	0	4	99	0	0	39	0	22	39	5	1	0	1	0	5	4
15-16cm	0	0	0	0	0	2	76	0	0	1	0	3	6	2	0	0	0	0	2	0
16-17cm	0	0	0	1	0	4	98.5	1	0	26	0	3	22	5	2	0	1	0	8	3
17-18cm	0	0	0	0	0	5	90	3	0	12	0	6	19	1	0	0	0	0	3	2
18-19cm	0	0	0	2	0	6	101	0	0	15	0	5	20	4	1	0	0	0	9	1
19-20cm	1	1	0	1	0	4	129.5	0	0	13	0	6	11	3	1	0	3	0	5	2
20-22cm	0	0	0	0	0	3	79	1	0	6	0	4	13	3	1	0	0	0	1	0
24-26cm	0	0	0	4	0	3	106.5	0	0	16	0	8	13	4	0	0	1	0	2	0
26-28cm	0	3	0	0	0	2	183	1	0	7	0	15	39	4	0	1	1	1	1	1
28-30cm	0	0	0	0	0	1	174.5	1	0	8	0	5	32	1	0	1	0	0	1	0
30-32cm	0	0	0	0	0	8	158	4	0	6	0	3	40	1	0	0	0	1	0	0
32-34cm	0	0	0	0	0	1	122	2	0	3	0	5	65	3	0	0	1	0	0	0
36-38cm	0	0	0	0	0	1	137	0	0	0	0	2	68	0	0	0	0	0	0	2
40-42cm	0	0	0	0	0	2	101.5	0	0	0	0	0	6	0	0	0	0	0	0	0
46-48cm	0	0	0	0	0	0	174.5	1	0	4	0	2	62	1	0	0	0	0	0	0
54-56cm	0	0	0	0	0	1	192	1	0	0	0	2	26	3	0	0	1	0	0	0
60-62cm	1	0	0	0	0	2	220	0	0	0	0	6	7	1	0	2	0	0	0	0
64-66cm	0	0	0	0	0	1	72.5	0	0	0	0	5	8	0	0	0	0	0	3	0

02-05-21-4	*Ludwigia*	*Myriophyllum*	*Nuphar*	*Nymphaea*	Poaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	*Vitis*	Triporate Pollen	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete Spores	*Osmunda regalis*	TOTAL	Unknown	Crumpled	Exotics	Sediment Dry Weight (g)
0-1cm	0	1	0	11	1	0	0	0	0	0	0	0	0	4	18	10	139	0	0	121	0.57
1-2cm	0	0	0	6	0	4	1	0	2	0	5	1	1	3	26	53	289	0	6	81	0.93
2-3cm	0	0	0	12	6	4	1	4	1	0	7	0	0	2	22	31	244	0	6	103	0.55
3-4cm	3	0	0	6	4	1	1	2	1	0	8	3	0	3	40	39	328.5	0	6	26	0.79
4-5cm	1	0	0	12	3	4	1	0	1	0	10	2	0	4	56	35	334.5	0	8	67	0.95
5-6cm	0	0	0	9	2	1	0	0	1	0	2	1	0	7	16	38	190	0	3	62	0.59
6-7cm	0	0	0	4	1	2	1	0	0	0	1	0	0	6	21	34	186.5	0	4	80	0.82
7-8cm	0	0	0	8	1	3	2	1	0	0	0	4	1	0	26	24	212	0	4	50	0.53
8-9cm	0	0	0	7	2	2	1	0	3	0	11	2	0	1	32	19	322	1	5	132	0.65
9-10cm	0	0	0	10	4	4	2	0	1	0	1	3	0	5	29	32	301.5	0	4	71	0.71
10-11cm	0	0	0	7	0	5	0	0	3	0	3	9	0	6	32	19	274	0	3	123	0.55
11-12cm	0	0	0	3	0	0	1	0	0	0	0	4	0	2	12	4	103	0	2	18	0.81
12-13cm	0	0	1	5	1	4	0	0	2	0	0	6	0	2	25	18	242	1	3	79	0.94
13-14cm	0	0	1	5	0	1	0	0	1	1	4	9	0	5	20	23	262	0	2	76	0.79
14-15cm	0	1	0	13	0	8	1	1	4	0	3	6	0	3	27	24	314	0	3	85	0.75
15-16cm	0	0	0	8	1	2	0	0	1	0	0	0	0	0	9	3	116	0	0	5	0.53
16-17cm	1	0	0	11	0	8	4	0	2	0	3	6	0	3	39	7	258.5	0	3	108	0.52
17-18cm	0	0	1	7	1	9	1	0	0	0	2	7	0	0	19	3	191	0	2	43	0.96
18-19cm	0	0	0	11	2	13	6	0	2	0	4	3	2	1	17	8	233	0	4	98	0.91
19-20cm	2	0	0	18	1	15	3	0	1	0	1	3	0	3	24	1	252.5	0	1	139	0.61
20-22cm	0	0	0	13	3	7	0	0	2	0	0	2	0	1	3	7	149	0	3	81	0.5
24-26cm	0	0	0	9	0	1	2	0	1	0	1	6	0	4	20	23	224.5	0	4	49	0.53
26-28cm	0	1	0	17	1	1	4	1	1	0	3	6	1	0	11	4	310	0	3	83	0.58
28-30cm	0	1	0	17	1	3	0	0	2	0	1	1	0	0	10	0	260.5	0	3	42	0.82
30-32cm	0	2	0	36	7	0	8	0	1	0	0	3	0	1	5	0	284	1	4	12	0.89
32-34cm	0	1	0	48	2	1	1	0	0	0	1	5	0	0	10	0	271	1	2	19	0.75
36-38cm	0	0	3	63	0	0	4	0	2	0	3	1	2	2	17	3	310	1	2	62	0.59
40-42cm	0	0	0	20	0	3	1	0	2	0	0	0	0	0	5	0	140.5	0	1	35	0.59
46-48cm	0	0	1	44	2	6	0	3	3	0	1	1	1	2	2	0	310.5	0	1	55	0.59
54-56cm	0	0	1	71	2	0	3	3	4	0	3	0	0	3	4	0	320	0	4	126	0.54
60-62cm	0	0	0	14	0	1	0	4	1	0	0	1	0	4	2	0	266	0	0	283	1.43
64-66cm	0	0	0	16	5	0	0	2	3	0	1	1	0	1	3	0	121.5	0	3	443	0.94

Appendix J. Pollen assemblage data for 02-05-21-4.

02-05-21-5	*Alnus*	*Carya*	*Casuarina*	*Cephalanthus*	*Ilex*	*Myrica*	*Nyssa*	*Pinus*	*Quercus*	Apiaceae	*Ambrosia*	Asteraceae	Cheno-Ams	*Cladium*	*Crinum*	Cyperaceae	Ericaceae	Euphorbiaceae	*Iva*	*Justicia*	*Lemna*	*Ludwigia*	*Myriophyllum*	*Nuphar*	Nymphaea	Poaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	Triporate Pollen	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete Spores	*Osmunda regalis*	TOTAL	Unknown	Crumpled	Exotics	Sediment Dry Weight (g)
0-1cm	0	0	0	0	0	9	0	59.5	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	1	0	0	3	11	18	119.5	0	2	92	
1-2cm	2	4	2	0	1	9	0	102	4	0	9	1	13	7	0	1	0	0	1	0	0	1	0	0	50	5	1	1	1	2	17	1	0	3	18	29	285	0	6	77	0.71
2-3cm	0	0	2	0	0	12	1	88.5	0	1	2	4	13	3	0	0	0	0	0	1	0	0	0	1	16	1	0	0	0	0	2	1	0	1	17	7	173.5	0	1	55	0.61
3-4cm	0	0	1	0	0	9	0	129	0	0	1	1	6	2	0	0	0	0	0	0	0	0	0	0	31	1	1	0	0	0	3	0	0	1	16	17	219	0	1	83	0.86
4-5cm	1	0	2	0	0	21	0	121	1	2	2	2	41	2	0	0	0	0	0	0	0	0	1	0	58	0	1	0	0	0	6	1	0	0	6	4	272	0	0	72	0.55
5-6cm	0	0	1	0	0	7	0	139	2	0	1	1	12	25	0	1	0	0	0	0	0	0	0	0	81	4	0	0	0	0	4	0	0	9	11	20	318	1	1	134	0.66
6-7cm	0	0	1	0	0	6	0	119.5	0	0	0	2	3	7	0	0	1	0	0	0	0	0	0	0	51	2	1	0	0	0	3	0	1	1	13	5	216.5	0	1	68	0.6
7-8cm	0	0	0	0	0	5	0	150.5	0	0	0	0	5	3	1	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	4	0	0	2	10	18	213.5	0	2	49	0.95
8-9cm	0	2	0	0	0	6	0	213	0	0	0	2	3	5	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	2	0	0	0	13	8	279	1	0	77	0.72
9-10cm	0	0	0	0	1	11	0	188	0	1	0	3	9	6	0	0	0	0	0	0	0	0	0	0	15	0	1	0	0	1	5	1	0	0	21	3	266	0	2	52	1
10-11cm	0	0	0	0	0	5	0	142	1	0	1	2	9	1	0	0	0	0	0	0	0	0	0	0	15	1	0	0	0	0	5	1	0	2	15	3	203	0	1	87	0.63
11-12cm	0	1	0	0	0	2	0	178	1	0	0	0	2	2	0	0	0	0	0	1	0	0	0	0	4	1	0	0	1	0	0	1	0	1	9	2	206	0	0	75	0.79
12-13cm	0	1	0	0	0	5	0	181.5	0	1	0	0	3	0	0	0	0	0	0	1	0	0	0	0	5	0	2	0	0	0	1	0	0	0	15	1	216.5	0	0	63	0.65
13-14cm	0	0	0	0	1	3	0	204	1	0	0	5	4	2	0	0	0	0	0	2	0	0	0	0	13	2	2	1	0	0	1	2	0	0	14	3	260	0	1	163	0.74
14-15cm	0	0	0	0	0	1	0	93	1	0	0	2	6	1	1	0	0	0	0	0	0	0	2	0	13	0	0	1	0	0	1	0	0	0	12	3	137	0	0	101	0.74
15-16cm	0	0	0	1	0	0	0	126.5	0	0	0	4	1	2	0	0	0	0	0	1	0	0	0	0	6	2	2	0	0	0	0	0	0	0	22	3	170.5	0	1	106	0.77
16-17cm	0	0	0	0	0	6	0	152	2	18	0	5	52	0	0	0	0	2	0	10	0	0	1	0	24	0	0	0	0	0	4	13	0	1	23	0	313	1	4	62	0.74
17-18cm	0	1	0	1	0	4	0	171	1	13	0	5	32	0	1	0	2	0	0	6	1	0	4	0	16	0	0	8	1	0	3	9	0	0	21	4	304	0	4	48	0.93
18-19cm	0	0	0	0	0	3	0	188	0	10	0	4	13	0	0	0	0	1	0	7	4	0	0	0	17	0	1	2	0	0	3	8	1	2	26	1	291	0	5	61	0.73
19-20cm	0	1	0	2	0	2	0	169	2	7	0	15	27	0	0	0	1	0	0	5	2	0	0	0	17	0	1	4	0	1	1	8	0	1	24	1	291	0	3	65	0.71
20-22cm	0	0	0	1	0	1	0	197	0	9	1	8	17	3	1	0	1	0	0	5	0	0	0	0	13	2	0	2	0	1	0	5	0	1	14	1	283	0	2	95	0.86
24-26cm	0	0	0	0	1	5	0	264.5	0	1	0	3	3	3	0	0	1	0	0	3	0	1	0	0	18	0	1	2	0	1	0	0	0	1	21	3	332.5	0	1	81	1.21
28-30cm	0	0	0	0	0	2	0	276.5	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	2	11	1	302.5	0	0	108	0.63
30-32cm	1	0	0	0	0	3	0	147.5	3	1	0	0	21	0	0	0	0	0	0	0	0	0	0	0	67	1	0	0	0	0	0	0	0	0	4	0	248.5	0	1	25	1
32-34cm	0	0	0	0	0	2	1	280	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	10	0	11	0	0	1	0	1	0	1	11	0	320	0	0	68	0.74
34-36cm	0	0	0	0	0	1	0	225	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	21	1	0	0	0	0	0	0	0	0	6	0	255	0	0	85	0.76
38-40cm	0	0	0	0	0	1	0	248	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	28	0	0	0	0	2	0	0	0	0	8	0	288	0	0	106	0.66
40-42cm	0	0	0	0	0	2	0	203	0	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	1	0	2	0	1	5	0	280	0	0	68	0.61
44-46cm	0	0	0	0	0	0	0	258	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	28	0	7	1	0	1	0	0	0	0	3	0	303	0	0	86	0.67
48-50cm	0	0	0	0	0	2	0	291	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	14	1	0	0	0	1	0	0	0	1	2	0	313	0	0	97	0.74
50-52cm	0	0	0	0	0	3	0	110.5	0	0	0	5	72	6	0	1	1	0	0	0	4	0	0	0	76	0	0	20	2	0	1	0	1	0	1	0	303.5	0	5	30	0.76
52-54cm	0	1	0	0	0	0	0	263	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	21	1	1	3	0	0	1	0	0	1	2	0	298	0	0	139	1.06
54-56cm	0	0	0	0	0	3	0	271.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	1	0	2	0	1	0	0	0	0	0	285.5	0	0	88	1.3
58-60cm	0	0	0	0	0	0	0	253	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	11	1	2	0	0	1	1	0	0	0	5	0	277	0	0	726	1.94
60-61cm	0	0	0	0	0	1	0	61	0	1	0	7	26	0	0	0	0	0	0	3	1	0	0	0	12	4	0	0	1	0	1	3	1	3	0	0	125	0	1	729	1.68

Appendix K. Pollen assemblage data for 02-05-21-5.

02-05-20-13	*Alnus*	*Casuarina*	*Cephalanthus*	*Ilex*	*Liquidambar*	*Myrica*	*Nyssa*	*Pinus*	*Quercus*	*Salix*	*Ulmus*	*Ambrosia*	Apiaceae	Asteraceae	Chenopodiaceae/ Amaranthaceae	*Cladium*	*Crinum*	Cyperaceae	Ericaceae	*Justicia*	*Myriophyllum*	*Nymphaea*	Poaceae	Polygalaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	*Waltheria*	Triporate Pollen	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete spores	*Osmunda regalis*	TOTAL	Unknown	Crumpled	Exotics	Sample Dry Weight (g)
0-1cm	0	0	0	0	0	22	0	73	20	0	0	4	0	1	5	7	0	1	0	0	0	57	1	0	0	0	0	1	0	2	1	1	0	8	1	205	1	3	199	
1-2cm	0	6	0	0	0	19	1	133	6	0	1	5	0	4	4	10	0	0	0	0	0	87	1	0	0	0	2	1	0	9	0	1	0	8	4	302	0	2	87	1.11
2-3cm	0	5	0	0	0	23	0	97	8	1	0	10	0	10	36	7	0	0	0	0	0	44	7	0	0	0	4	7	3	5	0	0	1	7	0	275	0	2	74	1.05
3-4cm	0	5	1	1	0	18	0	138	7	0	1	6	0	8	36	2	0	0	0	0	2	25	10	0	0	0	0	3	0	5	0	0	1	15	5	289	1	3	112	1.12
4-5cm	0	1	0	0	0	13	0	149	6	0	1	7	0	7	43	5	0	1	0	0	0	31	3	0	0	1	1	2	1	8	1	0	2	17	6	306	0	2	99	1.21
5-6cm	0	2	0	0		15	0	103	1	0	0	0	0	7	16	2	0	0	0	0	0	36	2	0	0	1	2	3	0	3	0	1	0	7	0	201	1	2	40	1.1
6-7cm	0	0	0	0	0	3	0	22	0	0	0	0	0	2	9	1	0	0	0	0	0	267	0	0	0	0	0	1	0	1	0	0	0	3	2	311	0	0	16	1.04
7-8cm	0	0	0	0	0	2	0	13	0	0	0	0	0	0	8	0	0	0	0	0	0	293	0	0	0	0	0	0	0	1	0	0	0	2	0	319	0	0	6	1.07
8-9cm	0	0	0	0	0	8	0	68	1	0	0	0	0	0	11	5	0	0	0	0	1	58	2	0	1	0	0	2	0	1	0	0	0	12	1	171	0	0	86	1.06
9-10cm	0	0	0	0	0	25	1	170	1	0	0	0	0	2	16	2	0	1	0	0	2	58	2	0	0	0	0	1	0	6	0	1	0	21	3	312	0	0	84	1
10-11cm	0	0	0	0	1	13	0	124	3	0	0	0	1	2	53	1	0	1	1	1	16	74	2	0	1	0	2	1	0	5	0	0	0	19	2	323	0	4	80	1.03
11-12cm	0	0	0	0	0	6	0	72	1	0	0	0	1	1	194	0	0	0	0	1	0	19	2	0	1	1	1	2	0	3	1	0	0	3	1	310	0	2	23	1.05
12-13cm	0	0	0	0	0	5	0	79.5	0	0	0	0	1	2	158	1	0	3	0	0	1	44	2	0	1	0	0	0	0	2	1	0	1	10	0	312	0	2	40	1.04
13-14cm	0	0	0	0	0	0	0	40	1	0	0	0	0	2	201	4	0	0	0	0	0	34	4	0	0	1	0	0	0	1	1	1	0	11	0	301	0	0	51	1.15
14-15cm	0	0	0	0	0	3	0	144	0	0	0	0	0	1	99	1	0	1	0	0	0	30	1	0	0	1	0	0	0	1	1	0	0	6	0	289	0	0	76	1.07
15-16cm	0	0	0	0	1	5	0	94.5	0	0	0	0	0	2	16	5	0	0	0	0	2	47	3	0	0	1	0	0	0	0	0	1	0	10	0	188	0	0	105	1.12
16-17cm	0	0	0	0	0	4	0	118	1	0	0	0	0	1	25	3	0	0	0	0	1	20	5	0	1	2	2	0	1	2	1	0	0	7	1	195	0	0	158	1.16
17-18cm	0	0	0	0	0	1	0	213	2	0	0	0	0	3	8	3	0	0	0	0	0	8	3	0	1	1	2	0	4	1	0	0	0	15	2	267	0	0	96	1.39
18-19cm	0	0	1	0	0	5	0	160	1	0	0	0	0	4	13	4	1	0	0	0	0	5	1	0	1	1	1	1	0	1	0	0	0	19	0	219	0	0	87	1.36
19-20cm	0	0	0	0	0	1	0	217	1	0	0	0	0	1	14	0	0	0	0	0	1	24	1	0	0	1	1	1	0	2	0	0	0	26	0	291	0	1	145	1.37
24-25cm	0	0	0	0	0	6	0	223	0	0	0	0	0	3	21	1	0	0	1	0	1	49	0	0	0	0	1	1	0	0	1	1	1	11	0	321	1	0	86	1.19
29-30cm	1	0	0	0	0	1	0	245	0	0	0	0	2	3	11	0	0	0	0	0	0	7	1	1	0	0	0	0	0	2	0	0	0	12	0	286	0	0	176	1.05
34-35cm	1	0	0	0	0	5	0	256	1	0	0	0	1	4	14	2	0	0	0	0	0	7	1	0	0	0	1	0	0	1	0	1	0	18	2	315	0	1	278	1.06
39-40.5cm	0	0	0	0	0	3	0	166	2	0	0	0	1	7	40	3	0	0	0	0	0	4	12	2	0	0	4	0	0	3	1	0	0	2	0	250	0	1	578	1.05

Appendix L. Pollen assemblage data for 02-05-21-13.

02-05-20-14	*Carya*	*Casuarina*	*Celtis*	*Cephalanthus*	*Myrica*	*Nyssa*	*Ostrya/Carpinus*	*Pinus*	*Quercus*	Taxodiaceae/Cupressaceae/ Taxaceae	Ambrosia	Apiaceae	Asteraceae	Cheno-Ams	*Cladium*	*Crinum*	Cyperaceae	Ericaceae	Euphorbiaceae	Fabaceae	*Justicia*	*Lemna*	*Myriophyllum*	*Nuphar*	*Nymphaea*	Onagraceae	Poaceae	Polygalaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	*Waltheria*	Triporate Pollen	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete Spores	*Osmunda regalis*	TOTAL	Unknown	Crumpled	Exotics	grams
0-1cm	0	0	0	1	13	0	0	51	6	0	6	0	2	8	29	0	1	0	0	0	0	0	0	0	0	0	1	0	0	3	1	0	0	3	0	0	0	9	1	135	0	2	118	
1-2cm	1	8	0	15	15	1	1	24.5	17	1	12	3	52	66	23	0	4	0	0	0	0	1	0	0	1	0	3	0	0	0	0	0	6	9	8	3	1	8	1	285	0	16	25	1.25
2-3cm	0	1	0	23	10	0	0	35	8	0	17	2	41	102	14	0	4	0	0	0	0	0	0	0	3	0	4	0	1	6	3	0	0	5	10	3	0	17	8	317	0	11	14	1.22
3-4cm	0	1	0	20	17	0	0	38.5	16	1	15	2	54	97	6	0	1	0	0	0	0	2	0	0	2	0	6	0	0	3	5	0	2	5	12	4	1	14	7	332	0	12	20	1.04
4-5cm	0	3	0	24	13	0	0	31.5	8	1	10	3	58	114	10	0	3	0	0	0	0	1	0	0	1	0	4	0	2	4	1	0	1	6	8	1	0	25	18	351	1	5	27	1.18
5-6cm	0	0	0	30	16	0	0	16	7	0	4	7	45	124	2	0	0	0	0	0	0	0	0	0	1	0	4	1	3	1	0	1	0	6	10	2	1	30	20	331	0	11	5	1
6-7cm	0	0	0	27	15	0	0	17	3	1	3	2	18	146	8	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0	3	0	1	3	12	0	0	40	18	322	0	7	10	1.05
7-8cm	0	0	0	25	15	0	0	16	3	0	0	3	24	147	6	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	3	0	2	3	5	2	0	44	17	319	0	8	8	1.16
8-9cm	0	0	0	44	28	0	0	17	7	2	0	12	15	102	15	0	0	0	0	0	0	2	0	0	7	0	5	0	0	3	9	0	1	5	14	5	0	16	2	311	0	11	17	1.06
9-10cm	0	0	0	33	32	0	0	40.5	4	0	1	13	14	72	24	0	0	2	0	0	0	4	1	0	12	0	2	0	5	4	1	2	1	5	9	0	0	30	8	320	0	10	37	1.07
10-11cm	0	0	0	51	45	0	0	26	5	0	2	20	15	40	35	0	2	0	1	0	0	2	0	0	7	1	5	0	3	9	2	1	0	8	12	4	0	19	2	317	0	16	16	1.84
11-12cm	0	0	0	34	25	0	0	30.5	2	2	0	23	38	61	38	0	1	0	0	0	2	7	0	0	10	0	2	0	2	13	2	0	0	6	19	2	0	18	3	342	0	9	14	1.09
12-13cm	0	0	0	36	37	0	0	22.5	5	0	2	34	30	71	22	0	1	0	0	0	0	8	0	0	6	0	1	0	6	8	0	1	0	4	15	4	0	7	4	325	0	3	18	1.14
13-14cm	0	0	0	24	12	0	0	28	6	0	0	22	57	116	22	1	1	0	0	0	2	4	0	0	7	0	2	0	0	13	4	2	0	2	9	5	0	11	1	351	0	14	12	1.35
14-15cm	1	0	0	12	10	0	0	21.5	6	1	1	19	46	133	15	0	0	0	0	0	3	4	0	0	7	1	7	0	1	5	1	0	0	6	10	5	0	6	2	324	0	8	9	1.69
15-16cm	0	0	0	9	7	0	0	37.5	2	0	0	8	25	75	8	0	0	0	0	0	2	1	0	0	6	0	2	0	0	7	1	0	0	2	13	2	1	9	2	220	0	2	21	1.1
16-17cm	0	0	0	27	8	0	0	42	5	0	0	35	42	55	11	1	0	0	0	0	2	5	2	0	29	0	5	3	0	7	2	2	0	0	17	1	0	15	1	317	0	5	12	1.18
17-18cm	0	0	0	15	7	0	0	68	11	1	0	30	21	49	18	1	1	0	0	0	0	5	0	0	32	0	5	0	1	16	5	2	1	2	11	5	0	18	0	325	0	7	26	1.13
18-19cm	0	0	0	5	8	0	0	62	3	0	0	17	9	27	36	0	0	0	0	0	0	7	0	0	40	0	8	0	1	33	6	0	1	1	5	4	0	16	0	289	0	6	25	1.19
19-20cm	0	0	0	7	11	0	0	64	2	0	1	24	12	24	37	0	0	1	0	0	2	10	0	0	20	0	9	0	2	40	10	3	2	5	7	2	0	10	0	305	0	11	27	1.71
21-22cm	0	0	0	0	8	0	0	84	3	1	0	19	12	49	15	0	2	0	0	0	3	5	0	0	15	0	8	2	1	8	9	0	0	0	12	2	0	18	0	276	0	4	24	1.6
24-25cm	0	0	0	0	10	0	0	135	0	0	0	4	5	57	10	1	1	0	0	0	1	2	0	0	14	0	5	0	0	4	6	3	4	3	1	1	0	21	1	289	0	5	28	1.55
27-28cm	0	0	0	0	3	0	0	152	2	0	0	2	4	64	2	1	0	1	0	0	0	2	0	0	26	0	4	0	0	0	1	2	0	1	4	2	1	18	0	292	0	2	18	1.4
30-31cm	0	0	0	0	4	0	0	212	0	0	0	2	7	31	7	1	0	0	0	0	0	4	0	1	16	0	1	0	0	5	0	0	0	3	1	1	0	16	3	315	0	5	25	1.92
35-36cm	0	0	0	0	1	0	0	198	0	0	0	0	0	6	1	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	1	0	0	0	0	10	0	222	0	0	49	2.39
38-39cm	0	0	0	0	0	0	0	143	1	0	0	0	0	5	2	0	0	0	0	0	0	0	0	0	6	0	0	0	1	2	0	0	0	0	0	0	2	13	1	176	0	0	88	3.11

Appendix M. Pollen assemblage data for 02-05-20-14.

00-8-10-13	*Bursera*	*Casuarina*	*Celtis*	*Cephalanthus*	*Ilex*	*Myrica*	*Pinus*	*Quercus*	*Salix*	Taxodiaceae/Cupressaeae/Taxaceae	Asteraceae	Chenopodiaceae-Amaranthaceae	*Cladium*	Cyperaceae	Ericaceae	*Iva*	*Justicia*	*Nymphaea*	Poaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	Triporate Pollen	P0X	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete Spores	*Osmunda regalis*	TOTAL	Unknown	Crumpled	Exotics	Sample Dry Weight (g)
0-1 cm	1	1	0	5	0	8	37	0	0	0	0	0	16	0	0	2	0	12	1	1	1	0	0	3	0	1	0	2	15	15	121	0	1	50	0.62
1-2 cm	0	0	0	4	0	4	33	0	0	0	0	1	14	0	0	2	0	6	0	0	4	0	0	1	0	0	0	2	19	10	100	0	2	43	0.54
2-3 cm	0	0	0	0	0	5	28	1	2	1	2	0	37	5	0	0	0	14	0	0	3	0	0	0	0	1	0	3	7	13	122	0	1	44	0.61
3-4 cm	0	0	0	3	0	2	27	2	0	0	2	2	38	0	0	1	0	13	0	0	0	0	0	1	0	0	0	1	9	17	118	0	1	17	0.7
4-5 cm	0	0	0	4	1	4	18	1	1	0	0	2	35	1	0	0	0	7	0	4	25	0	0	0	0	1	1	0	9	9	123	1	1	5	0.6
5-6cm	0	0	0	6	0	4	29	2	0	0	1	5	23	0	0	2	0	1	0	0	0	1	0	0	1	0	0	2	8	25	110	0	3	12	0.58
6-7 cm	0	0	0	1	0	5	22.5	3	0	0	0	2	30	3	0	0	0	0	1	0	2	0	0	1	0	0	0	4	10	22	106.5	0	1	27	0.66
7-8 cm	0	0	0	3	0	0	19.5	3	0	0	1	5	40	0	0	2	0	1	0	4	2	0	0	0	0	0	0	3	16	40	139.5	0	2	42	0.53
8-9 cm	0	0	0	2	1	6	43.5	1	1	2	1	10	27	0	0	0	0	3	1	1	3	0	0	4	0	2	1	8	11	37	165.5	2	1	54	0.54
9-10 cm	0	0	0	0	0	0	19.5	0	0	1	3	1	20	0	0	1	0	0	0	3	0	0	0	0	0	0	0	4	6	50	108.5	0	0	9	0.57
10-11cm	0	0	0	2	0	1	23	0	0	0	5	5	6	0	0	0	0	0	0	2	1	0	0	0	0	0	0	15	26	163	249	0	2	32	0.54
11-12 cm	0	0	0	2	0	0	13.5	0	0	0	2	8	16	0	0	0	0	3	0	0	3	0	0	0	0	2	0	10	11	110	180.5	0	3	26	0.57
12-13 cm	0	0	0	4	0	0	16.5	0	0	1	3	7	19	1	0	0	4	0	0	0	0	0	0	0	0	0	0	10	9	137	211.5	0	2	21	0.57
13-14cm	0	0	1	2	0	0	24.5	1	0	0	7	7	20	1	1	0	0	0	0	3	1	0	0	0	0	0	0	20	42	159	289.5	0	1	27	0.56
14-15 cm	0	0	0	0	0	4	40.5	0	0	0	13	15	38	4	0	0	0	2	0	1	0	0	2	0	0	0	0	9	73	124	325.5	0	2	33	0.57
15-16cm	0	0	0	2	0	1	6	0	0	0	2	4	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	7	11	79	116	0	2	26	0.53
16-17cm	0	0	0	2	0	2	20	2	0	1	8	10	23	1	0	1	1	2	1	2	0	0	0	0	0	0	0	9	38	125	248	0	3	28	0.5
17-18cm	0	0	0	0	0	2	34.5	0	0	0	3	11	6	0	0	0	0	0	0	3	1	0	0	1	0	0	0	0	64	30	155.5	0	0	46	0.62
18-19cm	0	0	0	1	0	3	13	2	0	0	4	23	4	0	0	0	0	1	0	0	0	0	0	2	0	0	0	9	32	52	146	0	1	29	0.57
19-20cm	0	0	0	0	0	1	41.5	2	0	0	10	18	14	1	1	0	0	5	0	4	1	0	0	0	0	0	0	4	60	39	201.5	0	1	39	0.62
20-22cm	0	0	0	0	0	1	49.5	1	0	0	6	4	8	0	2	0	0	1	0	1	2	0	0	0	0	1	0	6	37	15	134.5	0	1	48	0.53
24-26cm	0	0	0	0	0	1	27.5	0	0	0	0	0	19	1	0	0	0	1	0	1	1	0	0	0	0	0	0	3	119	2	175.5	1	1	50	0.57
30-32cm	0	0	0	0	0	0	74.5	0	0	0	0	1	6	1	0	0	0	3	0	0	0	0	1	0	0	0	0	2	22	3	113.5	0	0	67	0.61
34-36cm	0	0	0	0	0	0	29.5	0	0	0	0	0	6	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	10	0	50.5	1	0	104	0.57
40-42cm	0	0	0	0	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6	2	53	0	0	41	0.54
54-56cm	0	0	0	0	0	0	94.5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	3	0	99.5	0	0	54	0.47

Appendix N. Pollen assemblage data for 00-8-10-13.

00-8-10-14	*Carya*	*Casuarina*	*Celtis*	*Cephalanthus*	*Ilex*	*Juglans*	*Liquidambar*	*Myrica*	*Pinus*	*Quercus*	*Salix*	Taxodiaceae/Cupressaeae/ Taxaceae	*Ambrosia*	Asteraceae	Chenopodiaceae-Amarantha	*Cladium*	Cyperaceae	Ericaceae	Euphorbiaceae	Fabaceae
0-1 cm	0	2	0	0	0	0	0	10	51	4	0	0	2	0	6	19	1	0	0	0
1-2cm	0	0	0	0	0	0	0	5	13	0	0	0	0	0	1	0	0	0	0	0
2-3 cm	0	0	0	0	0	0	0	6	23.5	1	0	0	1	0	0	2	0	0	0	0
3-4cm	0	0	0	1	0	0	0	7	37.5	0	0	0	1	5	5	5	0	0	0	0
4-5cm	0	0	0	0	0	0	0	0	47.5	1	0	0	0	0	8	0	0	0	0	0
5-6cm	0	5	0	0	0	0	0	28	48.5	7	0	0	6	5	43	4	1	0	0	0
6-7cm	0	0	1	0	0	0	0	22	60.5	2	0	0	0	7	29	2	0	0	0	0
7-8cm	2	0	0	0	0	0	0	9	79.5	3	0	0	0	4	11	2	0	0	0	1
8-9cm	0	0	0	0	0	0	0	29	62.5	4	0	0	0	13	51	2	0	0	0	0
9-10cm	0	0	0	0	1	0	0	10	76	3	0	0	0	9	26	1	0	0	0	0
10-11cm	0	2	0	0	2	0	0	11	72.5	2	0	0	4	2	43	2	0	0	0	0
11-12cm	0	0	0	1	1	0	0	6	56.5	1	0	1	0	3	13	1	0	1	0	0
12-13 cm	1	0	0	0	0	0	1	4	64	0	0	0	0	0	1	0	0	0	0	0
13-14cm	0	0	0	0	0	0	0	1	55.5	1	0	0	0	1	7	1	0	0	1	0
14-15cm	0	0	0	0	0	0	0	1	57.5	0	0	0	0	1	1	0	0	0	0	0
15-16cm	0	0	0	0	0	0	0	1	49	0	0	0	0	1	20	1	0	0	0	0
16-17cm	0	0	0	0	0	0	0	1	48.5	0	0	0	0	0	5	1	0	0	0	0
17-18cm	0	0	0	0	0	1	0	2	47	0	1	0	0	0	4	1	0	1	0	0
18-19cm	0	0	0	0	0	1	0	4	56	0	0	0	0	0	10	1	0	0	0	0
19-20cm	0	0	0	0	0	0	0	0	62	0	0	0	0	0	7	1	0	0	0	0
20-22cm	0	0	0	0	0	0	0	1	38.5	1	0	0	0	0	17	0	1	1	0	0
24-26cm	0	0	0	1	0	0	0	2	89.5	4	0	0	0	0	2	1	0	0	0	0
30+32cm	0	0	0	1	0	0	0	0	88.5	1	0	0	0	0	0	1	0	0	0	0
34-36cm	0	0	0	0	0	0	0	0	104	0	0	1	0	0	2	1	0	0	0	0
40-42cm	0	0	0	0	0	0	0	0	93.5	0	0	0	0	0	2	0	0	0	0	0
44-46cm	0	0	0	0	0	0	0	2	77.5	0	0	0	0	0	8	0	0	0	0	0

00-8-10-14	*Iva*	*Myriophyllum*	*Nuphar*	*Nymphaea*	Onagraceae	Poaceae	Polygonaceae	*Sagittaria*	*Typha*	*Utricularia*	Triporate Pollen	Tricolporate Pollen	Tricolpate Pollen	Trilete Spores	Monolete Spores	Osmunda regalis	Monolete Spores Like	TOTAL	Unknown	Crumpled	sample dry weight (g)
0-1 cm	3	0	0	87	0	0	0	1	1	0	2	0	0	2	15	0	0	206	0	9	0.52
1-2cm	0	0	0	25	0	0	0	0	0	0	1	0	0	1	6	0	65	117	0	0	0.05
2-3 cm	0	0	0	15	0	1	0	0	0	1	0	0	0	3	0	0	64	117.5	3	0	0.4
3-4cm	0	0	0	17	0	0	0	0	0	0	1	0	1	2	10	3	25	120.5	0	0	0.42
4-5cm	0	0	1	9	0	1	0	0	0	0	0	0	0	2	10	8	22	109.5	0	0	0.56
5-6cm	3	1	0	15	0	3	0	2	3	5	4	0	1	2	21	4	0	211.5	1	5	0.58
6-7cm	0	0	0	25	0	0	0	0	3	5	6	0	1	1	19	12	7	202.5	0	1	0.54
7-8cm	0	0	0	25	0	0	1	1	2	0	2	0	0	1	20	13	1	177.5	0	1	0.42
8-9cm	0	0	0	19	0	1	2	3	3	2	4	0	1	1	14	14	2	227.5	0	2	0.46
9-10cm	0	0	0	24	0	0	0	1	1	0	2	1	0	4	14	17	0	190	1	1	0.45
10-11cm	0	3	0	28	0	1	1	11	0	3	3	0	1	0	16	10	0	217.5	0	6	0.62
11-12cm	0	1	0	17	0	0	1	1	0	0	0	0	0	0	18	12	1	134.5	0	1	0.53
12-13 cm	0	1	0	33	0	0	1	0	0	1	0	0	0	0	11	2	1	118	0	2	0.55
13-14cm	0	2	0	27	0	1	0	0	0	1	0	0	0	1	13	5	0	117.5	0	1	0.51
14-15cm	0	0		26	0	0	1	0	2	0	0	0	0	1	12	1	0	103.5	1	0	0.45
15-16cm	0	1	0	20	0	1	1	2	0	0	0	0	0	0	9	0	0	106	0	3	0.51
16-17cm	0	0	0	28	0	0	0	0	0	0	0	0	0	2	11	3	0	99.5	0	2	0.39
17-18cm	0	1	0	28	0	0	0	4	0	1	0	0	0	0	14	2	0	106	0	2	0.39
18-19cm	0	0	0	34	0	0	1	3	0	2	0	0	0	1	11	0	0	123	0	2	0.54
19-20cm	0	0		26	0	0	0	0	0	0	0	1	0	0	8	1	0	106	0	0	0.54
20-22cm	0	0	0	22	0	0	1	1	0	0	0	0	0	1	5	0	0	89.5	0	0	0.51
24-26cm	1	0	0	23	1	1	0	2	0	0	0	0	1	0	18	0	0	146.5	0	0	0.58
30+32cm	0	0	0	9	0	0	1	2	0	0	0	0	0	1	4	0	0	108.5	0	0	0.66
34-36cm	0	0	0	18	0	1	0	2	0	0	0	0	0	1	9	0	0	139	0	0	0.59
40-42cm	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5	0	0	102.5	0	0	0.72
44-46cm	0	0	0	16	0	0	0	1	0	0	2	0	0	0	5	0	0	111.5	0	0	0.64

Appendix O. Pollen assemblage data for 00-8-10-14.