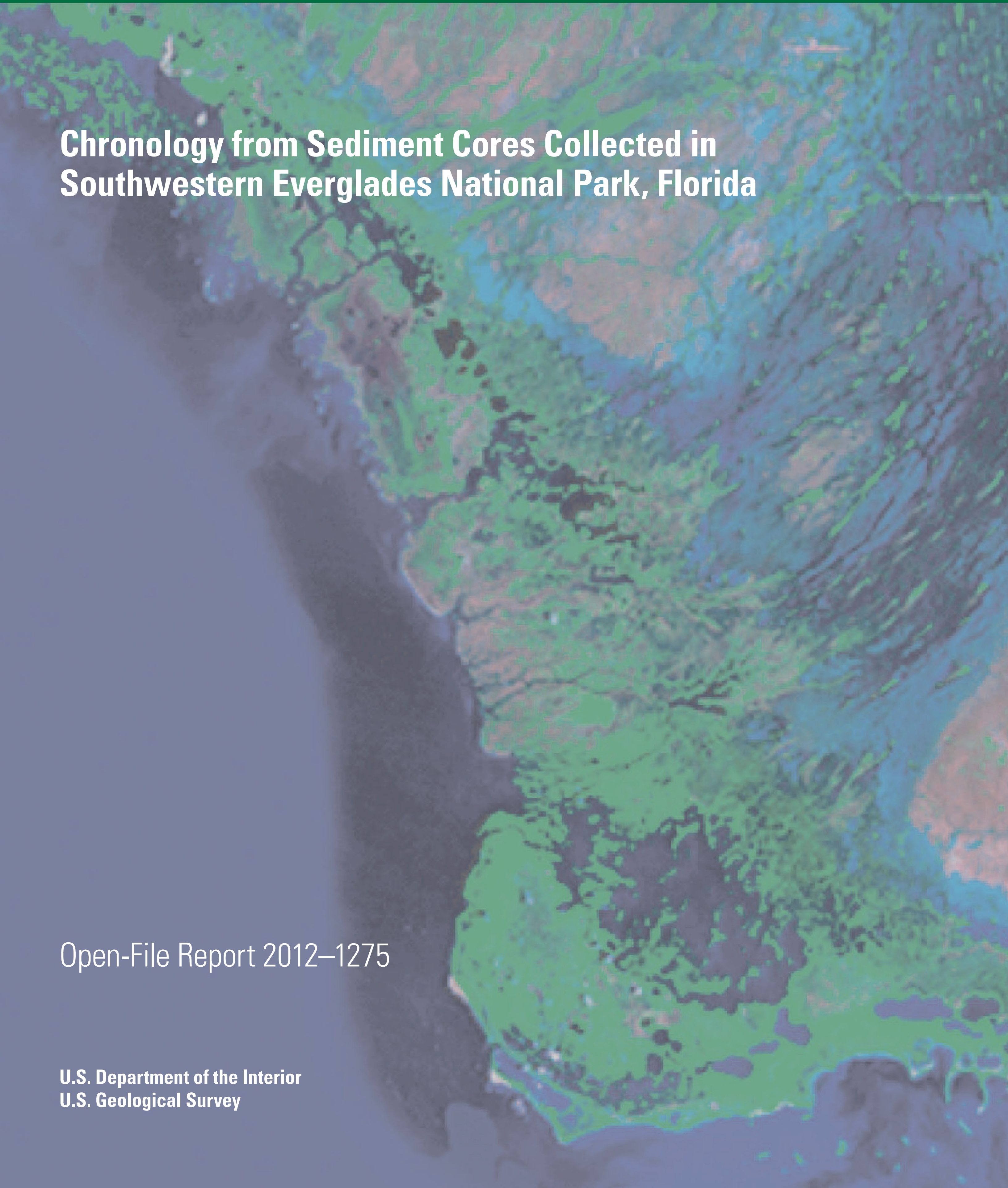

Chronology from Sediment Cores Collected in Southwestern Everglades National Park, Florida

Open-File Report 2012–1275

U.S. Department of the Interior
U.S. Geological Survey

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Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)

SI to Inch/Pound

Multiply	By	To obtain
	Length	
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)

Chronology from Sediment Cores Collected in Southwestern Everglades National Park, Florida

By C.E. Bernhardt, G.L. Wingard, D.A. Willard, M.E. Marot, B. Landacre, and C.W. Holmes

Abstract

Age model data are presented for 10 cores from the southwestern coastal mangrove zone of Everglades National Park, Florida, collected in Common Era (CE) 2004 and 2005 and used for paleoecological analysis. Carbon-14 (^{14}C), lead-210 (^{210}Pb), cesium-137 (^{137}Cs), radium-226 (^{226}Ra), and pollen biostratigraphic information is included, and age models were generated for 6 of the 10 cores. Age reversals and sediment disturbance prevented construction of age models on the remaining four cores. Four cores present a continuous record of the last 50 to 100 years, making them useful for analyzing the impacts caused by changes in water management in south Florida. These cores are Harney River 2A and Harney River 1A, Shark River 2A, and Roberts River.

Introduction

Accurate age models from sediment cores are necessary for determining the timing of changes in sedimentation rates and proxy assemblages, as well as correlating these changes to known anthropogenic land-use practices and regional and global climate change. This report focuses on age models for 10 cores collected along riverbanks and in bays of the southwest coastal area of Everglades National Park, Florida (fig. 1; table 1).

Understanding the timing of changes in proxy assemblages (such as mollusks, pollen, and ostracodes) in critical environments within the Everglades aids in the interpretation of key factors forcing environmental change, be it land use or climate. This information is important for management decisions dealing with the restoration of the natural hydrology of the Everglades as mandated by the Comprehensive Everglades Restoration Plan (CERP) (U.S. Army Corps of Engineers, 1999).

Acknowledgments

We thank the staff of Everglades National Park for their cooperation in this study; the work described here was conducted under National Park Service Study #EVER–00141. This project was funded by the U.S. Geological Survey (USGS) Greater Everglades Priority Ecosystems Science (GEPES) effort under the coordination of G. Ronnie Best.

A number of people assisted in the collection and processing of the cores. We especially thank James B. Murray, Rob Stamm, Thomas Sheehan, Carlos Budet, and Ruth Ortiz (USGS). Reviews by Thomas Cronin and Miriam Jones (USGS) improved the manuscript. Bethany Stackhouse (USGS) assisted in the final preparation of this report.

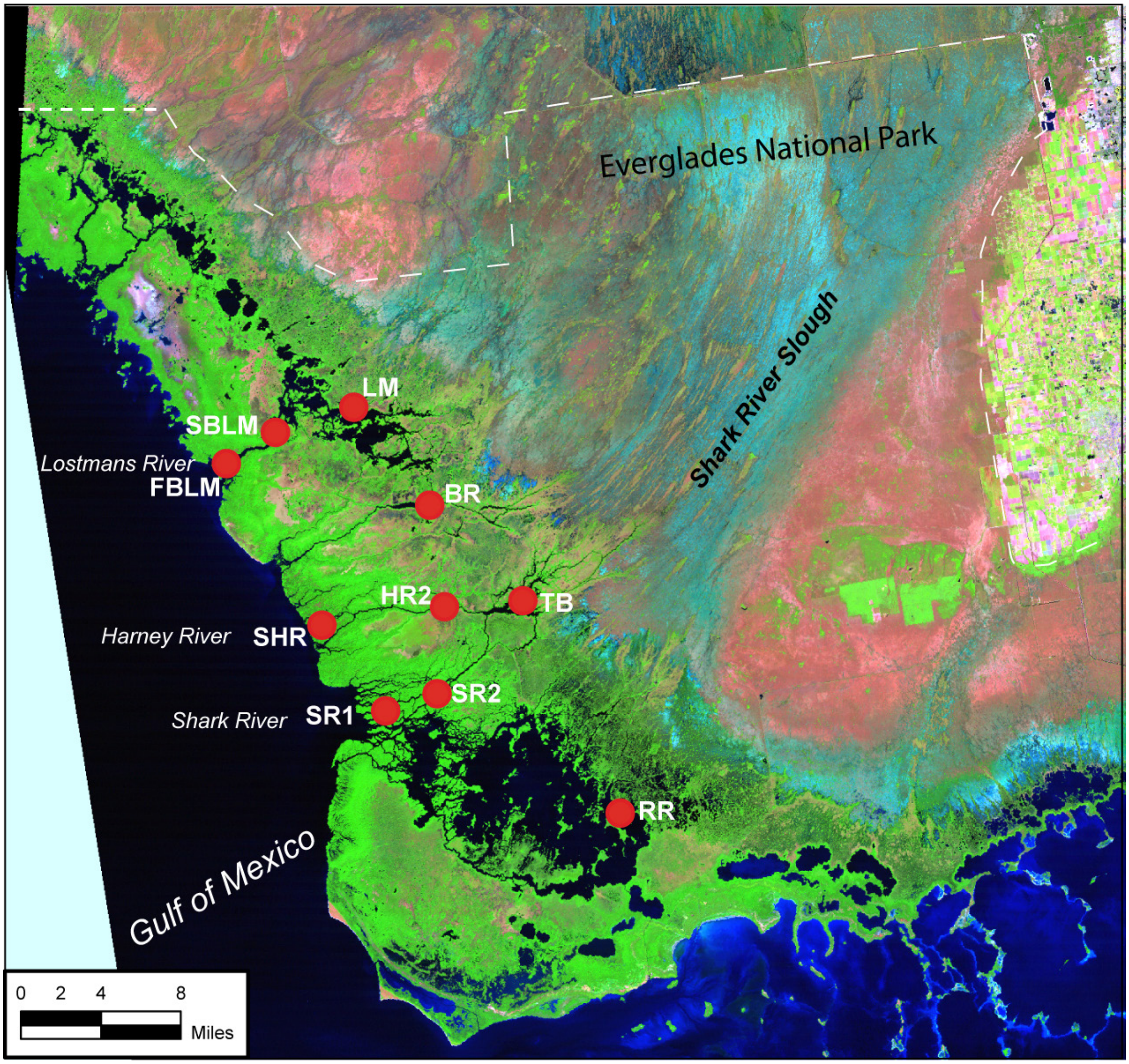

Figure 1. Core location map. The satellite image of the southwest part of the Florida Everglades displays the general location of cores (red circles) discussed in this report. From north to south, and east to west along transects: LM = Big Lostmans Bay (GLW504–LMA); SBLM = Second Bay Lostmans River (GLW705–SBLM2A); FBLM = First Bay Lostmans River (GLW705–FBLM1A); BR = Broad River Bay (GLW504–BRA); TB = Tarpon Bay (GLW504–TBA); HR2 = Harney River 2A (GLW705–HR2A); SHR = Harney River 1A (GLW705–SHR1A); SR2 = Shark River 2A (GLW705-SR2A); SR1 = Shark River 1A (GLW705–SR1A); RR = Roberts River (GLW504–RRA). See table 1 for information on cores.

Table 1. Core information and analyses conducted.

[Cores listed in order by river system, from north to south, and from east to west (downriver) along the transects. (See figure 1 for location.) Abbreviation: cm, centimeters]

Map Symbol (fig. 1)	Core ID	Core name	Latitude	Longitude	Core length in barrel (cm)	Analyses conducted ^{210}Pb*		Pollen**		^{14}C*** (number of samples)	Other analyses	Use for paleoecologic analyses
LM	GLW504–LMA	Big Lostmans Bay	25 34.02	81 05.86	61.5					2		Potentially for older portion of record
SBLM	GLW705–SBLM2A	Second Bay Lostmans River	25 33.877	81 09.171	114	√				3	Cs	Yes, for older portion of record
FBLM	GLW705–FBLM1A	First Bay Lostmans River	25 32.819	81 12.362	119	√				4	Ra	No
BR	GLW504–BRA	Broad River Bay	25 30.14	81 02.31	129					4		No
TB	GLW504–TBA (–TBB)	Tarpon Bay	25 25.23	80 59.95	108	√	(B)	√	(B)	6		Yes, for older portion of record
HR2	GLW705–HR2A	Harney River 2A	25 25.411	81 03.802	106	√		√		3	Cs	Yes, for last 50 years
SHR	GLW705–SHR1A	Harney River 1A (South Harney, near mouth)	25 24.580	81 08.491	170	√		√		4	Cs	Yes, for last 50 years
SR2	GLW705–SR2A	Shark River 2A (channels)	25 22.649	81 03.849	145	√		√		5	Cs	Yes, whole core
SR1	GLW705–SR1A	Shark River 1A (near mouth)	25 22.462	81 06.588	115	√		√		6	Cs	No
RR	GLW504–RRA (–RRB)	Roberts River (near mouth)	25 16.21	80 55.69	98.5	√	(B)	√	(B)	2		Yes, for 20th century portion

*Lead-210 data are in appendix A. Figure 2 illustrates total ^{210}Pb activity. (B) indicates data from a B core. All other analyses from A cores.

**Pollen biostratigraphic plots are shown in appendix B. (B) indicates data from a B core. All other analyses from A cores.

***Carbon-14 data are shown in Table 2.

Methods

Twenty piston cores were collected from ten sites in Everglades National Park on May 4 and 5, 2004 and July 12–14, 2006 (table 1; fig. 1). Duplicate cores, A and B, were taken side by side at each site (10–20 centimeters (cm) apart for most cores, ~1 meter (m) apart for GLW705–SBLMA & B). X-radiographs of the A cores were made, and the upper 10 to 20 cm of each A core were cut into 1-cm segments for analyses; for sections below 10 to 20 cm core depth the samples were cut into 2-cm segments. The subset A cores were set aside for faunal analyses (ostracodes, foraminifera and mollusks) and where possible for pollen, lead-210 (^{210}Pb), and sediment and shell geochemistry. Because several cores collected in 2004 were used completely for mollusk and gastropod analysis, in some cases the B cores were utilized for pollen, ^{210}Pb, and sediment geochemistry. Portions of the subset B cores will be archived for any additional analyses that may be necessary. Complete core descriptions can be found in Wingard and others (2005, 2006).

Chronology of the cores was developed using carbon-14 (^{14}C), ^{210}Pb, and pollen biostratigraphy (see table 1 for list of analyses conducted on each core) as described below. In addition, for some cores radium-226 (^{226}Ra) or cesium-137 (^{137}Cs) were analyzed by gamma spectroscopy (Robbins and Edgington, 1975).

^{210}Pb Analyses

Lead-210 radiometric dating is used to calculate sediment accumulation rates for the last 100 years of deposition. The accumulation rates were calculated by applying the constant initial concentration [CIC] model to the excess ^{210}Pb activity (Appleby and Oldfield, 1992). Lead-210 data can be found in appendix A, and total ^{210}Pb activity is shown in figure 2.

^{137}Cs Analyses

Cesium-137 is an anthropogenically produced radioisotope that was introduced into the atmosphere as a result of nuclear weapons testing. Cesium-137 is removed from the atmosphere by wet and dry precipitation. It is particle reactive and readily attaches to particulate matters whereby it is incorporated into to the sediment record. Based on atmospheric fallout, the first occurrence of ^{137}Cs in the sediment record is in the early CE 1950s, with a significant peak occurring at CE 1963–64.

Pollen Biostratigraphic Analyses

In this report, the first occurrence of pollen of *Casuarina equisetifolia,* an exotic species introduced to south Florida about CE 1900 (Langeland, 1990), is used to confirm ^{210}Pb and age model results. Pollen of *C. equisetifolia* first occurs in south Florida sediments at CE 1910±15 years and is common only in sediments deposited after CE 1940 (Wingard and others, 2003). Increases of woody and shrubby pollen, for example *Morella*, in south Florida can generally be attributed to the drier conditions approximately 400 years ago (Willard and others, 2006) and can be used to cross-check age model results. Pollen diagrams with biostratigraphic data are in appendix B.

^{14}C Analyses

Radiocarbon dates (^{14}C) were obtained on wood, plant fragments, peat, and shells by Beta Analytic, Miami, Fla. Shells were used only in a few circumstances and are noted on the age models below. See Wingard and others (2007, p. 16, 38–39) for a discussion of the problems associated with using shells for ^{14}C in south Florida. Dates in table 2 are presented as calibrated years before present (CE 1950) (cal. yr. BP). Plants that were respiring carbon after the start of thermonuclear bomb testing (CE 1950) will have an excess of ^{14}C. As a result, these samples cannot be assigned an age and are labeled as “pMC” or postmodern carbon. These samples are not reported as calibrated ages (table 2).

Age Models

Age models were constructed using the computer program Clam (methodology described in Blaauw, 2010) and available ^{14}C, ^{210}Pb, ^{137}Cs, ^{226}Ra, and pollen biostratigraphic information. Radiocarbon dates were calibrated using the Intcal09 calibration curve (appendix C). Age models are based on linear interpolation between dates. Age models were not run on cores that had many age reversals (for example when an older date is above a younger date with limited overall dates collected, and on cores where the radiocarbon dates are nearly identical regardless of depth).

Table 2. Results of radiocarbon (^{14}C) analyses on core samples.

[Analyses conducted by Beta Analytical, Miami, Fla. Abbreviations: cm, centimeters; yr. BP, years before present (CE 1950); pMC, postmodern carbon]

Core	Depth in cm	Beta Analytical sample ID	Material dated	Measured radiocarbon (yr. BP)	+/-	Conventional radiocarbon (yr. BP)	+/-	$^{13}C/^{12}C$ ratio
GLW504–LMA	20–22	206418	peat	1230	40	1230	40	-25.3
GLW504–LMA	46–48	206419	peat	2430	40	2420	40	-25.8
GLW705–SBLM2A	28–30	286361	wood	1220	40	1170	40	-28
GLW705–SBLM2A	76–78	286362	wood	2370	40	2320	40	-28.3
GLW705–SBLM2A	108–110	286363	wood	3890	40	3880	40	-25.4
GLW705–FBLM1A	34–36	286364	wood	170	40	150	40	-26
GLW705–FBLM1A	52–54	286364	wood	120	40	60	40	-28.6
GLW705–FBLM1A	82–84	286364	wood	120	40	90	40	-27
GLW705–FBLM1A	108–110	286364	wood	320	40	310	40	-25.4
GLW504–BRA	24–26	206415	wood	220	40	180	40	-27.7
GLW504–BRA	50–52	206416	wood	2240	40	2210	40	-27.1
GLW504–BRA	68–70	206417	wood	112.5 +/- 0.4 pMC	na	112.8 +/- 0.4 pMC	na	-26.5
GLW504–BRA	110–112	206414	wood	70	40	60	40	-25.9
GLW504–TBA	12–14	206421	wood	290	40	260	40	-27
GLW504–TBA	26–28	232722	wood	640	40	590	40	-28.2
GLW504–TBA	34–36	232723	wood	1380	40	1310	40	-29.4
GLW504–TBA	42–44	206422	wood	1500	40	1450	40	-27.9
GLW504–TBA	50–52	206423	wood	1320	40	1260	40	-28.6
GLW504–TBA	80–82	232724	peat	3510	40	3500	40	-25.7
GLW705–HR2A	32–34	286354	wood	102.9 +/- 0.4 pMC	na	103.0 +/- 0.4 pMC	na	-25.9
GLW705–HR2A	48–50	286355	wood	270	40	220	40	-28.2
GLW705–HR2A	96–98	286356	wood	150	40	120	40	-26.9
GLW705–SHR1–A	34–36	286357	wood	310	40	280	40	-27.1
GLW705–SHR1–A	84–86	286358	wood	290	40	200	40	-30.2
GLW705–SHR1–A	120–122	286359	wood	270	40	220	40	-28.2
GLW705–SHR1–A	160–162	286360	wood	350	40	270	40	-29.8
GLW705–SR2A	15–16	232717	wood	170	40	150	40	-26.2
GLW705–SR2A	36–38	232718	shell	610	40	860	40	-9.7
GLW705–SR2A	66–68	232719	wood	700	40	680	40	-26.2
GLW705–SR2A	86–88	232720	wood	1230	40	1200	40	-27.1
GLW705–SR2A	102–104	232721	wood	3720	40	3730	40	-24.5
GLW705–SR1A	20–22	232711	shell	124.4 +/- 0.5pMC	na	120.3 +/-0.5pMC	na	-8.7
GLW705–SR1A	44–46	232712	shell	440	40	710	40	-8.5
GLW705–SR1A	44–46	232713	wood	210	40	180	40	-26.7
GLW705–SR1A	62–64	232714	shell	510	40	790	40	-8.2
GLW705–SR1A	100–102	232715	shell	530	40	810	40	-7.9
GLW705–SR1A	100–102	232716	wood	170	40	150	40	-26.5
GLW504–RRA	56–58	286353	wood	3010	40	3020	40	-24.5
GLW504–RRA	82–84	206420	plant material	1970	40	1950	40	-26

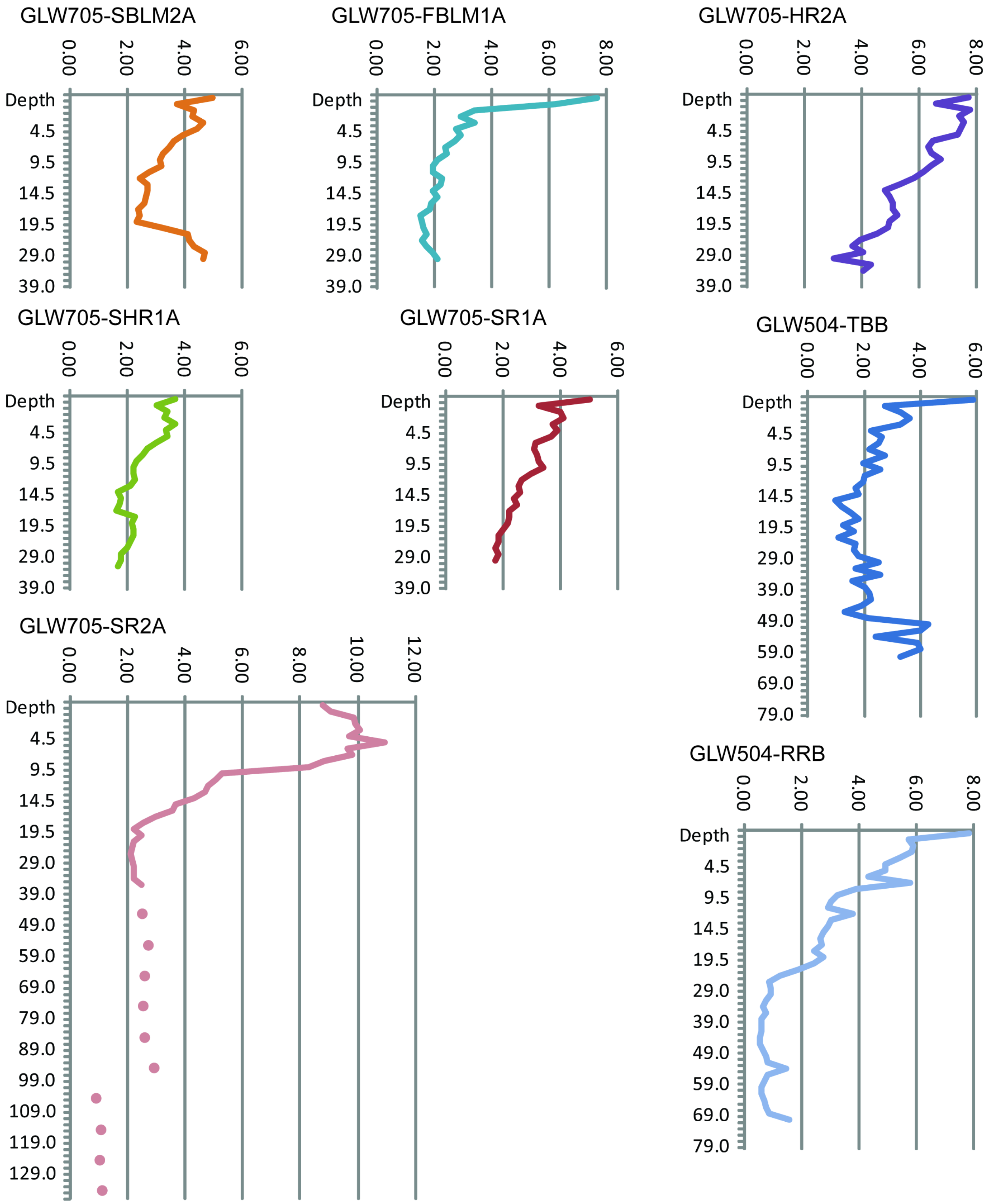

Figure 2. Total ^{210}Pb activity in decays per minute per gram (dpm/g) on the x-axis. Depth in the core in centimeters on the y-axis. See appendix A for data. Note: For GLW705-SR2A below 39 cm, samples were analyzed every 10 cm.

Age Model Results and Discussion

Big Lostmans Bay (GLW504–LMA)

The chronology for this core is based on two ^{14}C dates and assignment of the top sample to CE 2004 (year the core was collected) (fig. 3, table 2). No pollen or ^{210}Pb analyses were conducted on this core; therefore we cannot accurately constrain the 20th century. The age model for this core indicates it would be adequate for studies focused on the late Holocene at centennial scale resolution; however, additional analyses would be useful.

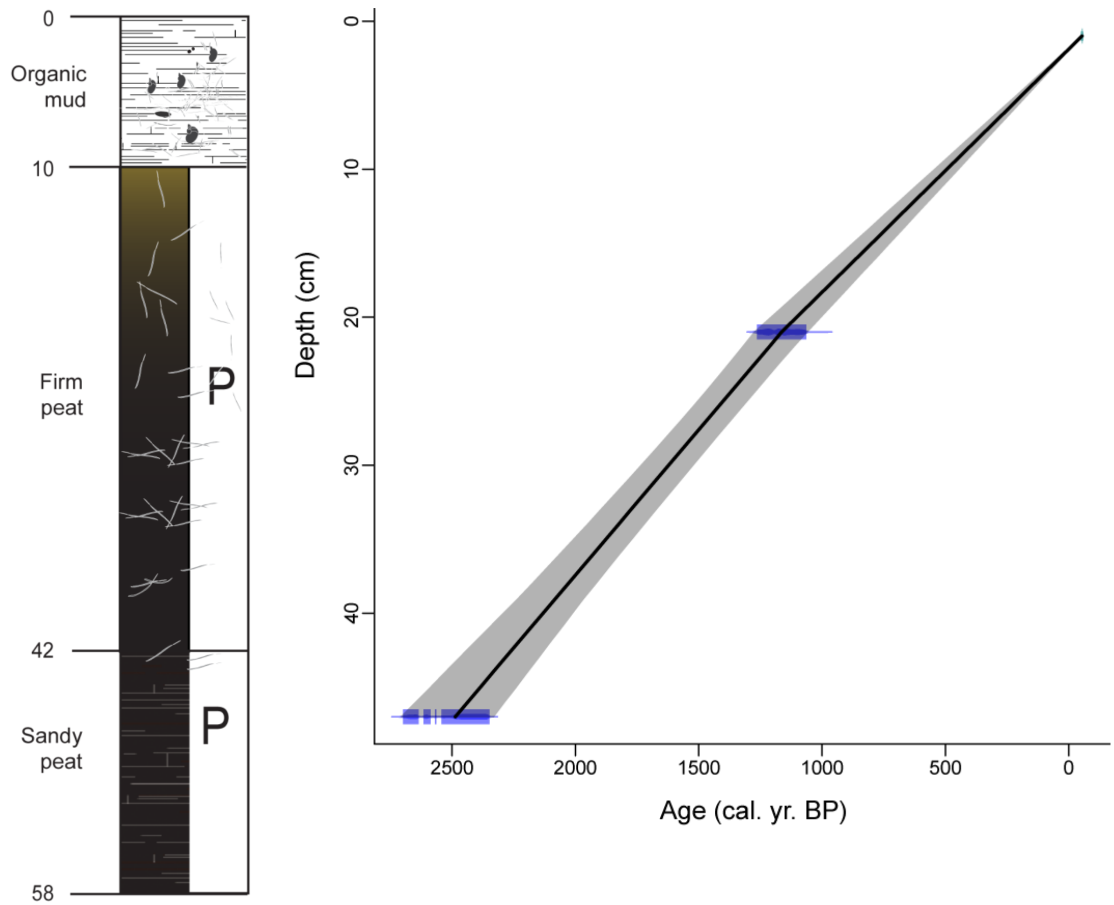

Figure 3. Age model for Big Lostmans Bay core (GLW504–LMA). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2). Age-depth values are listed in appendix D. In lithologic column, P represents peat. Cal. yr. BP., calibrated years before present (CE 2004).

Second Bay Lostmans River (GLW705–SBLM2A)

The chronology for this core is based on three ^{14}C dates and ^{210}Pb (fig. 4, table 2). Lead-210 is at background levels at 12 cm (fig. 2) and the calculated sedimentation rate places CE 1950 at approximately 9 cm. Cesium-137 was detectable in one sample at 6–7 cm, but could indicate a high flow event rather than the CE 1964 peak. The age model suggests that there are several changes in sedimentation rates, including one at approximately 1,000 cal. yr. BP. Due to the compressed and partly disturbed post-CE 1900 upper section, this core cannot be used for 20th century reconstructions. The consistent age model for the lower portion of the core indicates this could be used for mid- to late Holocene centennial scale analyses.

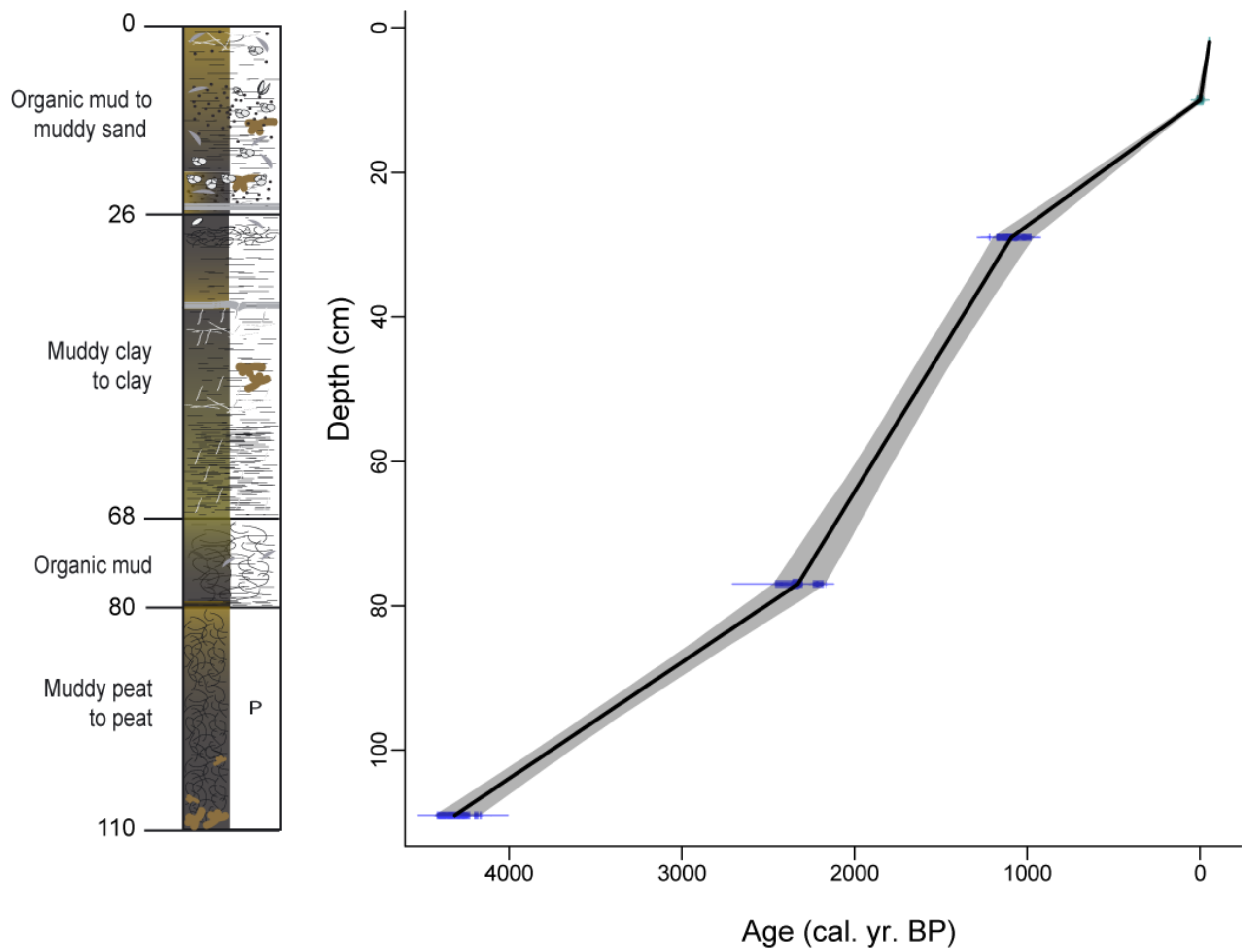

Figure 4. Age model for Second Bay Lostmans River core (GLW705–SBLM2A). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2), and green are ^{210}Pb control points. Age-depth values are listed in appendix D. In lithologic column, P represents peat. Cal. yr. BP., calibrated years before present (CE 2004).

First Bay Lostmans River (GLW705–FBLM1A)

The age model for this core is based on four ^{14}C dates and ^{210}Pb (fig. 5, table 2). Lead-210 is at background at 2 cm (fig. 2), confirmed by ^{226}Ra. Therefore, the 20th century is not represented in the core sediments. There are large errors in the model primarily due to the amount of variability in this part (around CE 1700) of the radiocarbon calibration curve (see range of possible ages in figure 5). With the lack of sediment detailing the 20th century and the large ^{14}C errors, this core is not useful for paleoenvironmental analysis.

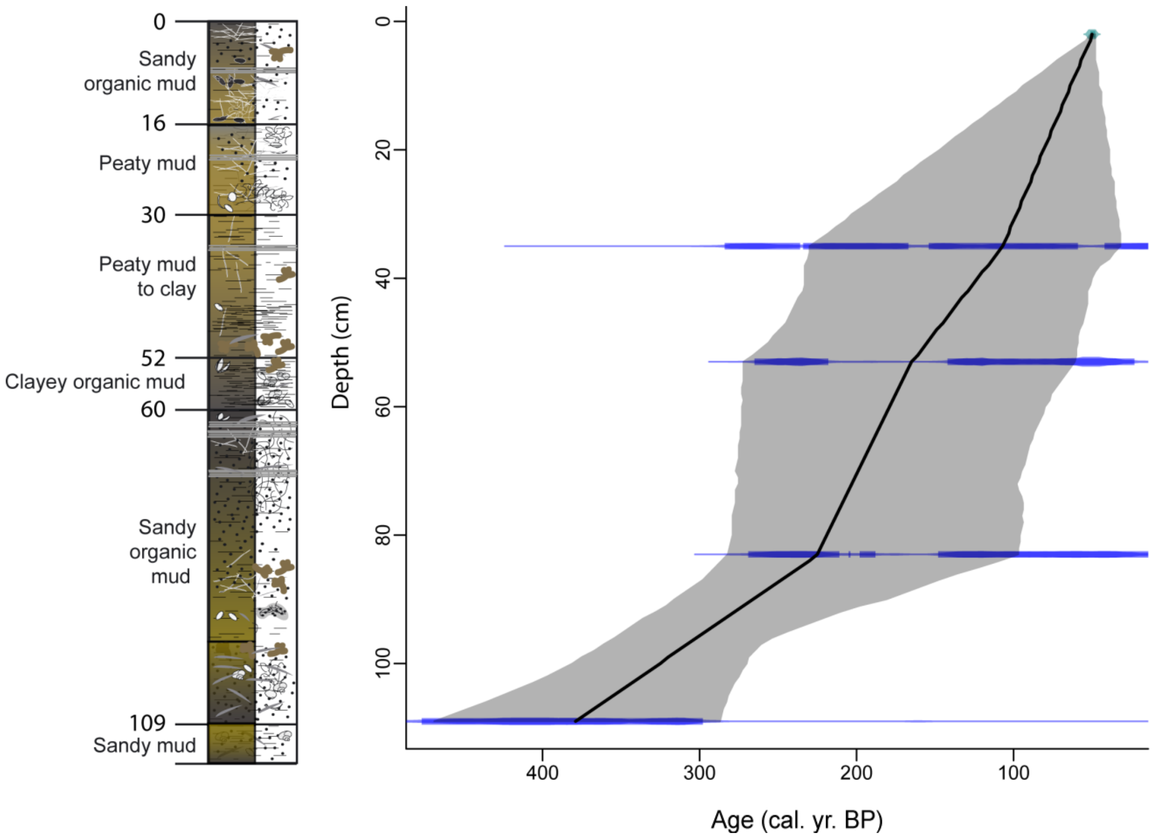

Figure 5. Age model for First Bay Lostmans River core (GLW705–FBLM1A). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2), and green are ^{210}Pb control points. Age-depth values are listed in appendix D. Cal. yr. BP., calibrated years before present (CE 2004).

Broad River Bay (GLW504–BRA)

Radiocarbon samples from this core all date to near modern (fig. 6, table 2). Only one date at 51 cm is older (~2,000 cal. yr. BP); this sample lies just below the unconformity between the unconsolidated sediment and the peat. There is no ^{210}Pb or pollen to constrain the last century, and therefore no reliable age model could be constructed.

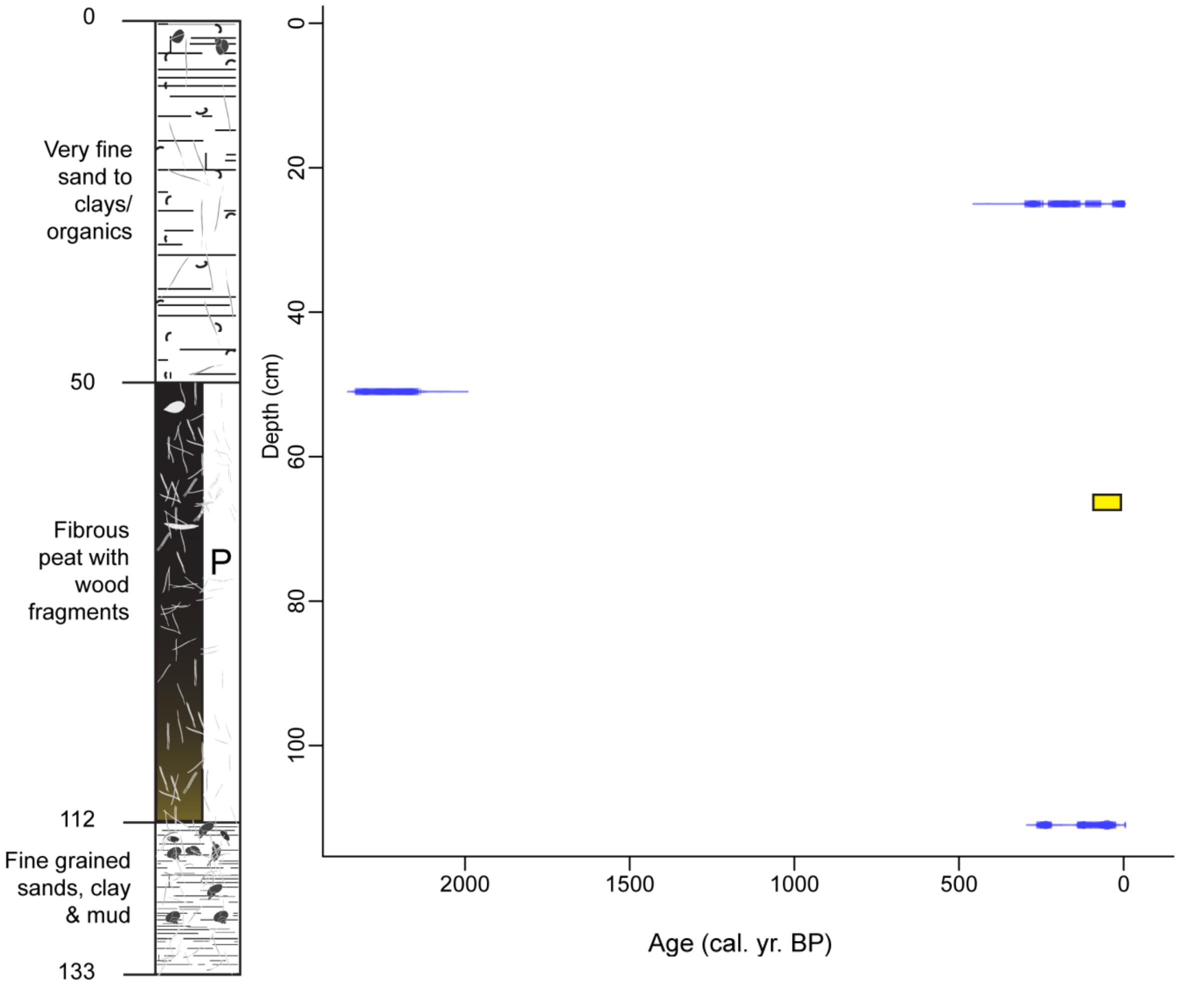

Figure 6. Age information for Broad River Bay core (GLW504–BRA). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages, and the yellow rectangle is a postmodern carbon sample (table 2). In lithologic column, P represents peat. Cal. yr. BP., calibrated years before present (CE 2004).

Tarpon Bay (GLW504–TBA)

The Tarpon Bay core chronology is based on six ^{14}C dates and ^{210}Pb (fig. 7, table 2). The ^{210}Pb age model indicates that CE 1950 is between 11 and 13 cm; however, ^{210}Pb does not follow a typical decay profile in this core. It fluctuates a great deal and does not reach background levels. The first occurrence of *Casuarina* in the replicate core from this site (GLW504–TBB) is at 20–22 cm. The presence of pollen from the Brazilian Pepper (*Schinus*), which was introduced during the 20th century, in the upper 15 cm also indicates that these sediments were deposited during the 20th century. There are two noticeable changes in sedimentation rate before and at 1,000 cal. yr. BP. The pollen profiles from the replicate core (appendix B) show clear patterns that most likely record local changes in sea level (Willard and Bernhardt, 2011). Overall, this core is reliable for paleoenvironmental analysis of the mid- to late Holocene at a centennial scale.

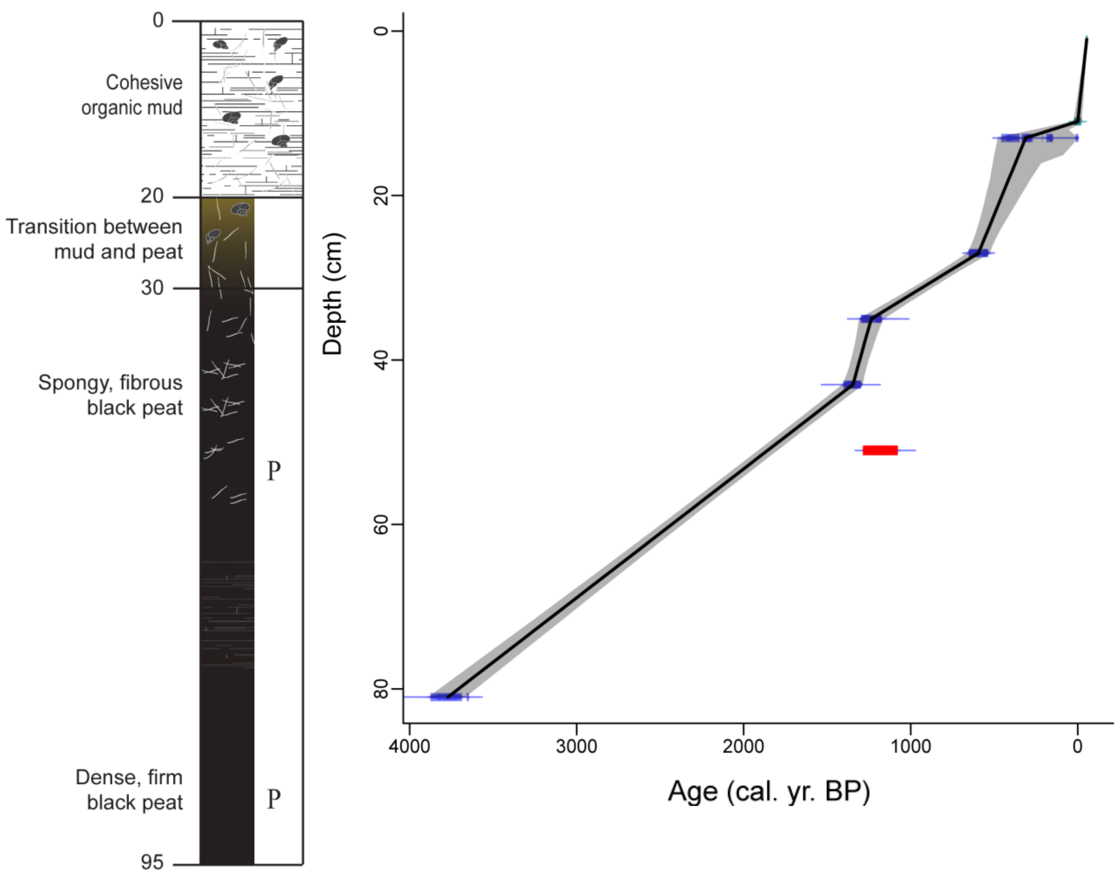

Figure 7. Age model for Tarpon Bay core (GLW504–TBA). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2), green are ^{210}Pb and biostratigraphic control points, and red are points removed from the age model. Age-depth values are listed in appendix D. In lithologic column, P represents peat. Cal. yr. BP., calibrated years before present (CE 2004).

Harney River 2A (GLW705–HR2A)

Radiocarbon dates from the Harney River 2A core have age ranges including modern ages at all depths (fig. 8, table 2); therefore, no age model was run. Excess ^{210}Pb is present in the upper 38 cm of the core (fig. 2). Although ^{210}Pb measurements did not reach background levels, a sedimentation rate of 1cm/yr was calculated for this upper portion of the core. ^{137}Cs levels drop between 40 and 50 cm, which suggests that sediment deposited at 40 cm is less than 50 years old. The first occurrence of *Casuarina* is at 45 cm. This core appears to provide the opportunity for high-resolution analysis of the last 50 years of deposition.

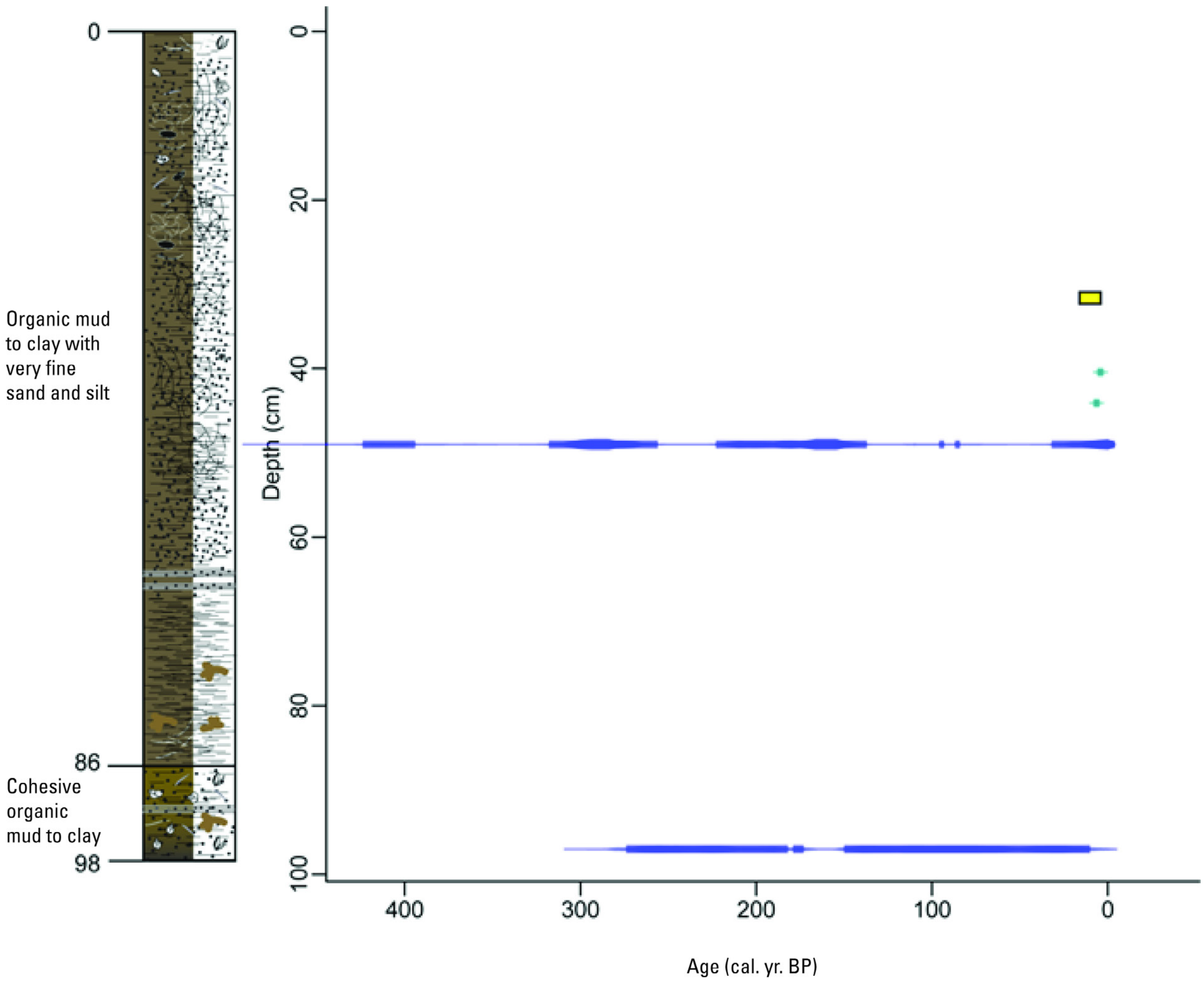

Figure 8. Age information for Harney River 2A core (GLW705–HR2A). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages, the yellow rectangle is a postmodern carbon sample (table 2), and green represents ^{210}Pb and biostratigraphic control points. Cal. yr. BP., calibrated years before present (CE 2004).

Harney River 1A (GLW705–SHR1A)

Four radiocarbon dates from the South Harney River Mouth core also have age ranges including modern time at all depths (fig. 9, table 2); therefore, no age model was run. Based on ^{210}Pb, the upper 5 cm appear slightly disturbed (fig. 2), so a calendar year was not calculated from the sedimentation rate because we do not know how much time is represented by the upper few centimeters. At 15 cm ^{210}Pb reaches background, but excess ^{210}Pb activity is again present between 20 and 30 cm. The core segment between 15 and 19 cm may have been deposited under different conditions. Cesium-137 was measured at 20 cm, indicating that the material above that depth was deposited within the last 50 years. The first occurrence of *Casuarina* further constrains the 20th century to the upper 25 cm of this core. Based on ^{210}Pb, ^{137}Cs and pollen, the upper 25 cm of this core is usable for paleoenvironmental analysis of the last 50 years of the 20th century.

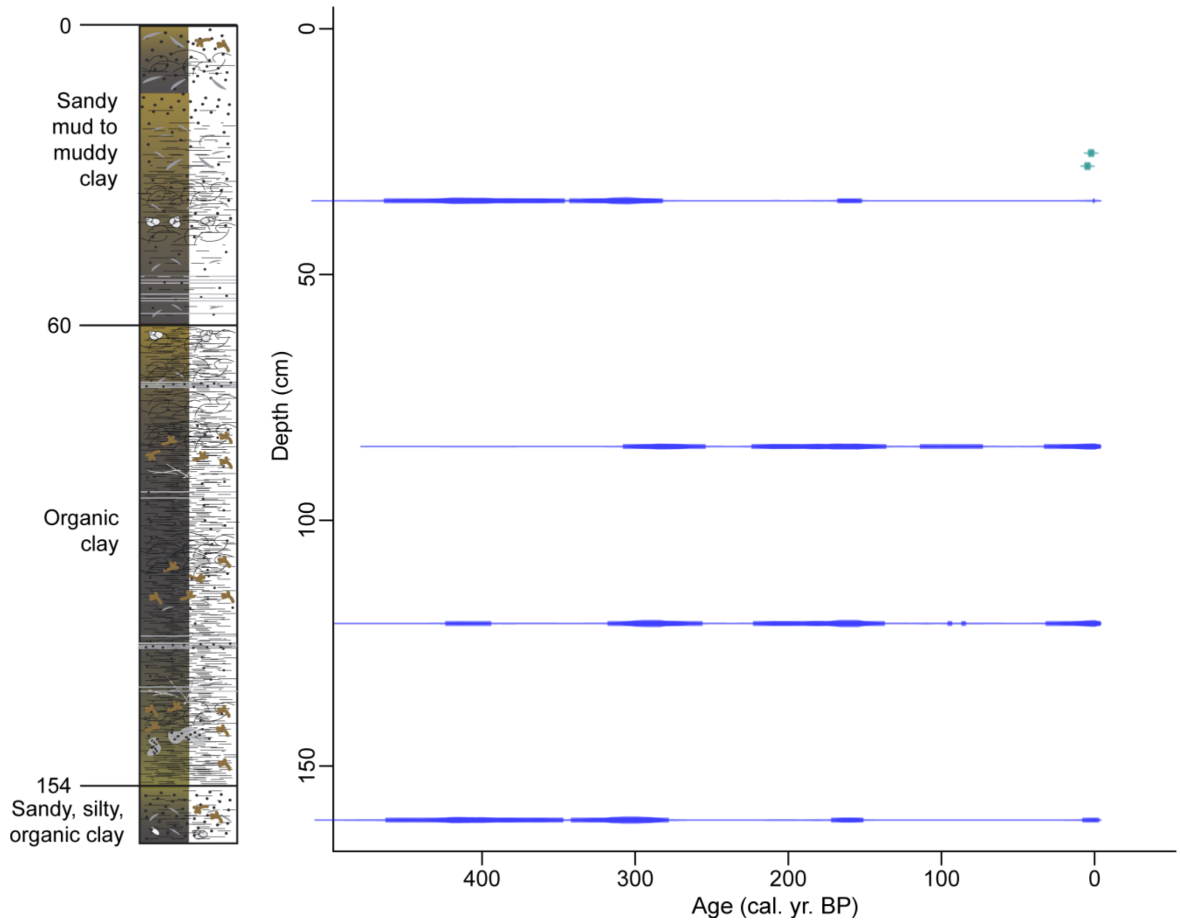

Figure 9. Age information for Harney River 1A core (GLW705–SHR1A). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2), and green represent ^{210}Pb and biostratigraphic control points. Cal. yr. BP., calibrated years before present (CE 2004).

Shark River 2A (GLW705–SR2A)

The chronology of this core is based on pollen biostratigraphy, ^{210}Pb and four ^{14}C dates (fig. 10, table 2); a radiocarbon sample from a shell at 37 cm was treated as an outlier and excluded from the model. According to the ^{210}Pb profile the upper 8 cm are disturbed (fig. 2), so calculation of a calendar year based on the sedimentation rate is not possible because the amount of time represented by the upper few centimeters is unknown. The first occurrence of ^{137}Cs is at 18–19 cm and constrains the sediment above to being deposited post-1954. Background ^{210}Pb is reached at 20 cm, which is generally consistent with the first occurrence of *Casuarina* at 21 cm depth. *Schinus* pollen in the upper 21 cm further confirms that this sediment is post-20th century in age. The timing of rise in *Morella* pollen, ~250 cal. yr. BP, appears consistent with general trends in the region (Willard and others, 2006). There is a change in sedimentation rate at approximately 1,000 cal. yr. BP, near a subtle shift in the sediment type at 96 cm from peaty to sandy organic mud. The entirety of this core, from 4,000 cal. yr. BP to modern, appears chronologically robust for paleoenvironmental analysis.

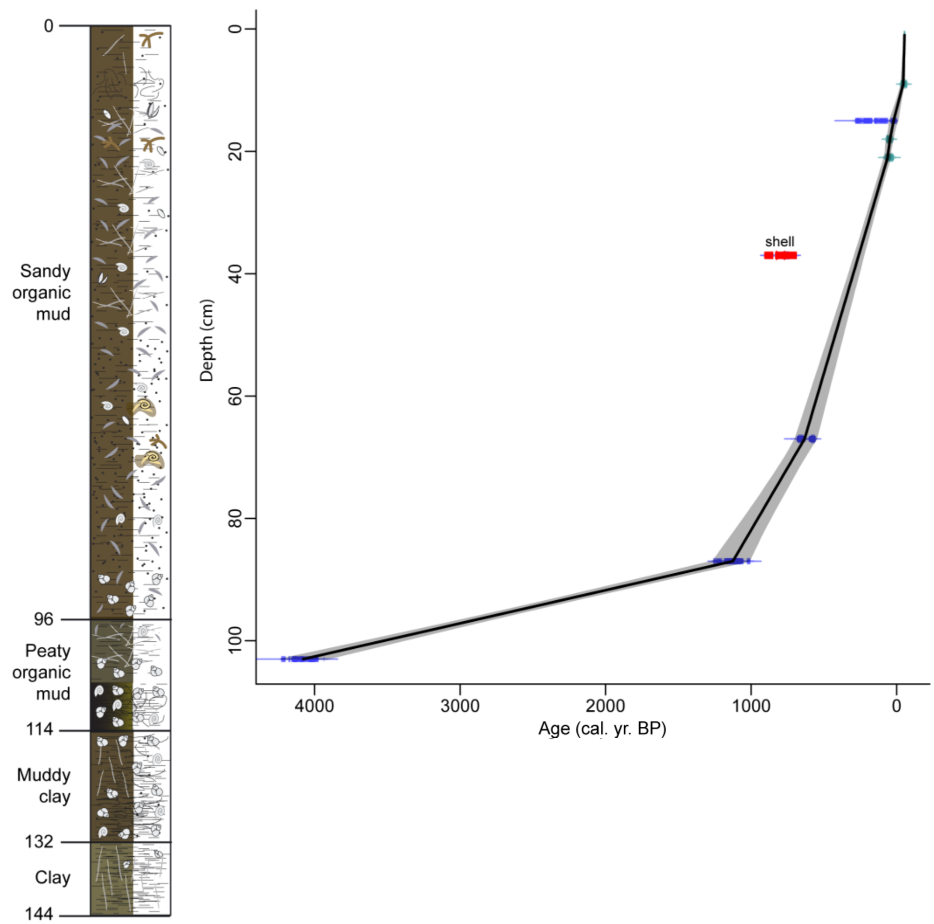

Figure 10. Age model for Shark River 2A core (GLW705–SR2A). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2), green are ^{210}Pb and biostratigraphic control points, and red are points removed from the age model. Age-depth values are listed in appendix D. Cal. yr. BP., calibrated years before present (CE 2004).

Shark River 1A (GLW705–SR1A)

We attempted to construct an age model based on pollen biostratigraphy, ^{210}Pb and six ^{14}C dates (fig. 11, table 2). Lead-210 dating places CE 1950 between 20 and 24 cm (fig. 2). Cesium-137 was measured in select depth intervals between 0 and 20 cm. Cesium-137 was still present at low activity levels at 20 cm, also suggesting that the upper portion of the core was deposited in the latter half of the 20th century. The first occurrence of *Casuarina* is at 61 cm depth. This biostratigraphic marker for the beginning of the 20th century is below a radiocarbon-dated shell that returned an age of 750 to 670 cal. yr. BP. The presence of *Schinus* pollen in the upper 60 cm further supports that this sediment is post-20th century in age. There are no other discernible patterns in the downcore pollen assemblages to constrain the age. The base of the core, 101 cm, was dated twice. One date is essentially modern while the second is 789 to 674 cal. yr. BP. This core is an example of the problem noted previously in south Florida that shells typically date older than wood (Wingard and others, 2007), and this discrepancy prevents us from developing a confident age model for this core.

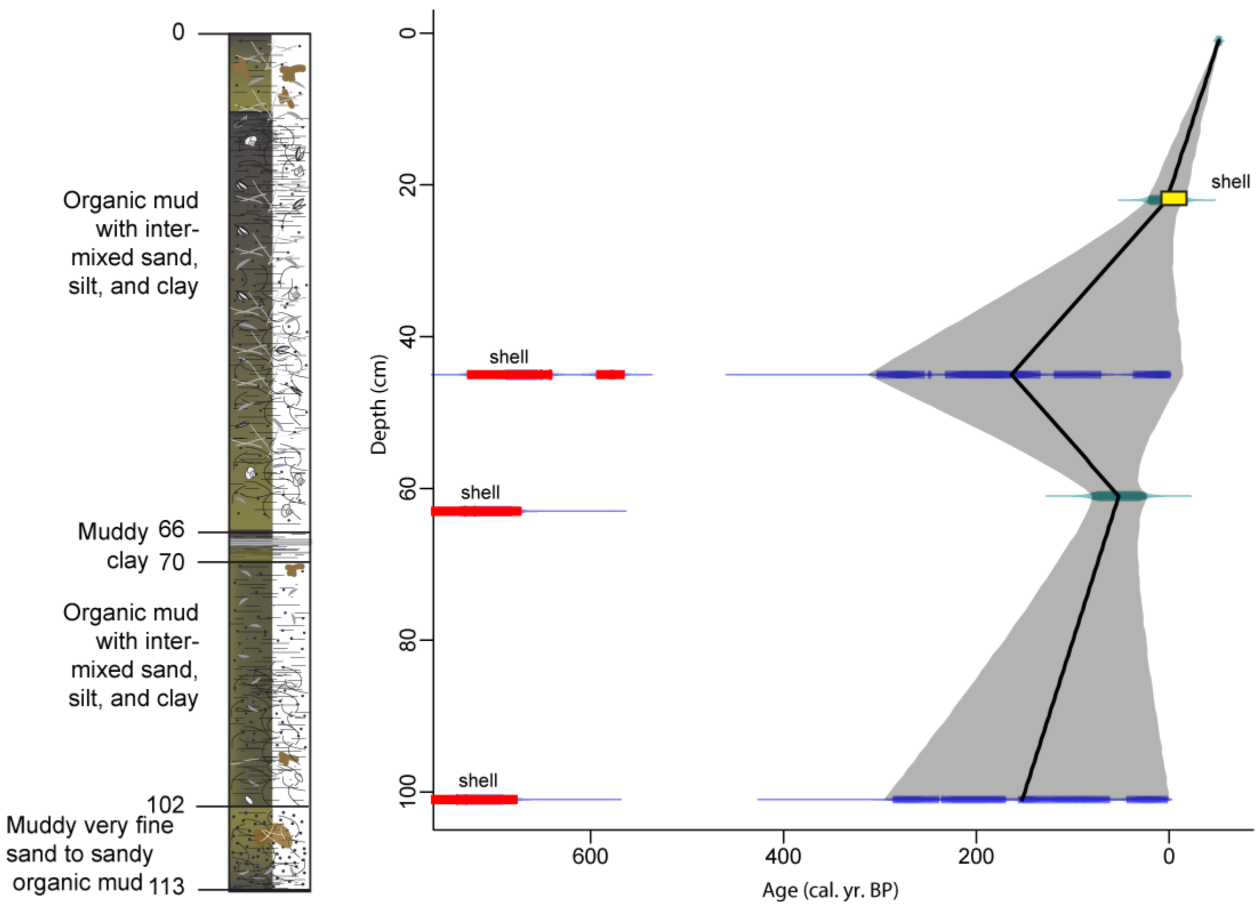

Figure 11. Age model for Shark River 1A core (GLW705–SR1A). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages, the yellow rectangle is a postmodern carbon sample (table 2), green are ^{210}Pb and biostratigraphic control points, and red are points removed from the age model. Age-depth values are listed in appendix D. Cal. yr. BP., calibrated years before present (CE 2004).

Roberts River (GLW504–RRA)

The two ^{14}C dates are reversed (fig. 12, table 2). However, the ^{210}Pb profile appears robust (fig. 2) and based on the sedimentation rate of 0.39 cm/yr, CE 1950 is at ~21 cm. The first occurrence of *Casuarina* is at 25 cm. The increase in *Quercus*, Amaranthaceae, and Asteraceae pollen and fern spores, with a decrease in *Nymphaea* pollen, indicates a change, perhaps drying, at this site during the 20th century. While more dating is needed to resolve the age reversals and construct an age model, this core has a reliable chronology for paleoenvironmental analysis documenting the last century.

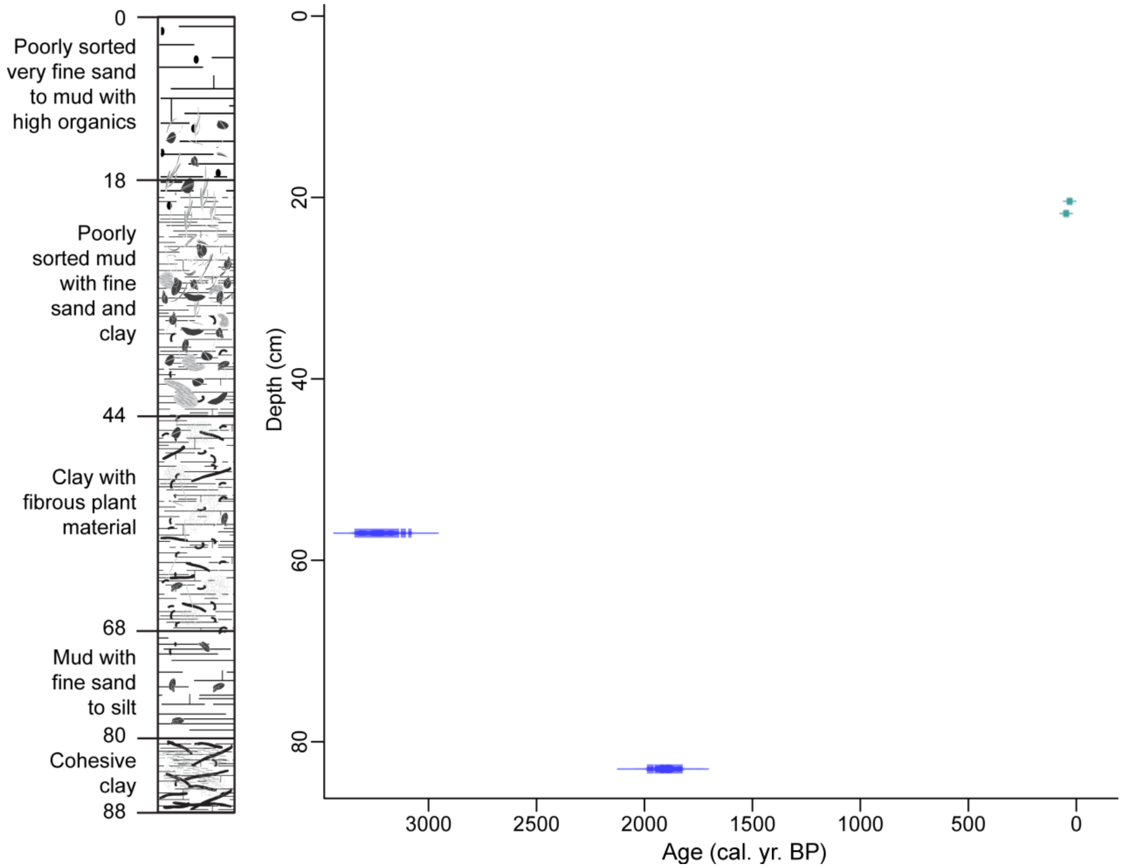

Figure 12. Age information for Roberts River core (GLW504–RRA). Blue control points on the age model diagram represent the measured range of possible radiocarbon ages (table 2); green represents ^{210}Pb and biostratigraphic control points. Cal. yr. BP., calibrated years before present (CE 2004).

Summary and Future Study

The current status and additional steps required to potentially refine the record of deposition in the southwestern coastal area of Everglades National Park are as follows:

Big Lostmans Bay. This core requires pollen biostratigraphic data and ^{210}Pb dating to constrain the last 100 years of deposition. The age model indicates the core could potentially be used for late Holocene studies, but would benefit from additional radiocarbon dates.

Second Bay Lostmans River. Although the 20th century portion of this core appears reliable, the compressed record makes it difficult to use for analyses of the flora and fauna. The older portion of the core can be used for paleoenvironmental analyses; however, additional radiocarbon dates would further refine the age model. Also, collection of a replicate core would be useful to confirm if the problems with dating the last 100 years of deposition are unique to this core or characteristic of this site.

First Bay Lostmans River. No portion of this core can be used for paleoenvironmental analyses. Collecting a replicate core could be useful to capture the last 100 years of deposition or characterization of the site. Also, collecting a core deeper than 100 cm and dating those deeper sediments would help refine late Holocene sedimentation history in this area.

Broad River Bay. Currently, no portion of this core is useful for paleoenvironmental analyses. Pollen biostratigraphy and ^{210}Pb dating should be done for this core to confirm if entirety of the core was deposited within the last 100 years (based on the radiocarbon dates).

Tarpon Bay. The lower portion of this core can be used for analyses of the mid- to late Holocene. The ^{210}Pb record could be refined by collecting a replicate core. Additional radiocarbon dates between 40 and 60 cm would further refine the age model.

Harney River 2A. Currently, the upper 45 cm can be used for analyses of the last 50 years. A replicate core could confirm if the ^{210}Pb and ^{137}Cs data are correct and also confirm if the sediment at this site is significantly disturbed, as the modern dates at depth indicate.

Harney River 1A. Currently, the upper 25 cm can be used for analyses of the last 50 years. Lead-210 dating from a replicate core could confirm if this core is useful for paleoenvironmental analysis of the 20th century.

Shark River 2A. Overall, the age model appears robust. Additional radiocarbon dates between 40 and 100 cm, using wood instead of shell for consistency, would help refine the age model.

Shark River 1A. Components of this age model seem consistent (^{210}Pb profile, postmodern carbon, ^{137}Cs); however, because the radiocarbon ages of the wood samples all date to near modern and the pollen biostratigraphic marker falls below a radiocarbon age of 750 to 670 cal. yr. BP, we cannot confidently use the core for paleoenvironmental analysis. This core provides an interesting contrast between shell and wood radiocarbon dates.

Roberts River. The 20th century ^{210}Pb profile appears robust and the upper portion of the core can be used for paleoenvironmental analysis of the 20th century. Additional radiocarbon dates are needed to clear up the age reversal in the lower portion of the core.

While returning to the same sites and obtaining replicate cores may help us answer specific questions about these ten cores, we should also pursue a strategy of locating additional core sites. Locating undisturbed sediment within the channels of the Shark River Slough and southwestern coastal area of Everglades National Park is proving to be more difficult than similar efforts in Florida Bay and Biscayne Bay. The directional flow dynamics of water in the region may be a factor, as well as the paucity of sub-aquatic vegetation to anchor the sediments. It is also likely that hurricanes or coastal storms in the locations closer to Florida Bay and the Gulf of Mexico constantly rework the sediments, which may cause age reversals (Kang and Trefy, 2003); and the upriver locations are more protected from the impacts of severe storms and the consequent reworking of sediments.

Additional investigations and regional comparisons may shed light on the sedimentary and paleoenvironmental history of the southwestern coastal area of Everglades National Park.

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Appendix A. Lead-210 (^{210}Pb) Data from Cores

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–SBLM2A

Core name: Second Bay Lostmans River

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
0–1	0.5	12.30	4.95	0.087	2.38	0.19	ND	--
1–2A	1.5	8.71	3.72	0.067	2.50	0.09	ND	--
1–2B	1.5	8.35	3.70	0.064	--	--	--	--
2–3	2.5	11.05	4.29	0.066	2.97	0.16	ND	--
3–4	3.5	10.50	4.26	0.065	2.67	0.18	ND	--
4–5	4.5	10.71	4.61	0.071	2.80	0.22	ND	--
5–6	5.5	11.49	4.45	0.069	2.67	0.15	ND	--
6–7	6.5	10.85	3.93	0.072	2.90	0.13	0.15	0.07
7–8	7.5	9.54	3.63	0.060	3.09	0.23	ND	--
8–9A	8.5	9.72	3.46	0.062	2.87	0.17	ND	--
8–9B	8.5	9.54	3.44	0.058	--	--	--	--
9–10	9.5	9.90	3.25	0.055	2.92	0.19	ND	--
10–11	10.5	9.74	3.14	0.050	2.75	0.15	ND	--
11–12	11.5	9.54	3.18	0.049	2.91	0.15	ND	--
12–13	12.5	10.74	2.73	0.041	2.76	0.18	ND	--
13–14	13.5	11.24	2.42	0.038	2.68	0.19	ND	--
14–15	14.5	11.73	2.69	0.041	2.68	0.14	ND	--
15–16	15.5	11.11	2.69	0.051	2.75	0.15	ND	--
16–17	16.5	10.93	2.62	0.042	2.66	0.16	ND	--
17–18	17.5	10.12	2.58	0.045	2.81	0.16	ND	--
18–19	18.5	9.34	2.39	0.036	2.84	0.13	ND	--
19–20	19.5	10.34	2.44	0.043	2.69	0.15	ND	--
20–22	21.0	10.28	2.33	0.038	--	--	--	--
22–24A	23.0	13.27	3.22	0.061	--	--	--	--
22–24B	23.0	13.52	3.18	0.059	--	--	--	--
24–26	25.0	13.44	4.11	0.068	--	--	--	--
26–28	27.0	11.68	4.13	0.063	3.36	0.16	ND	--
28–30	29.0	10.12	4.32	0.066	--	--	--	--
30–32	31.0	9.31	4.68	0.072	--	--	--	--
32–34	33.0	9.68	4.63	0.071	--	--	--	--
34–36	35.0	--	--	--	--	--	--	--
36–38	37.0	--	--	--	3.46	0.13	ND	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–SBLM2A

Core name: Second Bay Lostmans River

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
38–40	39.0	--	--	--	--	--	--	--
40–42	41.0	--	--	--	--	--	--	--
42–44	43.0	--	--	--	--	--	--	--
44–46	45.0	--	--	--	--	--	--	--
46–48	47.0	--	--	--	3.24	0.14	ND	--
48–50	49.0	--	--	--	--	--	--	--
50–52	51.0	--	--	--	--	--	--	--
52–54	53.0	--	--	--	--	--	--	--
54–56	55.0	--	--	--	--	--	--	--
56–58	57.0	--	--	--	3.27	0.16	ND	--
58–60	59.0	--	--	--	--	--	--	--
60–62	61.0	--	--	--	--	--	--	--
62–64	63.0	--	--	--	--	--	--	--
64–66	65.0	--	--	--	--	--	--	--
66–68	67.0	--	--	--	3.37	0.17	ND	--
68–70	69.0	--	--	--	--	--	--	--
70–72	71.0	--	--	--	--	--	--	--
72–74	73.0	--	--	--	--	--	--	--
74–76	75.0	--	--	--	--	--	--	--
76–78	77.0	--	--	--	3.38	0.15	ND	--
78–80	79.0	--	--	--	--	--	--	--
80–82	81.0	--	--	--	--	--	--	--
82–84	83.0	--	--	--	--	--	--	--
84–86	85.0	--	--	--	--	--	--	--
86–88	87.0	--	--	--	4.32	0.22	ND	--
88–90	89.0	--	--	--	--	--	--	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–FBLM1A

Core name: First Bay Lostmans River

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
0–1	0.5	30.48	7.64	0.139	1.75	0.16	0.17	0.09
1–2	1.5	21.67	6.19	0.117	2.12	0.15	ND	--
2–3	2.5	7.97	3.41	0.076	3.34	0.16	ND	--
3–4A	3.5	7.33	2.92	0.057	3.02	0.12	ND	--
3–4B	3.5	7.17	2.92	0.054	--	--	--	--
4–5	4.5	9.50	3.41	0.061	2.94	0.18	ND	--
5–6	5.5	7.94	2.76	0.052	3.17	0.15	ND	--
6–7	6.5	9.68	2.91	0.055	3.12	0.18	ND	--
7–8	7.5	8.12	2.71	0.062	3.65	0.18	ND	--
8–9	8.5	6.52	2.37	0.050	4.36	0.19	ND	--
9–10	9.5	7.44	2.42	0.050	2.71	0.12	ND	--
10–11	10.5	6.18	2.08	0.044	2.33	0.11	ND	--
11–12	11.5	6.55	1.92	0.042	2.17	0.14	ND	--
12–13	12.5	6.76	1.93	0.040	1.72	0.09	ND	--
13–14	13.5	8.57	2.27	0.045	1.55	0.08	ND	--
14–15A	14.5	8.32	2.23	0.041	1.61	0.07	ND	--
14–15B	14.5	8.30	2.24	0.043	--	--	--	--
15–16	15.5	10.45	1.93	0.039	2.04	0.11	ND	--
16–17	16.5	13.21	2.08	0.048	1.88	0.11	ND	--
17–18	17.5	15.37	1.90	0.041	2.09	0.16	ND	--
18–19	18.5	14.14	1.81	0.041	1.68	0.14	ND	--
19–20	19.5	6.53	1.49	0.030	1.74	0.10	ND	--
20–22	21.0	9.68	1.58	0.033	--	--	--	--
22–24A	23.0	13.29	1.63	0.035	--	--	--	--
22–24B	23.0	13.19	1.59	0.024	--	--	--	--
24–26	25.0	17.68	1.72	0.040	--	--	--	--
26–28	27.0	18.33	1.58	0.038	--	--	--	--
28–30	29.0	14.09	1.70	0.039	1.71	0.10	ND	--
30–32	31.0	15.54	1.93	0.042	--	--	--	--
32–34	33.0	16.87	2.08	0.042	--	--	--	--
34–36	35.0	--	--	--	--	--	--	--
36–38	37.0	--	--	--	--	--	--	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–FBLM1A

Core name: First Bay Lostmans River

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
38–40	39.0	--	--	--	1.80	0.08	ND	--
40–42	41.0	--	--	--	--	--	--	--
42–44	43.0	--	--	--	--	--	--	--
44–46	45.0	--	--	--	--	--	--	--
46–48	47.0	--	--	--	--	--	--	--
48–50	49.0	--	--	--	1.76	0.09	ND	--
50–52	51.0	--	--	--	--	--	--	--
52–54	53.0	--	--	--	--	--	--	--
54–56	55.0	--	--	--	--	--	--	--
56–58	57.0	--	--	--	--	--	--	--
58–60	59.0	--	--	--	1.71	0.07	ND	--
60–62	61.0	--	--	--	--	--	--	--
62–64	63.0	--	--	--	--	--	--	--
64–66	65.0	--	--	--	--	--	--	--
66–68	67.0	--	--	--	--	--	--	--
68–70	69.0	--	--	--	1.96	0.08	ND	--
70–72	71.0	--	--	--	--	--	--	--
72–74	73.0	--	--	--	--	--	--	--
74–76	75.0	--	--	--	--	--	--	--
76–78	77.0	--	--	--	--	--	--	--
78–80	79.0	--	--	--	1.69	0.10	ND	--
80–82	81.0	--	--	--	--	--	--	--
82–84	83.0	--	--	--	--	--	--	--
84–86	85.0	--	--	--	--	--	--	--
86–88	87.0	--	--	--	--	--	--	--
88–90	89.0	--	--	--	1.69	0.07	ND	--
90–92	91.0	--	--	--	--	--	--	--
92–94	93.0	--	--	--	--	--	--	--
94–96	95.0	--	--	--	--	--	--	--
96–98	97.0	--	--	--	--	--	--	--
98–100	99.0	--	--	--	1.96	0.11	ND	--
100–102	101.0	--	--	--	--	--	--	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–FBLM1A

Core name: First Bay Lostmans River

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
102–104	103.0	--	--	--	--	--	--	--
104–106	105.0	--	--	--	--	--	--	--
106–108	107.0	--	--	--	--	--	--	--
108–110	109.0	--	--	--	2.74	0.12	ND	--
110–112	111.0	--	--	--	--	--	--	
112–114	113.0	--	--	--	2.79	0.09	ND	--

Core ID: GLW705–HR2A

Core name: Harney River 2A

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
0–1	0.5	20.91	7.72	0.165	1.85	0.14	ND	--
1–2	1.5	18.77	6.59	0.131	1.77	0.11	Tr?	--
2–3	2.5	21.03	7.78	0.188	1.74	0.12	ND	--
3–4	3.5	21.35	7.37	0.166	1.95	0.15	ND	--
4–5	4.5	22.05	7.53	0.144	1.66	0.11	ND	--
5–6	5.5	22.75	7.43	0.141	1.76	0.15	ND	--
6–7	6.5	21.76	7.35	0.143	1.62	0.10	ND	--
7–8	7.5	20.77	6.48	0.128	1.80	0.15	ND	--
8–9	8.5	20.91	6.33	0.145	1.65	0.14	Tr	--
9–10	9.5	21.26	6.43	0.131	1.69	0.11	0.16	0.09
10–11	10.5	21.30	6.73	0.154	--	--	--	--
11–12	11.5	21.83	6.42	0.117	1.74	0.14	ND	--
12–13	12.5	21.74	6.13	0.124	--	--	--	--
13–14	13.5	20.87	5.83	0.115	1.56	0.11	0.17	0.07
14–15	14.5	19.80	5.35	0.125	--	--	--	--
15–16	15.5	20.79	4.79	0.103	1.34	0.08	0.19	0.05
16–17	16.5	19.57	4.96	0.115	--	--	--	--
17–18	17.5	20.00	5.06	0.102	1.44	0.09	0.31	0.07

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–HR2A

Core name: Harney River 2A

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
18–19	18.5	18.69	5.06	0.082	--	--	--	--
19–20	19.5	19.44	5.21	0.095	1.59	0.11	0.25	0.07
20–22	21.0	19.32	4.95	0.092	--	--	--	--
22–24	23.0	19.57	4.90	0.096	--	--	--	--
24–26	25.0	19.52	4.51	0.105	--	--	--	--
26–28	27.0	15.16	3.92	0.084	--	--	--	--
28–30A	29.0	15.17	3.68	0.085	1.61	0.07	0.31	0.05
28–30B	29.0	14.99	3.51	0.069	--	--	--	--
30–32	31.0	17.30	4.03	0.083	--	--	--	--
32–34	33.0	18.33	3.03	0.305	--	--	--	--
34–36	35.0	20.08	4.33	0.136	--	--	--	--
36–38	37.0	19.80	4.06	0.118	--	--	--	--
38–40	39.0	--	--	--	1.53	0.09	0.25	0.06
48–50	49.0	--	--	--	1.47	0.08	ND	--
58–60	59.0	--	--	--	1.44	0.08	ND	--
68–70	69.0	--	--	--	1.49	0.09	ND	--
78–80	79.0	--	--	--	1.60	0.08	ND	--
88–90	89.0	--	--	--	1.51	0.08	ND	--
96–98	97.0	--	--	--	1.57	0.09	ND	--

Core ID: GLW705–SHR1A

Core name: Harney River 1A (South Harney, near mouth)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
0–1	0.5	11.88	3.69	0.101	1.76	0.10	ND	--
1–2	1.5	10.47	3.03	0.079	1.94	0.15	ND	--
2–3	2.5	12.10	3.42	0.094	2.28	0.16	ND	--
3–4	3.5	12.08	3.28	0.082	1.86	0.13	ND	--
4–5	4.5	11.90	3.68	0.091	1.98	0.14	Tr?	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–SHR1A

Core name: Harney River 1A (South Harney, near mouth)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
5–6	5.5	11.16	3.32	0.079	2.05	0.14	ND	--
6–7	6.5	11.46	3.38	0.083	1.75	0.12	ND	--
7–8	7.5	10.85	3.03	0.075	1.90	0.12	0.10	0.06
8–9	8.5	10.10	2.67	0.078	1.92	0.12	0.17	0.08
9–10	9.5	9.07	2.52	0.072	1.72	0.11	0.16	0.06
10–11	10.5	8.91	2.30	0.064	--	--	--	--
11–12	11.5	8.71	2.20	0.055	1.91	0.09	0.16	0.06
12–13	12.5	8.93	2.20	0.060	--	--	--	--
13–14	13.5	8.10	2.24	0.060	1.71	0.09	0.14	0.05
14–15	14.5	7.28	2.11	0.064	--	--	--	--
15–16A	15.5	4.72	1.68	0.048	1.58	0.10	ND	--
15–16B	15.5	4.57	1.74	0.058	--	--	--	--
16–17	16.5	4.34	1.77	0.053	--	--	--	--
17–18	17.5	4.53	1.72	0.047	1.76	0.10	Tr	--
18–19	18.5	4.98	1.63	0.043	--	--	--	--
19–20	19.5	10.24	2.26	0.060	1.75	0.09	0.11	0.06
20–22	21.0	11.51	2.18	0.057	--	--	--	--
22–24	23.0	11.71	2.21	0.068	--	--	--	--
24–26	25.0	12.13	2.21	0.061	--	--	--	--
26–28	27.0	12.25	2.10	0.062	--	--	--	--
28–30A	29.0	10.89	2.00	0.056	1.65	0.08	ND	--
28–30B	29.0	10.50	2.15	0.063	--	--	--	--
30–32	31.0	8.55	1.79	0.052	--	--	--	--
32–34	33.0	9.68	1.78	0.054	--	--	--	--
34–36	35.0	10.85	1.66	0.048	--	--	--	--
36–38	37.0	--	--	--	--	--	--	--
38–40	39.0	--	--	--	1.76	0.07	ND	--
48–50	49.0	--	--	--	1.66	0.07	ND	--
58–60	59.0	--	--	--	1.59	0.09	ND	--
68–70	69.0	--	--	--	1.65	0.06	ND	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW504–TBB

Core name: Tarpon Bay

Date collected: May 2004

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	†Calc. Excess Pb-210 activity (dpm/g)
0–1	0.5	56.09	5.91	0.128	3.27
1–2	1.5	50.10	2.74	0.058	2.75
2–3	2.5	42.71	3.28	0.074	2.31
3–4	3.5	43.31	3.65	0.081	1.95
4–5	4.5	47.70	3.28	0.078	1.64
5–6	5.5	52.10	2.25	0.053	1.38
6–7	6.5	51.10	2.66	0.055	1.16
7–8	7.5	53.78	2.54	0.056	0.97
8–9	8.5	53.29	2.18	0.051	0.82
9–10	9.5	54.09	2.75	0.074	0.69
10–11	10.5	58.08	1.95	0.054	0.58
11–12	11.5	56.00	2.57	0.068	0.49
12–13A	12.5	59.68	1.65	0.051	0.41
12–13B	12.5	59.28	1.87	0.052	0.41
12–13C	12.5	57.88	2.05	0.053	0.41
13–14	13.5	54.89	1.98	0.064	0.35
14–15	14.5	60.40	1.68	0.052	0.29
15–16	15.5	61.95	1.81	0.061	0.24
16–17	16.5	62.87	0.95	0.037	0.21
17–18	17.5	60.28	1.22	0.038	0.17
18–19	18.5	62.87	1.54	0.042	0.15
19–20	19.5	67.27	1.80	0.053	0.12
20–22	21.0	61.20	1.26	0.038	0.09
22–24	23.0	57.40	1.66	0.062	0.07
24–26	25.0	73.00	1.09	0.062	0.05
26–28A	27.0	74.00	1.68	0.073	0.03
26–28B	27.0	74.45	1.04	0.057	0.03
26–28C	27.0	74.45	1.31	0.072	0.03
28–30	29.0	68.46	1.66	0.071	0.02
30–32	31.0	68.86	1.83	0.073	0.02
32–34	33.0	71.46	2.54	0.093	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW504–TBB

Core name: Tarpon Bay

Date collected: May 2004

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	†Calc. Excess Pb-210 activity (dpm/g)
34–36	35.0	78.00	1.72	0.069	--
36–38	37.0	82.80	2.57	0.101	--
38–40	39.0	83.00	1.56	0.063	--
40–42	41.0	81.64	2.00	0.064	--
42–44A	43.0	77.80	2.18	0.068	--
42–44B	43.0	75.50	2.07	0.066	--
44–46	45.0	80.00	2.22	0.070	--
46–48	47.0	82.83	1.93	0.084	--
48–50	49.0	77.69	1.31	0.060	--
50–52	51.0	72.26	2.11	0.056	--
52–54	53.0	75.20	4.31	0.100	--
54–56	55.0	67.40	4.04	0.096	--
56–58	57.0	55.09	2.43	0.067	--
58–60	59.0	46.81	3.91	0.161	--
60–62	61.0	36.73	4.00	0.105	--
62–64	63.0	27.94	3.32	0.077	--
64–65.5	64.75	14.34	2.74	0.067	--

Core ID: GLW705–SR2A

Core name: Shark River 2A (channels)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
0–1	0.5	27.81	8.79	0.157	1.72	0.16	ND	--
1–2	1.5	27.81	9.04	0.148	1.70	0.17	ND	--
2–3	2.5	28.40	9.85	0.165	1.56	0.15	Tr (0.15)	--
3–4	3.5	30.89	9.90	0.170	1.73	0.19	0.16	0.09
4–5	4.5	32.41	10.06	0.143	1.64	0.16	Tr (0.13)	--
5–6	5.5	37.73	9.69	0.146	1.80	0.18	Tr (0.17)	--

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–SR2A

Core name: Shark River 2A (channels)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
6–7	6.5	33.82	10.96	0.166	1.55	0.16	Tr (0.18)	--
7–8	7.5	32.02	9.66	0.145	1.78	0.15	ND	--
8–9	8.5	31.35	9.80	0.174	1.71	0.16	0.16	0.07
9–10	9.5	30.69	8.83	0.142	1.80	0.18	0.16	0.07
10–11	10.5	28.74	8.27	0.176	1.65	0.10	0.19	0.06
11–12	11.5	28.23	5.26	0.116	1.98	0.13	0.28	0.08
12–13	12.5	24.85	5.07	0.117	1.68	0.13	0.24	0.06
13–14	13.5	26.64	4.79	0.103	1.69	0.13	0.22	0.06
14–15	14.5	24.26	4.70	0.101	1.69	0.10	0.26	0.06
15–16	15.5	23.41	4.32	0.085	1.78	0.15	0.21	0.07
16–17	16.5	22.66	3.67	0.078	1.90	0.12	0.24	0.08
17–18	17.5	21.78	3.54	0.077	1.82	0.12	0.22	0.08
18–19	18.5	24.01	2.94	0.077	1.83	0.10	0.17	0.07
19–20	19.5	25.25	2.52	0.062	1.88	0.13	ND	--
20–22	21.0	23.96	2.23	0.058	1.85	0.11	ND	--
22–24	23.0	25.44	2.48	0.063	1.66	0.10	ND	--
24–26	25.0	23.66	2.23	0.058	--	--	--	--
26–28	27.0	22.18	2.15	0.052	1.71	0.11	ND	--
28–30A	29.0	22.97	2.10	0.048	--	--	--	--
28–30B	29.0	21.58	2.13	0.054	--	--	--	--
30–32	31.0	21.71	2.14	0.051	1.78	0.11	ND	--
32–34	33.0	21.98	2.23	0.052	--	--	--	--
34–36	35.0	21.78	2.22	0.048	1.66	0.08	ND	--
36–38	37.0	22.33	2.23	0.045	--	--	--	--
38–40	39.0	--	2.47	0.341	1.65	0.10	ND	--
48–50	49.0	--	2.53	0.316	1.85	0.10	ND	--
58–60	59.0	--	2.68	0.304	1.80	0.07	ND	--
68–70	69.0	--	2.51	0.342	2.03	0.14	ND	--
78–80	79.0	--	2.57	0.361	1.86	0.13	ND	--
88–90	89.0	--	2.63	0.383	1.90	0.10	ND	--
98–100	99.0	--	2.98	0.816	2.11	0.21	ND	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–SR2A

Core name: Shark River 2A (channels)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
108–110	109.0	--	0.84	0.270	0.84	0.08	ND	--
118–120	119.0	--	1.03	0.209	0.71	0.06	ND	--
128–130	129.0	--	1.00	0.236	0.83	0.09	ND	--
138–140	139.0	--	1.03	0.194	0.74	0.07	ND	--

Core ID: GLW705–SR1A

Core name: Shark River 1A (near mouth)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
0–1	0.5	15.90	5.03	0.130	1.59	0.13	ND	--
1–2	1.5	8.96	3.23	0.082	1.59	0.11	ND	--
2–3	2.5	10.50	3.99	0.107	1.44	0.09	ND	--
3–4	3.5	10.52	4.09	0.123	1.44	0.07	Tr	--
4–5	4.5	10.28	3.72	0.119	1.53	0.08	ND	--
5–6	5.5	11.51	3.88	0.099	1.53	0.12	ND	--
6–7	6.5	11.51	3.65	0.100	1.62	0.10	Tr	--
7–8	7.5	10.18	3.13	0.088	1.67	0.10	ND	--
8–9A	8.5	8.96	3.07	0.088	1.52	0.08	ND	--
8–9B	8.5	9.36	3.07	0.077	--	--	--	--
9–10	9.5	10.91	3.19	0.081	1.49	0.09	Tr	--
10–11	10.5	12.55	3.23	0.079	--	--	--	--
11–12	11.5	13.35	3.42	0.079	1.53	0.09	ND	--
12–13	12.5	10.12	2.98	0.074	--	--	--	--
13–14	13.5	8.86	2.62	0.068	1.65	0.09	ND	--
14–15	14.5	9.16	2.55	0.065	--	--	--	--
15–16A	15.5	9.54	2.59	0.075	1.45	0.08	0.08	0.04
15–16B	15.5	9.11	2.45	0.066	--	--	--	--
16–17	16.5	8.55	2.39	0.063	--	--	--	--
17–18	17.5	9.16	2.50	0.062	1.58	0.08	ND	--

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW705–SR1A

Core name: Shark River 1A (near mouth)

Date collected: July 2005

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Ra-226 activity (dpm/g)	Ra-226 error +/- (dpm/g)	Cs-137 activity (dpm/g)	Cs-137 error +/- (dpm/g)
18–19	18.5	8.13	2.21	0.063	--	--	--	--
19–20	19.5	7.97	2.21	0.062	1.66	0.10	Tr	--
20–22	21.0	7.91	2.14	0.049	--	--	--	--
22–24A	23.0	7.36	2.00	0.042	--	--	--	--
22–24B	23.0	7.51	2.18	0.051	--	--	--	--
24–26	25.0	5.93	1.85	0.040	--	--	--	--
26–28	27.0	5.15	1.83	0.041	--	--	--	--
28–30	29.0	5.78	1.70	0.039	--	--	--	--
30–32	31.0	7.34	1.82	0.043	--	--	--	--
32–34	33.0	6.92	1.75	0.036	--	--	--	--

Core ID: GLW504–RRB

Core name: Roberts River (near mouth)

Date collected: May 2004

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Calc. Excess Pb-210 activity (dpm/g)
0–1	0.5	35.13	7.84	0.171	6.43
1–2	1.5	27.89	5.70	0.110	5.94
2–3	2.5	27.09	5.90	0.108	5.48
3–4	3.5	25.90	5.83	0.110	5.06
4–5	4.5	25.55	5.40	0.101	4.67
5–6	5.5	25.90	4.89	0.090	4.31
6–7	6.5	25.55	4.90	0.107	3.98
7–8	7.5	24.95	4.29	0.081	3.67
8–9	8.5	28.69	5.77	0.104	3.39
9–10	9.5	28.29	3.86	0.077	3.13
10–11A	10.5	29.00	3.23	0.070	2.89
10–11B	10.5	27.80	3.25	0.066	2.89
10–11C	10.5	29.74	3.04	0.072	2.89
11–12	11.5	31.60	3.02	0.085	2.67

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW504–RRB

Core name: Roberts River (near mouth)

Date collected: May 2004

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Calc. Excess Pb-210 activity (dpm/g)
12–13	12.5	31.34	2.90	0.072	2.46
13–14	13.5	26.80	3.79	0.101	2.27
14–15	14.5	24.35	3.04	0.079	2.10
15–16	15.5	22.80	2.89	0.079	1.94
16–17	16.5	30.00	2.77	0.068	1.79
17–18	17.5	29.60	2.65	0.060	1.65
18–19	18.5	27.54	2.69	0.076	1.52
19–20	19.5	27.15	2.41	0.062	1.41
20–22	21.0	25.75	2.73	0.079	1.25
22–24	23.0	18.40	2.42	0.105	1.06
24–26	25.0	13.35	1.86	0.072	0.91
26–28	27.0	11.98	1.22	0.038	0.77
28–30A	29.0	10.80	0.84	0.035	0.66
28–30B	29.0	11.16	0.92	0.030	0.66
28–30C	29.0	11.16	0.85	0.033	0.66
30–32	31.0	11.58	0.92	0.035	0.56
32–34	33.0	10.36	0.91	0.042	0.48
34–36	35.0	8.58	0.77	0.032	0.41
36–38	37.0	10.40	0.64	0.027	0.35
38–40	39.0	8.96	0.75	0.027	0.30
40–42	41.0	8.60	0.61	0.026	0.25
42–44	43.0	7.00	0.62	0.028	0.21
44–46	45.0	9.20	0.61	0.027	0.18
46–48	47.0	10.58	0.53	0.020	0.16
48–50A	49.0	6.80	0.55	0.027	0.13
48–50B	49.0	6.80	0.57	0.030	0.13
48–50C	49.0	6.40	0.46	0.021	0.13
50–52	51.0	8.40	0.65	0.029	0.11
52–54	53.0	7.19	0.78	0.030	0.10
54–56	55.0	5.99	0.84	0.025	0.08
56–58	57.0	10.38	1.44	0.052	0.07

Appendix A. Lead-210 (^{210}Pb) Data from Cores—Continued

[cm, centimeters; dpm/g, disintegrations per minute per gram; % dry wt., percent dry weight; ND, not detected; Tr, trace quantity, too low to quantify; calc., calculated]

Core ID: GLW504–RRB

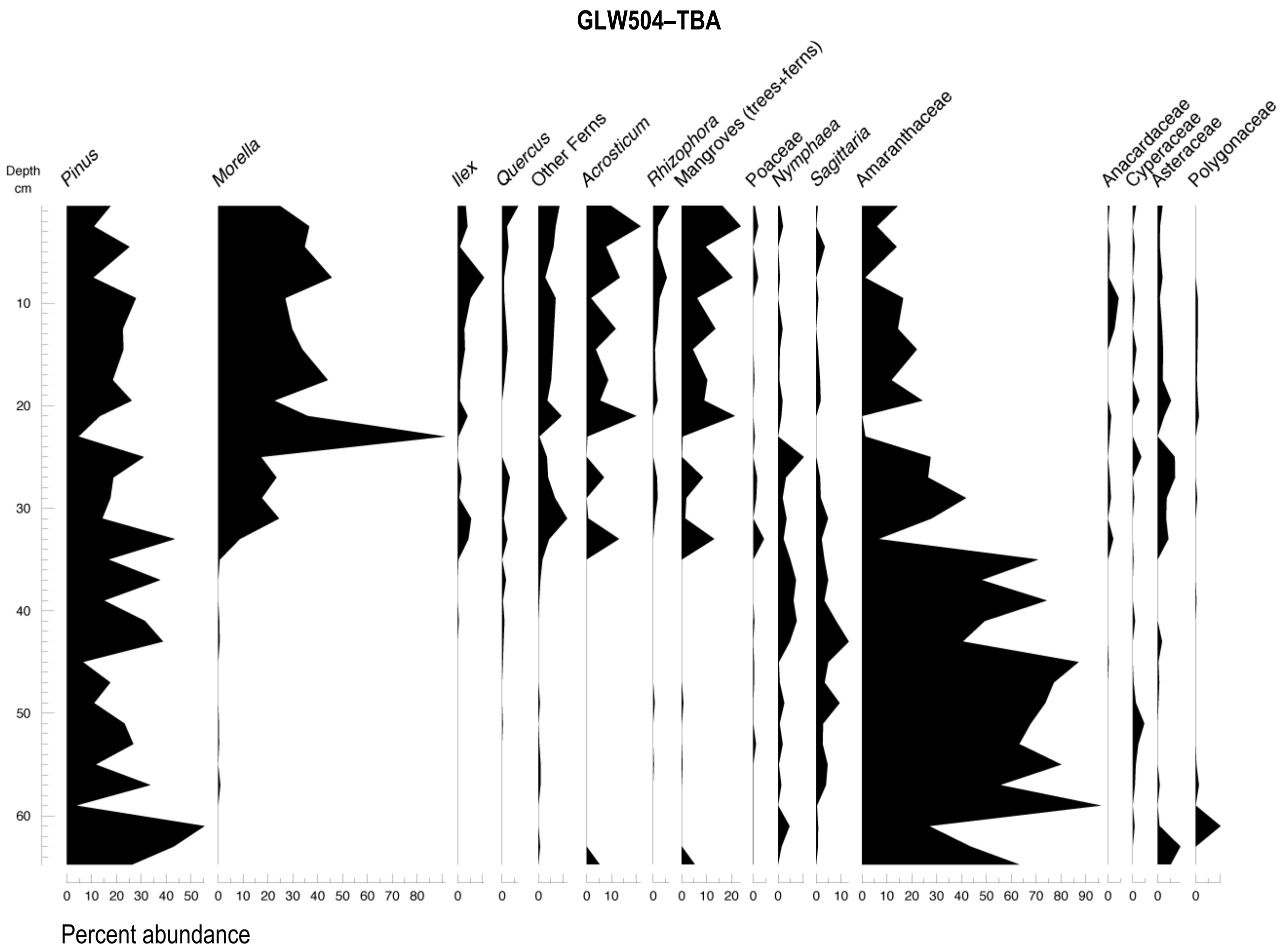
Core name: Roberts River (near mouth)

Date collected: May 2004

Depth (cm)	Mean depth (cm)	Loss on ignition (% dry wt.)	Total Pb-210 activity (dpm/g)	Total Pb-210 error +/- (dpm/g)	Calc. Excess Pb-210 activity (dpm/g)
58–60	59.0	7.37	0.82	0.030	0.06
60–62	61.0	9.00	0.69	0.022	0.05
62–64	63.0	9.78	0.62	0.020	0.04
64–66	65.0	10.18	0.60	0.020	0.04
66–68	67.0	11.20	0.70	0.022	0.03
68–70	69.0	8.58	0.74	0.023	0.03
70–72	71.0	6.57	0.88	0.030	0.02
72–74	73.0	5.40	1.55	0.054	0.02

Appendix B. Pollen Diagrams

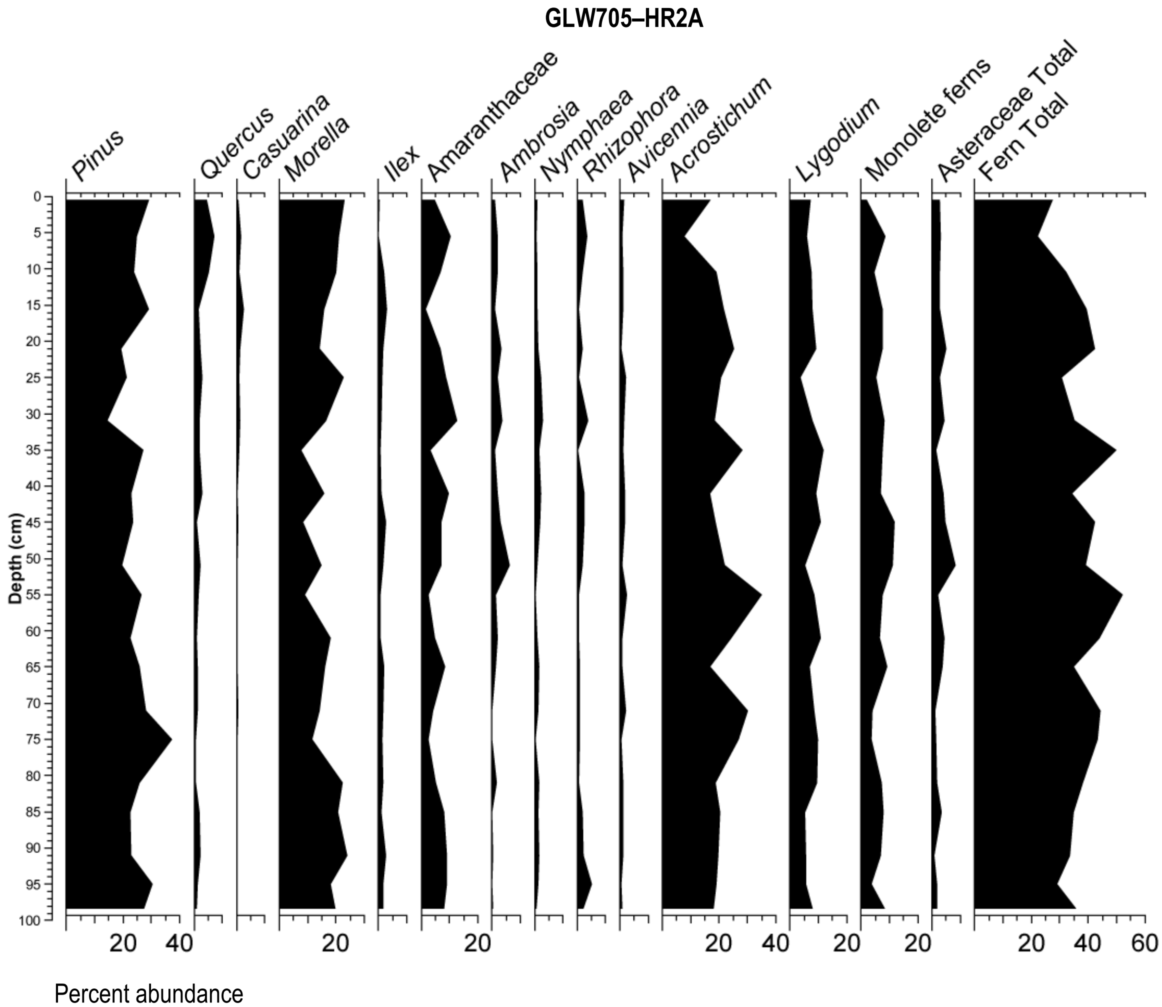
[cm, centimeters]



Percent abundance pollen for GLW504–TBA

Appendix B. Pollen Diagrams—Continued

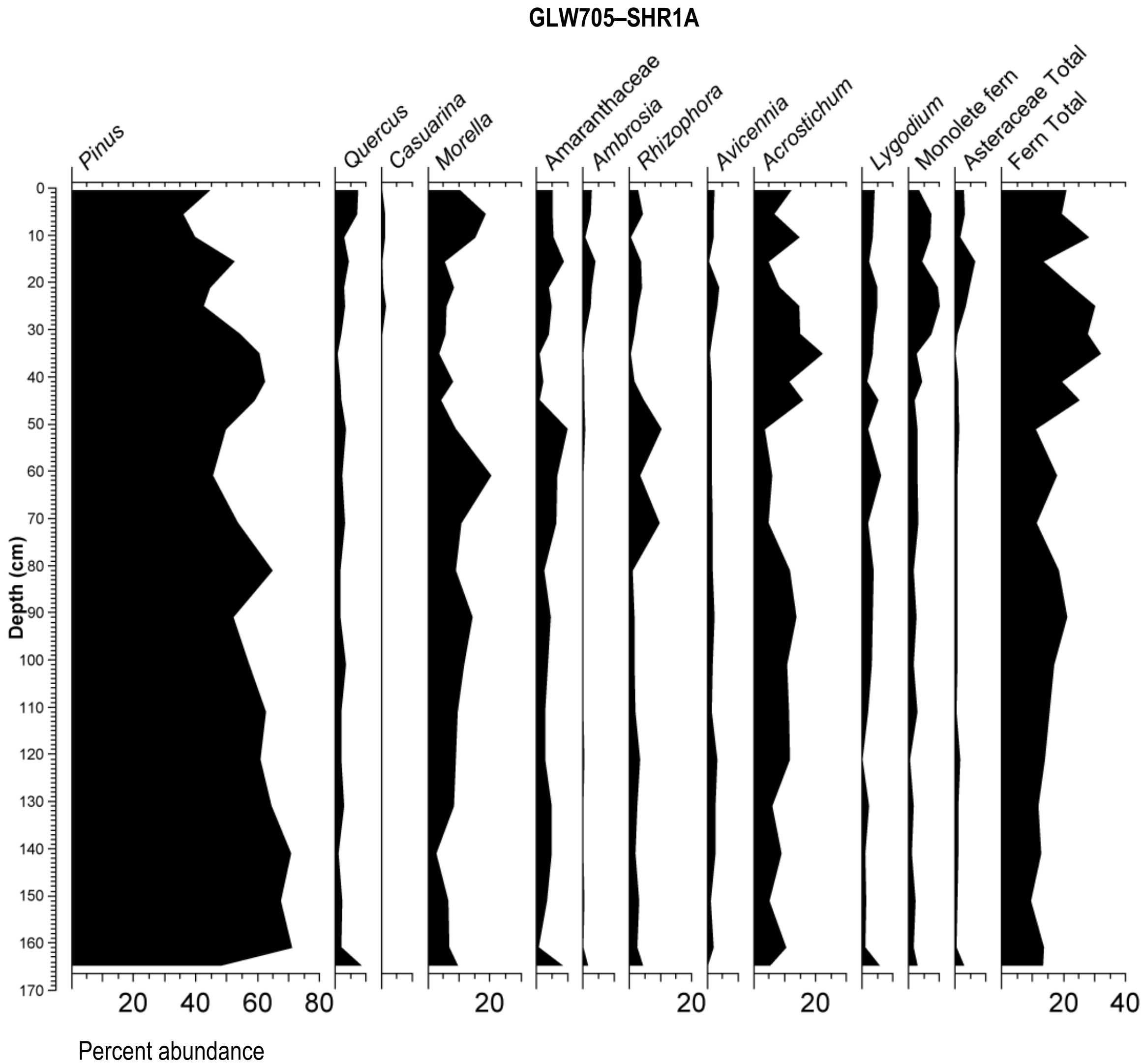
[cm, centimeters]



Percent abundance pollen for GLW705–HR2A

Appendix B. Pollen Diagrams—Continued

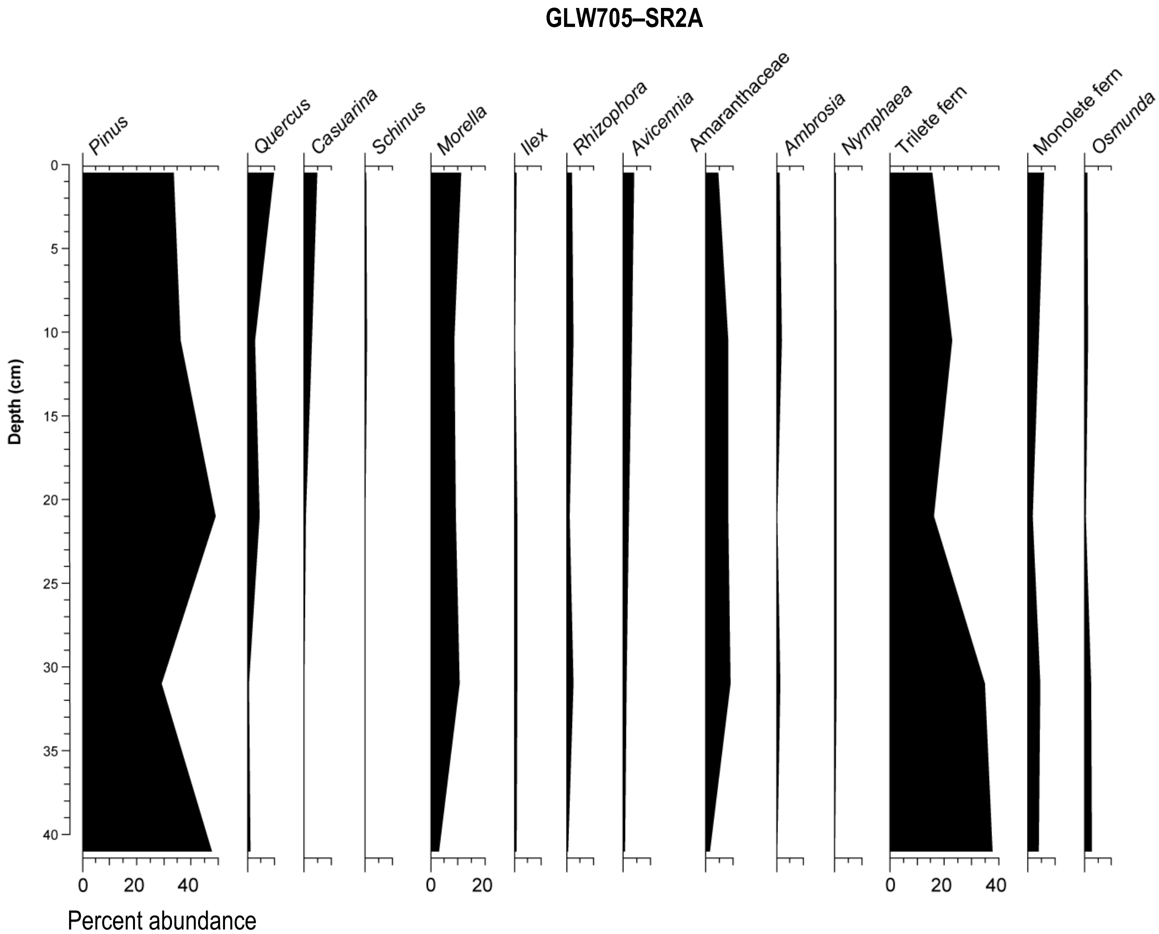
[cm, centimeters]



Percent abundance pollen for GLW705–SHR1A

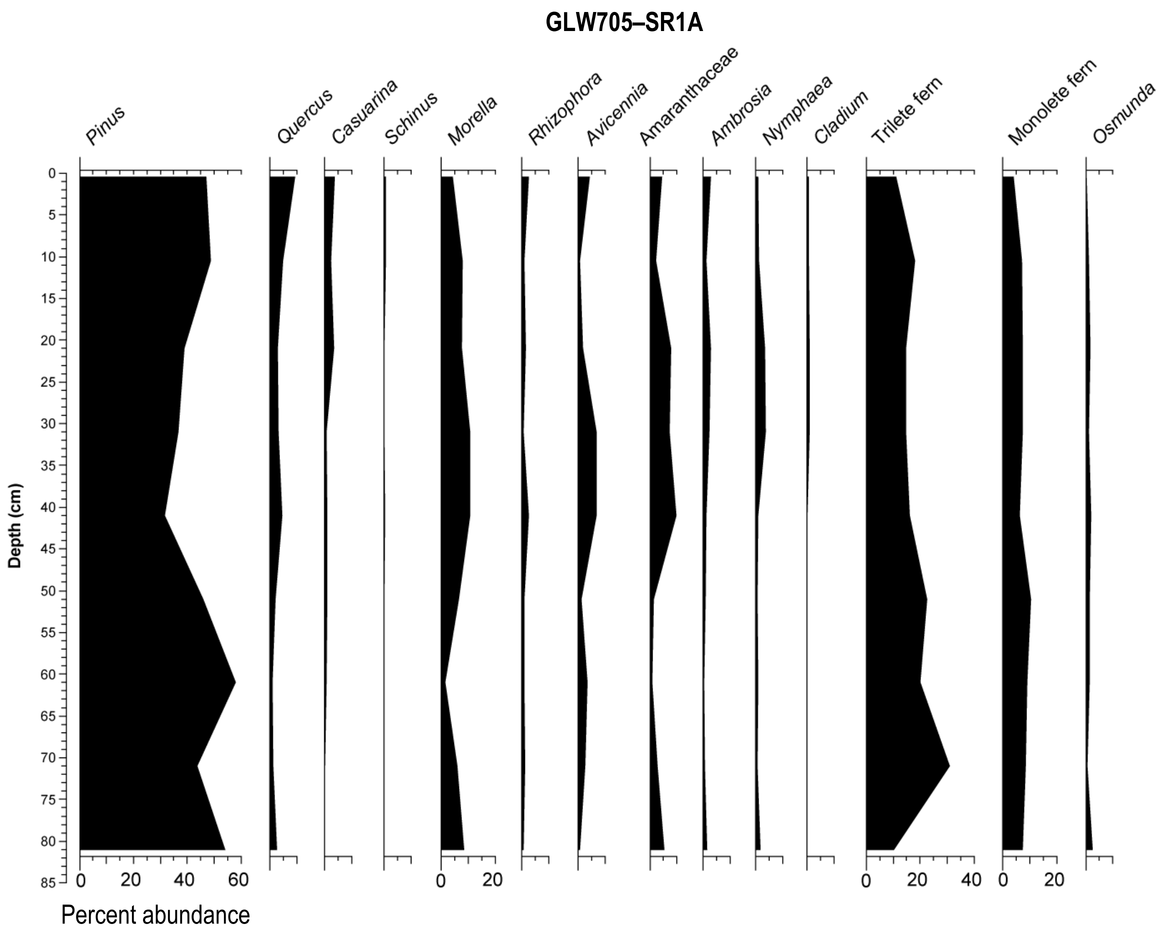
Appendix B. Pollen Diagrams—Continued

[cm, centimeters]



Percent abundance pollen for GLW705–SR2A

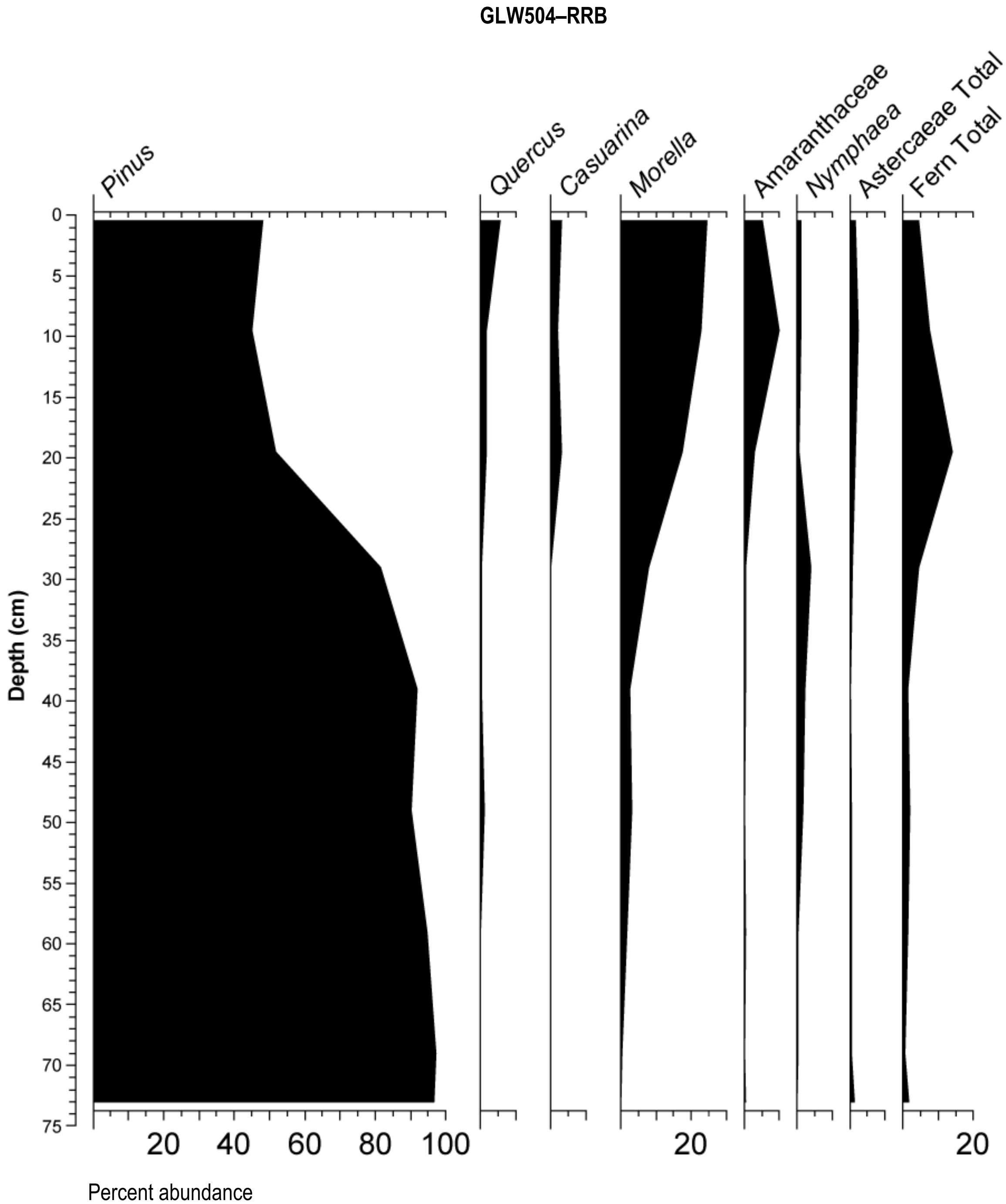
[cm, centimeters]



Percent abundance pollen for GLW705–SR1A

Appendix B. Pollen Diagrams—Continued

[cm, centimeters]



Percent abundance pollen for GLW504–RRB

Appendix C. Calibrated Age Ranges (Intcal09)

Calibrated data points were used to constrain the age models. Year 0 = CE 1950.
[cm, centimeters; min., minimum; max., maximum]

Core	Sample depth (cm)	Sample type	Min. year	Max. year	Probability
GLW705–SBLM2A	2	surface	-56	-53	95
	10	lead-210	-19	19	95
	29	carbon-14	976	1178	93.9
	29	carbon-14	1214	1222	1.1
	77	carbon-14	2164	2166	0.3
	77	carbon-14	2179	2241	15.7
	77	carbon-14	2302	2460	79
	109	carbon-14	4159	4170	2
	109	carbon-14	4178	4201	4.7
	109	carbon-14	4226	4419	88.3
GLW705–FBLM1A	2	surface	48	51	95
	35	carbon-14	-1	42	16.7
	35	carbon-14	59	154	32.4
	35	carbon-14	167	234	28.6
	35	carbon-14	236	284	17.2
	53	carbon-14	-5	-3	0.9
	53	carbon-14	23	142	69
	53	carbon-14	218	265	25
	83	carbon-14	13	148	66.5
	83	carbon-14	188	198	1.6
	83	carbon-14	204	205	0.2
	83	carbon-14	211	269	26.6
	109	carbon-14	298	477	95
GLW504–TBA	1	surface	-56	-53	95
	11	lead-210	-19	19	95
	13	carbon-14	-3	12	3.9
	13	carbon-14	149	187	13.9
	13	carbon-14	209	210	0.2
	13	carbon-14	270	336	40.4
	13	carbon-14	348	458	36.6
	27	carbon-14	536	653	95
	35	carbon-14	1173	1299	95
	43	carbon-14	1296	1403	95
	51	carbon-14	1082	1114	8
	51	carbon-14	1119	1164	13.3

Appendix C. Calibrated Age Ranges (Intcal09)—Continued

Calibrated data points were used to constrain the age models. Year 0 = CE 1950.
[cm, centimeters; min., minimum; max., maximum]

Core	Sample depth (cm)	Sample type	Min. year	Max. year	Probability
GLW504–TBA	51	carbon-14	1166	1282	73.6
	81	carbon-14	3646	3658	1.7
	81	carbon-14	3687	3876	93.3
GLW705–SR2A	1	surface	-56	-53	95
	15	carbon-14	-1	42	16.7
	15	carbon-14	59	154	32.4
	15	carbon-14	167	234	28.6
	15	carbon-14	236	284	17.2
	18	cesium	-19	19	95
	21	pollen	21	78	95
	37	carbon-14	690	803	71.7
	37	carbon-14	808	831	6.2
	37	carbon-14	852	905	17.1
	67	carbon-14	557	604	38.6
	67	carbon-14	626	686	56.3
	87	carbon-14	1005	1030	4.2
	87	carbon-14	1052	1188	77.6
	87	carbon-14	1200	1260	13.2
	103	carbon-14	3935	3936	0.2
	103	carbon-14	3973	4161	88.6
	103	carbon-14	4168	4179	1.4
	103	carbon-14	4199	4229	4.8
GLW705–SR1A	1	surface	-56	-53	95
	22	lead-210	-19	19	95
	61	pollen	21	78	95
	45	carbon-14	-4	35	17.8
	45	carbon-14	68	117	9.5
	45	carbon-14	131	230	47.4
	45	carbon-14	244	248	0.6
	45	carbon-14	251	301	19.7
	63	carbon-14	670	775	95
	101	carbon-14 (	674	789	95
	101	carbon-14 (:	-1	42	16.7
	101	carbon-14 (:	59	154	32.4
	101	carbon-14 (:	167	234	28.6
	101	carbon-14 (:	236	284	17.2

Appendix C. Calibrated Age Ranges (Intcal09)—Continued

Calibrated data points were used to constrain the age models. Year 0 = CE 1950.
[cm, centimeters; min., minimum; max., maximum]

Core	Sample depth (cm)	Sample type	Min. year	Max. year	Probability
GLW504–LMA	1	surface	-56	-53	95
	21	carbon-14	1064	1264	95
	47	carbon-14	2348	2543	70.7
	47	carbon-14	2564	2569	0.6
	47	carbon-14	2587	2616	6
	47	carbon-14	2636	2699	17.7

Appendix D. Age Model by Core

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SBLM2A	2	-56	-52	-54
	3	-50	-45	-47
	4	-45	-36	-41
	5	-40	-26	-34
	6	-36	-17	-27
	7	-32	-8	-20
	8	-27	2	-14
	9	-23	11	-7
	10	-19	20	0
	11	38	77	57
	12	93	136	115
	13	147	197	172
	14	200	259	230
	15	252	320	287
	16	304	383	345
	17	356	445	402
	18	407	507	460
	19	458	569	518
	20	509	631	575
	21	560	693	633
	22	612	756	690
	23	663	819	748
	24	714	881	805
	25	764	943	863
	26	815	1006	920
	27	866	1069	978
	28	918	1132	1035
	29	968	1194	1093
	30	996	1218	1119
	31	1025	1242	1145
	32	1053	1266	1170
	33	1081	1290	1196
	34	1109	1315	1222
	35	1137	1340	1247
	36	1165	1366	1273
	37	1193	1391	1299

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SBLM2A	38	1221	1418	1325
	39	1248	1443	1350
	40	1275	1469	1376
	41	1303	1495	1402
	42	1330	1521	1428
	43	1357	1547	1453
	44	1384	1573	1479
	45	1411	1599	1505
	46	1437	1625	1531
	47	1464	1651	1556
	48	1489	1676	1582
	49	1513	1701	1608
	50	1538	1726	1634
	51	1563	1752	1659
	52	1587	1777	1685
	53	1610	1801	1711
	54	1634	1826	1737
	55	1658	1852	1762
	56	1682	1878	1788
	57	1706	1904	1814
	58	1730	1930	1840
	59	1754	1956	1865
	60	1778	1983	1891
	61	1803	2010	1917
	62	1827	2037	1943
	63	1851	2064	1968
	64	1871	2095	1994
	65	1895	2125	2020
	66	1918	2155	2046
	67	1941	2183	2071
	68	1964	2211	2097
	69	1988	2239	2123
	70	2010	2268	2148
	71	2033	2296	2174
	72	2057	2324	2200
	73	2081	2352	2226

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SBLM2A	74	2106	2381	2251
	75	2130	2409	2277
	76	2153	2437	2303
	77	2176	2466	2329
	78	2241	2524	2391
	79	2304	2581	2453
	80	2369	2640	2515
	81	2437	2697	2577
	82	2503	2754	2639
	83	2568	2811	2701
	84	2634	2869	2763
	85	2703	2924	2825
	86	2768	2984	2887
	87	2832	3045	2949
	88	2897	3106	3011
	89	2962	3167	3074
	90	3026	3228	3136
	91	3090	3288	3198
	92	3155	3350	3260
	93	3219	3412	3322
	94	3283	3474	3384
	95	3347	3535	3446
	96	3409	3596	3508
	97	3470	3657	3570
	98	3531	3719	3632
	99	3592	3782	3694
	100	3651	3844	3756
	101	3710	3908	3818
	102	3769	3972	3881
	103	3827	4035	3943
	104	3886	4099	4005
	105	3944	4163	4067
	106	4003	4228	4129
	107	4061	4292	4191
	108	4119	4358	4253
	109	4177	4423	4315

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–FBLM1A	2	48	51	50
	3	50	56	53
	4	51	62	55
	5	50	67	58
	6	50	72	61
	7	50	78	63
	8	50	84	66
	9	50	90	69
	10	50	96	72
	11	50	102	74
	12	50	108	77
	13	49	113	80
	14	49	119	82
	15	49	125	85
	16	49	131	88
	17	48	136	90
	18	49	143	93
	19	49	149	96
	20	48	154	98
	21	49	161	101
	22	48	166	104
	23	48	172	107
	24	48	177	109
	25	48	183	112
	26	48	189	115
	27	48	195	117
	28	48	201	120
	29	48	207	123
	30	48	213	125
	31	47	218	128
	32	48	225	131
	33	47	230	134
	34	47	236	136
	35	46	241	139
	36	49	242	140
	37	51	243	142

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–FBLM1A	38	53	243	143
	39	55	244	144
	40	57	245	146
	41	58	245	147
	42	60	246	149
	43	61	246	150
	44	62	246	151
	45	64	247	153
	46	65	248	154
	47	65	247	156
	48	67	249	157
	49	67	248	158
	50	69	250	160
	51	69	250	161
	52	71	251	162
	53	71	251	164
	54	72	252	165
	55	72	252	167
	56	73	253	168
	57	75	254	169
	58	75	254	171
	59	75	254	172
	60	77	256	174
	61	77	257	175
	62	77	257	176
	63	78	258	178
	64	78	258	179
	65	79	259	180
	66	80	260	182
	67	80	261	183
	68	79	262	185
	69	79	264	186
	70	78	265	187
	71	78	267	189
	72	78	268	190
	73	78	270	192

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–FBLM1A	74	78	271	193
	75	78	273	194
	76	78	274	196
	77	79	276	197
	78	79	278	198
	79	79	279	200
	80	79	280	201
	81	79	282	203
	82	79	284	204
	83	80	287	205
	84	91	290	212
	85	103	295	219
	86	115	300	226
	87	127	303	233
	88	140	308	239
	89	152	314	246
	90	163	321	253
	91	173	328	260
	92	183	335	267
	93	191	342	273
	94	202	351	280
	95	211	359	287
	96	220	367	294
	97	228	375	301
	98	237	384	308
	99	244	391	314
	100	250	399	321
	101	256	407	328
	102	262	416	335
	103	265	423	342
	104	270	432	348
	105	273	440	355
	106	277	449	362
	107	281	459	369
	108	284	468	376
	109	287	478	382

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW504–TBA	1	-56	-52	-54
	2	-51	-47	-49
	3	-48	-40	-43
	4	-43	-32	-38
	5	-40	-25	-33
	6	-36	-17	-27
	7	-33	-10	-22
	8	-30	-3	-16
	9	-26	5	-11
	10	-22	13	-6
	11	-19	20	0
	12	61	240	156
	13	4	475	312
	14	47	484	332
	15	91	494	352
	16	223	503	372
	17	255	512	392
	18	288	520	413
	19	317	532	433
	20	347	545	453
	21	375	556	473
	22	405	569	493
	23	435	582	513
	24	464	597	533
	25	490	613	554
	26	513	632	574
	27	531	655	594
	28	619	728	674
	29	703	804	755
	30	785	883	835
	31	864	963	915
	32	941	1046	996
	33	1020	1131	1076
	34	1095	1217	1156
	35	1168	1305	1236
	36	1189	1312	1250

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW504–TBA	37	1207	1320	1264
	38	1224	1329	1278
	39	1240	1340	1291
	40	1257	1353	1305
	41	1271	1366	1319
	42	1283	1383	1332
	43	1292	1403	1346
	44	1357	1465	1410
	45	1422	1527	1474
	46	1486	1590	1538
	47	1550	1652	1601
	48	1615	1716	1665
	49	1679	1779	1729
	50	1742	1842	1793
	51	1806	1906	1857
	52	1870	1970	1921
	53	1933	2034	1984
	54	1996	2098	2048
	55	2060	2163	2112
	56	2124	2228	2176
	57	2187	2293	2240
	58	2250	2358	2303
	59	2312	2422	2367
	60	2374	2487	2431
	61	2437	2552	2495
	62	2500	2618	2559
	63	2562	2683	2622
	64	2624	2749	2686
	65	2686	2814	2750
	66	2748	2880	2814
	67	2810	2946	2878
	68	2872	3013	2942
	69	2934	3079	3005
	70	2995	3145	3069
	71	3056	3211	3133
	72	3118	3278	3197

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW504–TBA	73	3180	3345	3261
	74	3242	3412	3324
	75	3304	3479	3388
	76	3365	3546	3452
	77	3427	3613	3516
	78	3489	3680	3580
	79	3550	3747	3644
	80	3612	3814	3707
	81	3674	3881	3771
GLW705–SR2A	1	-56	-52	-54
	2	-53	-50	-51
	3	-51	-46	-48
	4	-48	-42	-45
	5	-45	-37	-41
	6	-43	-33	-38
	7	-41	-29	-35
	8	-39	-25	-32
	9	-37	-20	-29
	10	-35	-16	-26
	11	-33	-12	-22
	12	-30	-7	-19
	13	-28	-3	-16
	14	-27	1	-13
	15	-25	5	-10
	16	-23	9	-6
	17	-21	13	-3
	18	-19	17	0
	19	2	33	17
	20	14	54	34
	21	22	79	50
	22	35	91	63
	23	47	102	75
	24	60	115	88
	25	72	127	100
	26	85	140	113
	27	97	152	125

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SR2A	28	110	165	138
	29	122	178	150
	30	134	190	163
	31	146	203	175
	32	159	217	188
	33	170	229	200
	34	183	243	213
	35	193	255	226
	36	206	269	238
	37	217	281	251
	38	229	294	263
	39	241	308	276
	40	253	321	288
	41	265	335	301
	42	276	347	313
	43	287	360	326
	44	298	373	338
	45	310	387	351
	46	322	400	363
	47	333	413	376
	48	345	428	388
	49	355	442	401
	50	366	455	413
	51	377	469	426
	52	388	483	438
	53	399	497	451
	54	409	510	463
	55	421	524	476
	56	431	538	488
	57	443	552	501
	58	453	565	513
	59	464	579	526
	60	476	594	538
	61	487	608	551
	62	497	621	563
	63	508	635	576

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SR2A	64	519	649	588
	65	530	663	601
	66	541	677	613
	67	552	691	626
	68	580	713	651
	69	608	736	676
	70	637	757	701
	71	662	782	726
	72	688	810	751
	73	713	838	776
	74	738	866	801
	75	763	895	826
	76	788	925	851
	77	811	953	876
	78	833	982	901
	79	854	1011	926
	80	874	1041	951
	81	893	1070	976
	82	912	1100	1001
	83	931	1130	1026
	84	946	1163	1051
	85	961	1194	1076
	86	979	1227	1101
	87	996	1258	1126
	88	1191	1435	1311
	89	1385	1612	1495
	90	1584	1789	1680
	91	1775	1969	1864
	92	1964	2149	2049
	93	2151	2329	2233
	94	2336	2510	2418
	95	2521	2694	2602
	96	2702	2878	2787
	97	2882	3064	2971
	98	3061	3251	3156
	99	3242	3443	3341

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SR2A	100	3424	3639	3525
	101	3605	3835	3710
	102	3785	4033	3894
	103	3964	4229	4079
GLW705–SR1A	1	-56	-52	-54
	2	-53	-50	-51
	3	-51	-47	-49
	4	-48	-43	-46
	5	-47	-40	-44
	6	-45	-36	-41
	7	-44	-33	-38
	8	-42	-30	-36
	9	-40	-26	-33
	10	-39	-23	-31
	11	-37	-19	-28
	12	-35	-15	-26
	13	-34	-12	-23
	14	-32	-8	-20
	15	-31	-5	-18
	16	-29	-2	-15
	17	-27	2	-13
	18	-25	6	-10
	19	-23	10	-7
	20	-22	13	-5
	21	-20	17	-2
	22	-19	20	0
	23	-12	28	7
	24	-8	38	14
	25	-8	47	21
	26	-7	58	28
	27	-7	70	35
	28	-6	82	41
	29	-6	95	48
	30	-6	107	55
	31	-6	120	62
	32	-6	133	69

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SR1A	33	-6	146	76
	34	-8	159	83
	35	-8	173	89
	36	-9	187	96
	37	-10	200	103
	38	-10	214	110
	39	-11	227	117
	40	-12	240	124
	41	-13	254	131
	42	-14	267	137
	43	-14	280	144
	44	-15	294	151
	45	-16	307	158
	46	-12	291	151
	47	-7	276	145
	48	-3	259	138
	49	1	243	131
	50	6	227	124
	51	10	211	118
	52	14	194	111
	53	18	179	104
	54	21	165	98
	55	24	150	91
	56	26	135	84
	57	28	121	78
	58	31	108	71
	59	31	95	64
	60	28	85	58
	61	22	79	51
	62	24	81	53
	63	27	85	56
	64	28	88	58
	65	30	93	61
	66	30	96	63
	67	30	100	65
	68	31	105	68

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW705–SR1A	69	30	109	70
	70	31	114	73
	71	31	119	75
	72	30	124	78
	73	30	129	80
	74	29	134	83
	75	28	139	85
	76	28	145	87
	77	26	149	90
	78	25	155	92
	79	24	160	95
	80	23	165	97
	81	23	172	100
	82	21	177	102
	83	20	182	105
	84	19	188	107
	85	18	194	109
	86	17	199	112
	87	16	205	114
	88	15	211	117
	89	13	216	119
	90	12	222	122
	91	10	227	124
	92	10	234	126
	93	9	240	129
	94	7	245	131
	95	6	251	134
	96	4	257	136
	97	3	263	139
	98	2	269	141
	99	0	274	144
	100	0	281	146
	101	-2	286	148
GLW504–LMA	1	-57	-53	-54
	2	2	12	7
	3	58	78	68

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW504–LMA	4	114	145	129
	5	169	210	190
	6	225	277	250
	7	281	343	311
	8	337	410	372
	9	393	476	433
	10	448	542	494
	11	504	609	555
	12	560	675	616
	13	616	742	677
	14	671	807	737
	15	727	874	798
	16	782	940	859
	17	839	1007	920
	18	894	1073	981
	19	950	1139	1042
	20	1006	1206	1103
	21	1062	1273	1164
	22	1116	1321	1214
	23	1169	1370	1265
	24	1220	1419	1316
	25	1271	1469	1367
	26	1322	1520	1418
	27	1373	1572	1469
	28	1424	1625	1520
	29	1474	1678	1571
	30	1524	1732	1622
	31	1574	1786	1673
	32	1624	1841	1724
	33	1674	1896	1775
	34	1723	1950	1825
	35	1772	2006	1876
	36	1822	2062	1927
	37	1870	2118	1978
	38	1918	2174	2029
	39	1967	2231	2080

Appendix D. Age Model by Core—Continued

Output from age model. Year 0 = CE 1950.
[cm, centimeters; min, minimum; max, maximum]

Core	Sample depth (cm)	Min 95%	Max 95%	Best
GLW504–LMA	40	2013	2291	2131
	41	2058	2350	2182
	42	2105	2410	2233
	43	2150	2469	2284
	44	2196	2528	2335
	45	2241	2586	2385
	46	2288	2646	2436
	47	2333	2705	2487