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# Bulk Sedimentation and Nutrient Accumulation Rates in Lakes of the Upper St. Johns River Basin

Final Report

to

St. Johns River Water Management District

by

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## Executive Summary

Paleolimnological techniques were used to examine historical bulk sediment accumulation and nutrient sequestering in Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington, within the upper St. Johns River drainage basin. At selected sites in each waterbody, soft sediment depth was measured to ascertain the distribution of organic deposits. Short sediment cores (≤106 cm) were collected at widely-spaced sites in the lakes and sectioned at 4-cm intervals for organic matter and nutrient (C, N, P) analysis. A subset of cores from each basin was $^{210}$Pb-dated by gamma spectroscopy and historical changes in bulk sedimentation and nutrient burial rates during the last century were evaluated.

Eight limnetic sites were visited in Lake Hell 'n' Blazes on 25 September 1995. Water depth ranged between 200 and 240 cm, and seven of the eight sites displayed soft sediment accumulations between 60 and 117 cm. Sediment cores retrieved from these seven sites were 63 to 106 cm long and bottomed on relatively inorganic deposits. An eighth site, located near an island at the south end of the basin, had >150 cm of soft sediment, but was not cored.

Sawgrass Lake was sampled on 13 July 1995, at a time when it was occupied by dense *Hydrilla*. Water depth at eight limnetic stations throughout the lake ranged from 137 to 157 cm. Soft sediment depth at the sites varied between 64 and 122 cm, and cores retrieved from the stations were 44 to 88 cm long. Organic sediments are fairly evenly distributed in both Lake Hell 'n' Blazes and Sawgrass Lake.

Lake Washington was sampled in November 1995. Water depth at 24 limnetic stations ranged from 200 to 322 cm. Organic sediment depth ranged between 5 and 101 cm at 17 stations, while seven stations had hard sand bottoms. The greatest accumulation of organic sediment was encountered in the northeast part of the lake. Uneven distribution of organic deposits in Lake Washington is attributed to wind-generated resuspension, transport and redeposition of low-density organic sediments.

Sediment cores from four sites in Lake Hell 'n' Blazes, five sites in Sawgrass Lake, and 14 sites in Lake Washington were sectioned at 4-cm intervals for stratigraphic analysis of percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus content. A group of selected profiles, including two cores from Lake Hell 'n' Blazes, three cores from Sawgrass Lake, and four cores from Lake Washington were $^{210}Pb$-dated by gamma spectroscopy and application of the constant-rate-of-supply (c.r.s.) model.

Sites with appreciable accumulations of organic matter possess surface sediments with low bulk density that overlie increasingly dense deposits. Uppermost sediments (0-4 cm) at the four sites in Lake Hell 'n' Blazes contained a high proportion of organic matter (585-688 mg $g^{-1}$ dry sediment), as did surficial deposits in the five Sawgrass Lake cores (706-779 mg $g^{-1}$ dry sediment). Surface deposits in cores from the northeast part of Lake Washington had high organic matter content (606-631 mg $g^{-1}$ dry sediment), but elsewhere, inorganic surface deposits had as little as 10 mg $g^{-1}$ dry sediment. Organic-rich sediment profiles in all lakes tended to bottom on stiff deposits with higher inorganic content.

Total carbon and total nitrogen concentrations in all cores tracked organic matter content, suggesting that C and N are bound predominantly in the organic sediment fraction. With a few exceptions, total phosphorus concentrations (mg P $g^{-1}$ dry) were highest in surface, or near-surface deposits, and declined with increasing depth in the profiles.

$^{210}Pb$ dating revealed that much of the organic sediment that has accumulated in the upper St. Johns River lake basins was deposited since the turn of the century. Present-day rates of bulk sediment accumulation in Lake Hell 'n' Blazes exceed rates determined for the period around 1900. Both Hell 'n' Blazes coring sites record an episode of high sediment accumulation during the late 1940s. Modern rates of P burial at the sites (0.054 and 0.035 mg P $cm^{-2}$ $yr^{-1}$) are about an order of magnitude greater than rates that prevailed 100 years ago. If recent, rapid accumulation rates reflect lakewide P loading rates, they would have been sufficiently high to yield eutrophic conditions in this shallow basin, as inferred from nutrient loading models (Vollenweider 1968). Assuming that phosphorus accumulation on the bottom of Lake Hell 'n' Blazes has been spatially uniform for the last 100 years, P has accumulated in the basin at a mean annual rate of ~277 kg $yr^{-1}$. Approximately 27,000 kg of P have accumulated on the lake bottom since the turn of the century.

Temporal patterns of bulk sediment accumulation at the three sites in Sawgrass Lake display some differences. At station 3, bulk sediment accumulation fluctuated over time. High accumulation rates recorded for the late 1940s correlate with results from Lake Hell 'n' Blazes. At sites 4 and 8 in Sawgrass Lake, bulk sediment accumulation generally increased through time, with the exception of a brief period of high sedimentation in the 1920s and early 1930s. Total P accumulation at site 3 was quite variable through time, whereas P accumulation records from sites 4 and 8 display fairly consistent increases since ~1900. Based on nutrient loading models (Vollenweider 1968), modern rates of P accumulation at sites 3, 4, and 8 (0.016, 0.037 and 0.036 mg $cm^{-2}$ $yr^{-1}$, respectively), if representative of lakewide P loading rates, would have been high enough to maintain eutrophic water-column conditions. If phosphorus accumulation on the bottom of Sawgrass Lake has been spatially uniform since the turn of the century, then P has accumulated in the basin at a mean annual rate of ~195 kg $yr^{-1}$, and about 19,500 kg of P have accumulated on the lake bottom over the past ~100 years.

Historical bulk sediment accumulation in Lake Washington varied among sites, as indicated by the differential thickness of organic matter recorded at the 24 sampling stations (range = 0-101 cm). Temporal patterns of sediment accumulation also varied, even among the four sites in the northeastern area of the basin. For instance, the modern rate of sediment accumulation at station 1 is lower than the rate at the turn of the century. Records from sites 3, 6, and 8 display some fluctuation through time, but present-day rates of sedimentation exceed those for the early part of the century.

At all four sites in Lake Washington where cores were collected and dated, P accumulation rates display a fairly consistent trend of increase during the last 100 years. The most recent rates of P accumulation at the sites (0.064, 0.065, 0.065, and 0.054 mg $cm^{-2}$ $yr^{-1}$) are high, but unrepresentative of the lake as a whole. The phosphorus accumulation rates derived from cores taken in the northeast part of the lake probably overestimate the mean, lakewide P accumulation rate, because organic sediments are resuspended and focused to the north end of the lake. If sediment resuspension and focusing has been an ongoing process, the temporal changes in P accumulation at each site are real and indicate increasing nutrient sequestering through time.

Phosphorus accumulation on the bottoms of Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington has generally increased through time during the past century. Furthermore, mass-based P concentrations (mg P $g^{-1}$ dry sediment ) in surface sediments are generally higher than values measured in deep deposits. Results suggest that high concentrations of P in surface muds may be a source of nutrients for overlying waters via diffusional flux, and that organic sediment removal might mitigate internal nutrient loading. Calculation of volumetric P concentration in sediments (P $cm^{-3}$ wet sediment) indicates, however, that deep sediments can contain as much, or more P than do surface deposits. Low mass-based P concentrations (mg P $g^{-1}$ dry) in basal sediments are compensated for by their high bulk densities (g $cm^{-3}$), yielding high volumetric P concentrations (mg P $cm^{-3}$ wet) at depth.

If organic sediments are removed with the objective of reducing diffusional input of P to the water column, the effort may be unsuccessful because bottom waters will remain in contact with deposits that contain high amounts of P per unit volume of wet sediment. Also, dredging will increase the mean depths of Lake Hell 'n' Blazes and Sawgrass Lake by a small amount that will be insignificant in achieving lower water-column nutrient concentrations. Before dredging procedures are undertaken, it should be established that sediments contribute a significant amount of nutrient to overlying waters, i.e. whether internal nutrient loading is, in fact, a problem. Furthermore, it would be advisable to determine the forms in which P is bound in deeper, inorganic-rich sediments to evaluate whether diffusional P release from these deposits might be anticipated.

## Introduction

The principal objective of this study was to evaluate rates of bulk sediment accumulation and nutrient burial on the bottoms of three lakes in the Upper St. Johns River Basin (Map 1). Paleolimnological methods were used to achieve these objectives. The studied waterbodies included Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington. The research methodology was designed to 1) estimate the distribution and thickness of organic sediment in the three lakes, 2) use $^{210}Pb$ dating to measure changing bulk sediment accumulation rates during the last century at selected sites in each lake, 3) assess changes in nutrient (total C, total N, total P) burial at these sites, 4) assess baseline, predisturbance nutrient burial rates in the lakes, 5) provide a 3-dimensional picture of nutrient concentrations in sediments throughout the lakes based on nutrient analyses in additional, undated sediment cores from each lake, and 6) estimate historical lakewide nutrient sequestering in the three basins.

## Field Methods

We visited Sawgrass Lake on 13 July, 1995 and Lake Hell 'n' Blazes on 25 September, 1995. The lakes were accessed by airboat because *Hydrilla* infestation, particularly in Sawgrass Lake, precluded navigation using an outboard motor. Lake Washington was sampled on 2 and 3 November, 1995, and again on 30 November, 1995. Lake Washington was free of vegetation and sampling was done from an outboard motorboat. In Lake Hell 'n' Blazes (Map 2) and Sawgrass Lake (Map 3), we visited eight sites throughout each waterbody that were located to achieve equal area coverage of the lake (Håkanson 1981). In the larger, Lake Washington (Map 4), we identified 24 sampling sites, again sited to achieve good areal coverage of the lake.

At each site, we measured water depth by lowering a Secchi disk on a metered rope to the sediment surface. Next, the soft sediment lens was pierced with magnesium-zirconium coring rods that were forced through the organic deposits until they made contact with the underlying inorganic sands or clays. The distance from the water surface to hard bottom was measured and thickness of the soft sediment lens was estimated by subtracting the water depth from the total depth from the water surface to the hard, basement deposits.

At each site in Sawgrass Lake, seven of eight sites in Lake Hell 'n' Blazes, and 20 of 24 sites in Lake Washington, a sediment/water interface core was retrieved using a piston corer with a 7.6-cm diameter, clear polycarbonate core barrel (Fisher et al. 1992). The corer was specially designed to obtain recently deposited lake sediments. Site 8 in Lake Hell 'n' Blazes was not cored because the site was close to an island and possessed >150 cm of soft sediment, much of which may have come from island debris. We attempted to retrieve sediments from the four uncored stations in Lake Washington, but all four sites possessed no soft sediments, and surficial sand deposits could not be penetrated or retrieved effectively by the core barrel.

Core codes were assigned to each profile using the date of retrieval (day-month-year) followed by the site location. For instance, core Sawgrass 13-VII-95-4 was collected in Sawgrass Lake on 13 July, 1995 at coring site number 4. Latitude/longitude coordinates were recorded at all coring sites using a Global Positioning System (GPS). Core designations and locations are presented along with water depth, soft sediment thickness, and core length (Table 1).

Following retrieval, all cores were plugged at the base with an extruder piston, labelled and photographed in the polycarbonate core barrels. 35-mm slides were sent to the St. Johns River Water Management District for archival purposes. A second set of photographs is maintained at the University of Florida Department of Fisheries and Aquatic Sciences. Next, core tubes were topped off with lake water and a rubber stopper was used to seal the top of the core barrel. Cores were transferred to a storage box in a vertical position to minimize disturbance. Cores were transported to a local motel or the UF Department of Fisheries and Aquatic Sciences in an upright position to preclude sediment mixing.

To prepare cores for extrusion, stoppers were removed from the top of the core barrels and water overlying the sediment was carefully siphoned off. Next, the top of the core barrel was fitted with a PVC tray designed to sample unconsolidated sediments (Fisher et al. 1992). Cores were extruded upward by pushing on the base of the sediment column with a tight-fitting extruder piston, and soft sediment was collected in the sampling tray. Cores were sectioned in this manner at 4-cm intervals. Sediment samples, along with the associated interstitial water, were transferred to labelled 18-oz. Whirl-Pak™ bags that were in turn placed in larger, labelled zip-lock bags.

**Laboratory Methods**

Bagged samples were weighed to the nearest 0.01 g on a Fisher Scientific S-400 digital balance, and wet weight of the core sections was calculated by subtracting the average tare weight of Whirl-Pak™ bags. Mean and standard deviation for the weight of empty bags (tare) was $4.17 \pm 0.04$ g ($n = 10$). Samples were dried by opening the Whirl-Pak™ bags and setting them upright in clear plastic boxes. These boxes were put into large paper bags and placed in a Grieve Corporation Model SC-350 industrial drying oven at 60° C for several weeks. Following drying, Whirl-pak bags and their dried sediment contents were re-weighed on the Fisher digital balance. Dry sample mass was computed by subtracting the tare (bag) weight from the total weight of the dried sample and bag. Percent dry weight was calculated by dividing dry mass by wet mass (i.e. g dry ÷ g wet) [Table 2]. Dried sediments were ground in a mortar and pestle and dry material was stored in labelled 20-mL plastic scintillation vials. Excess dry sediment that could not fit into the scintillation vials was returned to labelled Whirl-Pak™ bags and archived.

Organic matter content in sediments was assessed by measuring weight loss on ignition at 550 °C in a Sybron Thermolyne muffle furnace (Håkanson and Jansson 1983). This was accomplished by placing dried sediment in preweighed crucibles and weighing the crucible and dry mass of sediment to the nearest 0.001 g on a Fisher Model S-110 digital balance. Next, the material was combusted for two hours and allowed to cool. The crucible and ash were again weighed and the mass lost during combustion was assumed to be the organic portion of the sediment. Organic matter content is expressed as a fraction of dry mass (Table 2).

Next, we calculated the density (g dry cm$^{-3}$ wet) of sediment at each stratigraphic interval using the formula of Binford (1990):

$$p_x = \frac{D(2.5I_x + 1.6C_x)}{D + (1\text{-}D)\,(2.5I_x + 1.6C_x)}$$

where $p_x$ is dry density (g dry cm$^{-3}$ wet), x is depth in the sediment profile (cm), D is proportion of dry mass in wet sediment (i.e. dry mass/wet mass), I is the inorganic proportion of dry mass, with density = 2.5 g cm$^{-3}$ dry, and C is the organic proportion of dry material with density = 1.6 g cm$^{-3}$ dry. Bulk density of sediments was calculated because the mass of dry material in each sampled section (mg cm$^{-2}$/4-cm slice) was required for $^{210}$Pb dating.

Three hundred samples from 23 cores were analyzed for organic matter and nutrient (C, N, P) content. Total carbon and total nitrogen were determined using a Carlo-Erba NA 1500 C/N/S analyzer. Total P was measured using a Technicon Autoanalyzer II with a single-channel colorimeter, following digestion with $H_2SO_4$ and $K_2S_2O_8$ (Schelske et al. 1986). $C_{tot}$, $N_{tot}$, and $P_{tot}$ content in sediments are all expressed as amount per gram dry mass (Table 2).

<u>Sediment Chronology</u>

We selected two cores from Lake Hell 'n' Blazes, three cores from Sawgrass Lake, and four cores from Lake Washington for $^{210}$Pb dating. We targeted cores that had long records of soft sediment accumulation to avoid measuring isotopic activity in truncated profiles, i.e. in cores with less than ~150 year of sediment accumulation. Cores selected for dating were Hell 'n' Blazes 25-IX-95-3 and 25-IX-95-7, Sawgrass 13-VII-95-3, 13-VII-95-4, and 13-VII-95-8, and Washington 2-XI-95-1, 2-XI-95-3, 3-XI-95-6, and 3-XI-

95-8 (Table 1, Maps 2, 3, and 4). Our objective was to establish, at each site, a continuous age/depth relation for sediments deposited over the last 100-150 years.

$^{210}Pb$ occurs naturally and is a member of the uranium-238 decay series. $^{238}U$ decays to $^{226}Ra$, which is ubiquitous in local soils and rock. When $^{226}Ra$ decays, radon gas ($^{222}Rn$) is produced, some of which escapes to the atmosphere. Radon-222 is short-lived, and rapidly undergoes further decays to produce particulate $^{210}Pb$ (half-life = 22.3 years) that is deposited onto land and lake surfaces. When this atmospherically-derived $^{210}Pb$ (often called "excess" or "unsupported" $^{210}Pb$) is delivered to lakes, it is ultimately incorporated into bottom sediments.

Another source of $^{210}Pb$ in lake deposits is *in situ* radium. $^{210}Pb$ generated by decay of $^{226}Ra$ in the sediment matrix is called "supported" $^{210}Pb$ and can be estimated from the activity of its precursors, $^{226}Ra$, $^{214}Pb$, and $^{214}Bi$. For dating purposes, it is necessary to measure total $^{210}Pb$ activity and supported $^{210}Pb$ activity throughout a sediment profile and calculate excess activity by subtraction (i.e. total activity minus supported activity). The stratigraphic distribution of atmospherically-derived, excess $^{210}Pb$ activity in the core can be used to calculate dates at depth in the accumulated sediments (Appleby and Oldfield 1983).

In some studies, the downcore, asymptotic total $^{210}Pb$ activity has been used to estimate supported $^{210}Pb$ activity, the presumption being that all activity deep in the core comes from *in situ* radium, and that all excess $^{210}Pb$ has decayed away. In such cases, the supported activity is assumed to have been constant over the length of the profile, and the estimated supported activity (a constant) is subtracted from the total $^{210}Pb$ activity measured in each core interval. In Florida, however, supported $^{210}Pb$ activities can be both high and variable over the lengths of cores (Brenner et al. 1994, 1995, 1996, in press, Schelske et al. 1994). Thus, it is invalid to assume that supported $^{210}Pb$ activity has remained unchanged over time. We measured supported $^{210}Pb$ activities directly and subtracted the measured supported activity from total $^{210}Pb$ activity on a level-by-level basis.

In some cases $^{210}Pb$ dates can be checked by comparison with $^{137}Cs$ distribution in the profile. $^{137}Cs$ is an anthropogenic radionuclide that was injected into the atmosphere as a consequence of atomic bomb testing. Maximum fallout occurred about 1960 and a $^{137}Cs$ peak in lake sediment profiles can sometimes be used to identify this time period (Krishnaswami and Lal 1978). Unfortunately, $^{137}Cs$ has not proven to be very helpful in most Florida lake cores. The highly soluble radionuclide typically fails to display a clear peak in Florida lake sediments, probably because these deposits lack 2:1 lattice clays that serve as binding sites (Brenner et al. 1994, Schelske et al. 1994).

To prepare samples for radiometric counting, dry sediment was loaded into tared plastic Sarstedt tubes to a height of ~30 mm and samples were weighed. All tubes were filled to nearly the same height with sediment to standardize sample geometry. Next, samples were sealed in the tubes with epoxy glue and permitted to equilibrate for at least 2-3 weeks to allow $^{214}Bi$ to come into equilibrium with *in situ* $^{226}Ra$.

Isotopic activities in a total of 135 samples from nine cores were measured by direct gamma counting (Appleby et al. 1986, Schelske et al. 1994), using ORTEC Intrinsic Germanium Detectors connected to a 4096 channel, multichannel analyzer. Total $^{210}Pb$ activity was obtained from the photopeak at 46.5 kilo electron volts (keV). $^{137}Cs$ activity was determined from the 662 keV photopeak. Supported $^{210}Pb$ activity, expressed here as $^{226}Ra$ activity, was estimated from the $^{214}Bi$ peak at 609.3 keV. Contiguous 4-cm samples were measured in each core to depths at which there was no remaining unsupported (excess) $^{210}Pb$. All activities were expressed as decays per minute per gram dry sediment (dpm $g^{-1}$).

$^{226}Ra$ activities were generally low, typically <3 dpm $g^{-1}$, but some values ranged between 3 and 6 dpm $g^{-1}$. Due to the stratigraphic variation in $^{226}Ra$ activities over the length of some sections, proxy estimates of supported $^{210}Pb$ (i.e. $^{226}Ra$ activities) were subtracted from the total $^{210}Pb$ activities on a level-by-level basis. Sediment age/depth relations and bulk sediment accumulation rates were calculated using the c.r.s. (constant rate of supply) model, which is the model of choice when changes in sediment accumulation rate are suspected (Appleby and Oldfield 1983, Oldfield and Appleby 1985, Binford and Brenner 1986). Calculated sediment dates correspond to the base of each 4-cm section, and ages are expressed relative to the core collection date. Counting errors were estimated by first-order approximation, assuming that gamma disintegrations are described by a Poisson distribution (Knoll 1989). Age errors, expressed as one standard deviation about the age (Figures 24, 26, 28, 30, 32, 34, 36, 38, and 40), were propagated by incorporating error associated with total $^{210}Pb$ and $^{226}Ra$ counts, background counts, and detector efficiency (Schelske et al. 1994).

Rates of accumulation of organic matter, $C_{tot}$, $N_{tot}$, and $P_{tot}$ were computed for each stratigraphic interval by multiplying the bulk sediment accumulation rate (g cm$^{-2}$ yr$^{-1}$) times the concentration (mg g$^{-1}$) of each constituent in the bulk sediment. Accumulation rates for individual sediment constituents are expressed in units of mg cm$^{-2}$ yr$^{-1}$.

## Results

### Soft Sediment Thickness and Spatial Distribution

Water depth was fairly consistent in the limnetic zone of Lake Hell 'n' Blazes when we visited the waterbody on 25 September, 1995. Water depth at the eight sites throughout the basin ranged from 200 to 240 cm (Table 1, Map 2). The shallowest site was recorded near an island that appeared to have been a massive floating mat in the recent past. Shallow water at the site may reflect the accumulation of plant detritus that sloughed from the island. Soft sediment thickness at seven of the eight sites ranged in thickness from 60 to 117 cm (Table 1). At station 8, near the island, more than 150 cm of soft sediment was measured, lending support to the idea that organic debris had "calved" from the island. Retrieved sediment cores ranged from 63 to 106 cm and core lengths at each site were generally similar to the measured soft sediment thickness, suggesting that the complete soft sediment lens had been sampled. In most cases, the coring drive was stopped by the inability of the plastic core barrel to penetrate the underlying sands and clays that line the basin. Cores from sites 2, 3, 6, and 7 were selected for full physical and chemical analyses.

Sawgrass Lake was heavily infested with *Hydrilla* when we sampled the sediments on 13 July 1995. Water depth at the eight sites visited ranged from 138 to 157 cm (Table 1, Map 3). Soft sediment thickness ranged from 64 to 122 cm. Retrieved cores contained between 44 and 88 cm of sediment. In some cases, piercing the sediments with metal rods overestimated the thickness of organic sediments, probably because the rods penetrate some distance into clayey inorganic sediments. For instance, at site 2, soft sediment thickness was measured to be 114 cm, but the retrieved core was only 64 cm long, and basal deposits were composed of gray clay. Cores from sites 1, 3, 4, 6, and 8 were chosen for full physical and chemical analyses.

We visited 24 stations in Lake Washington in November 1995 (Table 1, Map 4). Water depth varied from 200 cm at station 23, to 322 cm at station 1. Soft sediment distribution in Lake Washington was highly irregular. At seven stations we encountered sandy bottom, with no overlying organic deposits. Elsewhere, we found anywhere from 5 to 101 cm of accumulated soft sediment. At several sites characterized by sandy bottom, intact cores could not be obtained. Even when the core barrel was forced several cm into the sandy deposits, the large-grained sediments tended to fall out of the corer on retrieval. In some cases, where little organic sediment had accumulated, it was possible to penetrate through the underlying sands and plug the core barrel with even deeper gray clay deposits. Due to the short nature of the Lake Washington cores, it was possible to fully analyze profiles collected at 14 sites throughout the basin.

Physical and Chemical Properties of Cores

The four analyzed cores from Lake Hell 'n' Blazes (25-IX-95-2, 25-IX-95-3, 25-IX-95-6, 25-IX-95-7) display similar stratigraphies with respect to all physical and chemical variables, and differ principally in the total accumulation of soft sediment at each site (Table 2, Figures 1-4). All cores consist of low-bulk-density, organic sediments that are underlain by high-density inorganic deposits near the base of each section. The uppermost organic sediments typically range from about 5 to 12% dry weight, and the dry mass is dominated by organic matter (~500 to >800 mg $g^{-1}$ organic matter). Maximum organic matter concentrations are found at mid-depth in the cores. Near the bottom of each section, there is a rather abrupt shift in sediment type, and bottommost samples from the cores contain between 63 and 361 mg $g^{-1}$ organic matter, with the balance of the dry mass composed of inorganic material (i.e. sands and clays).

In the Hell 'n' Blazes cores, total carbon and total nitrogen concentrations track the stratigraphic shifts in organic matter content (Figures 1-4), suggesting that carbon and nitrogen are bound primarily in the organic sediment fraction. Phosphorus differs from $C_{tot}$ and $N_{tot}$ in its stratigraphic distribution. Minimum total P concentrations were measured in bottommost sediments from all four cores, and all profiles show gradual increases in total P with decreasing depth in the sediment column (Figures 1-4). Maximum total P concentrations were measured in samples at or near the top of the cores. Total P concentrations in basal deposits from the four cores ranged between 0.027 (ST 6) and 0.073 (ST 3) mg $g^{-1}$. Sediments in the topmost section of cores (0-4 cm) contain between 0.632 (ST 2) and 0.950 (ST 6) mg $g^{-1}$ total P.

Five cores from Sawgrass Lake were analyzed in detail for physical and chemical characteristics (13-VII-95-1, 13-VII-95-3, 13-VII-95-4, 13-VII-95-6, 13-VII-95-8). All profiles possessed between ~40 and ~60 cm of organic sediment that overlies inorganic, basement deposits (Table 2, Figures 5-9). Recent, organic sediments are characterized by low percent dry weight and low bulk density, whereas basal deposits have high percent dry weight and high bulk density. In all five cores, uppermost deposits are highly organic, containing between 706 and 779 mg $g^{-1}$ organic matter. Basal deposits from four of the cores (Stations 1, 3, 6, and 8) possess <99 mg $g^{-1}$ organic matter. Station 4 is the exception, and bottom deposits in the profile contain 349 mg $g^{-1}$ organic matter.

Stratigraphic shifts in total carbon and total nitrogen concentration closely track organic matter content in the Sawgrass Lake cores (Figures 5-9), implying that sedimented C and N are bound largely in the organic fraction of the sediment. Total phosphorus concentrations in the Sawgrass profiles tend to decline with increasing depth in the cores (Figures 5-9). Maximum or near-maximum P concentrations were recorded in topmost deposits and values recorded for the 0-4 cm depth range between 0.681 (ST 4) and 0.941 (ST 8) mg $g^{-1}$. Bottom deposits in the cores contain only 0.033 to 0.053 mg $g^{-1}$ P, with the exception of those from station 6, in which the bottom sample displayed an elevated total P content (0.853 mg $g^{-1}$).

Soft sediment distribution in Lake Washington was non-uniform, with thickest deposits encountered in the northeastern area of the lake (Table 1, Map 4). Cores from fourteen stations were selected for complete physical and chemical analyses (stations 1, 2, 3, 4, 6, 8, 9, 12, 17, 19, 20, 21, 22, 24) [Table 1, Figures 10-23]. Only four stations (1, 3, 6, 8) had appreciable accumulations of organic sediment, and these were used to characterize the soft sediment stratigraphy. At all four sites, organic matter concentration in surface deposits was similar, ranging from 606 to 631 mg $g^{-1}$. At site 1, organic matter tended to decrease with greater depth in the profile. There was some fluctuation in organic matter content with depth, but a minimum value was recorded in the basal deposits from 48-52 cm (134 mg $g^{-1}$). At site 3, organic matter content drops at mid-depth in the core, to 319 mg $g^{-1}$ between 28 and 36 cm, rises to the maximum concentration of 673 mg $g^{-1}$ at 40-44 cm, and then ultimately falls to a minimum at the base of the section (167 mg $g^{-1}$). Cores from sites 6 and 8 demonstrate minimum organic matter concentrations at mid-depth in the sections, and relatively high organic matter concentrations in the basal portions of the profiles. Total carbon and nitrogen again track organic matter content, indicating that C and N are bound in the organic sediment fraction.

Total phosphorus concentration in surface deposits from Lake Washington was similar at sites 1, 3, 6, and 8, ranging from 0.627 to 0.669 mg $g^{-1}$. At sites 1 and 6, total phosphorus concentration tends to decrease with increasing depth in the sections (Figures 10 and 14). At site 3, total P declines with depth to 52 cm, but phosphorus concentrations are higher in the bottom 30 cm of the profile, ranging between 0.663 (72-76 cm) and 1.011 (60-64 cm) mg $g^{-1}$ (Table 2, Figure 12). At site 8, total P concentration declines steadily from 0.655 mg $g^{-1}$ at the surface (0-4 cm) to 0.213 mg $g^{-1}$ at 36-40 cm (Table 2, Figure 14). Total P concentrations are maximal in samples from 40-44 cm (2.257 mg $g^{-1}$) and 44-48 cm (1.812 mg $g^{-1}$), but decline to low values (0.140-0.179 mg $g^{-1}$) in the bottommost three sections of the profile.

The balance of cores from Lake Washington were devoid of any significant organic matter accumulation or possessed a thin layer of organic matter overlying sands or inorganic clays. In the latter case, near-surface sediments with fairly high organic matter, total carbon, total nitrogen, and total phosphorus content, are underlain at shallow depth by sandy or clayey inorganic deposits with low organic concentration (e.g site 4:Table 2, Figure 13). At sites characterized by sandy surface deposits, sediments typically have high bulk density, low organic matter content, and low nutrient concentrations (e.g. site 19:Table 2, Figure 19).

Radioisotope Activities in Sediment Cores

Cores 25-IX-95-3 and 25-IX-95-7 from Lake Hell 'n' Blazes were isotopically analyzed for dating. Total $^{210}Pb$ activities decline rather steadily from maximum values in shallow deposits, to "supported" levels at 76 cm in the core from site 3, and at 56 cm in the core from site 7 (Table 3, Figures 24 and 26). Similar $^{210}Pb$ activities were recorded in topmost deposits (0-4 cm) from core 25-IX-95-3 (16.21 dpm $g^{-1}$) and 25-IX-95-7 (15.88 dpm $g^{-1}$). Radium-226 activity is generally low throughout core 25-IX-95-3 (<1.82 dpm $g^{-1}$) and 25-IX-95-7 (<2.48 dpm $g^{-1}$). Cesium-137 activities do not show distinct peaks in either Hell 'n' Blazes profile, but abrupt increases were recorded at 32 cm in the profile from site 3, and at 36 cm in the profile from site 7. Some $^{137}Cs$ activity is recorded in the deepest levels of the $^{210}Pb$-datable section of both cores.

Total residual unsupported $^{210}Pb$ activity was 40.0 dpm $cm^{-2}$ at site 3 and 25.1 dpm $cm^{-2}$ at site 7. These total residual values translate to $^{210}Pb$ fallout rates of 1.25 and 0.78 dpm $cm^{-2}$ $yr^{-1}$, close to the mean value of 1.01 dpm $cm^{-2}$ $yr^{-1}$ based on cores from a suite of Florida lakes (Binford and Brenner 1986). Between-site differences in total residual unsupported $^{210}Pb$ values in Lake Hell 'n' Blazes may reflect resuspension and focusing of sediment along with its associated $^{210}Pb$.

In Sawgrass Lake, gamma counting was done on samples from cores 13-VII-95-3, 13-VII-95-4, and 13-VII-95-8 (Table 3, Figures 28, 30, 32). Surface (0-4 cm) sediments from sites 3, 4, and 8 had similar activities; 14.07, 14.71, and 15.91 dpm $g^{-1}$, respectively. Supported $^{210}Pb$ levels were reached at 60 cm in the core from site 3, 56 cm in the core from site 4, and 48 cm in the core from site 8. Radium-226 activities were low (<2.0 dpm $g^{-1}$) in all but the surface deposits from core 13-VII-95-4 (2.85 dpm $g^{-1}$). $^{137}Cs$ activities are also low in Sawgrass sediments, remaining below 2.0 dpm $g^{-1}$ in all samples.

Total residual unsupported $^{210}Pb$ values at sites 3, 4, and 8 were 17.5, 21.7, and 19.7 dpm $cm^{-2}$, respectively. Calculated excess $^{210}Pb$ deposition rates at the three locations were 0.54, 0.68, and 0.61 dpm $cm^{-2}$ $yr^{-1}$. Site-to-site similarities suggest little resuspension and redeposition of sediment and adsorbed $^{210}Pb$. Nevertheless, computed values are somewhat low compared to the mean measured in other Florida lakes (1.1 dpm $cm^{-2}$ $yr^{-1}$:Binford and Brenner 1986), perhaps implying that some sediment and associated $^{210}Pb$ may be exported from the lake in outflow.

Sites 1, 3, 6, and 8 in the north end of Lake Washington yielded cores that were sufficiently long for dating (Table 3, Figures 34, 36, 38, 40). Total $^{210}Pb$ activities in surface (0-4 cm) sediments from the cores ranged from 17.13 dpm $g^{-1}$ at site 6 to 27.48 dpm $g^{-1}$ at site 1. Supported $^{210}Pb$ activities were reached at variable depth in the four cores: 52 cm at site 1, 40 cm at site 3, 40 cm at site 6, and 44 cm at site 8. Radium-226 activities were somewhat higher and more variable in the Lake Washington cores, as compared with sediment profiles from Lakes Hell 'n' Blazes and Sawgrass. In Lake Washington, some stratigraphic levels from all four profiles yielded >3 dpm $g^{-1}$ $^{226}Ra$. Maximum $^{226}Ra$ activity was recorded at 48-52 cm in core 2-XI-95-3 (5.64 dpm $g^{-1}$), but that sample was below the $^{210}Pb$-datable part of the core. Cores from Lake Washington fail to display a discrete $^{137}Cs$ peak, but in all cases, topmost sediments displayed higher $^{137}Cs$ activities than did basal deposits. Maximum $^{137}Cs$ activities exceed 5 dpm $g^{-1}$ in all cores, with minimum values at or near zero in bottommost levels.

Total residual unsupported $^{210}Pb$ activity at the four Lake Washingtion sites was variable: 2-XI-95-1 (79.6 dpm $g^{-1}$), 2-XI-95-3 (43.1 dpm $g^{-1}$), 3-XI-95-6 (50.0 dpm $g^{-1}$), 3-XI-95-8 (53.5 dpm $g^{-1}$). These values translate into excess $^{210}Pb$ deposition rates of 2.48, 1.34, 1.56, and 1.67 dpm $cm^{-2}$ $yr^{-1}$, respectively. Consistently high values may reflect resuspension of organic sediments and their associated $^{210}Pb$ from sites throughout the basin, and focusing to the region of the coring sites.

Material Accumulation Rates

Although $^{210}Pb$ dating models are capable of yielding sediment ages >100 years old, dates more than a century old have large error terms associated with them. The errors arise from two sources. First, "old" samples have low activities and statistical counting errors associated with such samples are large, even after long counting times. Second, the c.r.s. dating model has a systematic bias that produces "too-old" dates for the oldest sections of cores (Binford 1990). Although dates prior to the turn of the 20th century are reported, only dates since 1900 are considered reliable, and discussion of accumulation rates and trends is generally restricted to the present century.

At site 3 in Lake Hell 'n' Blazes, bulk sediment accumulated at a rate of about 17 mg $cm^{-2}$ $yr^{-1}$ at the turn of the century (Table 4, Figure 24). The rate of sedimentation increased to a peak of almost 80 mg $cm^{-2}$ $yr^{-1}$ in the late 1940s. Slightly lower values were recorded in the late 1950s through 1970s (50-55 mg $cm^{-2}$ $yr^{-1}$), but during the last decade, sediment accumulation proceeded at rates between 72 and 79 mg $cm^{-2}$ $yr^{-1}$. Since 1904, bulk sediment has accumulated at site 3 at a mean rate of 47 mg $cm^{-2}$ $yr^{-1}$. The average linear sedimentation rate at site 3 since the turn of the century has been 0.65 cm $yr^{-1}$.

At site 7 in Lake Hell 'n' Blazes, bulk sediment accumulated at a rate of about 26 mg $cm^{-2}$ $yr^{-1}$, beginning around 1911. The rate changed little until the late 1940s when a very high rate of sediment accumulation was recorded for the period 1947-1948 (160 mg $cm^{-2}$ $yr^{-1}$). This period also corresponds to an episode of relatively high sediment accumulation at site 3 in the lake. After the period of rapid accumulation in the late 1940s, sedimentation rates at site 7 declined, remaining between about 39 and 59 mg $cm^{-2}$ $yr^{-1}$ until the present. Since 1911, sediment mass has accumulated at site 7 at a mean rate of 40 mg $cm^{-2}$ $yr^{-1}$. For the same time period, the average linear sedimentation rate at the site has been 0.52 cm $yr^{-1}$.

At both sites 3 and 7 in Lake Hell 'n' Blazes, organic matter, total carbon, and total nitrogen accumulation rates generally track bulk sediment accumulation rates (Table 4, Figures 24-27). At site 7, maximum accumulation rates for organic matter, carbon and nitrogen were recorded for the period 1947-1948, during which time bulk sediment was accumulating rapidly. Total phosphorus accumulation trends for the cores differ from those of other nutrients (Table 4, Figures 25 and 27). At site 3, total P accumulated at a rate of about 0.004 mg $cm^{-2}$ $yr^{-1}$ around turn of the century, but the rate of deposition increased rather steadily to values between 0.049 and 0.058 mg $cm^{-2}$ $yr^{-1}$ in the 1980s and 1990s. At site 7, P was accumulating at a rate of 0.004 mg $cm^{-2}$ $yr^{-1}$ ~1911, and increased only slightly over the next several decades. A high rate of P accumulation was measured for the period 1947-1948 (0.035 mg $cm^{-2}$ $yr^{-1}$), but the rate declined to 0.011 mg $cm^{-2}$ $yr^{-1}$ in the subsequent seven-year period. Since about 1956, P accumulation has accelerated steadily, reaching levels in the early 1990s that are comparable to the high values measured for 1947-1948 (i.e. 0.035 mg $cm^{-2}$ $yr^{-1}$).

At site 3 in Sawgrass Lake, bulk sediment accumulation has been highly variable through time, ranging from a low of 20.4 mg $cm^{-2}$ $yr^{-1}$ over the past seven years to a maximum of 186 mg $cm^{-2}$ $yr^{-1}$ from 1947 to 1948 (Table 4, Figure 28). During the period from 1909 to 1912, the rate of sediment accumulation was rather high, ~101 mg $cm^{-2}$ $yr^{-1}$. It declined dramatically during the following decade and fluctuated somewhat before reaching the high values recorded for the late 1940s. Between 1951 and 1988, sediment accumulation rates remained rather constant, between 32 and 39 mg $cm^{-2}$ $yr^{-1}$, only dropping to minimal values in the last seven years. The mean mass sediment accumulation rate at site 3 has been 39 mg $cm^{-2}$ $yr^{-1}$ since 1909. Over the same time span, the average linear sediment accumulation rate was 0.60 cm $yr^{-1}$.

At site 4 in Sawgrass Lake, bulk sediment was accumulating slowly at the turn of the century (22.1 mg $cm^{-2}$ $yr^{-1}$), but the rate had more than doubled by 1919 (Table 4, Figure 30). Starting in 1935, rates of accumulation were again low, and remained between about 24 and 38 mg $cm^{-2}$ $yr^{-1}$ until 1993, when the bulk accumulation rate rose to a near-maximum value for the century (54.3 mg $cm^{-2}$ $yr^{-1}$). The mean rate of bulk sediment accumulation at site 4 was 32 mg $cm^{-2}$ $yr^{-1}$ since the turn of the century. Sediment has been accumulating at an average linear rate of 0.46 cm $yr^{-1}$.

At Sawgrass Lake site 8, bulk sediment accumulated at a rate of 16.6 mg $cm^{-2}$ $yr^{-1}$ between 1892 and 1912 (Table 4, Figure 32). The sediment accumulation rate changed little until the mid-1960s, when it increased slightly, to 23.4 mg $cm^{-2}$ $yr^{-1}$. Highest rates of sediment accumulation are recorded for the last four years (38.5 mg $cm^{-2}$ $yr^{-1}$). At site 8, mean mass sediment accumulation for the last 104 years has been 20 mg $cm^{-2}$ $yr^{-1}$, and the average linear sediment accumulation rate for the same period was 0.31 cm $yr^{-1}$.

Accumulation rates of organic matter, total carbon and total nitrogen track bulk sediment accumulation rates at all three sites in Sawgrass Lake (Figures 28-33). At site 3 in Sawgrass Lake, total P accumulation tracks the bulk sediment accumulation rate reasonably well, with distinctive maxima in the late 1940s. Nevertheless, whereas bulk sediment accumulation rates recorded for the last 13 years are relatively low, total P accumulation rates over the same time span have been fairly high. Throughout this century, P accumulation at site 3 has ranged from a low of 0.004 mg $cm^{-2}$ $yr^{-1}$, to a maximum of 0.033 mg $cm^{-2}$ $yr^{-1}$. At sites 4 and 8 in Sawgrass Lake, there has been a gradual increase in P accumulation over time, from minimum values of 0.004 and 0.003 mg $cm^{-2}$ $yr^{-1}$ at the turn of the century, respectively, to values of 0.037 or 0.036 mg $cm^{-2}$ $yr^{-1}$ recorded for the last several years.

Four sites in the northern part of Lake Washington possessed sufficiently long records for $^{210}Pb$ dating (sites 1, 3, 6, and 8). At site 1, bulk sediment accumulation rate has proceeded at a relatively rapid pace since the early 1900s (Table 4, Figure 34). From 1911 to 1920, bulk sediments accumulated at a rate of 153 mg $cm^{-2}$ $yr^{-1}$, a rate that was exceeded only in the 1940s (179 mg $cm^{-2}$ $yr^{-1}$). During this century, the rate of bulk sedimentation rate has not fallen below 81 mg $cm^{-2}$ $yr^{-1}$. There is no discernible temporal trend in rate of bulk sediment accumulation at site 1 in Lake Washington, the only notable shift being the high rate of accumulation recorded for the 1940s. The mean rate of mass sediment accumulation at site 1 in Lake Washington has been 112 mg $cm^{-2}$ $yr^{-1}$ since 1911. The mean linear rate of sediment accumulation between 1911 and 1995 was 0.52 cm $yr^{-1}$.

Because sediment composition changes dramatically with depth in Lake Washington core 2-XI-95-1, accumulation rate trends for organic matter, total carbon, and total nitrogen are different from the record for bulk sediment (Figures 34 and 35). Organic matter, C, and N display reasonably high rates of accumulation from 1911 to 1920, but rates decline in the 1920s and 1930s. Thereafter, accumulation rates of organic matter and nutrients increase, with maxima recorded about 1978-1982. Total phosphorus displays a generally increasing trend of accumulation through time, with about a three-fold increase between the period from 1911-1920 (0.021 mg $cm^{-2}$ $yr^{-1}$) and the period from 1992-1995 (0.064 mg $cm^{-2}$ $yr^{-1}$).

At site 3 in Lake Washington, bulk sediment accumulated at a rate of 38 mg $cm^{-2}$ $yr^{-1}$ from 1910 to 1933, changing little until the late 1940s (Table 4, Figure 36). Thereafter, bulk sediment deposition remained relatively constant, varying between 50 and

55 mg cm$^{-2}$ yr$^{-1}$ until 1993. Higher rates of bulk sediment accumulation were recorded for the last two years (104 mg cm$^{-2}$ yr$^{-1}$). Since 1910, the average rate of mass sediment accumulation has been 48 mg cm$^{-2}$ yr$^{-1}$. The mean rate of linear sedimentation has been 0.37 cm yr$^{-1}$.

Organic matter, total carbon,and total nitrogen accumulation rates at site 3 in Lake Washington tended to increase gradually between ~1910 and about 1959, when the rates stabilized (Table 4, Figure 37). High rates of organic matter, C, and N accumulation were measured for sediments deposited during the interval from 1993 to 1995. Phosphorus displays a steady increase in accumulation rate, from about the turn of the century (0.010 mg cm$^{-2}$ yr$^{-1}$) to the present (0.065 mg cm$^{-2}$ yr$^{-1}$).

At site 6 in Lake Washington, bulk sediment accumulation displays a gradual increase from ~1888 to the present, with the exception of a period of high sediment accumulation (149 mg cm$^{-2}$ yr$^{-1}$) from 1935-1947 (Table 4, Figure 38). Modern sediment accumulation (104 mg cm$^{-2}$ yr$^{-1}$) is about twice the rate recorded for the turn of the century (50 mg cm$^{-2}$ yr$^{-1}$). Since 1888, the mean bulk sediment accumulation rate has been 74 mg cm$^{-2}$ yr$^{-1}$, and linear accumulation has averaged 0.30 cm yr$^{-1}$. Despite minor fluctuations, since the turn of the century, there has been a generally increasing trend for organic matter and nutrient accumulation at site 6 in Lake Washington (Table 4, Figure 39).

Core 3-XI-95-8 displays generally increasing bulk sedimentation since the turn of the century, with highest rates of accumulation measured in deposits laid down over the last four years (83 mg cm$^{-2}$ yr$^{-1}$) [Table 4, Figure 40]. During the first half of the century, the highest rate of sedimentation was detected for the period 1947 to 1955. Organic matter and nutrient (C, N, P) accumulation rates track bulk sediment accumulation rates, with highest rates of accumulation measured for the last four years.

Bulk sediment accumulation rates measured for the topmost (0-4 cm) deposits in each Lake Washington core are similar (Table 4). Representing deposition over the last 3-4 years, rates of bulk sedimentation varied among sites from a low of 83 mg cm$^{-2}$ yr$^{-1}$ at site

8, to a high of 104 mg $cm^{-2}$ $yr^{-1}$ measured at both sites 3 and 6. Similarly, modern organic matter deposition varied minimally among sites, from 52.4 mg $cm^{-2}$ $yr^{-1}$ at site 8 to 63.9 mg $cm^{-2}$ $yr^{-1}$ at site 3. Not surprisingly, recent total carbon and nitrogen accumulation rates among sites are similar, with minima recorded at station 8 and maxima at station 3. The modern rates of carbon and nitrogen accumulation at site 8 have been 27 mg $cm^{-2}$ $yr^{-1}$ and 1.90 mg $cm^{-2}$ $yr^{-1}$, respectively. At site 3, carbon has accumulated at a rate of 36 mg $cm^{-2}$ $yr^{-1}$, while nitrogen has been sequestered at a rate of 2.58 mg $cm^{-2}$ $yr^{-1}$. Recent phosphorus accumulation at the four sites is nearly identical: 0.054 mg $cm^{-2}$ $yr^{-1}$ (site 8), 0.064 mg $cm^{-2}$ $yr^{-1}$ (site 1), 0.065 mg $cm^{-2}$ $yr^{-1}$ (site 3), and 0.065 mg $cm^{-2}$ $yr^{-1}$ (site 6).

## Discussion

### Hell 'n' Blazes

Lakes of the upper St. Johns River drainage constitute shallow, wide spots in the river channel. In September 1995, limnetic water depth at eight distant sites in Lake Hell 'n' Blazes varied between 200 and 240 cm. Soft sediment thickness at seven of the sites ranged between 60 and 117 cm, while an eighth site, in close proximity to an island at the south end of the lake, had >150 cm of soft mud. With the exception of the site near the island, sediment cores retrieved at seven widely-spaced sites terminated on hard bottom, at sediment depths ranging from 63 to 106 cm.

$^{210}Pb$ dating of cores from sites 3 and 7 indicated that a substantial fraction of the soft organic deposits have accumulated since the turn of the century. For instance, core 25-IX-95-3 had a total length of 106 cm, 60 cm of which was deposited since 1904. Core 25-IX-95-7 had a total length of 68 cm, of which the uppermost 44 cm were deposited since 1911. Very recent rates of mass sediment accumulation are higher than rates for the turn of the century. An important feature of the Hell 'n' Blazes bulk sediment accumulation trends is the high rate of material deposition recorded for the late 1940s. The period of high sedimentation may be related to human activities, but is more likely a consequence of a brief episodic event, such as a severe storm.

Since the turn of the century, Lake Hell 'n' Blazes has experienced an order-of-magnitude increase in phosphorus accumulation on the lake bottom, with modern rates of sequestering at sites 3 and 7 equal to 0.054 and 0.035 mg $cm^{-2}$ $yr^{-1}$, respectively. If P accumulation approximates total P loading to the system, then modern loading rates are sufficient to cause eutrophic conditions in this shallow basin, as indicated by nutrient loading models (Vollenweider 1968). Modern P accumulation rates measured at the two Lake Hell 'n' Blazes coring sites are, however, low relative to recent, mean lake-wide P accumulation rates estimated for a suite of 34 Florida lakes (Binford and Brenner 1986, 1988). Modern P accumulation in the 34-lake data set was determined using $^{210}Pb$ activity in surficial deposits as a dilution tracer, and provides an estimate of mean lake-wide P accumulation for about the last 2-10 years. Recent, lake-wide P accumulation in the 34 Florida lakes ranged from 0.024 to 0.586 mg $cm^{-2}$ $yr^{-1}$ (Table 5) and yielded an overall mean rate for all 34 lakes of 0.171±0.134 mg $cm^{-2}$ $yr^{-1}$. The dilution tracer method yields a recent, lake-wide mean P accumulation rate and the cores from Lake Hell 'n' Blazes yield a coring-site-specific P accumulation rate. Comparison of values derived from the two methods is not always appropriate. Because soft sediment accumulation is fairly uniform throughout Lake Hell 'n' Blazes, however, comparison of recent P accumulation rates in Lake Hell 'n' Blazes with values from the 34-lake data set is valid.

At site 7, high rates of P accumulation were associated with the short-lived episode of high bulk sedimentation in the late 1940s. Generally increasing total P sequestering during the 20th century may reflect increasing loading of the system. Recent high values, however, may be partly attributable to the presence of dense submersed macrophytes. When a significant proportion of the water column is occupied by submersed plants, physical conditions in the lake are altered. For instance, water flow through the system may be retarded (Carpenter and Lodge 1986), thereby allowing more efficient uptake of dissolved nutrients (Canfield and Jones 1984, Canfield et al. 1984). Furthermore, high plant biomass may act as a "filter," intercepting suspended particulate material, which is ultimately deposited on the lake bottom. Submersed plants also served to reduce wind-generated turbulence (Dieter 1990), thereby minimizing sediment resuspension and loss from the system . $^{210}Pb$-dated sediment cores from *Hydrilla*-infested Orange Lake, in Alachua and Marion Counties, north-central Florida, also suggest that as submersed macrophytes proliferate in shallow lakes, nutrient sequestering rates increase (Brenner and Whitmore 1996). Data from the three Orange Lake profiles suggest that P burial on the lake bottom has increased 5-10 times over the rate at the turn of the century. Modern rates of P accumulation recorded at the three sites in Orange Lake were 0.081, 0.103, and 0.053, mg $cm^{-2}$ $yr^{-1}$, similar to, or slightly higher than recent rates determined from the Hell 'n' Blazes cores.

Soft organic sediment is distributed rather evenly throughout the Hell 'n' Blazes basin, displaying less than a two-fold variation among sites, with the exception of the station near the island at the south end of the lake. Rather uniform deposition is supported by similar total residual unsupported $^{210}Pb$ accumulations at site 3 (40.0 dpm $cm^{-2}$) and site 7 (25.1 dpm $cm^{-2}$). The coefficient of variation for excess $^{210}Pb$ accumulation at the two sites is only 23%. Because sediment distribution is spatially homogeneous in the lake, it is reasonable to use computed rates of phosphorus accumulation derived from $^{210}Pb$-dated cores, to estimate lakewide P accumulation rates. Since 1904, a total of 1.90 mg of P $cm^{-2}$ have accumulated at site 3. Thus, the mean rate of P accumulation at the site has been 0.021 mg $cm^{-2}$ $yr^{-1}$ over the last 92 years. At site 7, a total of 1.18 mg of P $cm^{-2}$ has accumulated since 1911, yielding a mean rate for the last 85 years of 0.014 mg $cm^{-2}$ $yr^{-1}$. Using a mean lakewide rate of P accumulation for this century of 0.018 mg $cm^{-2}$ $yr^{-1}$ (i.e. the mean of the rates computed for sites 3 and 7) and a lake area of 154 ha (Lowe et al. 1984), total lakewide P sequestering in Lake Hell 'n' Blazes has proceeded at a mean rate of 277 kg $yr^{-1}$. Total P storage in Lake Hell 'n' Blazes over the past century thus amounts to about 27,000 kg.

Although the datable portions of the cores represent the majority of the soft organic matter accumulation at the sites, basal deposits store appreciable amounts of total P. Total P concentrations in bottom deposits are low if expressed on a dry weight basis (mg P g $dry^{-1}$), but volumetric storage is high because the bulk density of basal sediments is high. Volumetric P storage in basal deposits of the cores was calculated by multiplying the concentration per gram dry weight (mg P $g^{-1}$ dry) times the bulk density (g dry $cm^{-3}$ wet), thus yielding the amount of P per $cm^3$ wet sediment. Volumetric P storage in surface sediments (0-4 cm) was also computed. In all four cores that were fully analyzed, volumetric P storage at the tops and bottoms of cores was similar. In core 25-IX-95-2, top sediments contain 0.033 mg P $cm^{-3}$ wet sediment, and basal deposits at 64-68 cm possess 0.037 mg P $cm^{-3}$ wet sediment. At site 3 (Figure 42), volumetric P storage varies more than five-fold over the length of the section. Nevertheless, topmost sediments from 0-4 cm depth have 0.029 mg P $cm^{-3}$ wet sediment, only slightly more than the sample from 100-104 cm depth (0.023 mg P $cm^{-3}$ wet sediment). Removal of the top meter of sediment would yield surface deposits that possess the same amount of P per $cm^3$ as exist at the site today. At site 6, top (0-4) and bottom (100-104) sediments possess 0.031 and 0.028 mg P $cm^{-3}$ wet sediment, respectively. Finally, at site 8, surface (0-4 cm) muds have 0.038 mg P $cm^{-3}$ wet sediment and bottom deposits contain 0.042 mg P $cm^{-3}$ wet sediment.

Sawgrass Lake

Sawgrass Lake displayed rather simple bathymetry in July 1995, with water depth varying between 138 and 157 cm at the eight limnetic sites visited. Likewise, soft sediment thickness was rather uniform at the eight distant locations in the basin. Piercing the organic sediment lens yielded soft sediment thicknesses ranging from 64 to 122 cm. With the exception of site 7, sediment thickness fell in the range between 92 and 122 cm. Short cores bottomed on dense deposits with high inorganic content and ranged from 44 to 88 cm in length. Again, excluding site 7, the retrieved cores displayed a narrow range of lengths (64-88 cm).

$^{210}$Pb-dated cores from three sites in Sawgrass Lake (3, 4, 8) demonstrate that much of the soft sediment in the basin was deposited during the 20th century. Core 13-VII-95-3 had a total length of 80 cm, but the uppermost 52 cm in the section were deposited since 1909. Likewise, 44 cm of the 88-cm core 13-VII-95-4 accumulated since 1899. At site 8 (core 13-VII-95-8), 32 cm of 84 cm retrieved were deposited in the last 104 years.

Temporal patterns of sediment deposition at the three sites in Sawgrass Lake differ somewhat. At site 3, there is a brief period of high sediment accumulation around 1909-1912, but thereafter, rates of accumulation are lower until the 1940s. The very high rates recorded for the period of the late 1940s may correlate with the same episode of high sedimentation revealed in Lake Hell 'n' Blazes, especially at site 7. Sites 4 and 8 in Sawgrass Lake fail to display the period of high sediment accumulation in the late 1940s, though a brief period of elevated accumulation at site 4 is recorded for the 1920s and early 1930s.

Total residual excess $^{210}$Pb accumulation at Sawgrass Lake sites 3, 4, and 8 was nearly identical, amounting to 17.5 dpm cm$^{-2}$, 21.7 dpm cm$^{-2}$, and 19.7 dpm cm$^{-2}$ respectively. The low variance suggests minimal resuspension and focusing of sediments and suggests that phosphorus accumulation at the three sites is characteristic of the basin as a whole. Mean phosphorus accumulation rates for the last century were computed for the three sites. For core 13-VII-95-3, 0.898 mg cm$^{-2}$ of total P accumulated in the 52 cm of sediment that were deposited since 1909. The average total P accumulation rate at site 3 for the last 87 years has thus been 0.010 mg cm$^{-2}$ yr$^{-1}$. At site 4, 1.096 mg cm$^{-2}$ accumulated in the topmost 44 cm, which were laid down over a period of 96 years. Thus, since the turn of the century, the mean rate of P accumulation at site 4 has been 0.011 mg cm$^{-2}$ yr$^{-1}$. At site 8, 0.942 mg cm-2 total P accumulated in the topmost 32 cm of sediment, which represent the accumulation for the past 104 years. The mean total P accumulation rate over the past century has amounted to 0.009 mg cm$^{-2}$ yr$^{-1}$.

Average P accumulation rates at the three sites have been similar since the turn of the century. Assuming that the values are typical of the basin as a whole, total P sequestering since the turn of the century was computed. The only caveat is that the longest cores were used for dating and calculating accumulation rates, so computed values may provide slight overestimates of lakewide P sequestering. To estimate the total P storage on the lake bottom during this century, an average P accumulation rate of 0.010 mg $cm^{-2}$ $yr^{-1}$ was used (i.e. the mean for the three sites), and the lake area was assumed to be 195 ha (Lowe et al. 1984). Annual P accumulation in Sawgrass Lake has averaged 195 kg $yr^{-1}$ over the past ~100 years, and P storage on the lake bottom has amounted to ~19, 500 kg P since the turn of the century.

Much as for Lake Hell 'n' Blazes, the most recent phosphorus accumulation rates recorded for Sawgrass Lake are much higher than rates determined for the turn of the century. The most recent rates recorded at sites 3, 4, and 8 (0.016, 0.037, and 0.036 mg $cm^{-2}$ $yr^{-1}$) exceed baseline rates for the turn of the century by about an order of magnitude. Based on Vollenweider's (1968) nutrient loading models, modern P loading of this magnitude would yield eutrophic water-column conditions in this shallow lake. The modern P sequestering rates in Sawgrass Lake are, however, low relative to values measured in many Florida waterbodies (Table 5).

Volumetric phosphorus storage in top and bottom samples was computed for the five Sawgrass cores that were fully analyzed for nutrient concentrations. Again, despite decreasing mass-based concentrations of total P (mg P $g^{-1}$ dry) with increasing depth in the profiles, increasing bulk density with depth tends to yield higher volumetric P storage in deep sediments relative to surface deposits. In core 13-VII-95-1, topmost (0-4 cm) sediments contain 0.039 mg P $cm^{-3}$ wet sediment, and bottommost deposits (60-64 cm) contain 0.046 mg P $cm^{-3}$ wet sediment. At sites 3, 4, and 8 uppermost deposits had 0.029, 0.025 and 0.037 mg P $cm^{-3}$ wet sediment, respectively. Bottom samples at 76-80 cm, 84-88 cm, and 80-84 cm possess 0.041, 0.019 and 0.053 mg P $cm^{-3}$ wet sediment, respectively. Bottom sediments at 64-68 cm from site 6 had both high dry mass concentration and high bulk density, so the volumetric content was 0.707 mg P $cm^{-3}$ wet sediment, much higher than the value of 0.028 mg P $cm^{-3}$ wet sediment calculated for surface (0-4 cm) sediments in the profile. The source of high P concentration in the bottommost sample from site 6 (64-68 cm) is not obvious, but the deposits differ from overlying sediments in possessing very low organic matter content, and probably contain Pleistocene-age sediments that underlie much of the region (Brooks 1981).

Lake Washington

Lake Washington was the deepest of the three lakes visited, registering a maximum water depth of 322 cm in November 1995. Water depth was fairly uniform throughout the limnetic region of the basin, varying between 200 and 322 cm at 24 widely-spaced sites where measurements were taken. Soft sediment distribution in Lake Washington is, nevertheless, highly variable. A number of sites contain no organic sediment, and surficial deposits are characterized by inorganic sands. Elsewhere, thin organic deposits overlie the sandy bottom. Only in the northeastern portion of the basin was there appreciable accumulation of organic sediment. Sediment piercing yielded maximum sediment thickness (101 cm) at site 1, where water depth is greatest. The core retrieved from site 1 was only 51 cm long, and basal deposits contain far more inorganic material (87%) than surface sediments from the site (39 %). With the exception of cores 2-XI-95-1, 2-XI-95-3, 3-XI-95-6, and 3-XI-95-8, collected from the northeast part of the lake, all cores had <40 cm of unconsolidated organic matter.

Shallow Florida lakes often demonstrate non-uniform organic sediment distribution, which is generally attributed to erosion, resuspension and redeposition of unconsolidated surface deposits (Whitmore et al. 1996). Wind-generated wave action is responsible for sediment transport. Lake Washington, with its large area (1766 ha), predominantly shallow water depth (2-3 m), and long fetch (>6 km) is highly susceptible to sediment redistribution.

Non-uniform sediment accumulation in Lake Washington is evident from the sediment sampling effort at 24 sites in the basin. Even in the northeastern part of the lake, where there is appreciable soft sediment accumulation, there is apparently between-site variability in deposition, as reflected in the total residual $^{210}Pb$ accumulations at sites 1, 3, 6, and 8 (79.6, 43.1, 50.0, and 53.5 dpm $cm^{-2}$, respectively).

Sediment accumulation is non-uniform throughout Lake Washington, thus phosphorus accumulation rates derived from the dated profiles are not indicative of lake-wide P sequestering. Because the northeast area of the lake represents a depositional zone, P accumulation rates derived from the cores overestimate lakewide P deposition. P accumulation rates are considered to be site-specific. At site 1, 2.696 mg P $cm^{-2}$ accumulated since 1911. This yields an average rate of P accumulation of 0.032 mg P $cm^{-2}$ $yr^{-1}$ for the past 84 years. At site 3, 1.732 mg P cm-2 were deposited since 1910, from which a mean P accumulation rate of 0.020 mg P $cm^{-2}$ $yr^{-1}$ was calculated. At site 6, 2.284 mg P $cm^{-2}$ accumulated since 1888, yielding an average rate of P accumulation over the last century equal to 0.021 mg P $cm^{-2}$ $yr^{-1}$. Lastly, at site 8, 1.865 mg P $cm^{-2}$ accumulated since 1891, for an average rate of 0.018 mg P $cm^{-2}$ $yr^{-1}$ over the past 105 years.

Mean P sequestering rates in Lake Washington over the past ~100 years (0.018-0.032 mg P $cm^{-2}$ $yr^{-1}$) are higher than mean values recorded in Sawgrass lake (0.009-0.011 mg P $cm^{-2}$ $yr^{-1}$) and comparable or just slightly higher than rates measured in Lake Hell 'n' Blazes (0.014 and 0.021 mg P $cm^{-2}$ $yr^{-1}$). This probably reflects the effect of sediment focusing in Lake Washington, biasing P accumulations on the high side in the region of organic sediment accumulation. Because soft sediment accumulation is spatially heterogeneous in Lake Washington, no attempt was made to calculate lakewide P storage during the 20th century. Likewise, comparison of site-specific, recent P accumulation rates derived from the Lake Washington cores with recent, mean lake-wide P accumulation rates for the 34 Florida lakes in Table 5 is inappropriate. Although rates of P accumulation derived from the four cores cannot be generalized to the lake as a whole, the data illustrate that P accumulation at all four sites has accelerated since the turn of the century. Modern rates of P accumulation are three (site 1) to ten (site 8) times higher than rates recorded ~1900.

Volumetric total P storage was calculated for top and bottom samples from the four dated cores from Lake Washington. In core 2-XI-95-1, bottom samples from 48-52 cm contain 0.060 mg P $cm^{-3}$ wet sediment, slightly more than the amount measured in surface deposits (0.055 mg P $cm^{-3}$ wet sediment). In core 2-XI-95-3, highly organic surface sediments contain less P (0.049 mg P $cm^{-3}$ wet sediment) than consolidated, inorganic material from 76-80 cm depth (0.347 mg P $cm^{-3}$ wet sediment). At site 6, surface sediments are richer in P (0.052 mg P $cm^{-3}$ wet sediment) than deposits from 52-56 cm (0.012 mg P $cm^{-3}$ wet sediment). At site 8, uppermost organic sediments contained more P (0.054 mg P $cm^{-3}$ wet sediment) than basal sediments from 56-60 cm (0.036 mg P $cm^{-3}$ wet sediment). It is notable that at sites 3 and 8, some deeper deposits contain relatively high concentrations of P, even when expressed on a dry mass basis. Samples demonstrating high phosphorus concentrations are associated with material that contains low organic matter, or with several stratigraphic levels among which the organic/inorganic content of the sediments varies considerably.

A comparison was also made between volumetric P storage in surface sediments from sites with organic-rich and organic-poor deposits. For this comparison, topmost sediments with >20% organic matter were deemed "organic" and those with <20% organic matter were considered inorganic. Sites 1, 3, 4, 6, 8, 12, 17, 22, and 24 had organic deposits. Phosphorus storage in uppermost organic sediments from these sites averaged $0.060 \pm 0.009$ mg P $cm^{-3}$ wet sediment. Inorganic surface sediments from sites 2, 9, 19, 20, and 21 possess $0.188 \pm 0.249$ mg P $cm^{-3}$ wet sediment. There is high variability in P storage among sites with inorganic surface deposits (range = 0.033-0.627 mg P $cm^{-3}$ wet sediment) and no statistical difference between P storage in organic versus inorganic surficial sediments.

## Conclusions

Lake Hell 'n' Blazes, the southernmost study basin in the upper St. Johns River drainage was visited in late September 1995. Water depth at eight sites in the limnetic area of the lake ranged between 200 and 240 cm. Seven of the eight sites had soft sediment accumulations of 60 to 117 cm, while station 8, near an island at the south end of the basin possessed more than 150 cm of soft, organic mud. No sediment core was retrieved near the island. Sediment cores retrieved from the other seven sites in the lake ranged in length from 63 to 106 cm, and bottomed on firm, relatively inorganic deposits. Soft organic sediments are rather evenly distributed throughout Lake Hell 'n' Blazes.

Sawgrass Lake was visited in mid-July 1995 and water depth at eight stations throughout the basin ranged from 137 to 157 cm. Soft sediment depth determined by "spudding," i.e. piercing the organic deposits with metal rods, yielded sediment thicknesses ranging from 64 to 122 cm. Sediment cores retrieved from eight stations ranged in length from 44 to 88 cm, suggesting that "spudding" rods penetrated underlying inorganic sediments to some degree, thereby overestimating organic sediment thickness. Similar to the situation in Lake Hell 'n' Blazes, organic sediments are fairly evenly distributed in Sawgrass Lake.

Twenty-four stations were sampled in Lake Washington during November 1995. Water depth ranged from 200 to 322 cm at the widely-spaced sites. Organic sediment distribution is non-uniform in Lake Washington, with the thickest soft sediment deposits encountered in the northeastern portion of the basin. Seven sites had sandy bottom, with no accumulation of organic sediment. The remaining 17 stations possessed between 5 and 101 cm of soft, organic sediment. The uneven distribution of organic sediment in Lake Washington is not surprising, considering the lake's shallow depth and long fetch. Study of Lake Apopka indicated that soft sediments in large, shallow Florida lakes can be resuspended, transported, and redeposited as a consequence of wind-generated wave action (Carrick et al. 1993). Disjunct distribution of soft organic sediment has been reported for many shallow Florida basins, with resuspended deposits often relocated to deeper areas or littoral zones of the lake (Whitmore et al. 1996)

Surface sediments from Lakes Hell 'n' Blazes and Sawgrass Lake are rich in organic matter. Topmost muds from four sites in Hell 'n' Blazes contain 645±43 mg organic matter per g dry sediment, and uppermost deposits from five stations in Sawgrass Lake possess 753±33 mg $g^{-1}$. These values are high compared to the mean value for surface deposits collected from single mid-lake sites in 97 Florida basins, which were shown to average 397±219 mg organic matter per g dry sediment (Brenner and Binford 1988). Statewide survey lakes displayed a broad range of organic matter concentration in surface deposits, from 8 to 842 mg $g^{-1}$ dry. In Lake Washington, organic matter concentration is variable. At the 14 sites where it was measured, the concentration ranged from ~10 to 631 mg organic matter per g dry sediment. The mean value for Lake Washington was 327±240 mg $g^{-1}$ dry.

Stratigraphic distributions of organic matter, total carbon and total nitrogen (mg $g^{-1}$ dry sediment) in four cores from Lake Hell 'n' Blazes, five cores from Sawgrass Lake, and 14 cores from Lake Washington demonstrate that C and N concentrations track organic matter content, indicating that carbon and nitrogen are bound predominantly in the organic sediment fraction. Total phosphorus (mg $g^{-1}$ dry sediment) does not track organic matter content quite so closely. In the Hell 'n' Blazes cores, total P content increases with decreasing depth in the sediments, reaching highest concentration in surface or near-surface sediments. A similar pattern was encountered in the Sawgrass cores, with the exception of the profile from site 6, that displayed high total P content in a single, basal sample. Total phosphorus concentrations were typically higher in uppermost sediments of Lake Washington cores. Greater depth in the profiles was generally associated with declining total P concentrations. Nevertheless, at sites 3 and 8, some deep sediments contained high P concentrations.

$^{210}Pb$ dating of two cores in Lake Hell 'n' Blazes, three cores in Sawgrass Lake, and four cores in Lake Washington demonstrates that a significant fraction of the organic sediment in these basins has accumulated since the turn of the century. In Lake Hell 'n' Blazes, modern rates of bulk sediment accumulation are higher than rates determined for the period about 1900. An episode of high sediment accumulation during the late 1940s is recorded at both Hell 'n' Blazes coring sites. Total phosphorus accumulation in Lake Hell 'n' Blazes has increased appreciably over rates that prevailed 100 years ago, and modern rates of P burial at sites 3 and 7 are high (0.054 and 0.035 mg P $cm^{-2}$ $yr^{-1}$). Because sediment distribution throughout the lake is fairly homogeneous, P accumulation rates determined for these sites are thought to be representative of rates at sites throughout the lake as a whole. If these rates are reflective of P loading to the lake, nutrient loading models (Vollenweider 1968) indicate that they are sufficient to maintain eutrophic water-column conditions in this shallow waterbody.

Temporal patterns of sediment accumulation in Sawgrass Lake display site-to-site variation. Bulk sediment accumulation at site 3 fluctuates appreciably through time, but demonstrates a high rate of accumulation in the late 1940s, similar to the results from Lake Hell 'n' Blazes. At sites 4 and 8 in Sawgrass Lake, there is a general increase in sediment accumulation through time, with a short period of high sedimentation that persisted through the 1920s and early 1930s. Total P accumulation at site 3 displays pronounced fluctuations through time, whereas the P accumulation records from sites 4 and 8 indicate fairly consistent increases since the turn of the century. Nutrient loading models (Vollenweider 1968) indicate that modern rates of P sequestering at sites 3, 4, and 8 (0.016, 0.037 and 0.036 mg $cm^{-2}$ $yr^{-1}$, respectively), if representative of lakewide P loading rates, are sufficiently high to maintain eutrophic conditions in this shallow basin.

Bulk sedimentation patterns within Lake Washington have been somewhat different from site to site. At site 1, modern rates of sediment accumulation are lower than values determined for the turn of the century. At sites 3, 6, and 8, there has been some fluctuation through time, but present-day rates of sedimentation exceed those determined for the early part of the century. At all four sites, P accumulation demonstrates a fairly consistent trend of increase over the last ~100 years. Modern rates of P accumulation at the sites (0.064, 0.065, 0.065, and 0.054 mg $cm^{-2}$ $yr^{-1}$) are high, but probably not representative of the basin as a whole. Because organic sediments are likely resuspended and preferentially focused to the northeast part of the basin, P accumulation rates derived from cores taken in this region of deposition are biased, and probably exceed the lakewide mean. Nevertheless, assuming that sediment resuspension and focusing has been an ongoing process, site-specific temporal changes in P accumulation are real and indicate increasing nutrient sequestering through time.

In Lake Hell 'n' Blazes and Sawgrass Lake, where sediment accumulation has been relatively uniform throughout the basins, the dated sediment profiles were used to estimate long-term, lakewide P burial. Mean annual phosphorus accumulation in Lake Hell 'n' Blazes proceeded at a rate of 277 kg $yr^{-1}$ in this century, and thus some 27,000 kg of P have accumulated on the lake bottom in the past 100 years. In Sawgrass Lake, the mean annual rate of P burial since ~1900 was 195 kg yr-1, so that 19,500 kg of P have accumulated in the last century. Because sediment distribution is heterogeneous in Lake Washington, no attempt was made to estimate mean lakewide rates of P burial for the last 100 years.

Results from all three lakes indicate that phosphorus accumulation on the lake bottoms has generally increased through time. Furthermore, P concentrations, expressed as a fraction of dry mass, are generally much higher in surface sediments than in deep deposits. This suggests that surface muds may be a significant source of diffusional P flux to the overlying waters, and that removal of the soft organic sediments might reduce internal nutrient loading. Analysis of volumetric P concentration in sediments (total P $cm^{-3}$ wet sediment) suggests, however, that such a procedure will not be a panacea. Despite low mass-based P concentrations (i.e. mg P $g^{-1}$ dry) in deep sediments, volumetric concentrations of phosphorus are typically as high or higher than values recorded in uppermost deposits. Low mass-based P concentrations (mg $g^{-1}$) in basal sediments are compensated for by their high bulk densities (g $cm^{-3}$), yielding high volumetric P concentrations. The implication is that even if organic sediments are removed in an effort to reduce diffusional input of P to the water column, bottom waters will still be in contact with sediments that contain a comparable amount of P, as expressed on a volume basis.

An additional objective of dredging might be to increase the mean depth (i.e. volume) of the lakes. Complete removal of organic sediments from Lake Hell 'n' Blazes will increase water depths in the limnetic zone by about 80 cm, from about 230 cm to 310 cm. In Sawgrass Lake, complete soft sediment removal might increase depths in the limnetic zone from about 150 cm to 250 cm. If recent rates of P accumulation derived from dated sediment cores reflect external P loading to the lakes, then the modest increases in depth achieved by dredging will have little effect on nutrient concentrations in the water column. Nevertheless, organic sediment removal in Lakes Hell 'n' Blazes and Sawgrass Lake may achieve goals such as providing better spawning habitat for sportfish.

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Table 1. Core site, core designation, water depth, soft sediment depth, length of retrieved core, and coring locations in Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington.

Lake Hell 'n' Blazes

| Site (#) | Core (#) | $H_2O$ Depth (cm) | Soft Sediment (cm) | Core Length (cm) | Coordinates (N Lat x W Long) |
|---|---|---|---|---|---|
| 1 | 25-IX-95-1 | 240 | 60 | 63 | 28°01'26.2" x 80°47'55.9" |
| 2 | 25-IX-95-2 | 220 | 75 | 70 | 28°01'34.8" x 80°47'48.9" |
| 3 | 25-IX-95-3 | 230 | 117 | 106 | 28°01'13.9" x 80°47'46.6" |
| 4 | 25-IX-95-4 | 240 | 84 | 88 | 28°01'13.1" x 80°47'32.2" |
| 5 | 25-IX-95-5 | 220 | 85 | 65 | 28°00'59.6" x 80°47'49.6" |
| 6 | 25-IX-95-6 | 235 | 99 | 102 | 28°00'57.9" x 80°47'38.5" |
| 7 | 25-IX-95-7 | 230 | 60 | 68 | 28°00'47.6" x 80°47'50.1" |
| 8 | 25-IX-95-8 | 200 | >150 | ** | 28°00'49.8" x 80°47'39.2" |

**No core retrieved

Sawgrass Lake

| Site (#) | Core (#) | $H_2O$ Depth (cm) | Soft Sediment (cm) | Core Length (cm) | Coordinates (N Lat x W Long) |
|---|---|---|---|---|---|
| 1 | 13-VII-95-1 | 140 | 92 | 64 | 28°04'30" x 80°47'10" |
| 2 | 13-VII-95-2 | 140 | 114 | 64 | 28°04'20" x 80°47'11" |
| 3 | 13-VII-95-3 | 144 | 110 | 80 | 28°04'34" x 80°46'52" |
| 4 | 13-VII-95-4 | 150 | 122 | 88 | 28°04'26" x 80°46'49" |
| 5 | 13-VII-95-5 | 138 | 93 | 69 | 28°04'09" x 80°46'50" |
| 6 | 13-VII-95-6 | 157 | 96 | 68 | 28°04'39" x 80°46'31" |
| 7 | 13-VII-95-7 | 138 | 64 | 44 | 28°04'23" x 80°46'30.5" |
| 8 | 13-VII-95-8 | 157 | 107 | 84 | 28°04'35" x 80°46'09.5" |

Table 1 (continued). Core site, core designation, water depth, soft sediment depth, length of retrieved core, and coring locations in Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington.

Lake Washington

| Site (#) | Core (#) | $H_2O$ Depth (cm) | Soft Sediment (cm) | Core Length (cm) | Coordinates (N Lat x W Long) |
|---|---|---|---|---|---|
| 1 | 2-XI-95-1 | 322 | 101 | 51 | 28°09'01.6" x 80°44'26.6" |
| 2 | 2-XI-95-2 | 250 | 0 | 32 | 28°09'16.3" x 80°45'01.6" |
| 3 | 2-XI-95-3 | 316 | 94 | 80 | 28°09'45.0" x 80°44'29.8" |
| 4 | 2-XI-95-4 | 310 | 28 | 34 | 28°10'00.6" x 80°45'04.4" |
| 5 | 3-XI-95-5 | 255 | 9 | 17 | 28°10'01.8" x 80°45'32.8" |
| 6 | 3-XI-95-6 | 300 | 60 | 60 | 28°10'04.6" x 80°44'30.8" |
| 7 | 3-XI-95-7 | 300 | 0 | ** | 28°09'39.0" x 80°45'00.5" |
| 8 | 3-XI-95-8 | 320 | 66 | 60 | 28°09'26.2" x 80°44'28.8" |
| 9 | 3-XI-95-9 | 260 | 20 | 19 | 28°09'14.9" x 80°44'07.2" |
| 10 | 3-XI-95-10 | 310 | 35 | 12 | 28°09'00.4" x 80°44'49.2" |
| 11 | 3-XI-95-11 | 270 | 0 | ** | 28°08'37.4" x 80°44'58.9" |
| 12 | 3-XI-95-12 | 320 | 20 | 24 | 28°08'40.0" x 80°44'39.3" |
| 13 | 3-XI-95-13 | 300 | 0 | ** | 28°08'38.6" x 80°44'12.5" |
| 14 | 3-XI-95-14 | 250 | 28 | 20 | 28°08'20.6" x 80°45'02.5" |
| 15 | 3-XI-95-15 | 310 | 0 | 17 | 28°08'22.7" x 80°44'37.6" |
| 16 | 3-XI-95-16 | 300 | 0 | ** | 28°08'20.3" x 80°44'13.4" |
| 17 | 30-XI-95-17 | 236 | 18 | 29 | 28°07'56.3" x 80°44'15.1" |
| 18 | 30-XI-95-18 | 240 | 16 | 10 | 28°07'47.6" x 80°44'34.4" |
| 19 | 30-XI-95-19 | 260 | 24 | 21 | 28°07'48.5" x 80°44'55.8" |
| 20 | 30-XI-95-20 | 220 | 5 | 15 | 28°07'25.0" x 80°44'57.6" |
| 21 | 30-XI-95-21 | 205 | 5 | 16 | 28°07'26.3" x 80°44'38.6" |

Table 1 (continued). Core site, core designation, water depth, soft sediment depth, length of retrieved core, and coring locations in Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington.

Lake Washington

| Site (#) | Core (#) | $H_2O$ Depth (cm) | Soft Sediment (cm) | Core Length (cm) | Coordinates (N Lat x W Long) |
|---|---|---|---|---|---|
| 22 | 30-XI-95-22 | 220 | 5 | 18 | 28°07'29.8" x 80°44'16.9" |
| 23 | 30-XI-95-23 | 200 | 0 | 10 | 28°07'12.5" x 80°45'10.3" |
| 24 | 30-XI-95-24 | 230 | 30 | 40 | 28°07'09.4" x 80°44'55.2" |

**No core retrieved

Table 2. Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Hell 'n' Blazes 25-IX-95-2

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 5.1 | 0.052 | 657.9 | 405.7 | 30.8 | 0.632 |
| 4-8 | 11.2 | 0.119 | 557.4 | 391.2 | 28.9 | 0.454 |
| 8-12 | 12.3 | 0.131 | 502.4 | 427.3 | 30.4 | 0.226 |
| 12-16 | 10.8 | 0.114 | 629.0 | 422.0 | 29.5 | 0.187 |
| 16-20 | 10.3 | 0.109 | 646.6 | 440.5 | 30.7 | 0.146 |
| 20-24 | 11.1 | 0.117 | 576.6 | 437.4 | 29.9 | 0.149 |
| 24-28 | 11.8 | 0.126 | 612.3 | 364.0 | 24.6 | 0.147 |
| 28-32 | 11.0 | 0.116 | 645.6 | 484.6 | 33.9 | 0.131 |
| 32-36 | 13.2 | 0.141 | 634.2 | 418.0 | 29.9 | 0.131 |
| 36-40 | 9.1 | 0.095 | 797.9 | 454.2 | 33.4 | 0.180 |
| 40-44 | 8.8 | 0.091 | 855.4 | 483.1 | 36.9 | 0.158 |
| 44-48 | 14.9 | 0.161 | 562.6 | 458.1 | 32.6 | 0.124 |
| 48-52 | 11.1 | 0.117 | 715.6 | 451.7 | 31.5 | 0.128 |
| 52-56 | 11.6 | 0.122 | 709.8 | 416.3 | 28.8 | 0.121 |
| 56-60 | 11.5 | 0.123 | 452.0 | 353.9 | 24.5 | 0.116 |
| 60-64 | 24.1 | 0.278 | 281.2 | 170.8 | 11.1 | 0.101 |
| 64-68 | 33.7 | 0.417 | 232.3 | 174.7 | 12.0 | 0.068 |
| 68-70 | 43.7 | 0.582 | 193.7 | 110.9 | 6.9 | 0.063 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Hell 'n' Blazes 25-IX-95-3

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 4.3 | 0.043 | 688.0 | 364.7 | 30.3 | 0.679 |
| 4-8 | 5.5 | 0.057 | 687.6 | 370.5 | 29.3 | 0.662 |
| 8-12 | 5.9 | 0.061 | 668.0 | 346.2 | 29.2 | 0.809 |
| 12-16 | 6.8 | 0.070 | 675.3 | 357.8 | 28.5 | 0.723 |
| 16-20 | 7.6 | 0.079 | 693.5 | 371.8 | 29.1 | 0.626 |
| 20-24 | 8.0 | 0.083 | 697.9 | 366.9 | 28.5 | 0.677 |
| 24-28 | 8.2 | 0.085 | 733.5 | 393.8 | 30.1 | 0.429 |
| 28-32 | 7.9 | 0.082 | 755.1 | 411.5 | 29.2 | 0.381 |
| 32-36 | 7.2 | 0.074 | 765.0 | 441.6 | 29.7 | 0.252 |
| 36-40 | 6.7 | 0.069 | 790.8 | 450.9 | 30.3 | 0.251 |
| 40-44 | 6.4 | 0.066 | 796.1 | 467.0 | 31.0 | 0.193 |
| 44-48 | 7.0 | 0.072 | 792.1 | 449.3 | 30.6 | 0.231 |
| 48-52 | 7.5 | 0.078 | 807.4 | 444.2 | 28.2 | 0.303 |
| 52-56 | 7.4 | 0.076 | 813.7 | 452.1 | 30.5 | 0.346 |
| 56-60 | 7.2 | 0.074 | 815.7 | 452.6 | 29.6 | 0.253 |
| 60-64 | 6.9 | 0.071 | 831.2 | 477.5 | 32.6 | 0.224 |
| 64-68 | 7.6 | 0.079 | 832.1 | 485.7 | 32.2 | 0.190 |
| 68-72 | 6.0 | 0.061 | 846.6 | 469.6 | 31.6 | 0.155 |
| 72-76 | 6.3 | 0.065 | 838.7 | 483.8 | 33.5 | 0.134 |
| 76-80 | 6.7 | 0.069 | 830.5 | 458.8 | 30.5 | 0.127 |
| 80-84 | 9.4 | 0.099 | 771.0 | 441.2 | 28.6 | 0.106 |
| 84-88 | 8.3 | 0.087 | 755.8 | 443.3 | 29.2 | 0.132 |
| 88-92 | 14.8 | 0.159 | 672.5 | 373.3 | 25.5 | 0.103 |
| 92-96 | 16.7 | 0.182 | 622.8 | 346.7 | 21.2 | 0.122 |
| 96-100 | 20.8 | 0.232 | 518.6 | 273.8 | 17.7 | 0.076 |
| 100-104 | 26.8 | 0.313 | 361.4 | 212.5 | 14.9 | 0.073 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Hell 'n' Blazes 25-IX-95-6

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 3.2 | 0.033 | 648.4 | 338.9 | 28.8 | 0.950 |
| 4-8 | 5.4 | 0.055 | 603.6 | 316.0 | 27.7 | 0.728 |
| 8-12 | 7.0 | 0.072 | 627.4 | 334.7 | 25.0 | 0.574 |
| 12-16 | 7.3 | 0.075 | 678.7 | 372.8 | 26.5 | 0.428 |
| 16-20 | 7.3 | 0.075 | 727.9 | 390.1 | 26.6 | 0.312 |
| 20-24 | 6.4 | 0.066 | 768.1 | 435.4 | 29.0 | 0.204 |
| 24-28 | 6.1 | 0.063 | 811.3 | 479.0 | 32.5 | 0.204 |
| 28-32 | 5.7 | 0.059 | 813.3 | 477.3 | 31.3 | 0.144 |
| 32-36 | 5.9 | 0.060 | 829.6 | 487.8 | 34.2 | 0.137 |
| 36-40 | 6.4 | 0.066 | 841.6 | 488.7 | 32.8 | 0.131 |
| 40-44 | 7.0 | 0.072 | 814.2 | 473.2 | 30.9 | 0.165 |
| 44-48 | 6.3 | 0.065 | 803.9 | 465.9 | 33.0 | 0.177 |
| 48-52 | 6.3 | 0.065 | 817.0 | 500.7 | 33.9 | 0.178 |
| 52-56 | 6.0 | 0.061 | 858.0 | 495.7 | 35.7 | 0.189 |
| 56-60 | 5.8 | 0.060 | 849.2 | 498.1 | 33.4 | 0.140 |
| 60-64 | 6.0 | 0.061 | 836.1 | 473.4 | 31.0 | 0.123 |
| 64-68 | 6.3 | 0.064 | 822.0 | 461.8 | 30.8 | 0.127 |
| 68-72 | 6.7 | 0.069 | 810.8 | 465.4 | 30.0 | 0.114 |
| 72-76 | 7.2 | 0.074 | 806.7 | 484.4 | 30.3 | 0.095 |
| 76-80 | 9.9 | 0.104 | 702.4 | 432.1 | 28.5 | 0.094 |
| 80-84 | 17.5 | 0.193 | 419.2 | 347.9 | 23.0 | 0.084 |
| 84-88 | 14.8 | 0.160 | 514.0 | 353.6 | 22.9 | 0.096 |
| 88-92 | 23.3 | 0.266 | 386.4 | 196.3 | 13.3 | 0.057 |
| 92-96 | 27.6 | 0.326 | 316.0 | 224.0 | 16.7 | 0.043 |
| 96-100 | 49.1 | 0.686 | 146.5 | 104.1 | 7.6 | 0.043 |
| 100-104 | 64.2 | 1.027 | 113.0 | 50.7 | 3.7 | 0.027 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Hell 'n' Blazes 25-IX-95-7

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 5.6 | 0.057 | 584.5 | 304.7 | 23.8 | 0.674 |
| 4-8 | 6.7 | 0.069 | 561.1 | 287.7 | 22.8 | 0.623 |
| 8-12 | 7.8 | 0.081 | 582.0 | 298.7 | 23.4 | 0.655 |
| 12-16 | 7.9 | 0.083 | 624.8 | 321.6 | 24.0 | 0.515 |
| 16-20 | 8.1 | 0.084 | 699.7 | 395.9 | 26.5 | 0.258 |
| 20-24 | 7.9 | 0.082 | 747.4 | 413.4 | 27.4 | 0.215 |
| 24-28 | 7.9 | 0.081 | 763.8 | 405.3 | 26.4 | 0.230 |
| 28-32 | 8.4 | 0.087 | 723.3 | 379.8 | 25.2 | 0.220 |
| 32-36 | 7.4 | 0.077 | 750.0 | 408.4 | 27.3 | 0.210 |
| 36-40 | 6.7 | 0.069 | 817.6 | 453.3 | 30.4 | 0.176 |
| 40-44 | 8.4 | 0.087 | 775.3 | 470.4 | 30.2 | 0.148 |
| 44-48 | 7.9 | 0.082 | 760.4 | 429.7 | 28.3 | 0.190 |
| 48-52 | 7.5 | 0.078 | 783.6 | 429.3 | 29.2 | 0.178 |
| 52-56 | 9.0 | 0.094 | 738.3 | 395.9 | 27.0 | 0.150 |
| 56-60 | 22.5 | 0.255 | 444.9 | 271.1 | 17.5 | 0.115 |
| 60-64 | 60.6 | 0.940 | 91.5 | 35.4 | 2.6 | 0.039 |
| 64-68 | 72.7 | 1.273 | 62.5 | 35.4 | 2.9 | 0.033 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-1

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 4.6 | 0.046 | 778.5 | 400.8 | 32.4 | 0.837 |
| 4-8 | 5.9 | 0.061 | 777.4 | 406.2 | 32.4 | 0.712 |
| 8-12 | 7.1 | 0.073 | 787.4 | 415.2 | 30.8 | 0.446 |
| 12-16 | 7.7 | 0.079 | 809.2 | 431.8 | 30.5 | 0.294 |
| 16-20 | 8.3 | 0.086 | 819.3 | 458.1 | 31.5 | 0.252 |
| 20-24 | 8.8 | 0.092 | 816.7 | 448.1 | 31.9 | 0.221 |
| 24-28 | 9.1 | 0.095 | 737.2 | 405.8 | 28.9 | 0.203 |
| 28-32 | 9.1 | 0.095 | 675.9 | 368.0 | 25.9 | 0.176 |
| 32-36 | 9.0 | 0.094 | 798.4 | 467.9 | 32.5 | 0.239 |
| 36-40 | 12.2 | 0.130 | 644.3 | 331.4 | 22.9 | 0.209 |
| 40-44 | 37.1 | 0.474 | 99.7 | 47.3 | 3.4 | 0.039 |
| 44-48 | 65.4 | 1.073 | 26.5 | 11.0 | 0.9 | 0.021 |
| 48-52 | 72.3 | 1.266 | 44.8 | 20.3 | 2.0 | 0.021 |
| 52-56 | 75.5 | 1.365 | 51.8 | 21.4 | 2.5 | 0.026 |
| 56-60 | 74.8 | 1.341 | 55.0 | 23.1 | 2.6 | 0.030 |
| 60-64 | 76.3 | 1.395 | 39.4 | 14.0 | 1.4 | 0.033 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-3

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 3.7 | 0.038 | 705.9 | 373.7 | 32.1 | 0.771 |
| 4-8 | 5.1 | 0.052 | 716.3 | 383.7 | 31.1 | 0.611 |
| 8-12 | 6.7 | 0.069 | 696.6 | 372.9 | 26.9 | 0.287 |
| 12-16 | 7.0 | 0.072 | 705.0 | 405.2 | 28.5 | 0.282 |
| 16-20 | 6.6 | 0.069 | 754.6 | 412.5 | 29.2 | 0.270 |
| 20-24 | 6.6 | 0.068 | 727.4 | 401.6 | 28.3 | 0.227 |
| 24-28 | 6.4 | 0.066 | 740.0 | 402.7 | 28.3 | 0.190 |
| 28-32 | 6.3 | 0.065 | 753.1 | 402.8 | 28.4 | 0.176 |
| 32-36 | 6.3 | 0.065 | 745.8 | 408.5 | 28.7 | 0.173 |
| 36-40 | 6.8 | 0.070 | 735.2 | 438.5 | 30.8 | 0.180 |
| 40-44 | 7.0 | 0.073 | 733.9 | 370.3 | 25.9 | 0.187 |
| 44-48 | 6.7 | 0.069 | 765.7 | 415.8 | 30.0 | 0.195 |
| 48-52 | 7.2 | 0.074 | 752.6 | 434.7 | 30.1 | 0.196 |
| 52-56 | 15.9 | 0.174 | 362.6 | 167.9 | 11.7 | 0.150 |
| 56-60 | 11.4 | 0.120 | 584.3 | 318.9 | 23.0 | 0.194 |
| 60-64 | 10.6 | 0.112 | 533.0 | 306.7 | 22.0 | 0.193 |
| 64-68 | 27.1 | 0.320 | 171.3 | 65.3 | 4.7 | 0.173 |
| 68-72 | 51.5 | 0.742 | 49.7 | 18.5 | 1.4 | 0.029 |
| 72-76 | 63.8 | 1.028 | 38.5 | 18.4 | 1.5 | 0.025 |
| 76-80 | 67.3 | 1.116 | 70.8 | 34.0 | 4.0 | 0.037 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-4

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 3.6 | 0.037 | 732.3 | 370.8 | 31.9 | 0.681 |
| 4-8 | 4.5 | 0.046 | 723.1 | 377.1 | 31.5 | 0.703 |
| 8-12 | 5.0 | 0.051 | 748.3 | 380.5 | 31.0 | 0.624 |
| 12-16 | 5.3 | 0.055 | 727.5 | 384.1 | 31.0 | 0.548 |
| 16-20 | 5.4 | 0.055 | 737.3 | 389.3 | 30.1 | 0.535 |
| 20-24 | 5.7 | 0.058 | 747.8 | 399.6 | 30.8 | 0.487 |
| 24-28 | 6.0 | 0.062 | 793.2 | 413.6 | 30.2 | 0.365 |
| 28-32 | 6.9 | 0.072 | 702.8 | 340.9 | 24.9 | 0.245 |
| 32-36 | 9.4 | 0.099 | 567.1 | 300.8 | 20.6 | 0.186 |
| 36-40 | 11.2 | 0.119 | 512.6 | 266.6 | 19.1 | 0.175 |
| 40-44 | 10.6 | 0.112 | 558.0 | 282.1 | 20.2 | 0.161 |
| 44-48 | 8.0 | 0.083 | 707.6 | 309.3 | 22.1 | 0.172 |
| 48-52 | 7.1 | 0.073 | 697.9 | 394.9 | 28.2 | 0.188 |
| 52-56 | 5.9 | 0.061 | 757.7 | 393.1 | 28.1 | 0.204 |
| 56-60 | 5.9 | 0.060 | 806.0 | 420.6 | 30.2 | 0.249 |
| 60-64 | 6.6 | 0.068 | 739.2 | 372.9 | 26.4 | 0.217 |
| 64-68 | 14.5 | 0.157 | 408.0 | 171.9 | 11.7 | 0.099 |
| 68-72 | 24.5 | 0.285 | 198.9 | 74.3 | 5.4 | 0.094 |
| 72-76 | 33.3 | 0.414 | 109.9 | 72.8 | 5.3 | 0.058 |
| 76-80 | 46.6 | 0.619 | 405.4 | 26.6 | 2.1 | 0.047 |
| 80-84 | 33.5 | 0.411 | 278.7 | 109.8 | 7.5 | 0.043 |
| 84-88 | 29.7 | 0.354 | 349.3 | 199.9 | 14.1 | 0.053 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-6

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 3.4 | 0.035 | 772.5 | 400.0 | 33.9 | 0.799 |
| 4-8 | 5.4 | 0.055 | 766.0 | 400.5 | 32.7 | 0.705 |
| 8-12 | 6.3 | 0.064 | 788.6 | 410.6 | 30.9 | 0.515 |
| 12-16 | 6.7 | 0.069 | 812.9 | 433.3 | 30.4 | 0.409 |
| 16-20 | 6.8 | 0.071 | 803.6 | 425.8 | 30.7 | 0.358 |
| 20-24 | 7.0 | 0.072 | 825.3 | 440.4 | 30.5 | 0.296 |
| 24-28 | 7.1 | 0.074 | 810.2 | 437.4 | 29.9 | 0.247 |
| 28-32 | 7.0 | 0.072 | 824.7 | 428.2 | 30.6 | 0.220 |
| 32-36 | 7.1 | 0.073 | 797.4 | 433.3 | 30.4 | 0.214 |
| 36-40 | 8.6 | 0.089 | 693.5 | 322.6 | 22.2 | 0.203 |
| 40-44 | 7.8 | 0.081 | 739.0 | 312.2 | 21.8 | 0.196 |
| 44-48 | 10.4 | 0.110 | 615.8 | 282.1 | 19.5 | 0.178 |
| 48-52 | 9.2 | 0.096 | 574.6 | 376.9 | 26.9 | 0.213 |
| 52-56 | 10.6 | 0.112 | 574.3 | 290.6 | 20.1 | 0.185 |
| 56-60 | 17.2 | 0.190 | 273.1 | 183.9 | 12.7 | 0.111 |
| 60-64 | 37.2 | 0.472 | 202.7 | 99.6 | 6.7 | 0.107 |
| 64-68 | 55.8 | 0.829 | 98.9 | 35.5 | 2.5 | 0.853 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-8

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 3.8 | 0.039 | 777.0 | 392.5 | 33.5 | 0.941 |
| 4-8 | 4.8 | 0.049 | 777.5 | 391.9 | 33.2 | 0.801 |
| 8-12 | 5.4 | 0.056 | 778.3 | 396.2 | 32.6 | 0.705 |
| 12-16 | 6.6 | 0.068 | 783.3 | 398.8 | 31.1 | 0.542 |
| 16-20 | 7.2 | 0.074 | 804.4 | 424.8 | 29.9 | 0.374 |
| 20-24 | 6.9 | 0.071 | 809.8 | 422.5 | 29.7 | 0.314 |
| 24-28 | 7.1 | 0.073 | 747.6 | 388.5 | 26.4 | 0.222 |
| 28-32 | 8.3 | 0.086 | 667.2 | 319.8 | 22.6 | 0.204 |
| 32-36 | 7.7 | 0.080 | 698.7 | 362.5 | 24.4 | 0.192 |
| 36-40 | 7.5 | 0.078 | 650.5 | 377.2 | 25.4 | 0.189 |
| 40-44 | 6.8 | 0.071 | 726.1 | 391.8 | 25.4 | 0.175 |
| 44-48 | 12.4 | 0.133 | 405.8 | 173.9 | 11.3 | 0.143 |
| 48-52 | 9.4 | 0.098 | 563.6 | 359.6 | 24.8 | 0.161 |
| 52-56 | 9.9 | 0.105 | 540.7 | 264.1 | 18.1 | 0.138 |
| 56-60 | 14.3 | 0.156 | 324.8 | 209.4 | 14.7 | 0.240 |
| 60-64 | 26.3 | 0.307 | 325.8 | 144.1 | 9.7 | 0.080 |
| 64-68 | 25.9 | 0.300 | 447.4 | 219.9 | 15.4 | 0.066 |
| 68-72 | 33.6 | 0.412 | 312.2 | 146.5 | 10.5 | 0.055 |
| 72-76 | 46.7 | 0.637 | 196.6 | 85.2 | 6.2 | 0.056 |
| 76-80 | 55.5 | 0.820 | 115.3 | 59.2 | 4.6 | 0.049 |
| 80-84 | 69.5 | 1.179 | 67.2 | 34.5 | 3.2 | 0.045 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Washington 2-XI-95-1

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 7.9 | 0.082 | 608.7 | 344.1 | 24.8 | 0.669 |
| 4-8 | 10.6 | 0.112 | 558.9 | 314.3 | 22.2 | 0.591 |
| 8-12 | 11.5 | 0.122 | 581.3 | 323.8 | 22.4 | 0.590 |
| 12-16 | 10.8 | 0.114 | 618.4 | 346.2 | 23.2 | 0.483 |
| 16-20 | 11.3 | 0.119 | 600.0 | 350.1 | 23.5 | 0.429 |
| 20-24 | 13.7 | 0.147 | 506.5 | 274.9 | 18.4 | 0.328 |
| 24-28 | 15.3 | 0.166 | 421.0 | 205.6 | 14.2 | 0.305 |
| 28-32 | 19.7 | 0.221 | 315.1 | 149.0 | 10.2 | 0.289 |
| 32-36 | 31.6 | 0.386 | 200.5 | 84.5 | 6.1 | 0.214 |
| 36-40 | 42.6 | 0.563 | 173.8 | 98.8 | 7.0 | 0.146 |
| 40-44 | 28.8 | 0.342 | 332.6 | 164.7 | 11.6 | 0.139 |
| 44-48 | 36.8 | 0.464 | 218.8 | 123.7 | 9.4 | 0.099 |
| 48-52 | 47.7 | 0.660 | 134.4 | 78.5 | 6.4 | 0.091 |

Washington 2-XI-95-2

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 79.2 | 1.506 | 9.7 | 5.4 | 0.5 | 0.022 |
| 4-8 | 80.4 | 1.552 | 5.8 | 2.5 | 0.3 | 0.016 |
| 8-12 | 76.0 | 1.393 | 8.7 | 2.6 | 0.3 | 0.012 |
| 12-16 | 77.8 | 1.454 | 11.6 | 7.5 | 0.5 | 0.012 |
| 16-20 | 77.3 | 1.436 | 14.5 | 11.8 | 0.7 | 0.011 |
| 20-24 | 74.4 | 1.337 | 27.4 | 25.6 | 1.6 | 0.028 |
| 24-28 | 79.0 | 1.498 | 11.1 | 6.9 | 0.6 | 0.013 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Washington 2-XI-95-3

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 7.4 | 0.077 | 616.7 | 347.2 | 24.9 | 0.632 |
| 4-8 | 10.5 | 0.111 | 587.4 | 332.1 | 23.5 | 0.616 |
| 8-12 | 12.8 | 0.137 | 501.0 | 341.0 | 23.3 | 0.547 |
| 12-16 | 10.7 | 0.113 | 618.5 | 350.5 | 24.0 | 0.469 |
| 16-20 | 9.9 | 0.104 | 655.5 | 372.2 | 25.2 | 0.386 |
| 20-24 | 11.7 | 0.124 | 541.7 | 321.4 | 21.6 | 0.364 |
| 24-28 | 13.3 | 0.143 | 472.5 | 263.2 | 18.0 | 0.317 |
| 28-32 | 19.5 | 0.219 | 319.0 | 206.9 | 14.8 | 0.261 |
| 32-36 | 15.7 | 0.172 | 319.1 | 140.5 | 10.2 | 0.261 |
| 36-40 | 20.7 | 0.232 | 440.0 | 233.4 | 15.0 | 0.122 |
| 40-44 | 14.2 | 0.152 | 673.4 | 352.3 | 22.0 | 0.062 |
| 44-48 | 13.6 | 0.146 | 654.1 | 371.1 | 23.2 | 0.057 |
| 48-52 | 16.9 | 0.184 | 599.4 | 342.1 | 22.0 | 0.064 |
| 52-56 | 17.5 | 0.192 | 597.6 | 336.2 | 21.8 | nd |
| 56-60 | 15.4 | 0.167 | 627.5 | 359.0 | 24.6 | 0.707 |
| 60-64 | 15.2 | 0.165 | 600.0 | 335.8 | 23.2 | 1.011 |
| 64-68 | 15.3 | 0.165 | 649.7 | 375.0 | 27.0 | 0.894 |
| 68-72 | 19.1 | 0.212 | 497.4 | 281.8 | 19.0 | 0.699 |
| 72-76 | 29.3 | 0.351 | 247.4 | 155.0 | 10.5 | 0.663 |
| 76-80 | 33.4 | 0.413 | 167.4 | 104.4 | 7.3 | 0.839 |

Washington 2-XI-95-4

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 8.8 | 0.092 | 578.7 | 318.5 | 22.8 | 0.638 |
| 4-8 | 11.5 | 0.122 | 580.9 | 322.5 | 22.6 | 0.608 |
| 8-12 | 11.4 | 0.121 | 596.9 | 322.5 | 22.0 | 0.487 |
| 12-16 | 11.2 | 0.118 | 609.5 | 334.3 | 22.6 | 0.425 |
| 16-20 | 12.7 | 0.136 | 531.8 | 290.6 | 19.6 | 0.379 |
| 20-24 | 19.1 | 0.213 | 359.8 | 186.4 | 12.7 | 0.252 |
| 24-28 | 28.5 | 0.339 | 256.9 | 144.7 | 10.0 | 0.252 |
| 28-32 | 47.9 | 0.662 | 151.1 | 79.4 | 6.7 | 0.140 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Washington 3-XI-95-6

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 8.0 | 0.083 | 605.5 | 314.9 | 22.8 | 0.627 |
| 4-8 | 11.8 | 0.126 | 479.9 | 248.9 | 17.7 | 0.660 |
| 8-12 | 20.2 | 0.226 | 411.6 | 218.9 | 15.5 | 0.439 |
| 12-16 | 16.5 | 0.181 | 406.9 | 217.6 | 15.0 | 0.364 |
| 16-20 | 16.0 | 0.175 | 403.2 | 202.7 | 14.0 | 0.367 |
| 20-24 | 17.1 | 0.188 | 362.3 | 201.0 | 13.7 | 0.333 |
| 24-28 | 35.1 | 0.439 | 148.8 | 75.6 | 5.1 | 0.168 |
| 28-32 | 43.2 | 0.578 | 100.3 | 47.8 | 3.4 | 0.121 |
| 32-36 | 32.9 | 0.404 | 214.7 | 120.8 | 7.9 | 0.148 |
| 36-40 | 16.8 | 0.182 | 631.1 | 375.7 | 22.8 | 0.098 |
| 40-44 | 14.9 | 0.160 | 721.7 | 410.4 | 25.4 | 0.082 |
| 44-48 | 16.4 | 0.178 | 652.2 | 380.3 | 23.4 | 0.118 |
| 48-52 | 14.1 | 0.151 | 743.3 | 416.1 | 25.5 | 0.066 |
| 52-56 | 17.0 | 0.185 | 623.1 | 334.2 | 21.2 | 0.067 |

Washington 3-XI-95-8

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 8.0 | 0.083 | 630.6 | 325.5 | 22.9 | 0.655 |
| 4-8 | 12.4 | 0.132 | 588.9 | 310.7 | 21.9 | 0.583 |
| 8-12 | 11.7 | 0.124 | 598.9 | 314.0 | 21.5 | 0.540 |
| 12-16 | 11.5 | 0.122 | 619.9 | 327.7 | 22.4 | 0.515 |
| 16-20 | 11.1 | 0.118 | 641.7 | 346.2 | 22.9 | 0.445 |
| 20-24 | 11.0 | 0.116 | 632.8 | 331.6 | 22.3 | 0.422 |
| 24-28 | 12.2 | 0.130 | 577.4 | 281.3 | 18.9 | 0.392 |
| 28-32 | 13.6 | 0.146 | 480.3 | 286.4 | 19.4 | 0.360 |
| 32-36 | 20.4 | 0.230 | 314.8 | 149.0 | 10.5 | 0.315 |
| 36-40 | 29.0 | 0.347 | 226.9 | 105.8 | 7.5 | 0.213 |
| 40-44 | 19.4 | 0.215 | 520.9 | 293.8 | 19.3 | 2.257 |
| 44-48 | 33.4 | 0.411 | 243.8 | 222.9 | 14.8 | 1.812 |
| 48-52 | 15.8 | 0.171 | 610.8 | 338.7 | 22.1 | 0.152 |
| 52-56 | 17.0 | 0.186 | 545.1 | 308.8 | 20.4 | 0.140 |
| 56-60 | 18.0 | 0.199 | 516.7 | 282.4 | 19.0 | 0.179 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Washington 3-XI-95-9

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 51.8 | 0.737 | 169.0 | 105.4 | 7.0 | 0.182 |
| 4-8 | 20.6 | 0.231 | 464.5 | 226.6 | 14.8 | 0.174 |
| 8-12 | 36.7 | 0.461 | 288.3 | 85.1 | 5.4 | 0.075 |
| 12-16 | 52.2 | 0.753 | 78.4 | 40.2 | 2.7 | 0.042 |

Washington 3-XI-95-12

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 11.0 | 0.116 | 429.5 | 255.1 | 18.9 | 0.535 |
| 4-8 | 34.2 | 0.427 | 131.5 | 68.9 | 5.0 | 0.303 |
| 8-12 | 38.8 | 0.501 | 122.1 | 55.1 | 3.8 | 0.157 |
| 12-16 | 52.7 | 0.763 | 87.8 | 33.0 | 2.3 | 0.181 |
| 16-20 | 75.1 | 1.359 | 27.4 | 13.8 | 1.1 | 0.031 |
| 20-24 | 79.8 | 1.522 | 32.8 | 15.1 | 1.3 | 0.034 |

Washington 30-XI-95-17

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 17.7 | 0.197 | 243.0 | 134.4 | 10.2 | 0.385 |
| 4-8 | 58.3 | 0.891 | 48.9 | 22.5 | 1.5 | 0.072 |
| 8-12 | 65.7 | 1.079 | 38.2 | 14.9 | 1.2 | 0.035 |
| 12-16 | 66.7 | 1.098 | 69.6 | 33.1 | 3.5 | 0.052 |
| 16-20 | 74.8 | 1.342 | 53.6 | 26.0 | 2.6 | 0.046 |
| 20-24 | 75.6 | 1.370 | 52.4 | 24.8 | 2.3 | 0.037 |
| 24-28 | 79.3 | 1.500 | 37.0 | 18.9 | 1.7 | 0.031 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Washington 30-XI-95-19

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 34.5 | 0.431 | 130.3 | 48.6 | 3.6 | 0.246 |
| 4-8 | 41.9 | 0.554 | 121.7 | 45.5 | 3.2 | 0.240 |
| 8-12 | 48.2 | 0.672 | 94.9 | 37.1 | 2.6 | 0.082 |
| 12-16 | 52.6 | 0.758 | 125.6 | 59.3 | 4.9 | 0.071 |

Washington 30-XI-95-20

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 59.6 | 0.923 | 39.0 | 14.2 | 1.1 | 0.045 |
| 4-8 | 65.1 | 1.063 | 36.0 | 16.9 | 1.2 | 0.020 |
| 8-12 | 48.9 | 0.678 | 206.0 | 69.0 | 5.3 | 0.098 |
| 12-16 | 46.9 | 0.640 | 185.0 | 84.4 | 6.7 | 0.102 |

Washington 30-XI-95-21

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 40.2 | 0.527 | 79.0 | 31.0 | 2.6 | 1.189 |
| 4-8 | 63.5 | 1.018 | 44.0 | 21.4 | 1.6 | 0.060 |
| 8-12 | 61.4 | 0.960 | 79.0 | 35.9 | 3.7 | 0.065 |

Washington 30-XI-95-22

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 15.2 | 0.166 | 234.4 | 113.3 | 8.8 | 0.429 |
| 4-8 | 61.2 | 0.964 | 31.1 | 14.5 | 1.1 | 0.118 |
| 8-12 | 65.1 | 1.063 | 32.9 | 18.9 | 1.4 | 0.036 |
| 12-16 | 53.7 | 0.784 | 91.8 | 36.2 | 2.8 | 0.046 |

Table 2 (continued). Percent dry weight, bulk density (g dry $cm^{-3}$ wet), organic matter, total carbon, total nitrogen, and total phosphorus concentration in sediment cores from lakes of the upper St. Johns River.

Washington 30-XI-95-24

| Depth Interval (cm) | Dry Weight (%) | Bulk Density (g dry $cm^{-3}$ wet) | Organic Matter (mg $g^{-1}$) | Total Carbon (mg $g^{-1}$) | Total Nitrogen (mg $g^{-1}$) | Total Phosphorus (mg $g^{-1}$) |
|---|---|---|---|---|---|---|
| 0-4 | 24.2 | 0.280 | 201.0 | 64.0 | 4.5 | 0.211 |
| 4-8 | 27.3 | 0.322 | 280.4 | 99.4 | 6.1 | 0.074 |
| 8-12 | 22.9 | 0.262 | 362.5 | 148.6 | 9.2 | 0.054 |
| 12-16 | 19.5 | 0.217 | 417.4 | 186.8 | 12.2 | 0.064 |
| 16-20 | 32.0 | 0.390 | 260.0 | 120.1 | 9.9 | 0.038 |
| 20-24 | 48.3 | 0.668 | 162.1 | 81.6 | 6.9 | 0.057 |
| 24-28 | 61.5 | 0.962 | 91.4 | 42.7 | 4.5 | 0.019 |
| 28-32 | 67.6 | 1.124 | 63.9 | 27.4 | 2.8 | 0.023 |

Table 3. Total $^{210}Pb$, supported $^{210}Pb$ ($^{226}Ra$) and $^{137}Cs$ activities in sediment cores from lakes of the upper St. Johns River.

Hell 'n' Blazes 25-IX-95-3

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 16.21 | 1.15 | 3.660 |
| 4-8 | 6 | 16.37 | 1.59 | 3.960 |
| 8-12 | 10 | 15.48 | 1.71 | 3.070 |
| 12-16 | 14 | 12.74 | 1.37 | 4.210 |
| 16-20 | 18 | 16.39 | 1.12 | 4.970 |
| 20-24 | 22 | 13.29 | 1.71 | 5.300 |
| 24-28 | 26 | 11.34 | 1.66 | 5.750 |
| 28-32 | 30 | 10.24 | 1.82 | 5.600 |
| 32-36 | 34 | 6.38 | 1.11 | 2.260 |
| 36-40 | 38 | 5.21 | 0.72 | 1.400 |
| 40-44 | 42 | 3.77 | 0.22 | 1.070 |
| 44-48 | 46 | 5.12 | 1.20 | 1.340 |
| 48-52 | 50 | 7.87 | 1.33 | 2.550 |
| 52-56 | 54 | 5.88 | 0.84 | 2.150 |
| 56-60 | 58 | 6.87 | 1.32 | 1.680 |
| 60-64 | 62 | 3.96 | 0.78 | 1.870 |
| 64-68 | 66 | 2.20 | 1.01 | 0.590 |
| 68-72 | 70 | 1.61 | 0.28 | 0.520 |
| 72-76 | 74 | 2.84 | 0.43 | 0.220 |
| 76-80 | 78 | 1.03 | 0.86 | 0.230 |

Hell 'n' Blazes 25-IX-95-7

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 15.88 | 1.85 | 4.620 |
| 4-8 | 6 | 13.52 | 1.17 | 5.170 |
| 8-12 | 10 | 14.37 | 1.83 | 5.890 |
| 12-16 | 14 | 9.99 | 1.49 | 5.030 |
| 16-20 | 18 | 6.50 | 0.99 | 4.150 |
| 20-24 | 22 | 8.22 | 1.50 | 3.170 |
| 24-28 | 26 | 5.68 | 1.38 | 4.000 |
| 28-32 | 30 | 3.54 | 2.44 | 4.320 |
| 32-36 | 34 | 8.50 | 2.48 | 3.070 |
| 36-40 | 38 | 4.52 | 1.12 | 0.820 |
| 40-44 | 42 | 3.04 | 0.40 | 0.240 |
| 44-48 | 46 | 3.30 | 0.47 | 0.850 |
| 48-52 | 50 | 2.84 | 0.88 | 0.340 |
| 52-56 | 54 | 0.45 | 0.47 | 0.220 |
| 56-60 | 58 | 0.60 | 0.37 | -0.010 |

Table 3 (continued). Total $^{210}Pb$, supported $^{210}Pb$ ($^{226}Ra$) and $^{137}Cs$ activities in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-3

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 14.07 | 1.55 | 1.430 |
| 4-8 | 6 | 11.85 | 1.00 | 1.250 |
| 8-12 | 10 | 10.13 | 0.98 | 0.850 |
| 12-16 | 14 | 7.45 | 0.56 | 1.000 |
| 16-20 | 18 | 6.10 | 0.18 | 0.860 |
| 20-24 | 22 | 4.29 | 0.43 | 0.420 |
| 24-28 | 26 | 1.75 | 0.71 | 0.310 |
| 28-32 | 30 | 1.09 | 0.43 | 0.130 |
| 32-36 | 34 | 2.55 | 0.84 | 0.210 |
| 36-40 | 38 | 4.10 | 0.50 | 0.140 |
| 40-44 | 42 | 2.25 | 0.55 | 0.230 |
| 44-48 | 46 | 2.19 | -0.04 | 0.460 |
| 48-52 | 50 | 0.80 | 0.43 | 0.110 |
| 52-56 | 54 | 2.62 | 1.22 | 0.050 |
| 56-60 | 58 | 1.10 | 0.98 | 0.120 |
| 60-64 | 62 | 1.48 | 1.21 | 0.060 |
| 64-68 | 66 | 1.41 | 1.42 | -0.010 |
| 68-72 | 70 | 1.73 | 1.17 | 0.020 |

Sawgrass 13-VII-95-4

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 14.71 | 2.85 | 1.870 |
| 4-8 | 6 | 18.25 | 1.33 | 1.890 |
| 8-12 | 10 | 14.34 | 1.65 | 1.330 |
| 12-16 | 14 | 12.86 | 0.13 | 1.260 |
| 16-20 | 18 | 12.72 | 1.40 | 1.300 |
| 20-24 | 22 | 10.01 | 0.28 | 1.720 |
| 24-28 | 26 | 8.10 | 0.73 | 0.860 |
| 28-32 | 30 | 5.18 | 0.21 | 0.570 |
| 32-36 | 34 | 2.30 | 0.57 | 0.340 |
| 36-40 | 38 | 1.62 | 0.36 | 0.230 |
| 40-44 | 42 | 2.51 | 0.43 | 0.090 |
| 44-48 | 46 | 2.42 | 0.85 | 0.190 |
| 48-52 | 50 | 1.95 | 1.00 | -0.120 |
| 52-56 | 54 | 1.02 | -0.03 | 0.020 |

Table 3 (continued). Total $^{210}Pb$, supported $^{210}Pb$ ($^{226}Ra$) and $^{137}Cs$ activities in sediment cores from lakes of the upper St. Johns River.

Sawgrass 13-VII-95-8

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 15.91 | 1.28 | 1.780 |
| 4-8 | 6 | 18.66 | 1.35 | 1.520 |
| 8-12 | 10 | 12.99 | 0.99 | 1.460 |
| 12-16 | 14 | 12.82 | 0.63 | 1.780 |
| 16-20 | 18 | 11.63 | 1.48 | 1.650 |
| 20-24 | 22 | 7.73 | 0.61 | 0.900 |
| 24-28 | 26 | 5.13 | 1.20 | 0.490 |
| 28-32 | 30 | 3.17 | 1.19 | 0.120 |
| 32-36 | 34 | 2.14 | 0.96 | 0.120 |
| 36-40 | 38 | 1.09 | 0.36 | 0.000 |
| 40-44 | 42 | 1.01 | 0.02 | -0.020 |
| 44-48 | 46 | 0.97 | 1.19 | -0.010 |
| 48-52 | 50 | 0.26 | 0.32 | -0.010 |

Washington 2-XI-95-1

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 27.48 | 3.16 | 5.250 |
| 4-8 | 6 | 24.63 | 3.18 | 4.450 |
| 8-12 | 10 | 21.46 | 0.14 | 5.590 |
| 12-16 | 14 | 14.55 | 1.42 | 6.060 |
| 16-20 | 18 | 14.89 | -0.42 | 5.470 |
| 20-24 | 22 | 11.55 | 0.78 | 3.710 |
| 24-28 | 26 | 10.65 | 1.16 | 1.430 |
| 28-32 | 30 | 7.56 | 0.81 | 1.120 |
| 32-36 | 34 | 3.74 | 0.87 | 0.130 |
| 36-40 | 38 | 3.67 | 0.61 | 0.140 |
| 40-44 | 42 | 2.95 | 1.62 | 0.540 |
| 44-48 | 46 | 3.99 | 1.53 | 0.250 |
| 48-52 | 50 | 3.29 | 2.89 | 0.260 |

Table 3 (continued). Total $^{210}Pb$, supported $^{210}Pb$ ($^{226}Ra$) and $^{137}Cs$ activities in sediment cores from lakes of the upper St. Johns River.

Washington 2-XI-95-3

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 22.63 | 2.13 | 5.130 |
| 4-8 | 6 | 22.21 | 1.97 | 4.350 |
| 8-12 | 10 | 16.52 | 2.12 | 3.950 |
| 12-16 | 14 | 12.85 | 1.93 | 5.680 |
| 16-20 | 18 | 11.43 | 2.85 | 2.970 |
| 20-24 | 22 | 9.28 | 2.10 | 2.080 |
| 24-28 | 26 | 8.16 | 1.38 | 1.490 |
| 28-32 | 30 | 5.63 | 2.12 | 0.650 |
| 32-36 | 34 | 4.64 | 2.06 | 0.600 |
| 36-40 | 38 | 1.84 | 1.70 | 0.120 |
| 40-44 | 42 | 1.78 | 0.12 | 0.010 |
| 44-48 | 46 | -0.09 | 0.76 | 0.000 |
| 48-52 | 50 | 1.73 | 5.64 | 0.320 |
| 52-56 | 54 | 0.56 | 0.92 | 0.120 |
| 56-60 | 58 | 1.91 | 0.27 | 0.130 |
| 60-64 | 62 | 1.67 | 0.90 | 0.110 |
| 64-68 | 66 | -0.47 | 0.62 | -0.090 |
| 68-72 | 70 | 0.88 | 1.21 | -0.010 |

Washington 3-XI-95-6

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 17.13 | 3.04 | 5.380 |
| 4-8 | 6 | 18.06 | 4.21 | 3.590 |
| 8-12 | 10 | 15.60 | 3.32 | 3.530 |
| 12-16 | 14 | 11.13 | 3.42 | 3.840 |
| 16-20 | 18 | 10.53 | 2.69 | 2.960 |
| 20-24 | 22 | 8.64 | 2.06 | 2.560 |
| 24-28 | 26 | 3.05 | 1.19 | 0.260 |
| 28-32 | 30 | 4.35 | 1.93 | 0.550 |
| 32-36 | 34 | 2.12 | 1.08 | 0.240 |
| 36-40 | 38 | 0.99 | 0.94 | 0.190 |

Table 3 (continued). Total $^{210}Pb$, supported $^{210}Pb$ ($^{226}Ra$) and $^{137}Cs$ activities in sediment cores from lakes of the upper St. Johns River.

Washington 3-XI-95-8

| Depth interval (cm) | Mid-depth interval (cm) | Total $^{210}Pb$ activity (dpm $g^{-1}$) | $^{226}Ra$ activity (dpm $g^{-1}$) | $^{137}Cs$ activity (dpm $g^{-1}$) |
|---|---|---|---|---|
| 0-4 | 2 | 23.14 | 4.47 | 5.370 |
| 4-8 | 6 | 21.04 | 4.50 | 5.190 |
| 8-12 | 10 | 24.03 | 3.48 | 4.130 |
| 12-16 | 14 | 15.15 | 3.50 | 5.320 |
| 16-20 | 18 | 17.68 | 2.66 | 5.500 |
| 20-24 | 22 | 12.18 | 4.60 | 5.340 |
| 24-28 | 26 | 10.94 | 1.96 | 3.220 |
| 28-32 | 30 | 9.82 | 1.47 | 1.640 |
| 32-36 | 34 | 3.85 | 1.86 | 0.710 |
| 36-40 | 38 | 4.52 | 2.28 | 0.710 |
| 40-44 | 42 | 1.15 | 2.00 | 0.580 |
| 44-48 | 46 | 0.51 | 0.78 | 0.000 |
| 48-52 | 50 | -1.49 | 0.45 | 0.030 |
| 52-56 | 54 | 1.51 | 2.09 | 0.340 |

Table 4. Depth interval, age, date and accumulation rate of bulk sediment, organic matter, total carbon, total nitrogen and total phosphorus in cores from lakes in the upper St. Johns River.

Hell 'n' Blazes 25-IX-95-3

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate ($mg\ cm^{-2}\ yr^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 2.2 | 1993.6 | 79.3 | 54.5 | 28.9 | 2.40 | 0.054 |
| 4-8 | 5.2 | 1990.6 | 74.5 | 51.2 | 27.6 | 2.18 | 0.049 |
| 8-12 | 8.6 | 1987.2 | 72.3 | 48.3 | 25.0 | 2.11 | 0.058 |
| 12-16 | 12.2 | 1983.6 | 78.5 | 53.0 | 28.1 | 2.24 | 0.057 |
| 16-20 | 18.5 | 1977.3 | 50.2 | 34.8 | 18.6 | 1.46 | 0.031 |
| 20-24 | 24.6 | 1971.2 | 54.5 | 38.0 | 20.0 | 1.55 | 0.037 |
| 24-28 | 31.0 | 1964.8 | 53.8 | 39.4 | 21.2 | 1.62 | 0.023 |
| 28-32 | 37.4 | 1958.4 | 50.7 | 38.3 | 20.9 | 1.48 | 0.019 |
| 32-36 | 41.8 | 1954.0 | 68.4 | 52.3 | 30.2 | 2.03 | 0.017 |
| 36-40 | 45.7 | 1950.1 | 70.6 | 55.8 | 31.8 | 2.14 | 0.018 |
| 40-44 | 49.0 | 1946.8 | 79.7 | 63.5 | 37.2 | 2.47 | 0.015 |
| 44-48 | 53.5 | 1942.3 | 63.9 | 50.6 | 28.7 | 1.96 | 0.015 |
| 48-52 | 63.6 | 1932.2 | 30.6 | 24.7 | 13.6 | 0.86 | 0.009 |
| 52-56 | 74.3 | 1921.5 | 28.8 | 23.4 | 13.0 | 0.88 | 0.010 |
| 56-60 | 91.8 | 1904.0 | 16.9 | 13.8 | 7.7 | 0.50 | 0.004 |
| 60-64 | 108.2 | 1887.6 | 17.4 | 14.4 | 8.3 | 0.57 | 0.004 |
| 64-68 | 118.4 | 1877.4 | 30.8 | 25.6 | 14.9 | 0.99 | 0.006 |
| 68-72 | 131.1 | 1864.7 | 19.3 | 16.3 | 9.0 | 0.61 | 0.003 |

Hell 'n' Blazes 25-IX-95-7

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate ($mg\ cm^{-2}\ yr^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 4.4 | 1991.3 | 51.4 | 30.1 | 15.7 | 1.22 | 0.035 |
| 4-8 | 10.0 | 1985.8 | 50.1 | 28.1 | 14.4 | 1.14 | 0.031 |
| 8-12 | 18.1 | 1977.7 | 39.9 | 23.2 | 11.9 | 0.93 | 0.026 |
| 12-16 | 25.2 | 1970.6 | 46.4 | 29.0 | 14.9 | 1.11 | 0.024 |
| 16-20 | 30.9 | 1964.8 | 58.6 | 41.0 | 23.2 | 1.55 | 0.015 |
| 20-24 | 39.4 | 1956.3 | 38.5 | 28.8 | 15.9 | 1.06 | 0.008 |
| 24-28 | 46.3 | 1949.4 | 47.3 | 36.1 | 19.2 | 1.25 | 0.011 |
| 28-32 | 48.5 | 1947.2 | 160.2 | 115.9 | 60.9 | 4.04 | 0.035 |
| 32-36 | 61.8 | 1934.0 | 23.2 | 17.4 | 9.5 | 0.63 | 0.005 |
| 36-40 | 71.4 | 1924.3 | 28.7 | 23.5 | 13.0 | 0.87 | 0.005 |
| 40-44 | 84.9 | 1910.8 | 25.8 | 20.0 | 12.1 | 0.78 | 0.004 |
| 44-48 | 109.0 | 1886.7 | 13.6 | 10.4 | 5.9 | 0.39 | 0.003 |
| 48-52 | 151.3 | 1844.4 | 7.3 | 5.8 | 3.2 | 0.21 | 0.001 |

Table 4 (continued). Depth interval, age, date and accumulation rate of bulk sediment, organic matter, total carbon, total nitrogen and total phosphorus in cores from lakes in the upper St. Johns River.

Sawgrass 13-VII-95-3

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg cm$^{-2}$ yr$^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 7.5 | 1988.1 | 20.4 | 14.4 | 7.6 | 0.65 | 0.016 |
| 4-8 | 13.2 | 1982.3 | 36.0 | 25.8 | 13.8 | 1.12 | 0.022 |
| 8-12 | 21.2 | 1974.4 | 34.6 | 24.1 | 12.9 | 0.93 | 0.010 |
| 12-16 | 29.3 | 1966.3 | 35.8 | 25.2 | 14.5 | 1.02 | 0.010 |
| 16-20 | 37.8 | 1957.8 | 32.1 | 24.3 | 13.3 | 0.94 | 0.009 |
| 20-24 | 44.8 | 1950.8 | 38.7 | 28.1 | 15.5 | 1.09 | 0.009 |
| 24-28 | 46.9 | 1948.7 | 124.0 | 91.8 | 49.9 | 3.51 | 0.024 |
| 28-32 | 48.3 | 1947.3 | 186.2 | 140.2 | 75.0 | 5.29 | 0.033 |
| 32-36 | 52.3 | 1943.3 | 65.8 | 49.0 | 26.9 | 1.89 | 0.011 |
| 36-40 | 63.5 | 1932.1 | 24.8 | 18.2 | 10.9 | 0.76 | 0.004 |
| 40-44 | 71.0 | 1924.6 | 39.1 | 28.7 | 14.5 | 1.01 | 0.007 |
| 44-48 | 83.7 | 1912.0 | 21.8 | 16.7 | 9.1 | 0.65 | 0.004 |
| 48-52 | 86.6 | 1909.0 | 101.3 | 76.2 | 44.0 | 3.05 | 0.020 |
| 52-56 | 146.2 | 1849.4 | 11.7 | 4.2 | 2.0 | 0.14 | 0.002 |

Sawgrass 13-VII-95-4

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg cm$^{-2}$ yr$^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 2.7 | 1992.9 | 54.3 | 39.7 | 20.1 | 1.73 | 0.037 |
| 4-8 | 8.3 | 1987.3 | 32.9 | 23.8 | 12.4 | 1.04 | 0.023 |
| 8-12 | 13.7 | 1981.9 | 37.6 | 28.2 | 14.3 | 1.17 | 0.023 |
| 12-16 | 20.7 | 1974.9 | 30.9 | 22.5 | 11.9 | 0.96 | 0.017 |
| 16-20 | 28.7 | 1966.9 | 27.5 | 20.3 | 10.7 | 0.83 | 0.015 |
| 20-24 | 38.3 | 1957.3 | 24.4 | 18.3 | 9.8 | 0.75 | 0.012 |
| 24-28 | 48.7 | 1946.9 | 23.6 | 18.7 | 9.8 | 0.71 | 0.009 |
| 28-32 | 60.3 | 1935.3 | 24.9 | 17.5 | 8.5 | 0.62 | 0.006 |
| 32-36 | 67.8 | 1927.8 | 52.7 | 29.9 | 15.9 | 1.09 | 0.010 |
| 36-40 | 76.2 | 1919.4 | 56.2 | 28.8 | 15.0 | 1.07 | 0.010 |
| 40-44 | 96.4 | 1899.2 | 22.1 | 12.3 | 6.2 | 0.45 | 0.004 |
| 44-48 | 118.3 | 1877.3 | 15.2 | 10.8 | 4.7 | 0.34 | 0.003 |
| 48-52 | 141.8 | 1853.8 | 12.5 | 8.7 | 4.9 | 0.35 | 0.002 |

Table 4 (continued). Depth interval, age, date and accumulation rate of bulk sediment, organic matter, total carbon, total nitrogen and total phosphorus in cores from lakes in the upper St. Johns River.

Sawgrass 13-VII-95-8

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg $cm^{-2}$ $yr^{-1}$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Bulk | Org Matter | C | N | P |
| 0-4 | 4.0 | 1991.5 | 38.5 | 29.9 | 15.1 | 1.29 | 0.036 |
| 4-8 | 11.2 | 1984.4 | 27.4 | 21.3 | 10.7 | 0.91 | 0.022 |
| 8-12 | 18.2 | 1977.3 | 31.7 | 24.6 | 12.5 | 1.03 | 0.022 |
| 12-16 | 29.8 | 1965.8 | 23.4 | 18.3 | 9.3 | 0.73 | 0.013 |
| 16-20 | 45.9 | 1949.7 | 18.4 | 14.8 | 7.8 | 0.55 | 0.007 |
| 20-24 | 64.4 | 1931.2 | 15.3 | 12.4 | 6.5 | 0.46 | 0.005 |
| 24-28 | 83.3 | 1912.3 | 15.5 | 11.6 | 6.0 | 0.41 | 0.003 |
| 28-32 | 104.1 | 1891.5 | 16.6 | 11.1 | 5.3 | 0.37 | 0.003 |
| 32-36 | 126.5 | 1869.1 | 14.2 | 9.9 | 5.2 | 0.35 | 0.003 |
| 36-40 | 157.0 | 1838.6 | 10.2 | 6.6 | 3.8 | 0.26 | 0.002 |

Washington 2-XI-95-1

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg $cm^{-2}$ $yr^{-1}$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Bulk | Org Matter | C | N | P |
| 0-4 | 3.4 | 1992.4 | 95.5 | 58.1 | 32.9 | 2.37 | 0.064 |
| 4-8 | 8.1 | 1987.7 | 95.5 | 53.4 | 30.0 | 2.12 | 0.056 |
| 8-12 | 14.1 | 1981.7 | 81.4 | 47.3 | 26.4 | 1.82 | 0.048 |
| 12-16 | 18.1 | 1977.7 | 113.0 | 69.9 | 39.1 | 2.62 | 0.055 |
| 16-20 | 23.9 | 1971.9 | 83.2 | 50.0 | 29.1 | 1.96 | 0.036 |
| 20-24 | 29.8 | 1966.0 | 98.7 | 50.0 | 27.1 | 1.82 | 0.032 |
| 24-28 | 37.1 | 1958.7 | 91.2 | 38.4 | 18.7 | 1.29 | 0.028 |
| 28-32 | 46.0 | 1949.8 | 99.8 | 31.4 | 14.9 | 1.02 | 0.029 |
| 32-36 | 54.6 | 1941.2 | 179.0 | 35.9 | 15.1 | 1.09 | 0.038 |
| 36-40 | 75.6 | 1920.2 | 107.3 | 18.7 | 10.6 | 0.75 | 0.016 |
| 40-44 | 84.5 | 1911.3 | 152.8 | 50.8 | 25.2 | 1.77 | 0.021 |
| 44-48 | 138.0 | 1857.8 | 34.7 | 7.6 | 4.3 | 0.33 | 0.003 |

Table 4 (continued). Depth interval, age, date and accumulation rate of bulk sediment, organic matter, total carbon, total nitrogen and total phosphorus in cores from lakes in the upper St. Johns River.

Washington 2-XI-95-3

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg $cm^{-2}$ $yr^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 3.0 | 1992.8 | 103.6 | 63.9 | 36.0 | 2.58 | 0.065 |
| 4-8 | 11.4 | 1984.4 | 52.6 | 30.9 | 17.5 | 1.24 | 0.032 |
| 8-12 | 21.3 | 1974.5 | 55.6 | 27.9 | 19.0 | 1.30 | 0.030 |
| 12-16 | 29.5 | 1966.3 | 55.3 | 34.2 | 19.4 | 1.33 | 0.026 |
| 16-20 | 37.0 | 1958.8 | 55.0 | 36.0 | 20.5 | 1.39 | 0.021 |
| 20-24 | 47.0 | 1948.8 | 50.1 | 27.1 | 16.1 | 1.08 | 0.018 |
| 24-28 | 63.0 | 1932.8 | 35.6 | 16.8 | 9.4 | 0.64 | 0.011 |
| 28-32 | 86.1 | 1909.7 | 37.9 | 12.1 | 7.8 | 0.56 | 0.010 |
| 32-36 | 116.3 | 1879.5 | 22.8 | 7.3 | 3.2 | 0.23 | 0.006 |

Washington 3-XI-95-6

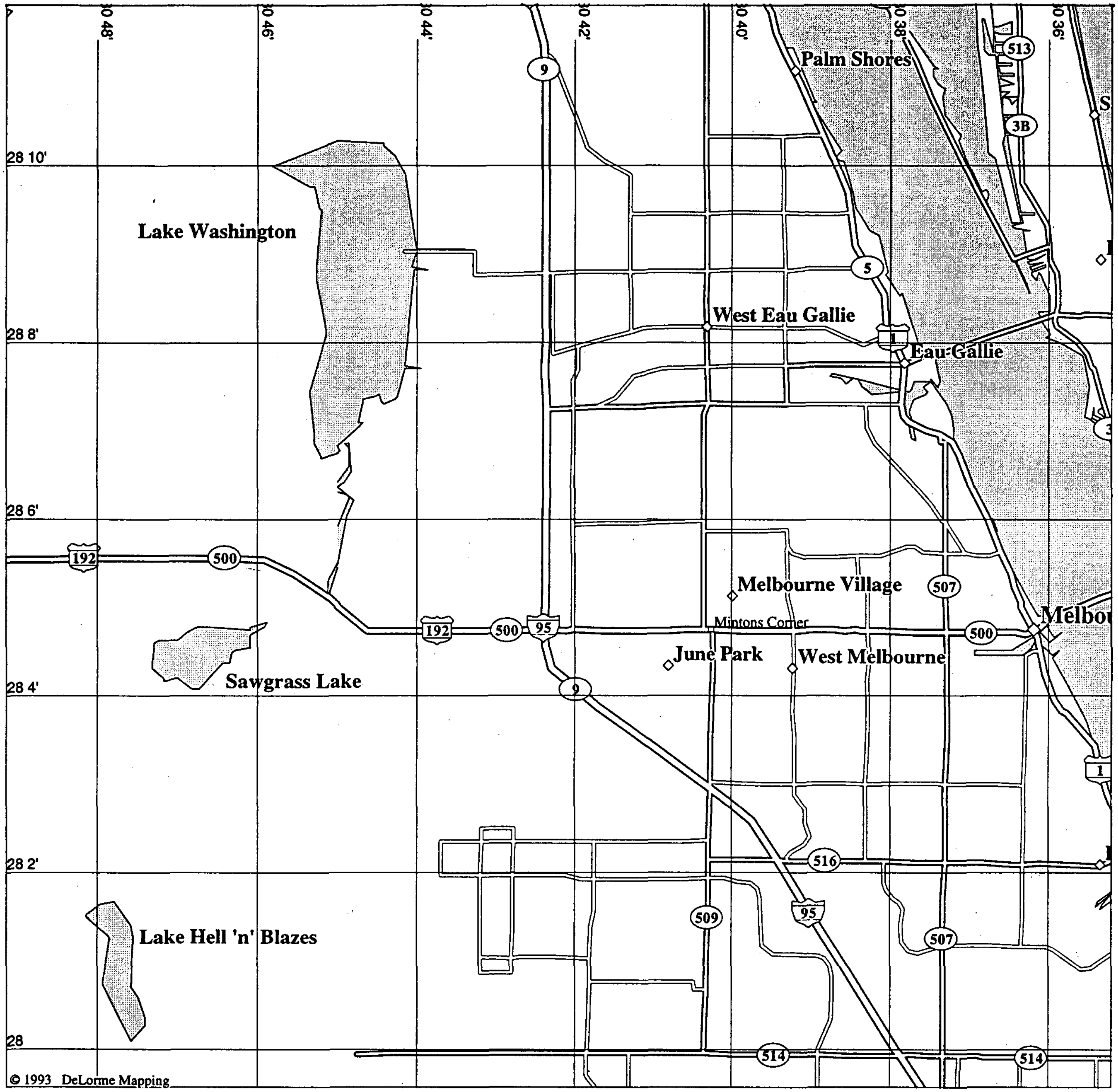
| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg $cm^{-2}$ $yr^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 3.2 | 1992.6 | 104.2 | 63.1 | 32.8 | 2.37 | 0.065 |
| 4-8 | 8.6 | 1987.2 | 92.7 | 44.5 | 23.1 | 1.64 | 0.061 |
| 8-12 | 19.8 | 1976.0 | 81.1 | 33.4 | 17.7 | 1.26 | 0.036 |
| 12-16 | 27.3 | 1968.5 | 96.2 | 39.2 | 20.9 | 1.44 | 0.035 |
| 16-20 | 37.0 | 1958.8 | 72.5 | 29.2 | 14.7 | 1.01 | 0.027 |
| 20-24 | 49.2 | 1946.6 | 61.7 | 22.3 | 12.4 | 0.84 | 0.021 |
| 24-28 | 61.0 | 1934.8 | 149.2 | 22.2 | 11.3 | 0.76 | 0.025 |
| 28-32 | 107.6 | 1888.2 | 49.6 | 5.0 | 2.4 | 0.17 | 0.006 |

Washington 3-XI-95-8

| Depth Interval (cm) | Age Int bottom (years) | Date (AD) | Accumulation rate (mg $cm^{-2}$ $yr^{-1}$) Bulk | Org Matter | C | N | P |
|---|---|---|---|---|---|---|---|
| 0-4 | 4.0 | 1991.8 | 83.1 | 52.4 | 27.0 | 1.90 | 0.054 |
| 4-8 | 10.7 | 1985.2 | 79.5 | 46.8 | 24.7 | 1.74 | 0.046 |
| 8-12 | 20.7 | 1975.1 | 49.5 | 29.6 | 15.5 | 1.06 | 0.027 |
| 12-16 | 28.0 | 1967.8 | 66.5 | 41.2 | 21.8 | 1.49 | 0.034 |
| 16-20 | 40.4 | 1955.4 | 38.1 | 24.4 | 13.2 | 0.87 | 0.017 |
| 20-24 | 48.9 | 1946.9 | 54.3 | 34.4 | 18.0 | 1.21 | 0.023 |
| 24-28 | 65.6 | 1930.2 | 31.2 | 18.0 | 8.8 | 0.59 | 0.012 |
| 28-32 | 105.3 | 1890.5 | 14.7 | 7.1 | 4.2 | 0.28 | 0.005 |

Table 5. Comparison of recent material accumulation rates in 34 Florida lakes with recent material accumulation rates in Lakes Hell 'n' Blazes, Sawgrass Lake, and Lake Washington. Values from the 34-lake data set were determined using $^{210}Pb$ in surface sediment deposits as a dilution tracer and provide estimates of mean, lake-wide material accumulation rates (Binford and Brenner 1986, 1988). Values for Lakes Hell 'n' Blazes, Sawgrass Lake, and Lake Washington are accumulation rates in the topmost 4 cm of sediment cores and were determined by the c.r.s. $^{210}Pb$ dating model. They represent recent, site-specific material accumulation rates.

| | | Accumulation rate ($mg\ cm^{-2}\ yr^{-1}$) | | | | |
|---|---|---|---|---|---|---|
| Lake/Core | County | Bulk | Org Matter | C | N | P |
| Apopka | Orange | 91.4 | 58.5 | 29.7 | 2.61 | 0.137 |
| Butler | Orange | 1061.2 | 20.2 | 9.6 | 0.85 | 0.106 |
| Clay | Highlands | 31.9 | 15.3 | 7.9 | 0.69 | 0.067 |
| Cypress | Osceola | 131.6 | 44.8 | 20.8 | 2.47 | 0.237 |
| Eagle | Polk | 81.5 | 35.9 | 17.1 | 1.54 | 0.155 |
| Fairview | Orange | 216.7 | 19.5 | 8.2 | 0.74 | 0.325 |
| Geneva | Putnam | 56.5 | 18.1 | 9.0 | 0.72 | 0.028 |
| Griffin | Lake | 150.7 | 88.9 | 46.7 | 4.42 | 0.166 |
| Hawthorne | Alachua | 77.5 | 62.0 | 32.5 | 3.07 | 0.194 |
| Howard | Polk | 140.9 | 62.0 | 31.3 | 3.02 | 0.254 |
| Jackson | Highlands | 65.2 | 22.2 | 11.1 | 0.72 | 0.052 |
| Jessamine | Orange | 49.4 | 18.3 | 9.3 | 0.66 | 0.302 |
| Josephine | Highlands | 1019.6 | 59.1 | 34.7 | 2.55 | 0.204 |
| June-In-Winter | Highlands | 374.1 | 22.5 | 12.4 | 1.20 | 0.150 |
| Kingsley | Clay | 39.5 | 15.4 | 6.9 | 0.56 | 0.039 |
| Kissimmee | Osceola | 2080.0 | 18.7 | 8.3 | 1.25 | 0.208 |
| Little Red Water | Highlands | 68.4 | 28.0 | 14.2 | 0.80 | 0.116 |
| Marian | Osceola | 110.2 | 62.8 | 34.7 | 3.15 | 0.198 |
| Minnehaha | Lake | 323.0 | 27.8 | 8.7 | 0.68 | 0.032 |
| Ocean Pond | Baker | 103.2 | 40.2 | 22.2 | 1.03 | 0.155 |
| Okahumpka | Sumter | 61.2 | 44.7 | 20.1 | 1.74 | 0.024 |
| Parker | Polk | 82.8 | 53.0 | 24.7 | 2.56 | 0.546 |
| Pierce | Polk | 69.2 | 42.2 | 22.1 | 2.40 | 0.118 |
| Santa Fe | Alachua | 76.2 | 28.2 | 15.2 | 1.01 | 0.107 |
| Sheelar | Clay | 112.3 | 29.2 | 12.5 | 0.92 | 0.079 |
| Stella | Putnam | 169.4 | 27.1 | 12.0 | 0.95 | 0.085 |
| Thonotosassa | Hillsborough | 78.2 | 28.9 | 15.8 | 1.82 | 0.586 |
| Tohopekaliga | Osceola | 547.4 | 43.8 | 20.2 | 2.79 | 0.274 |
| Townsend Pond | Lafayette | 43.7 | 35.4 | 19.3 | 1.53 | 0.026 |
| Tsala Apopka | Citrus | 74.4 | 61.0 | 31.4 | 3.15 | 0.365 |
| Watertown | Columbia | 65.8 | 40.8 | 22.4 | 1.48 | 0.138 |
| Wauberg | Alachua | 90.1 | 63.1 | 32.7 | 3.40 | 0.207 |
| Yale | Lake | 138.3 | 78.8 | 36.4 | 3.76 | 0.083 |
| Weir | Marion | 59.7 | 38.2 | 19.2 | 1.82 | 0.066 |
| Hell 'n' Blazes 25-IX-95-3 | | 79.3 | 54.5 | 28.9 | 2.40 | 0.054 |
| Hell 'n' Blazes 25-IX-95-7 | | 51.4 | 30.1 | 15.7 | 1.22 | 0.035 |
| Sawgrass 13-VII-95-3 | | 20.4 | 14.4 | 7.6 | 0.65 | 0.016 |
| Sawgrass 13-VII-95-4 | | 54.3 | 39.7 | 20.1 | 1.73 | 0.037 |
| Sawgrass 13-VII-95-8 | | 38.5 | 29.9 | 15.1 | 1.29 | 0.036 |
| Washington 2-XI-95-1 | | 95.5 | 58.1 | 32.9 | 2.37 | 0.064 |
| Washington 2-XI-95-3 | | 103.6 | 63.9 | 36.0 | 2.58 | 0.065 |
| Washington 3-XI-95-6 | | 104.2 | 63.1 | 32.8 | 2.37 | 0.065 |
| Washington 3-XI-95-8 | | 83.1 | 52.4 | 27.0 | 1.90 | 0.054 |




LEGEND

Population Center
State Route
Geo Feature
Town, Small City
Interstate, Turnpike
US Highway
Major Street/Road
State Route
Interstate Highway
US Highway
Open Water

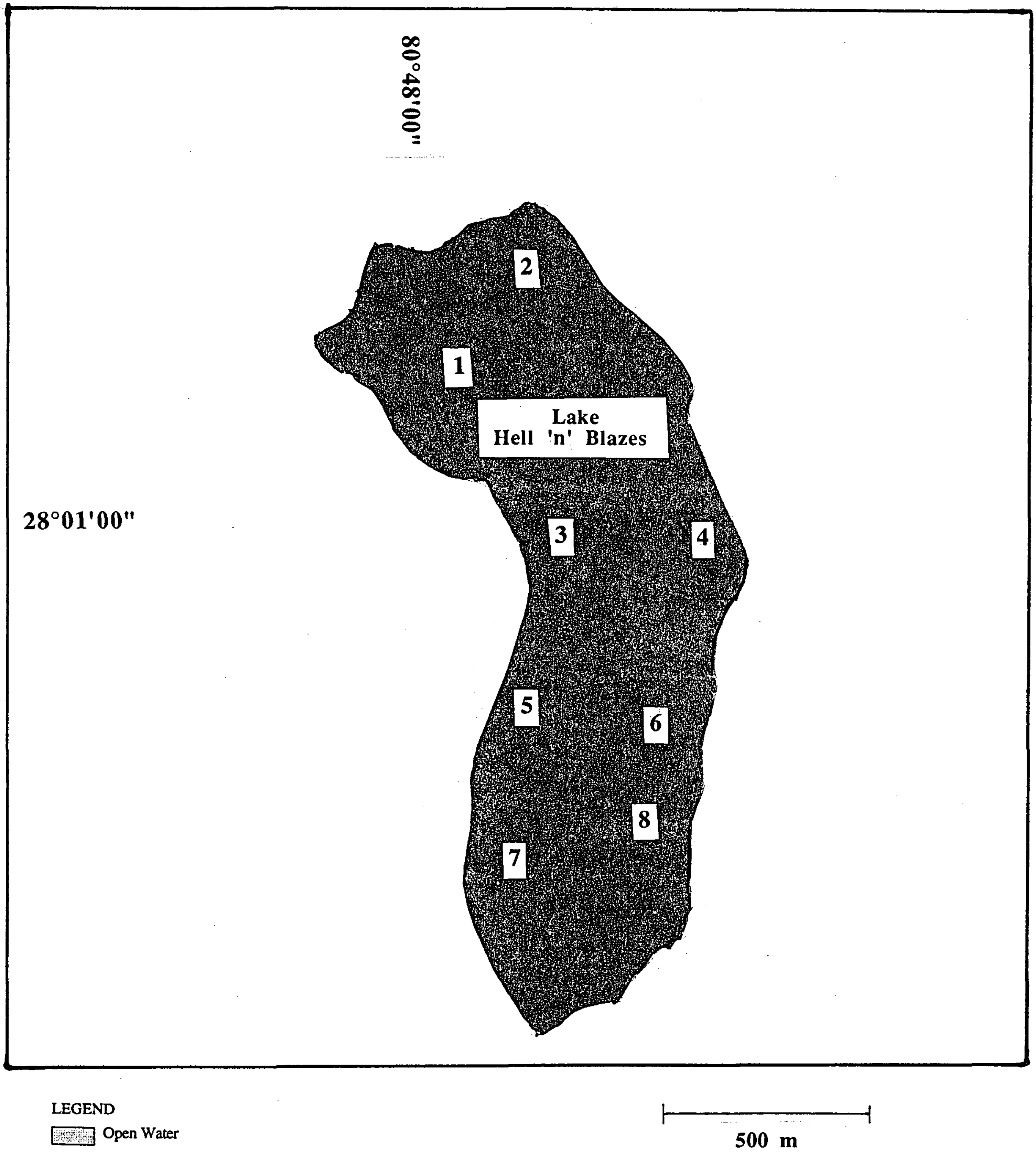
Scale 1:112,500 (at center)

2 Miles

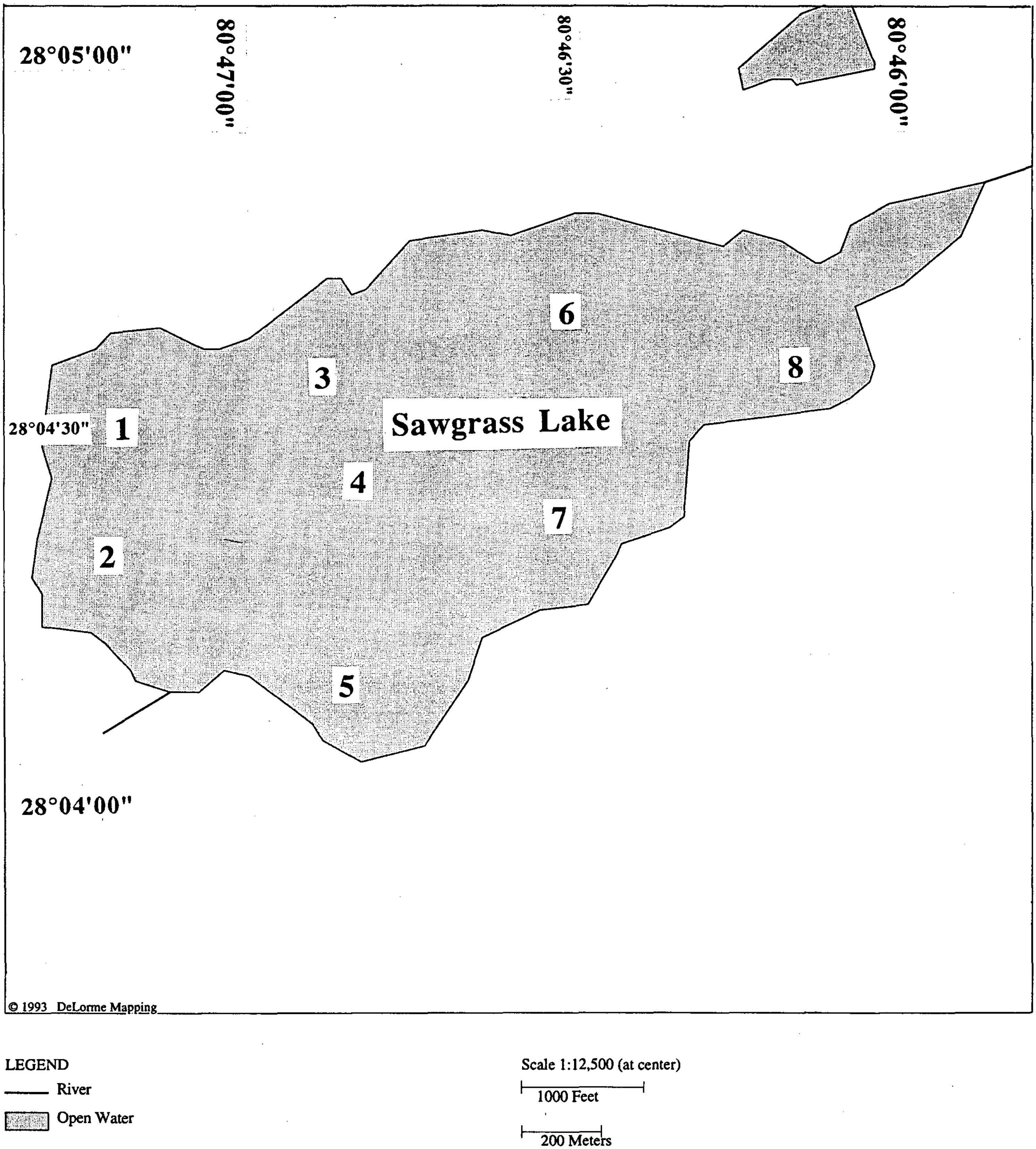
2 KM

Mag 12.00
Thu Nov 21 13:55:37 1996

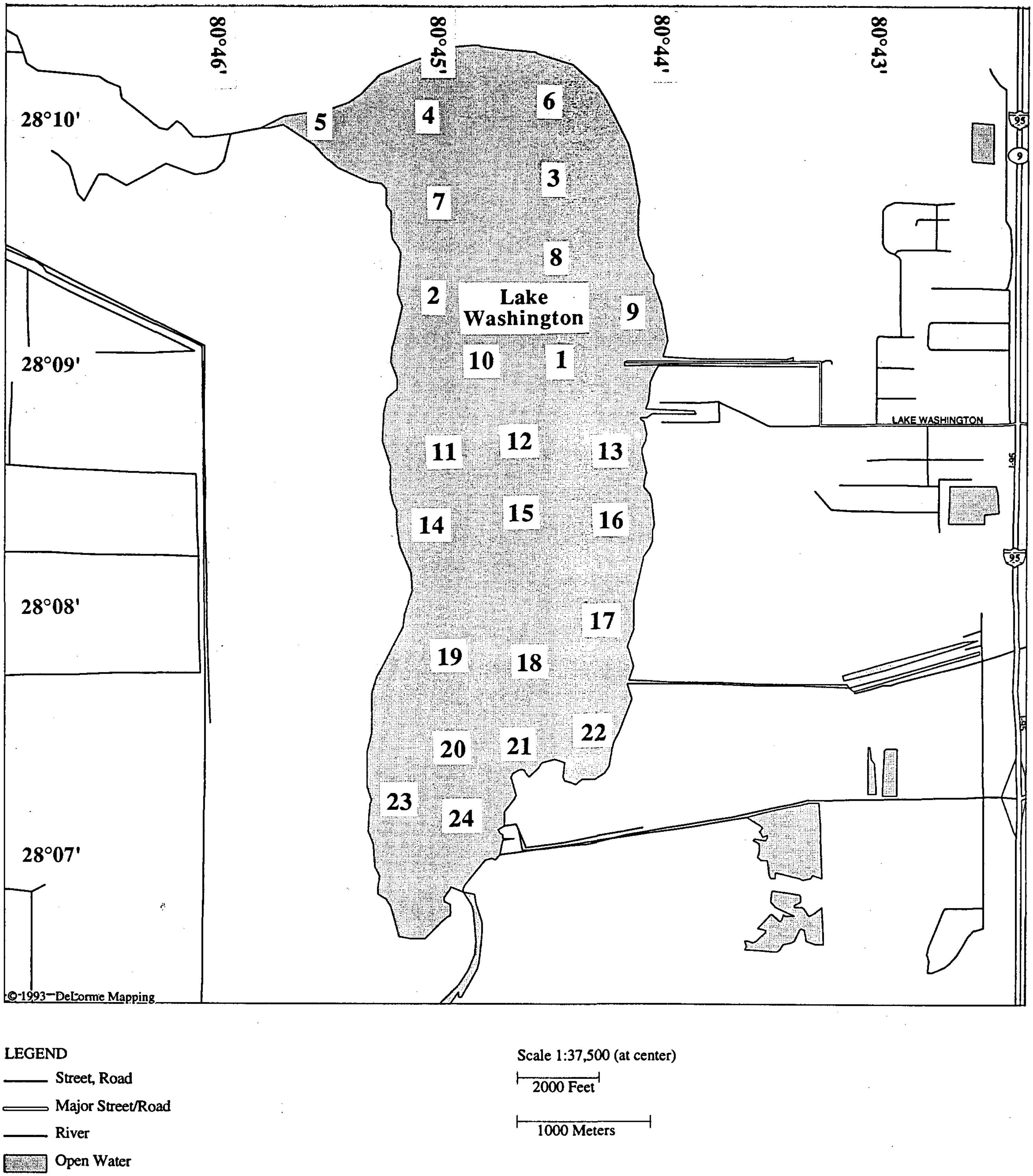
Map 1. Map of the upper St. Johns River, showing the locations of Lake Hell 'n' Blazes, Sawgrass Lake, and Lake Washington.




Map 2. Map of Lake Hell 'n' Blazes showing sediment coring sites.




Map 3. Map of Sawgrass Lake showing sediment coring sites.




Map 4. Map of Lake Washington showing sediment coring sites.

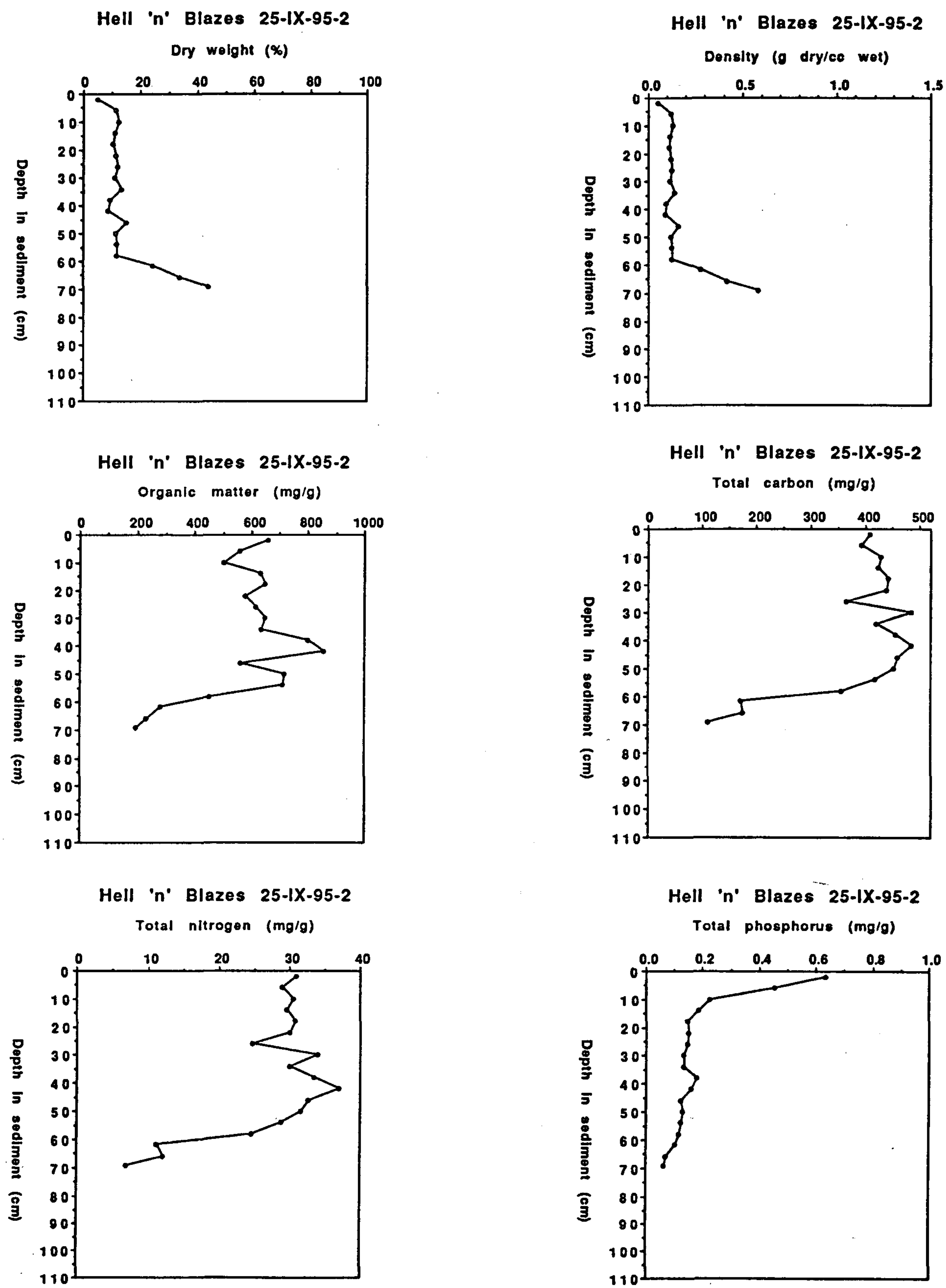



Figure 1. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Hell 'n' Blazes core 25-IX-95-2.

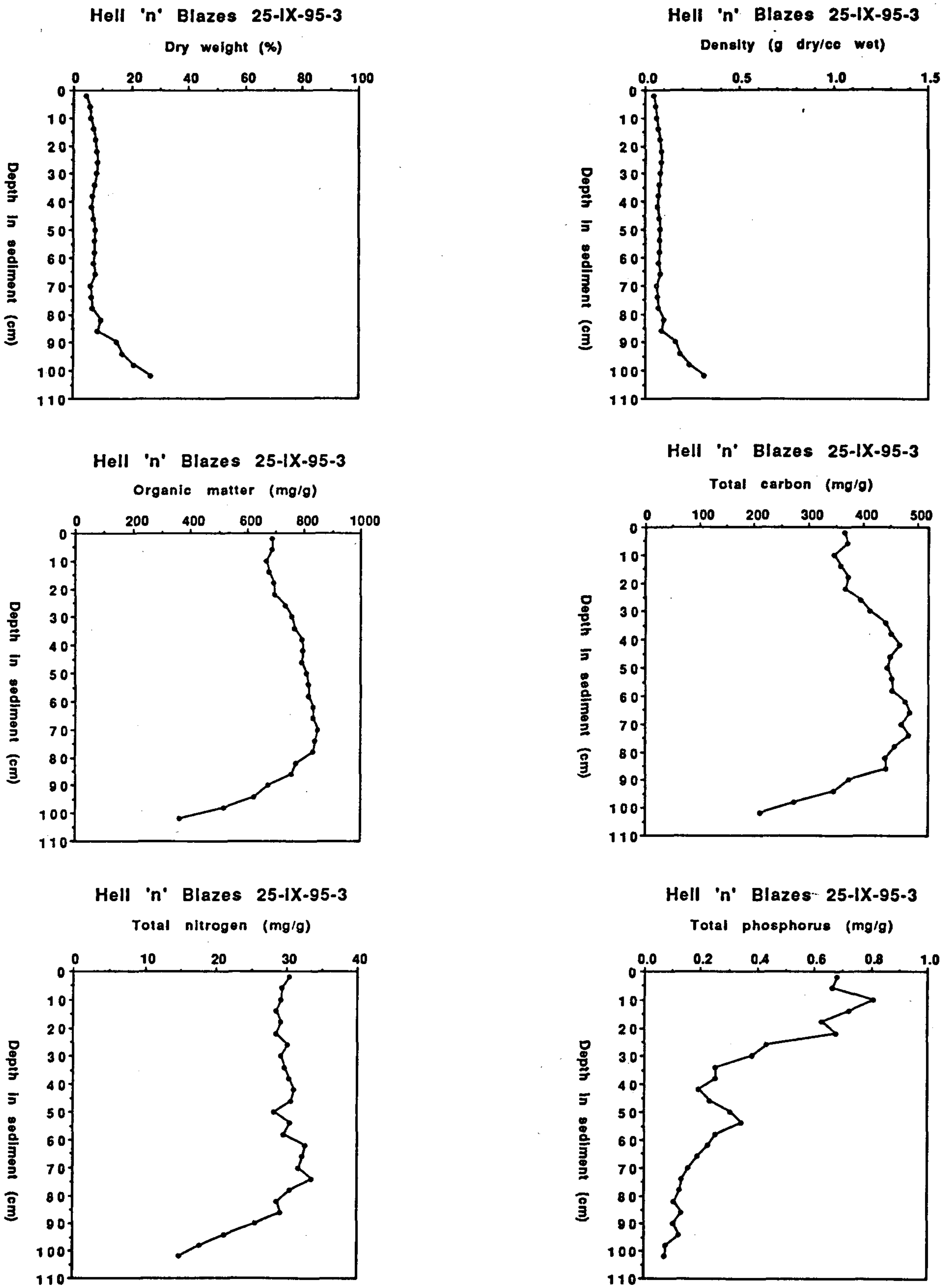



Figure 2. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Hell 'n' Blazes core 25-IX-95-3.

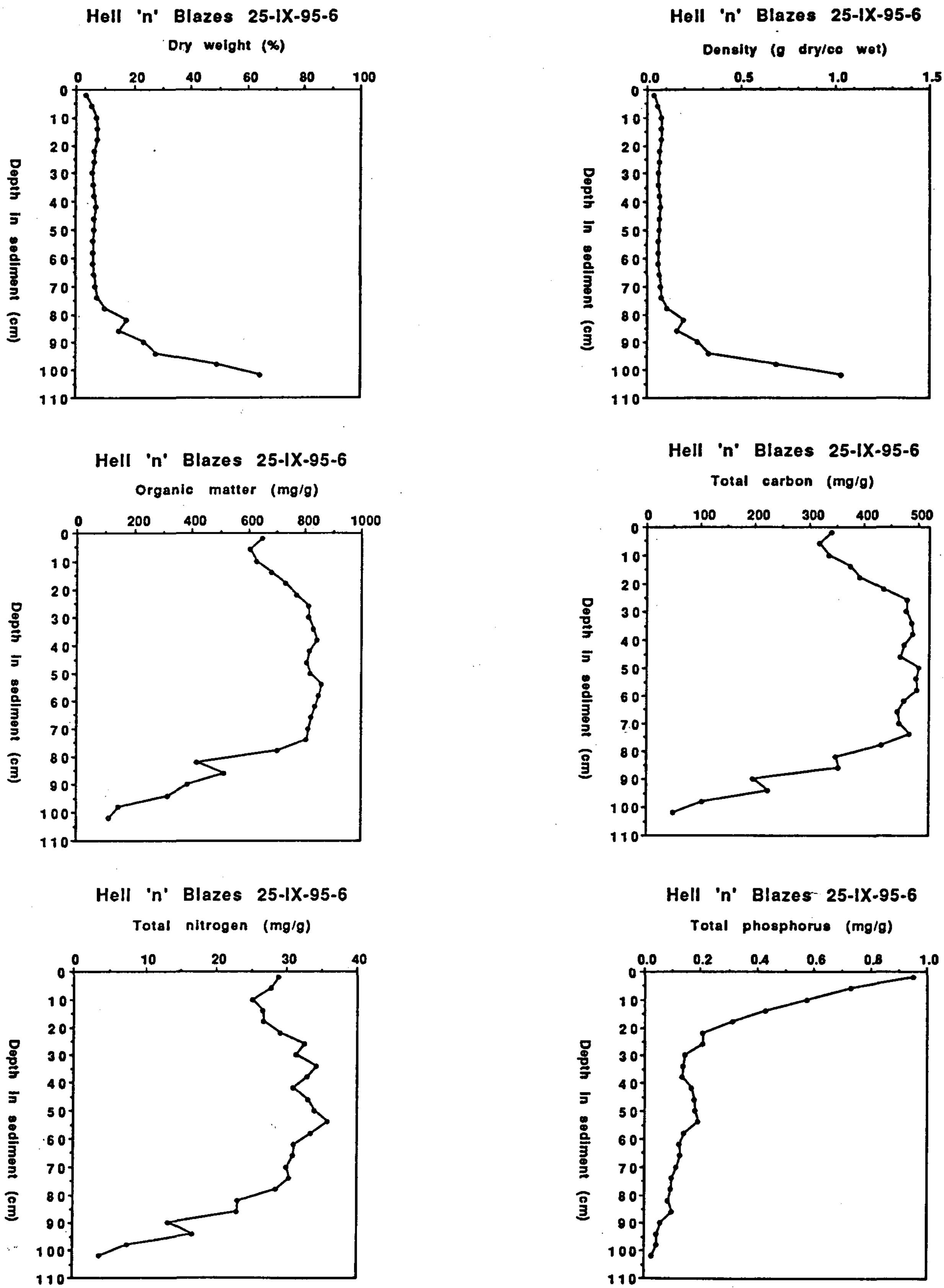



Figure 3. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Hell 'n' Blazes core 25-IX-95-6.

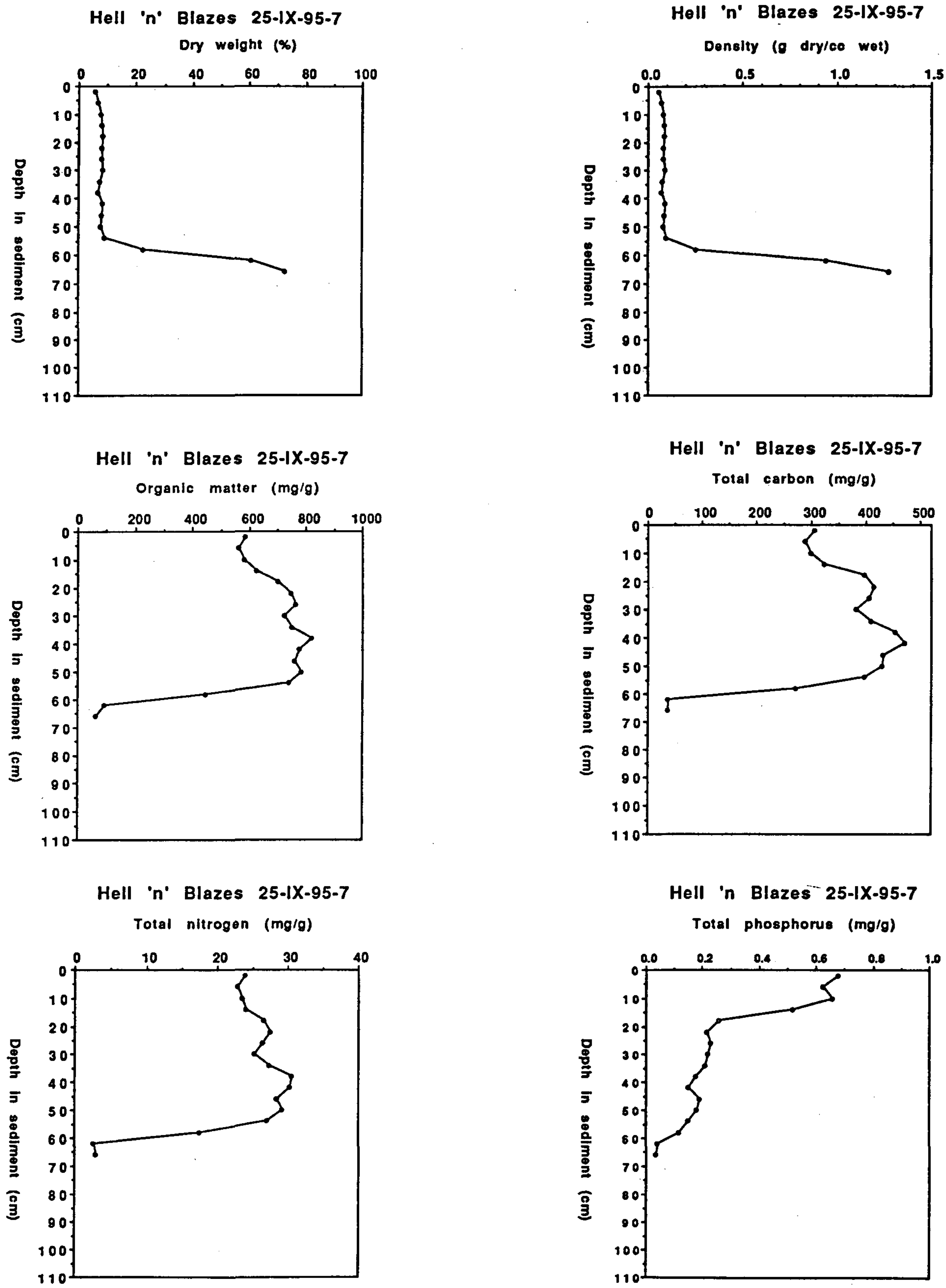



Figure 4. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Hell 'n' Blazes core 25-IX-95-7.

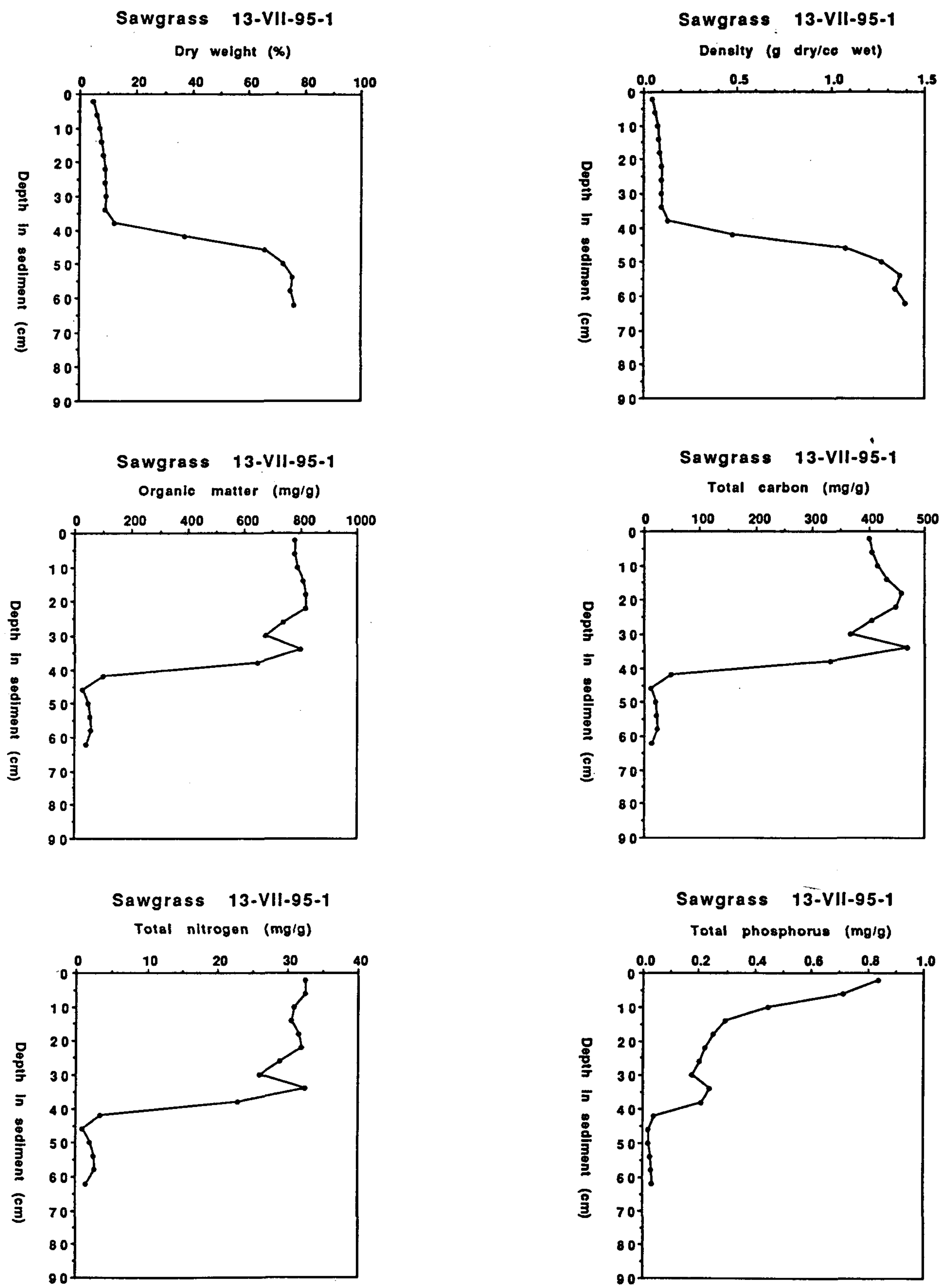



Figure 5. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Sawgrass Lake core 13-VII-95-1.

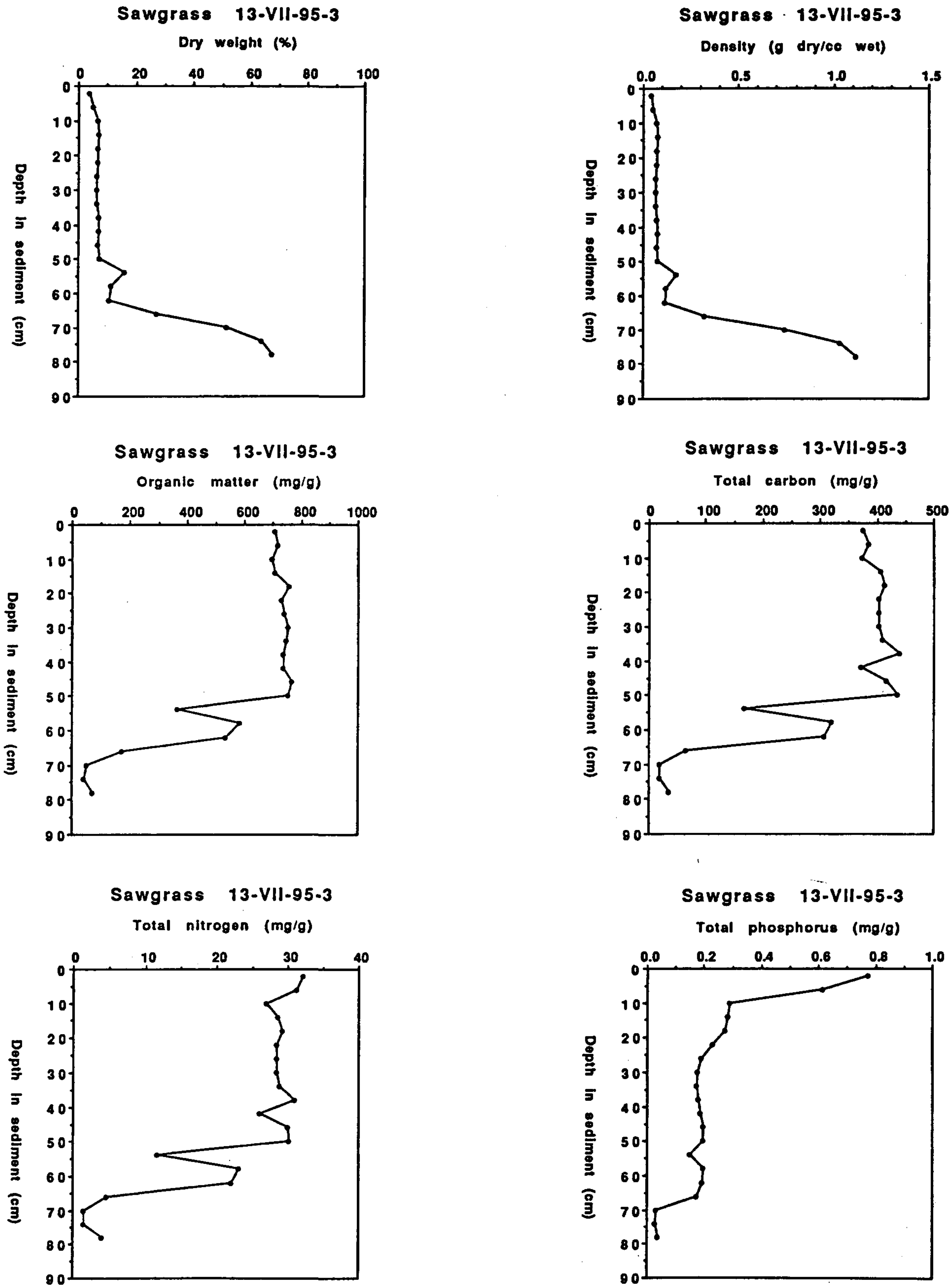



Figure 6. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Sawgrass Lake core 13-VII-95-3.

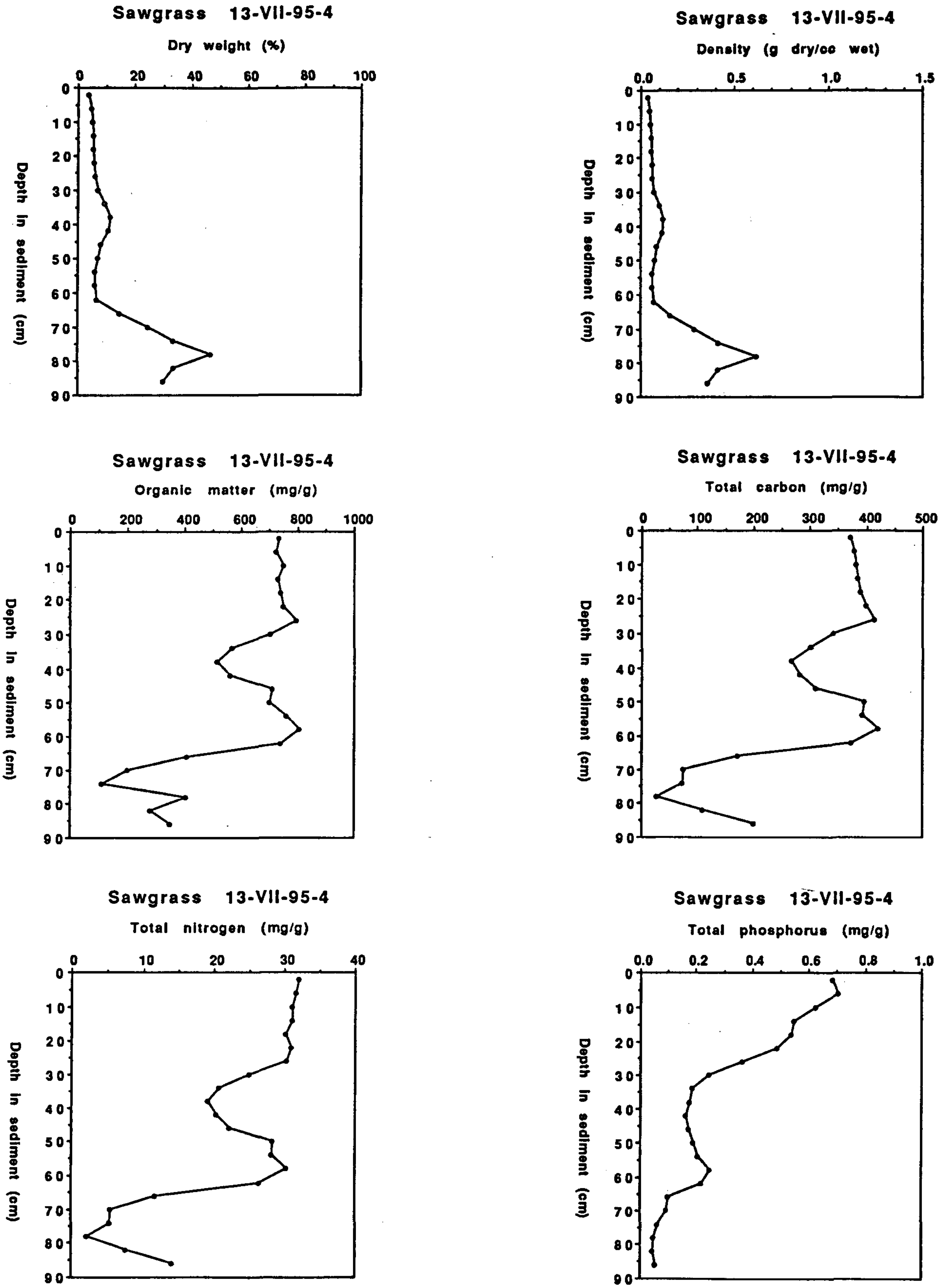



Figure 7. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Sawgrass Lake core 13-VII-95-4.

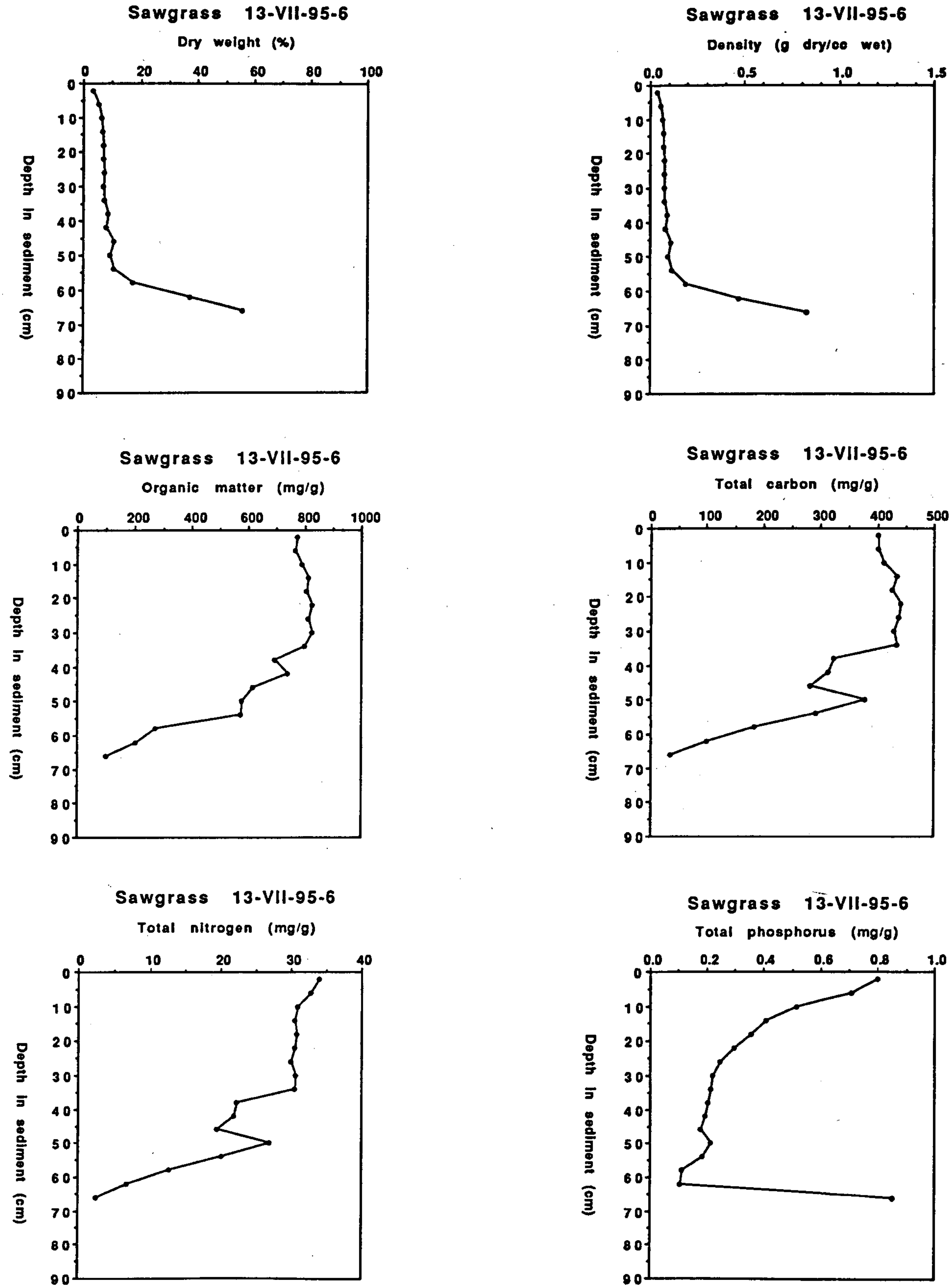



Figure 8. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Sawgrass Lake core 13-VII-95-6.

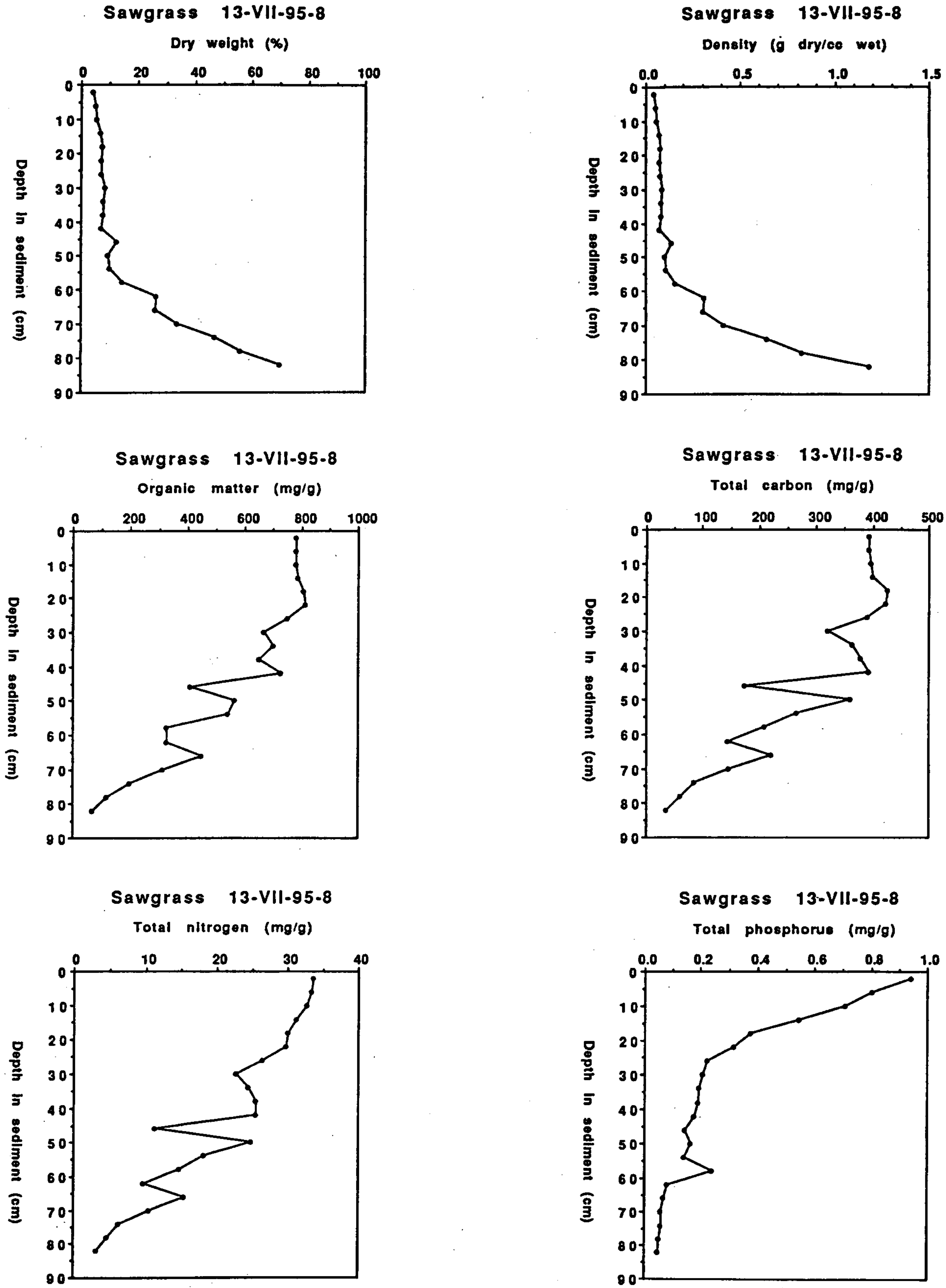



Figure 9. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Sawgrass Lake core 13-VII-95-8.

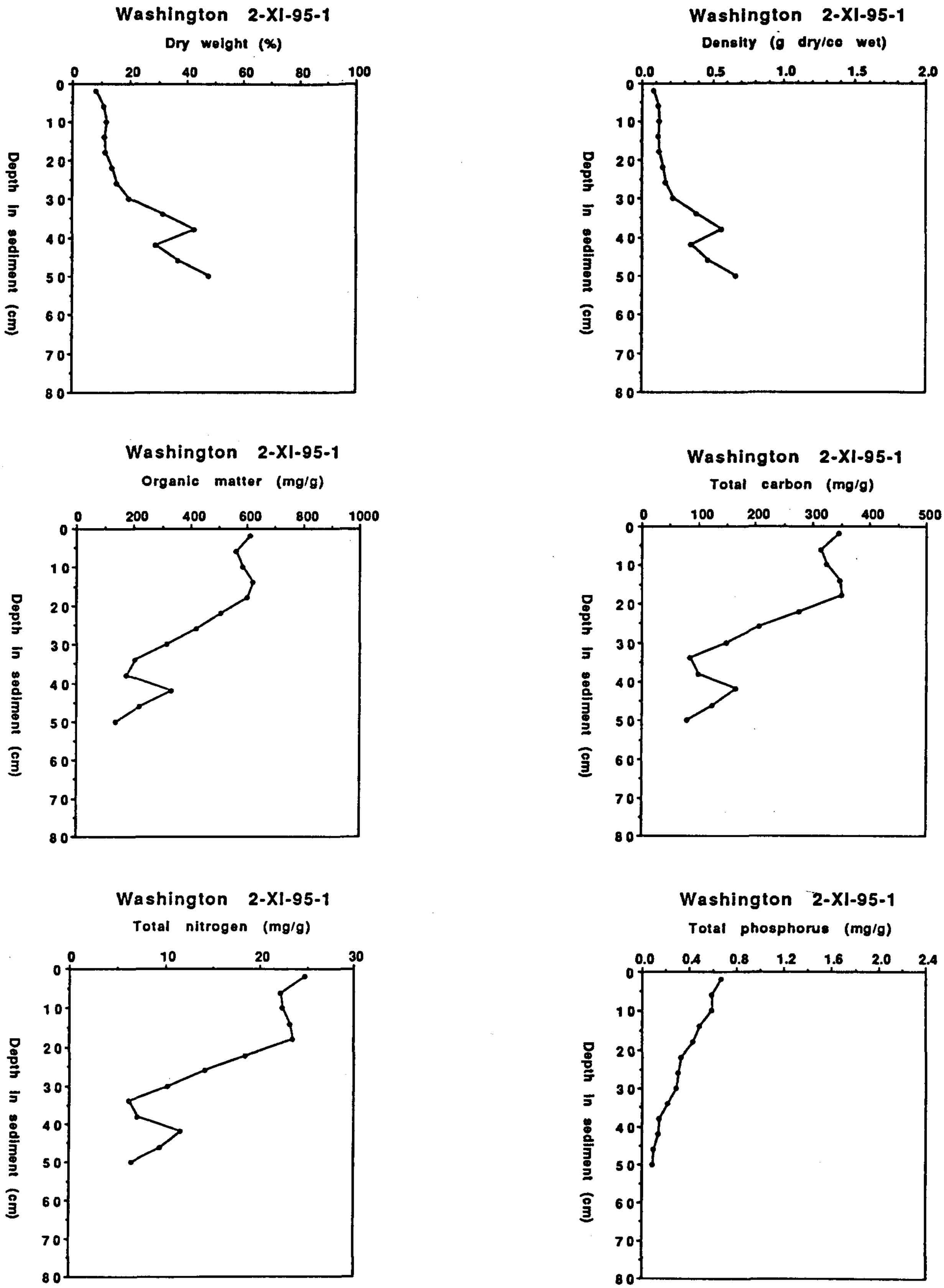



Figure 10. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 2-XI-95-1.

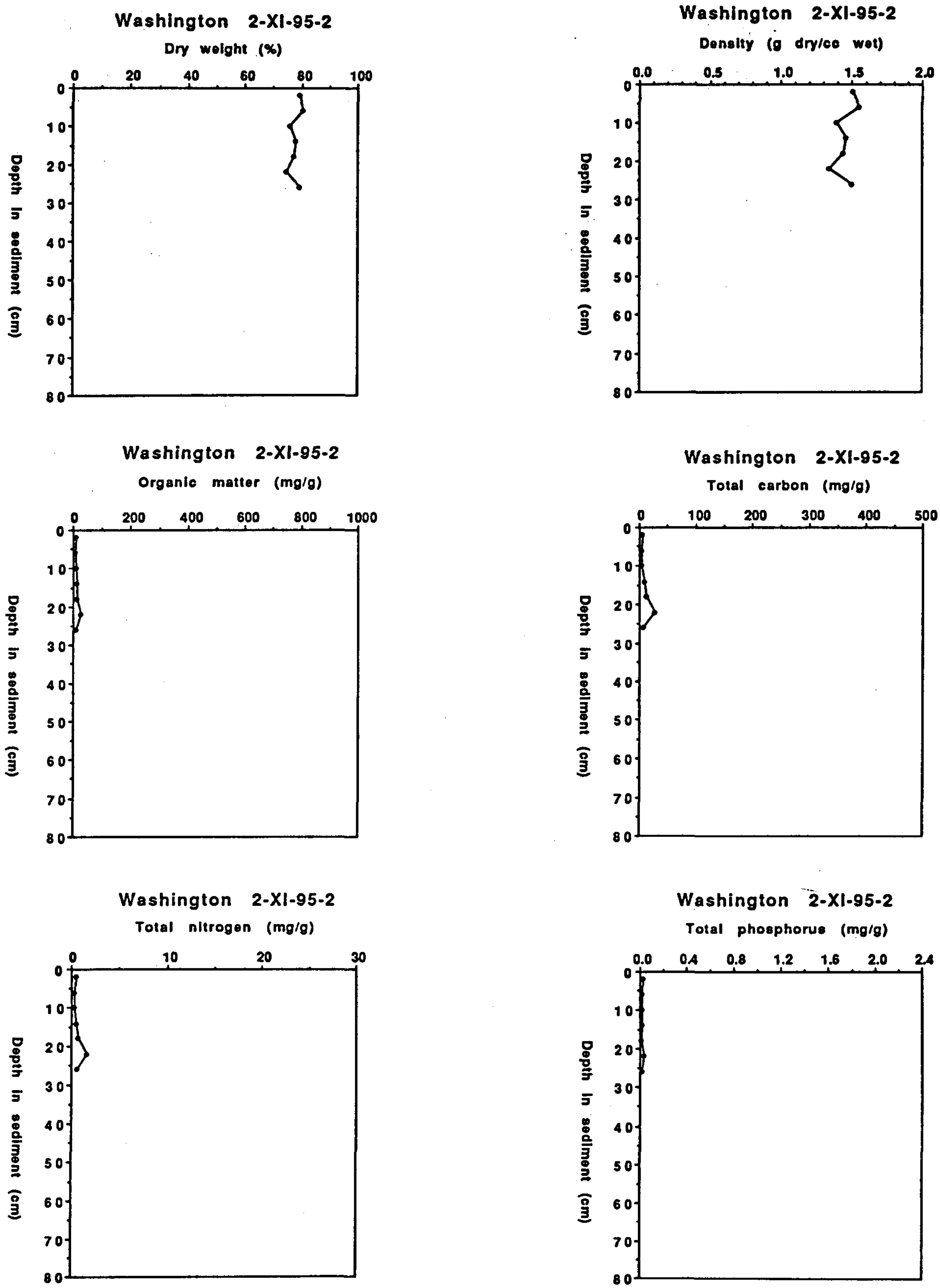



Figure 11. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 2-XI-95-2.

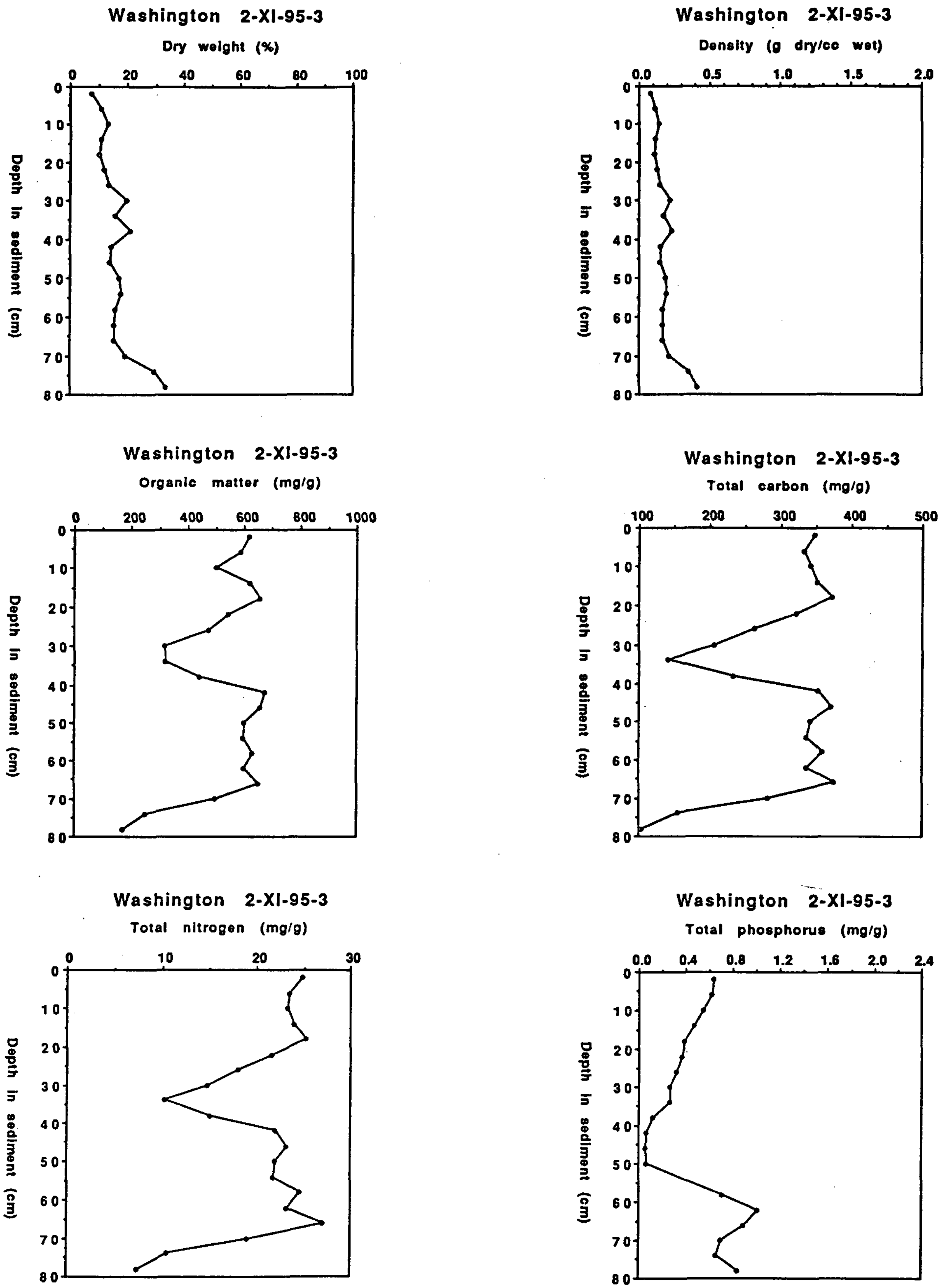



Figure 12. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 2-XI-95-3.

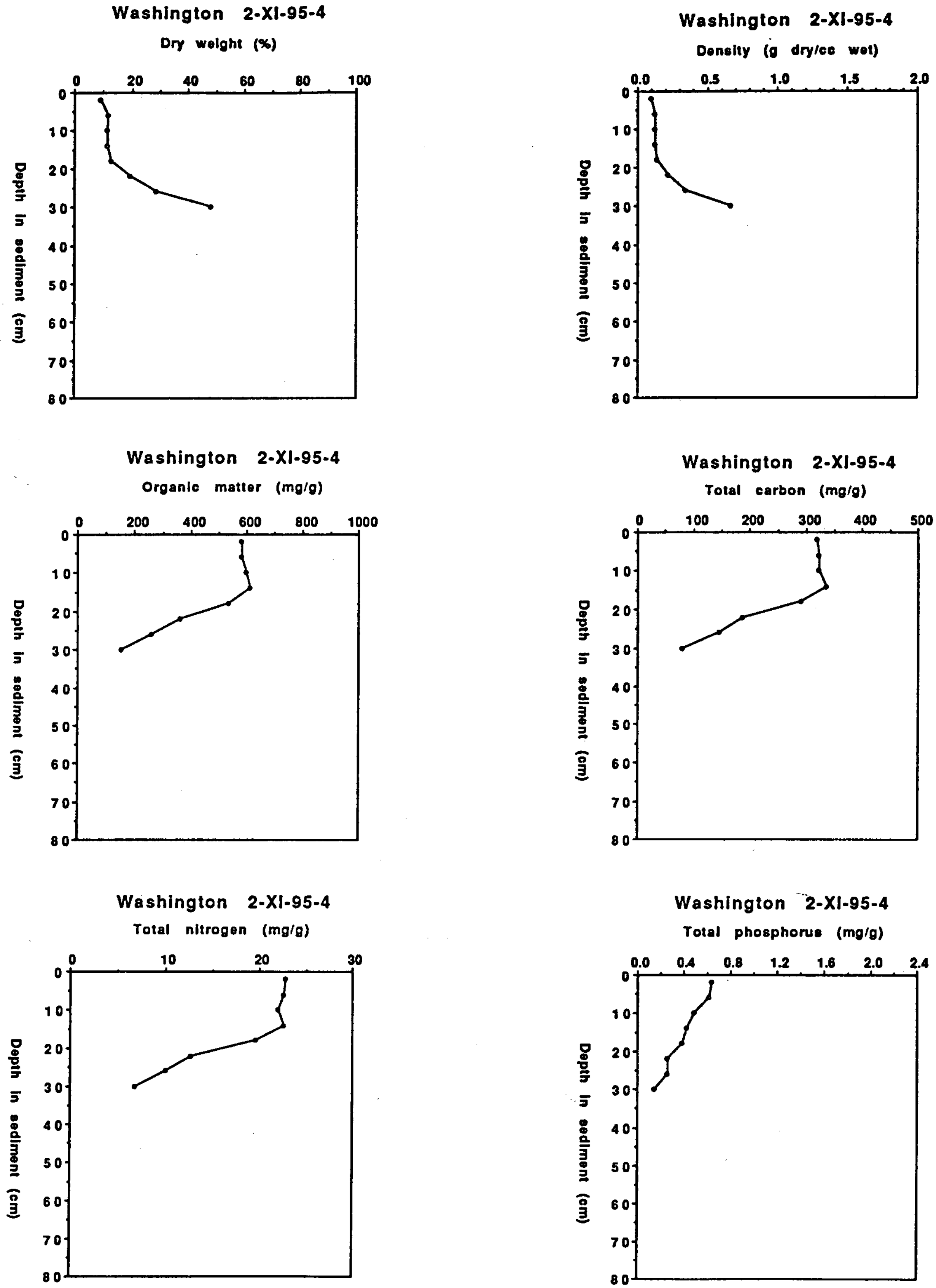



Figure 13. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 2-XI-95-4.

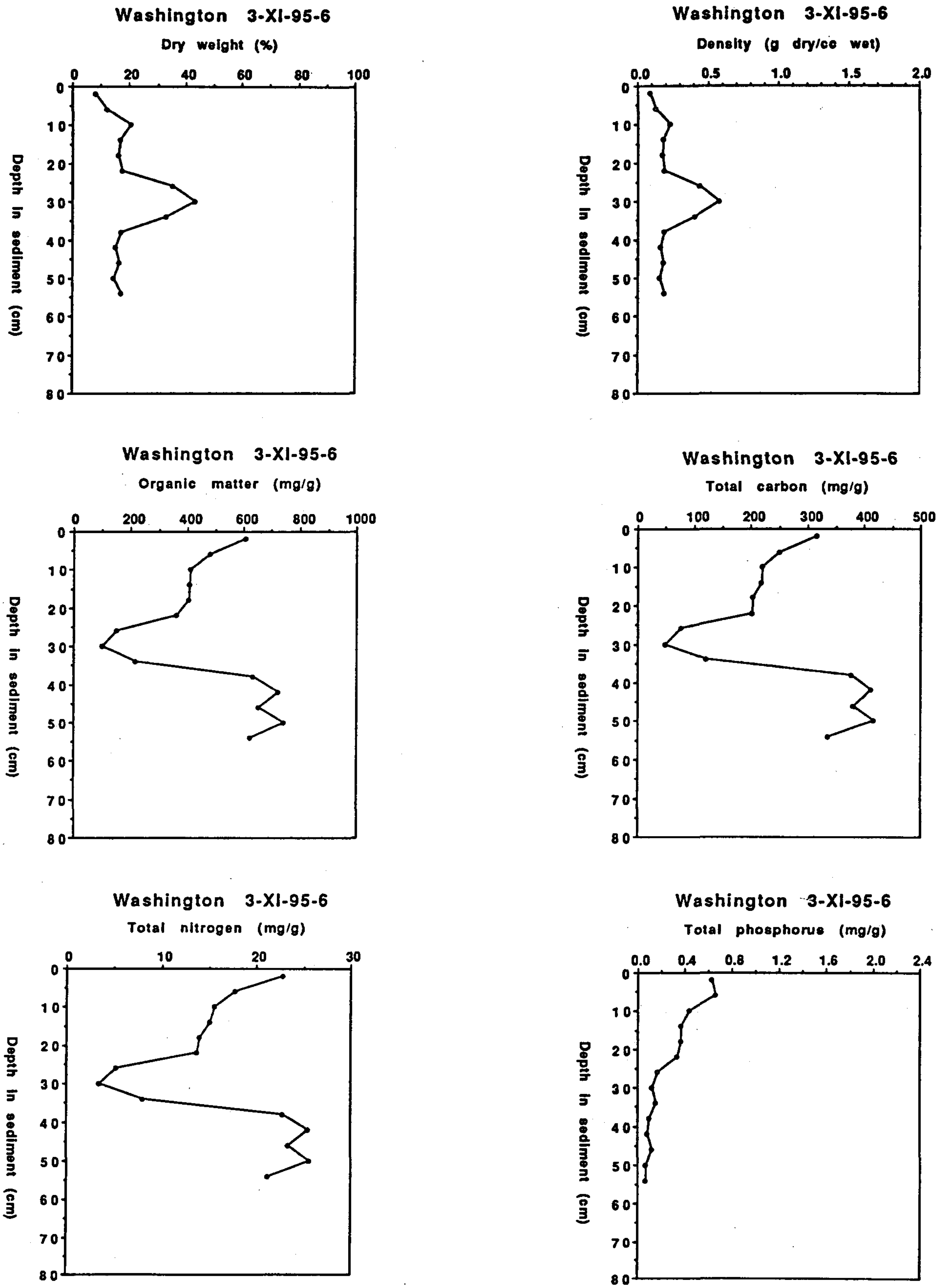



Figure 14. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 3-XI-95-6.

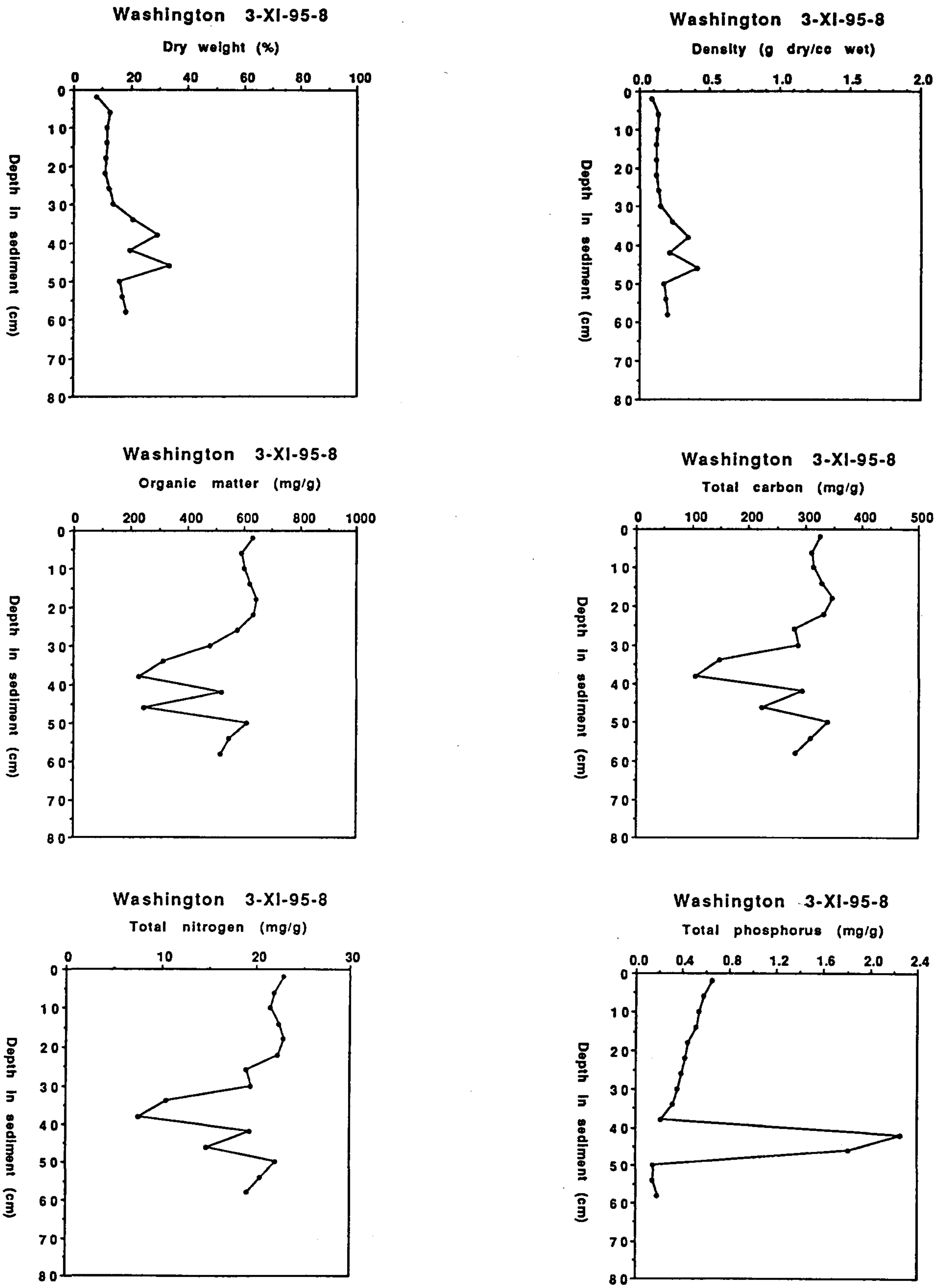



Figure 15. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 3-XI-95-8.

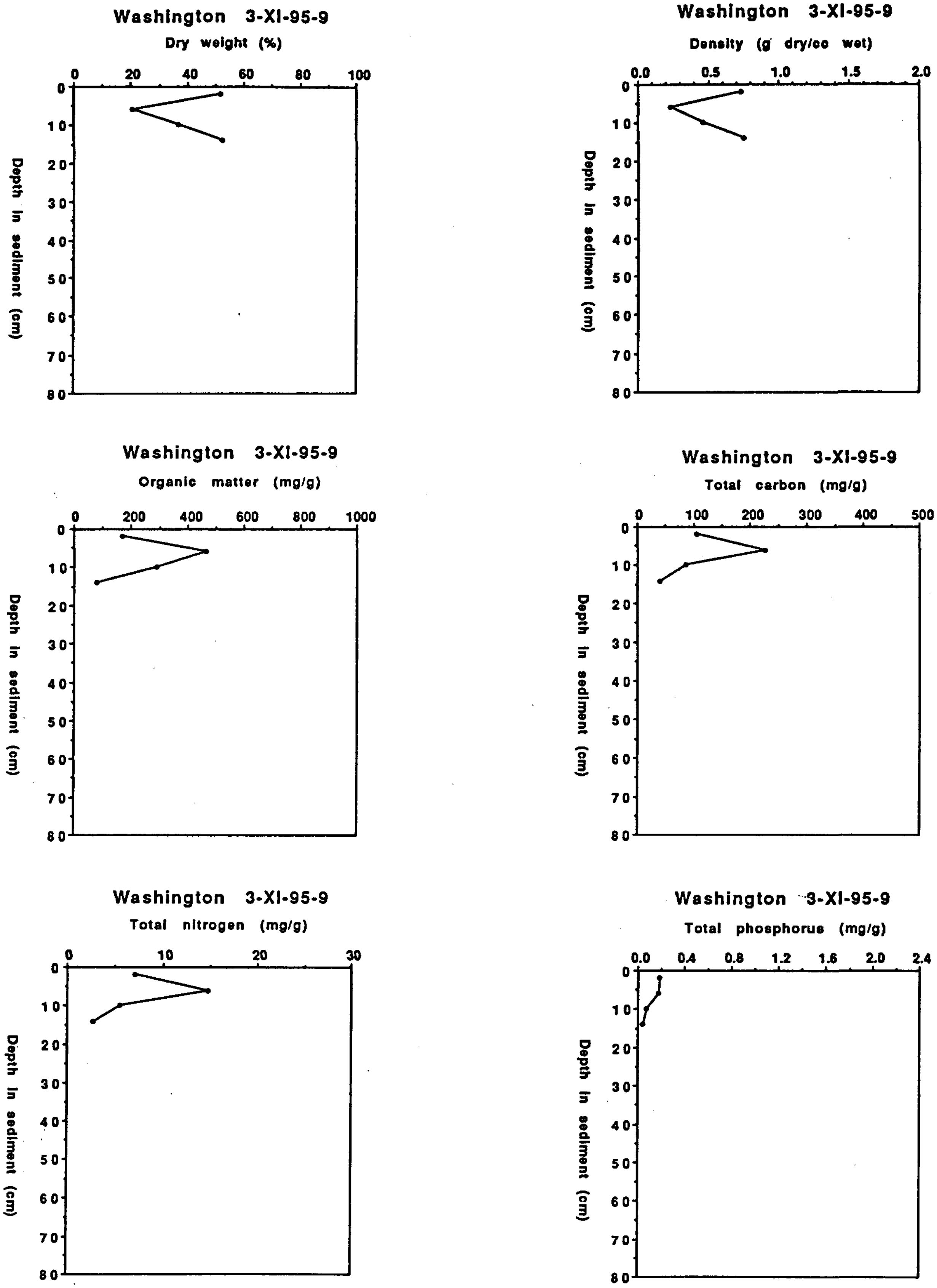



Figure 16. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 3-XI-95-9.

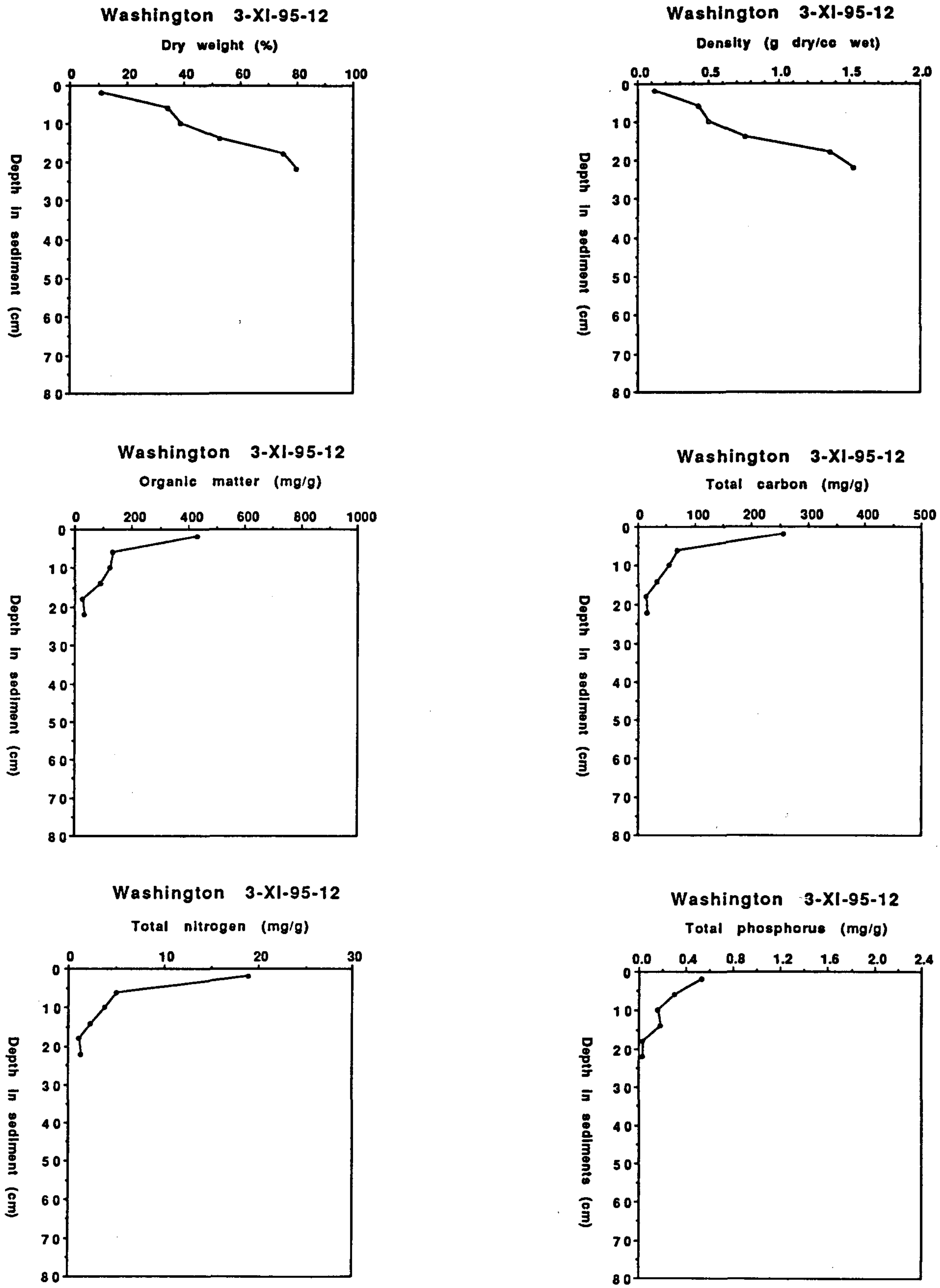



Figure 17. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 3-XI-95-12.

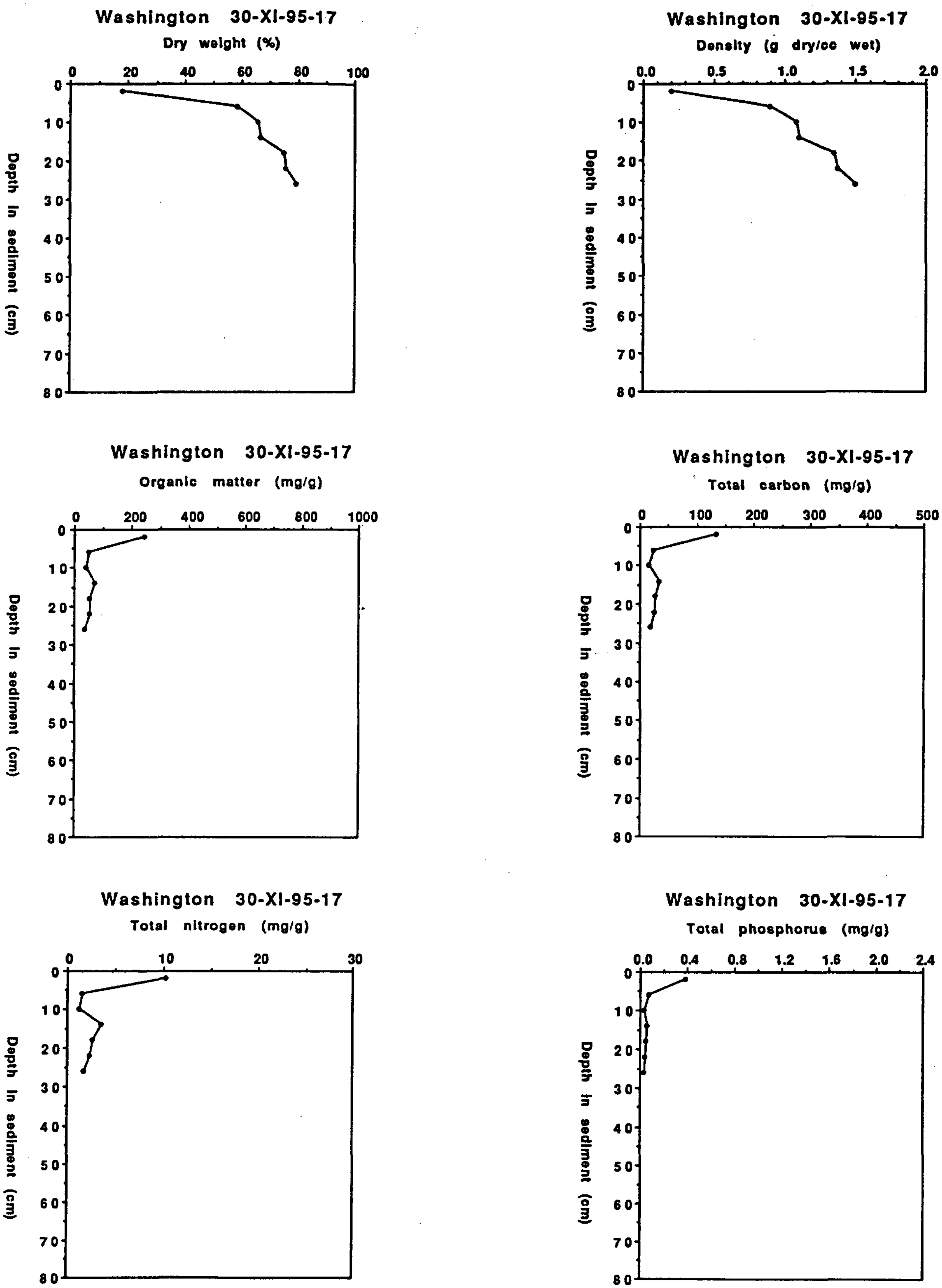



Figure 18. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 30-XI-95-17.

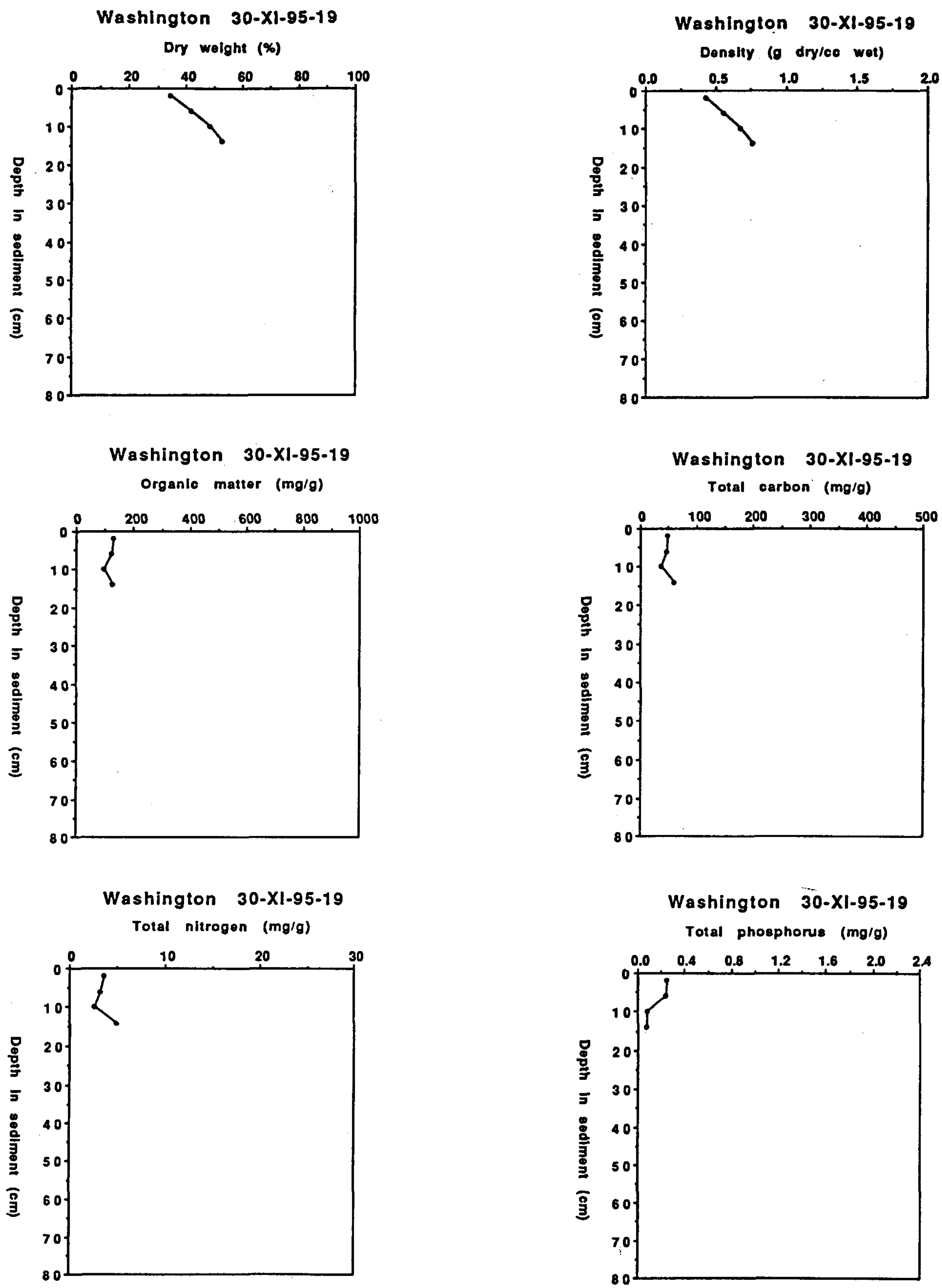



Figure 19. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 30-XI-95-19.

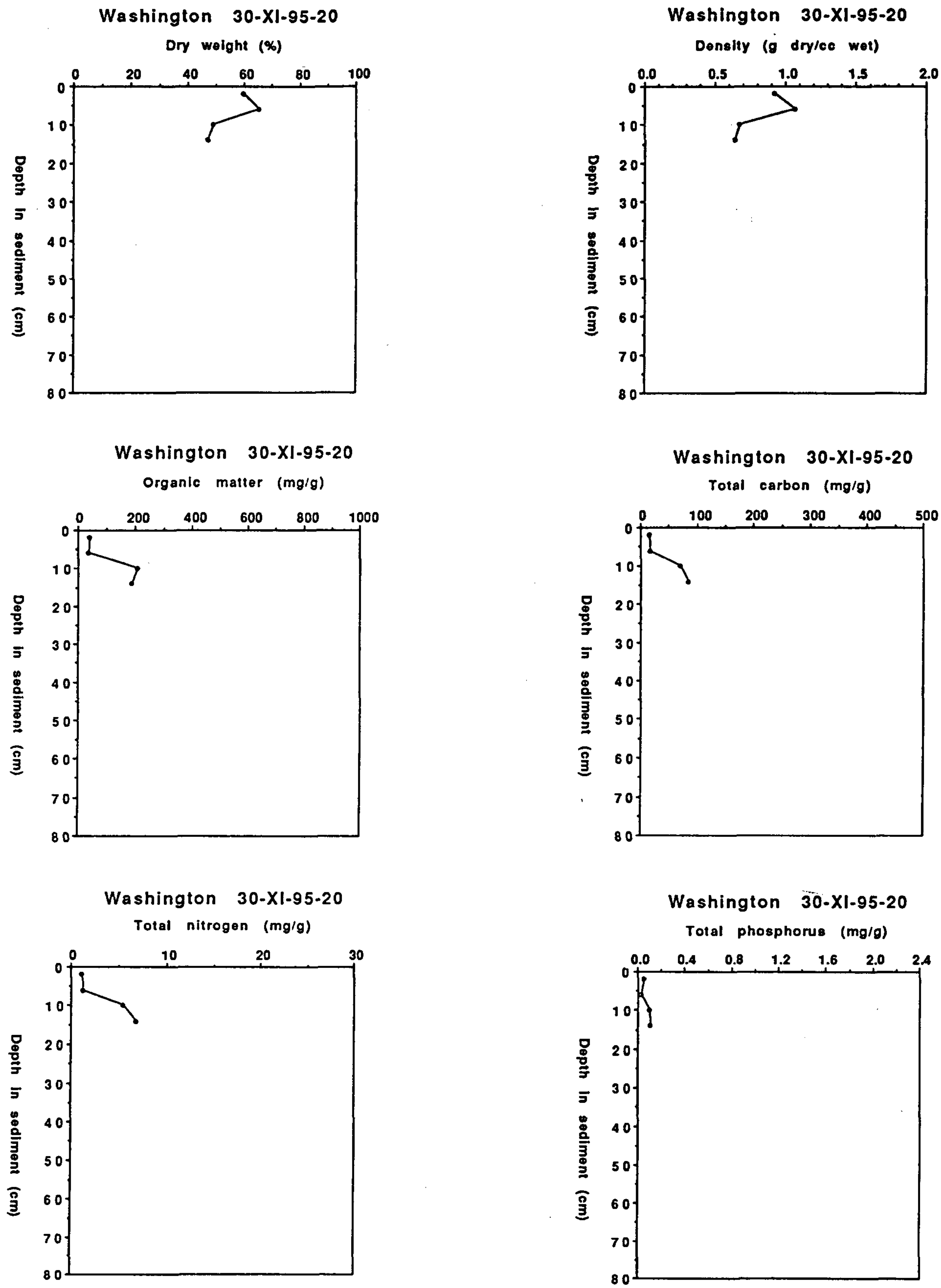



Figure 20. Percent dry weight, density (g dry $cm^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 30-XI-95-20.

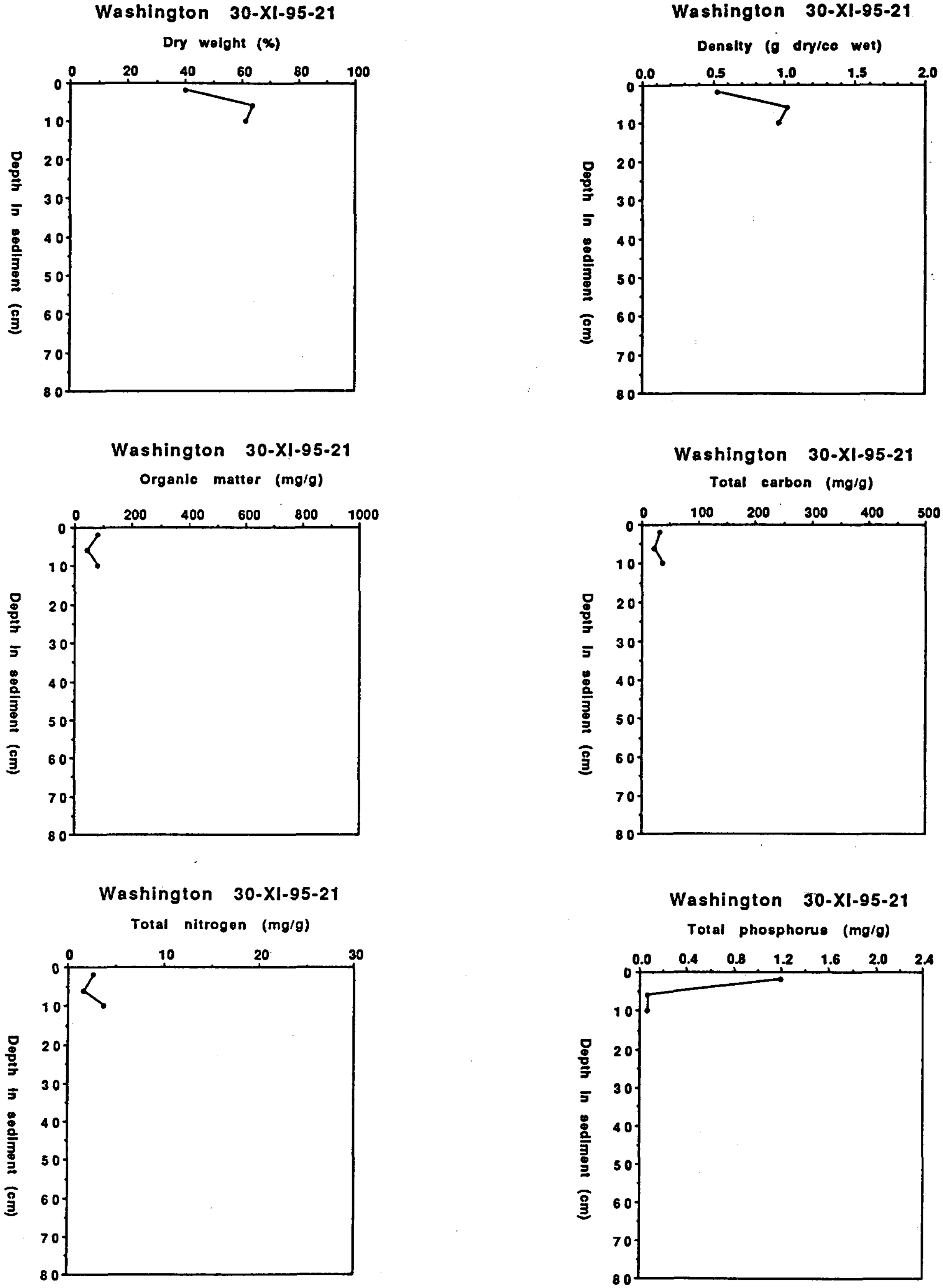



Figure 21. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 30-XI-95-21.

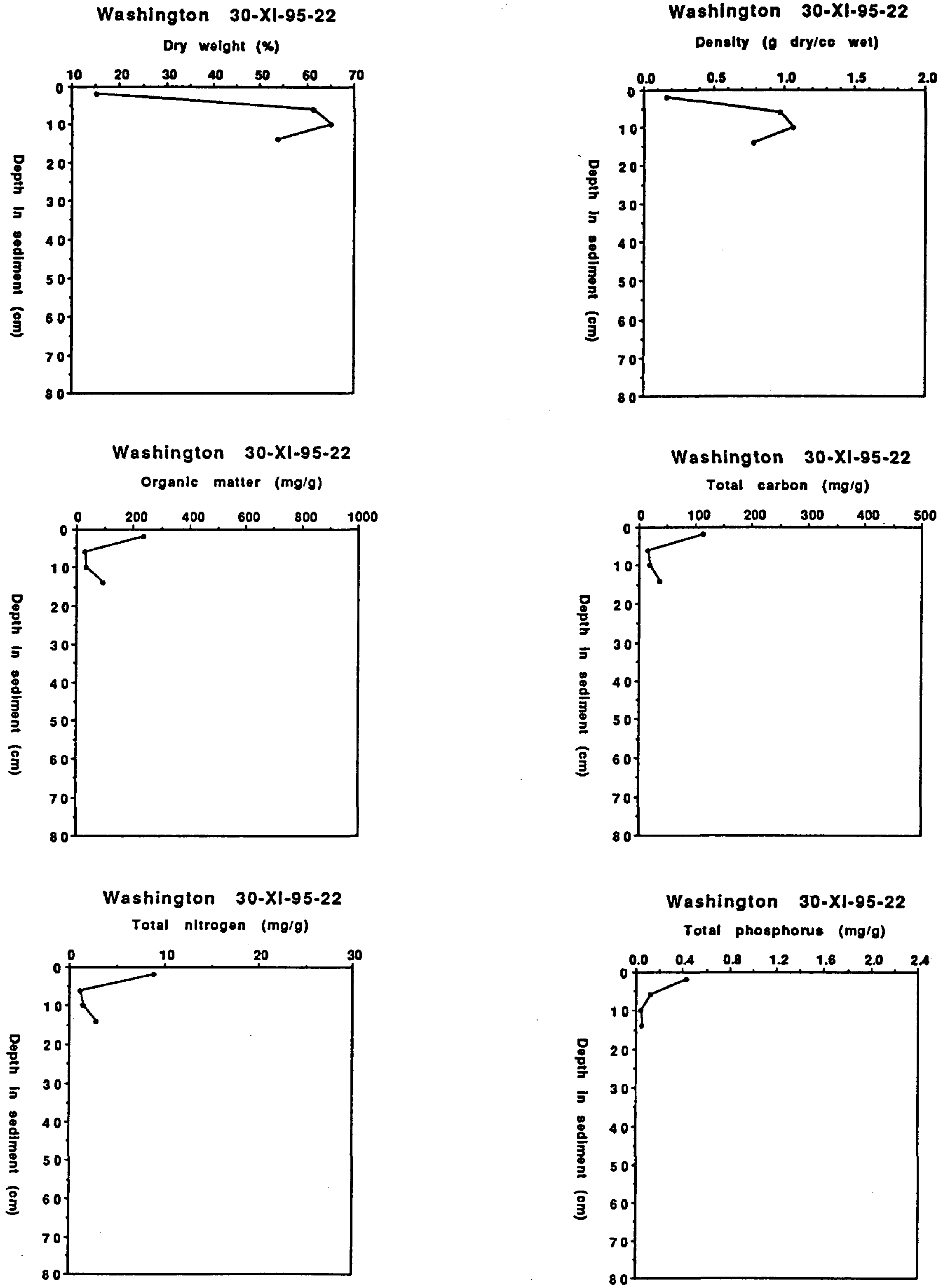



Figure 22. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 30-XI-95-22.

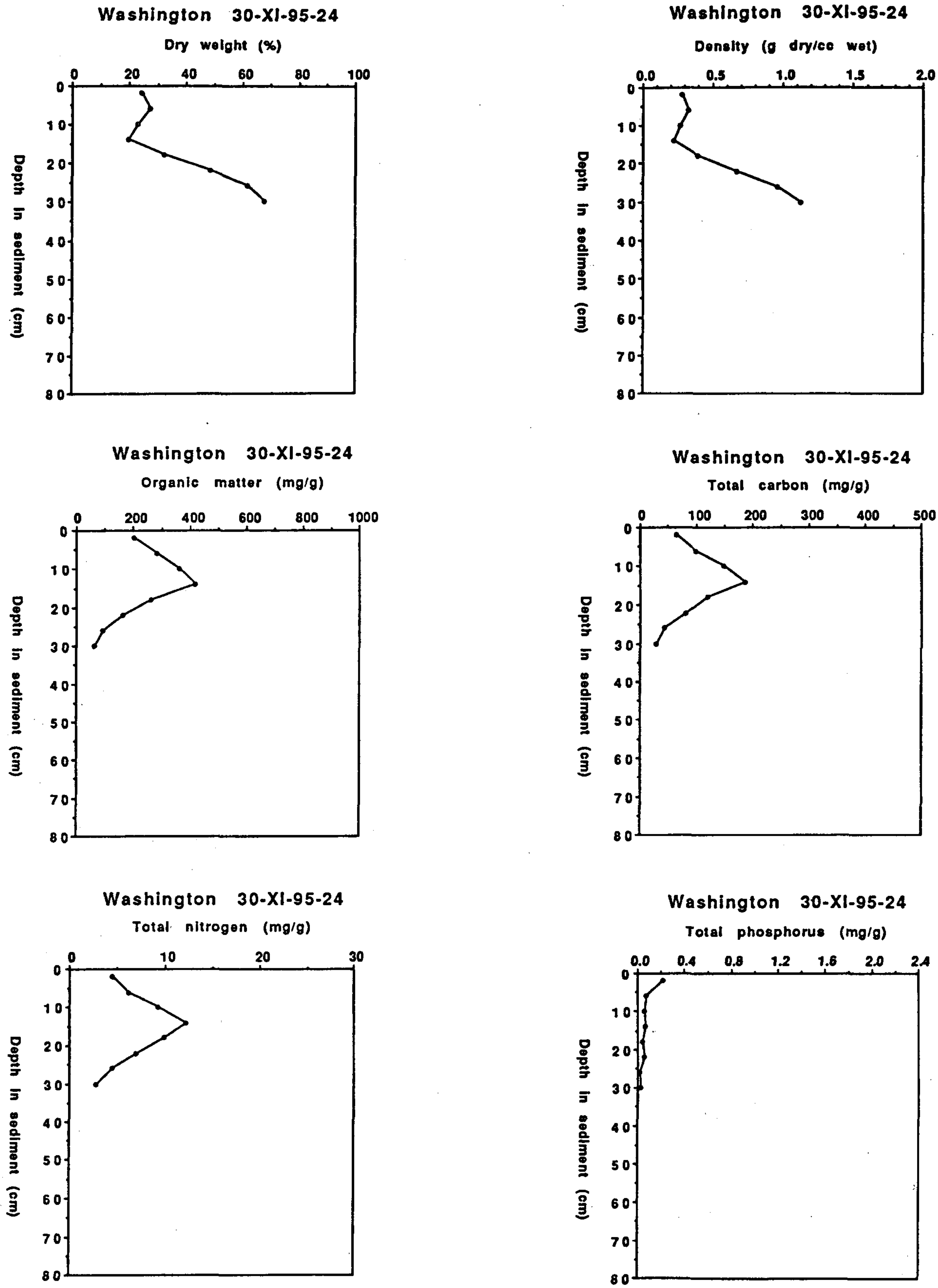



Figure 23. Percent dry weight, density (g dry cm$^{-3}$ wet), organic matter concentration (% LOI 550 °C) and total carbon, total nitrogen, and total phosphorus concentration versus depth in Lake Washington core 30-XI-95-24.

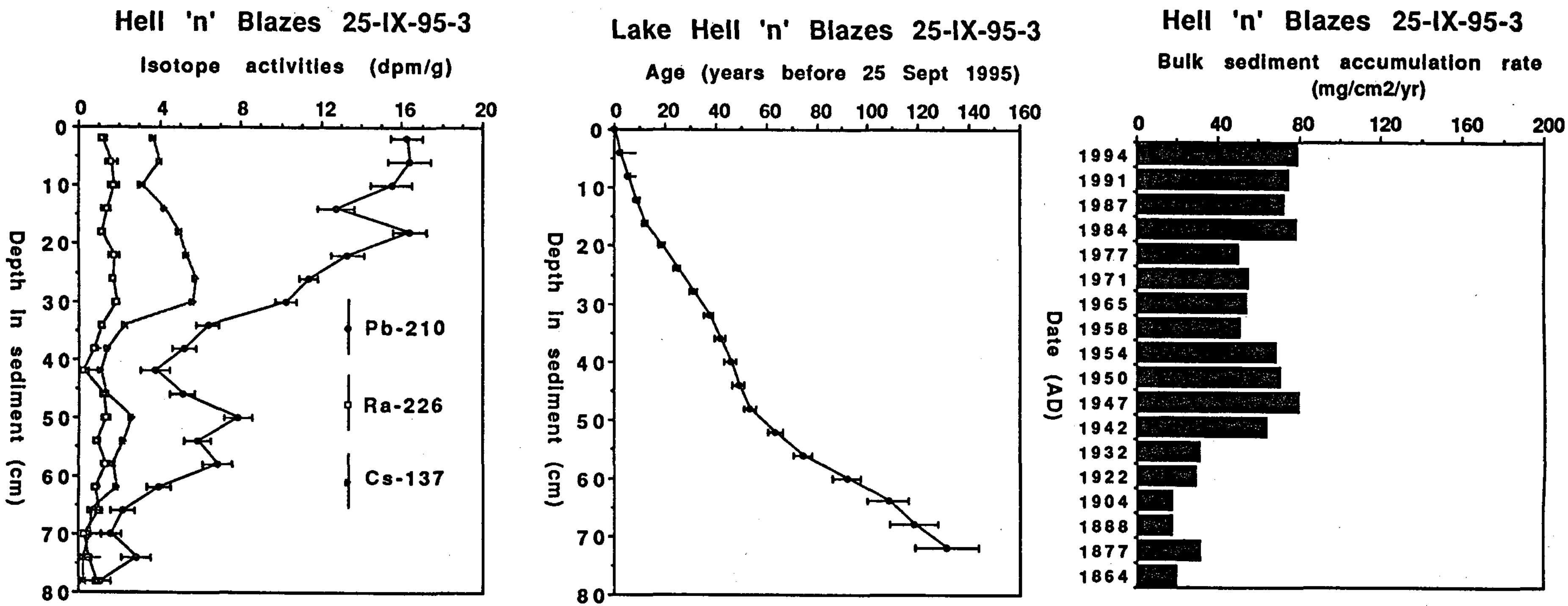



Figure 24. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Lake Hell 'n' Blazes core 25-IX-95-3. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

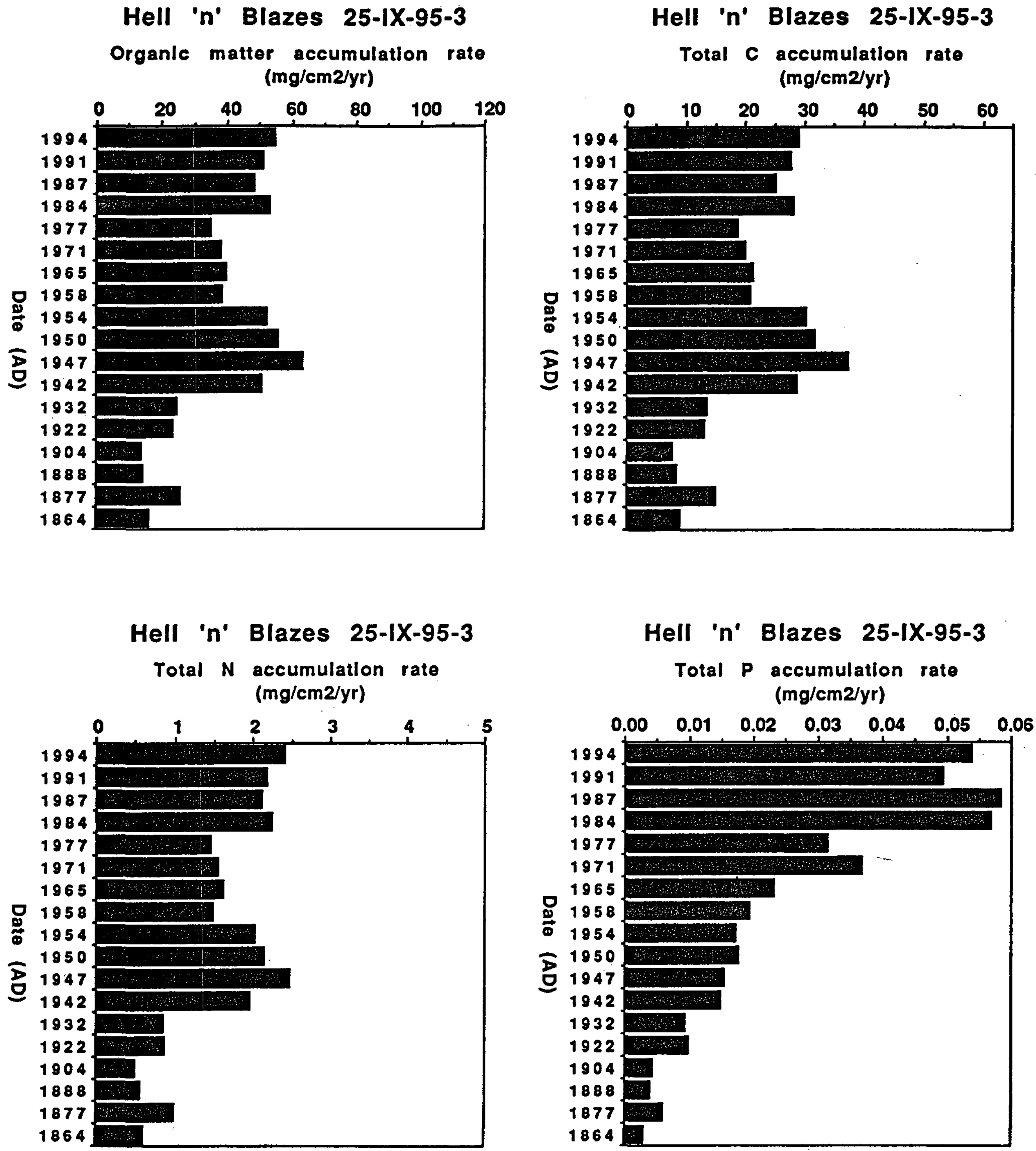



Figure 25. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Lake Hell 'n' Blazes core 25-IX-95-3.

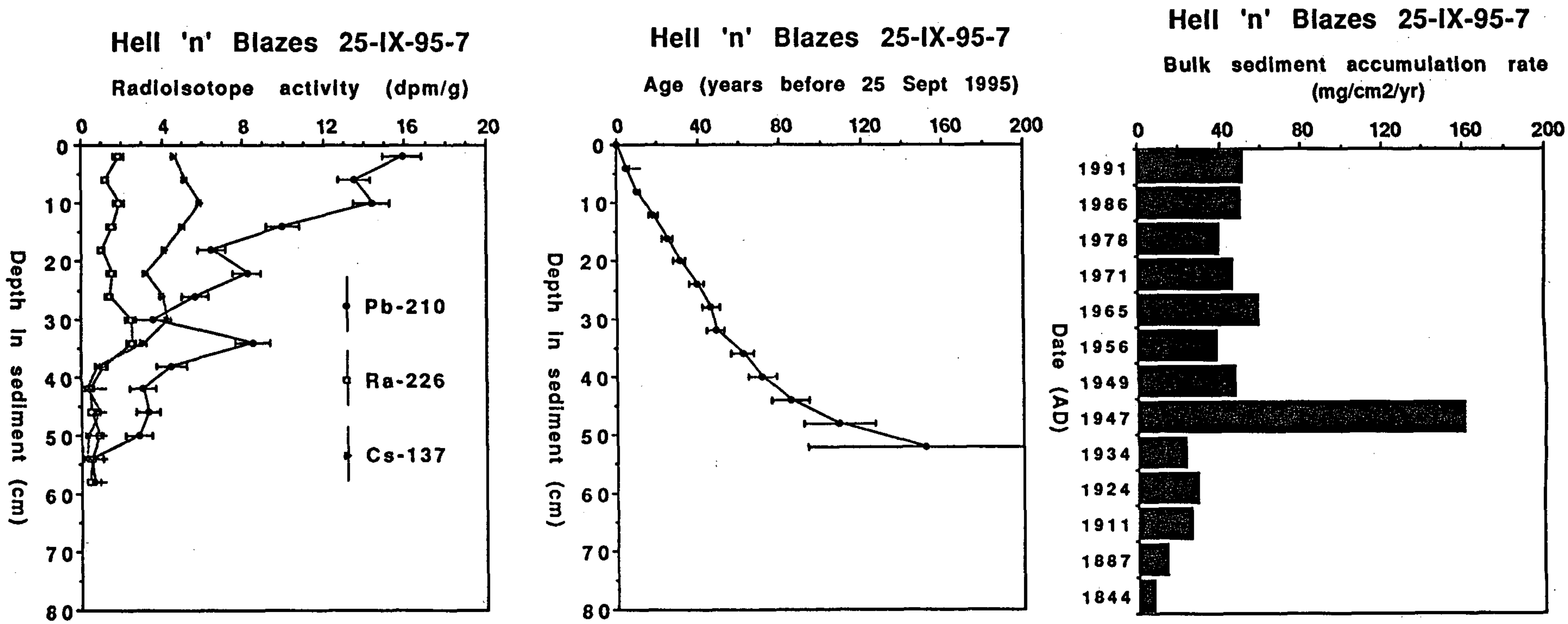



Figure 26. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Lake Hell 'n' Blazes core 25-IX-95-7. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

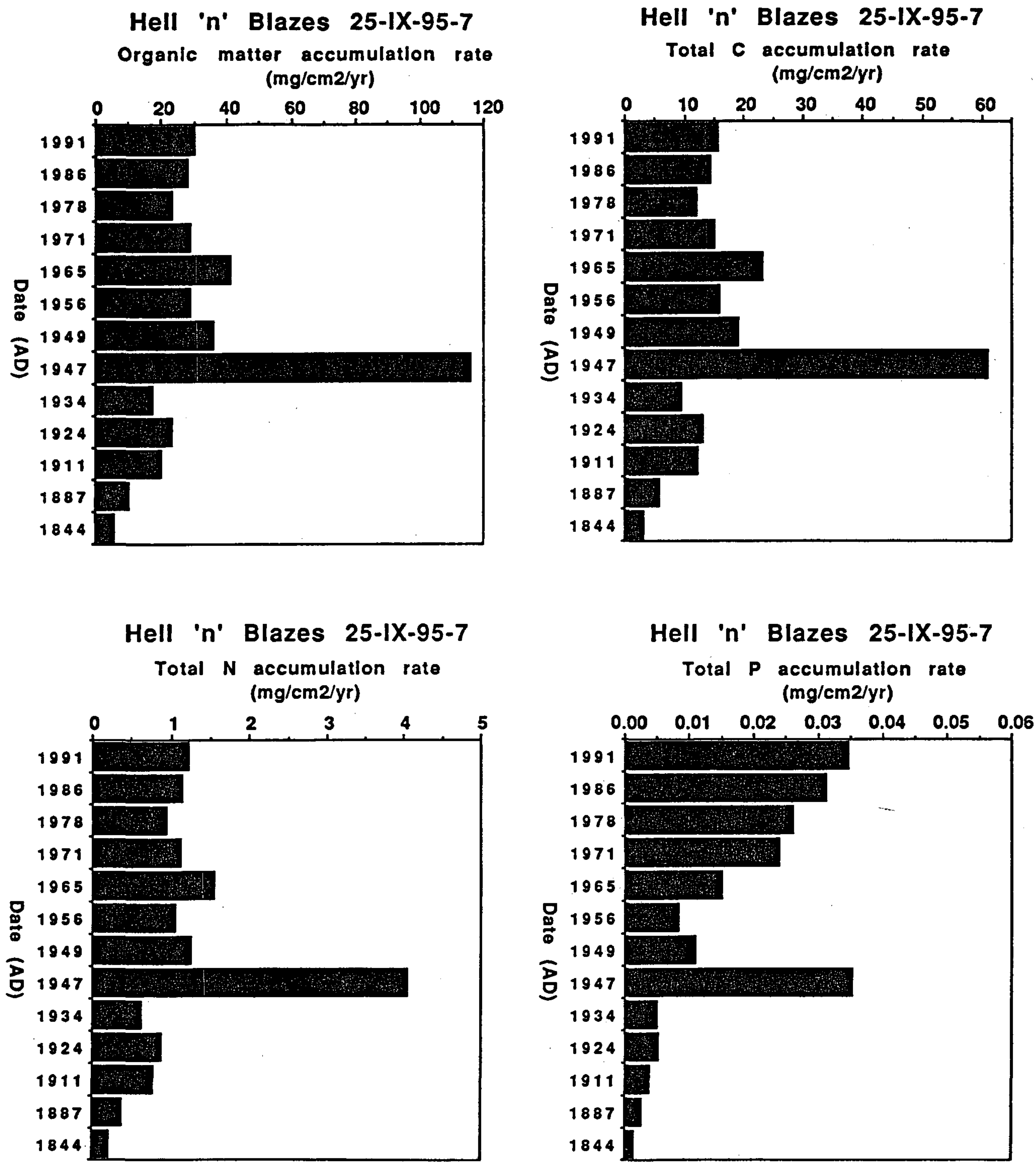



Figure 27. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Lake Hell 'n' Blazes core 25-IX-95-7.

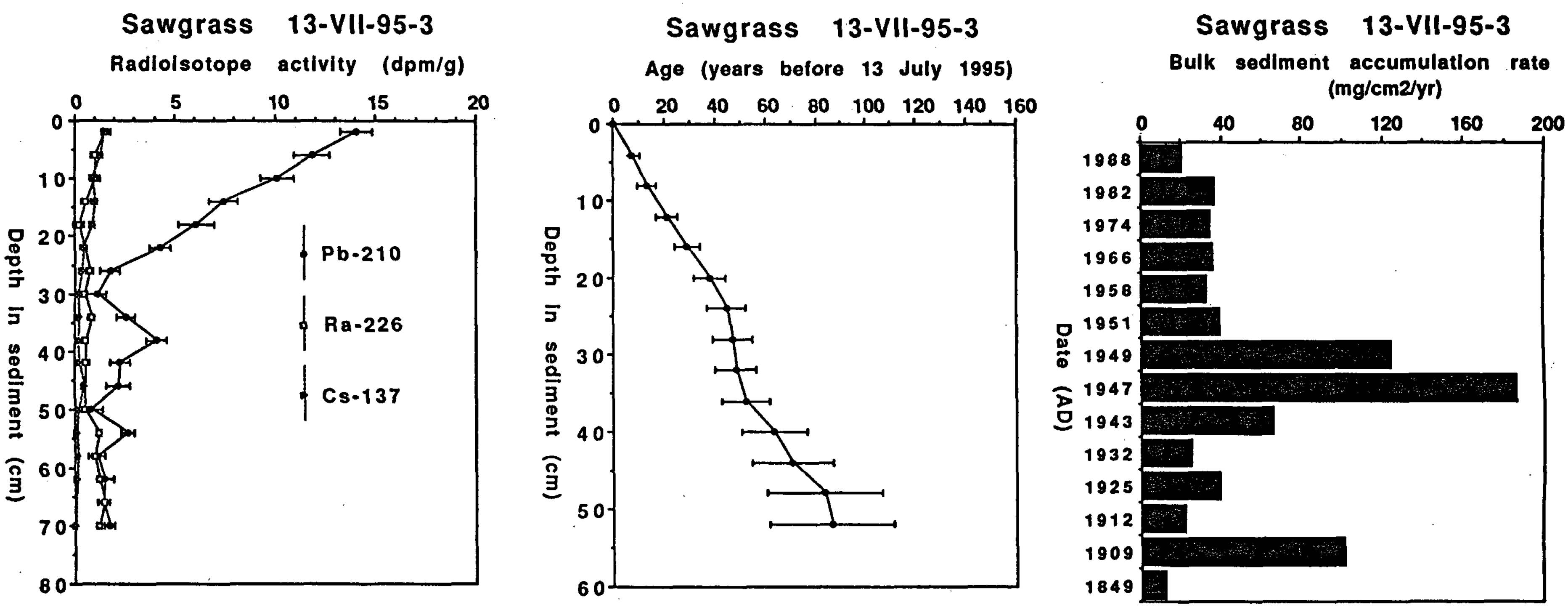



Figure 28. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Sawgrass Lake core 13-VII-95-3. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

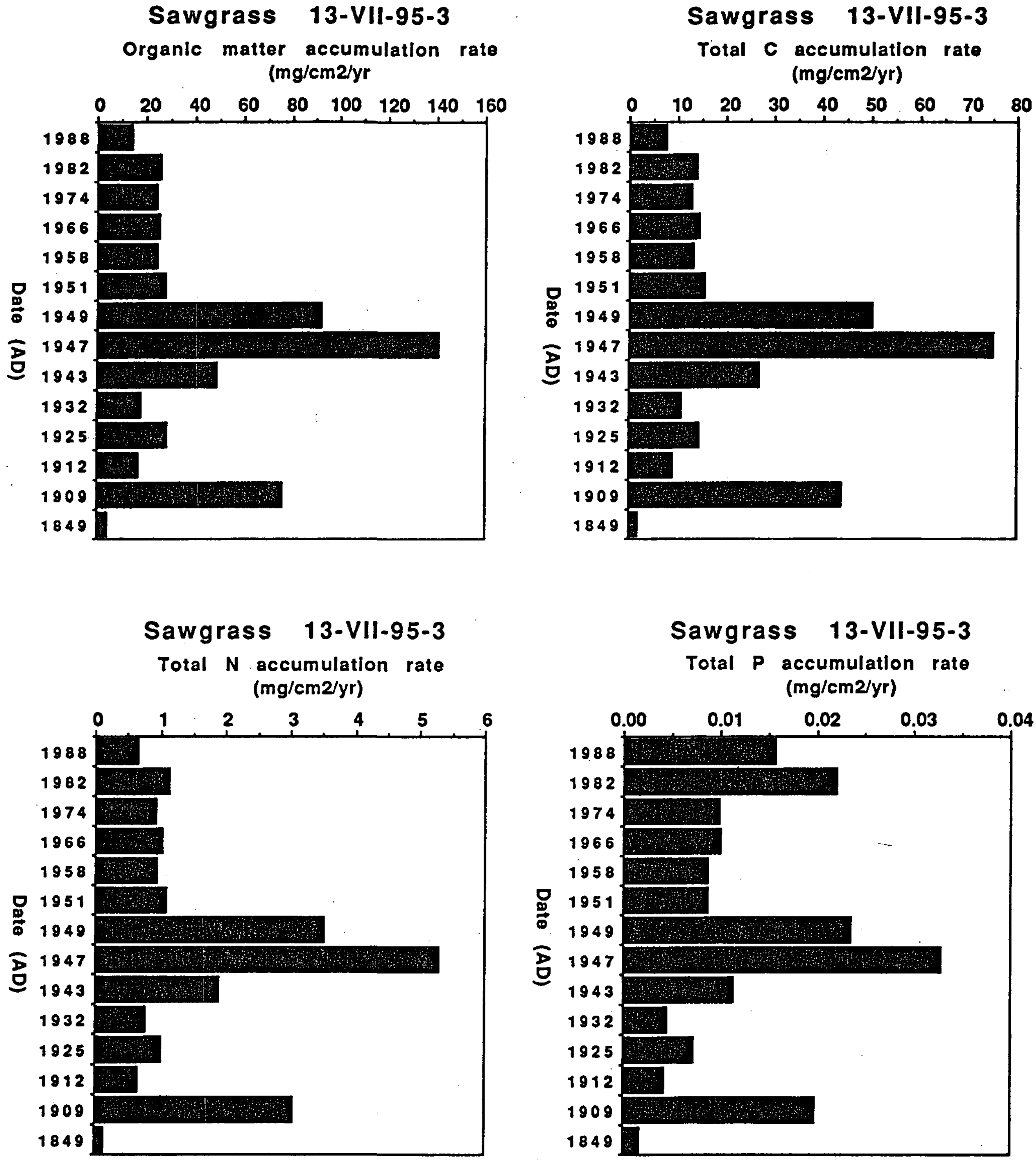



Figure 29. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Sawgrass Lake core 13-VII-95-3.

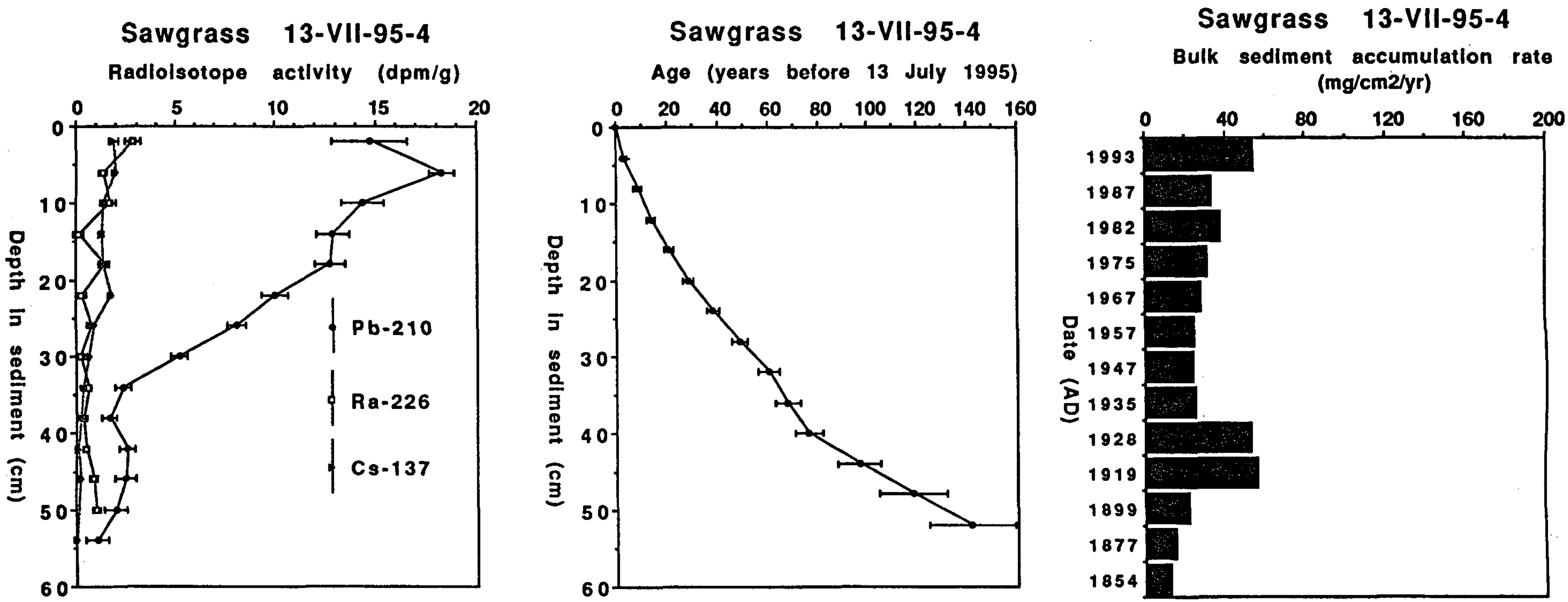



Figure 30. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Sawgrass Lake core 13-VII-95-4. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

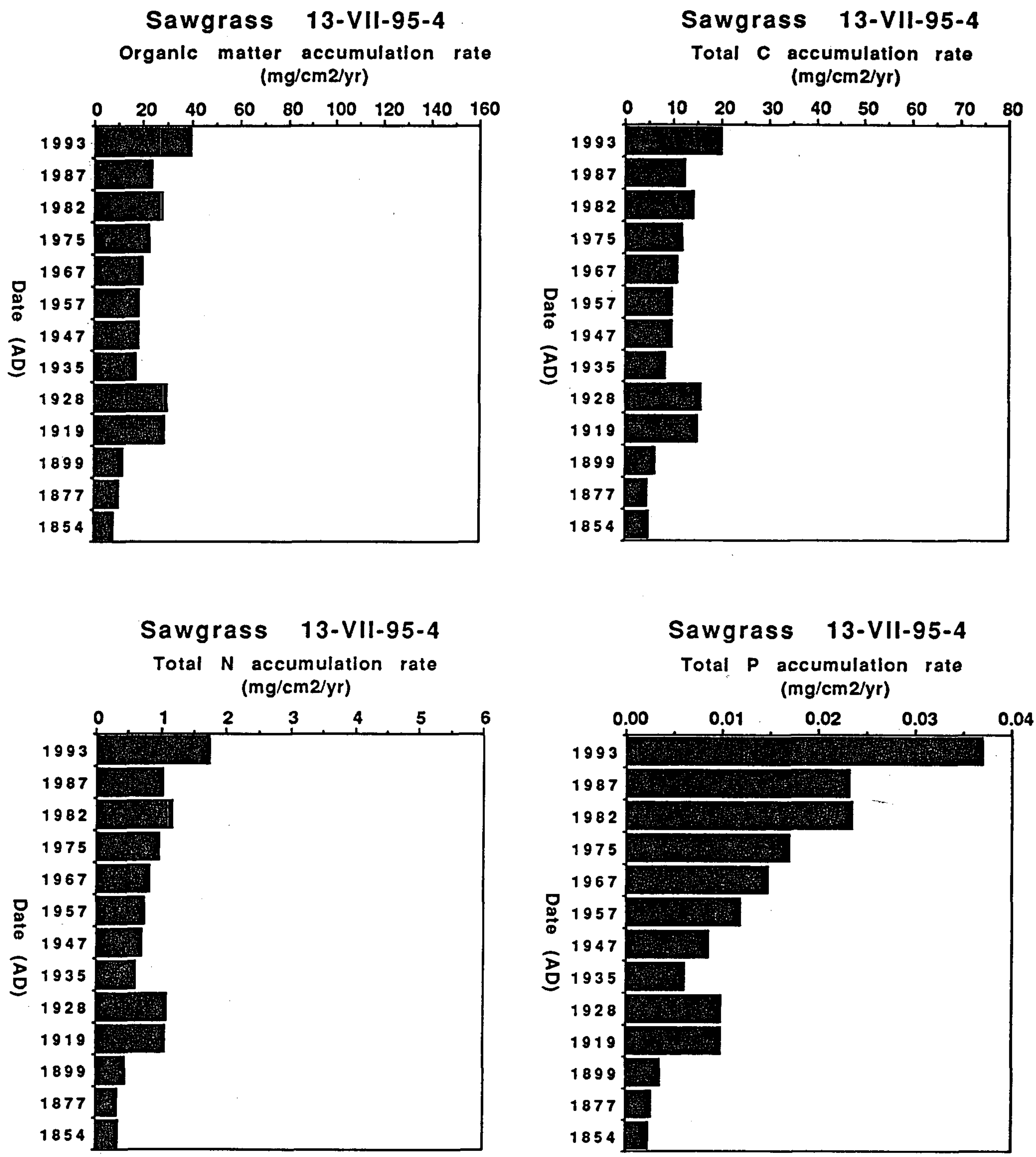



Figure 31. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Sawgrass Lake core 13-VII-95-4.

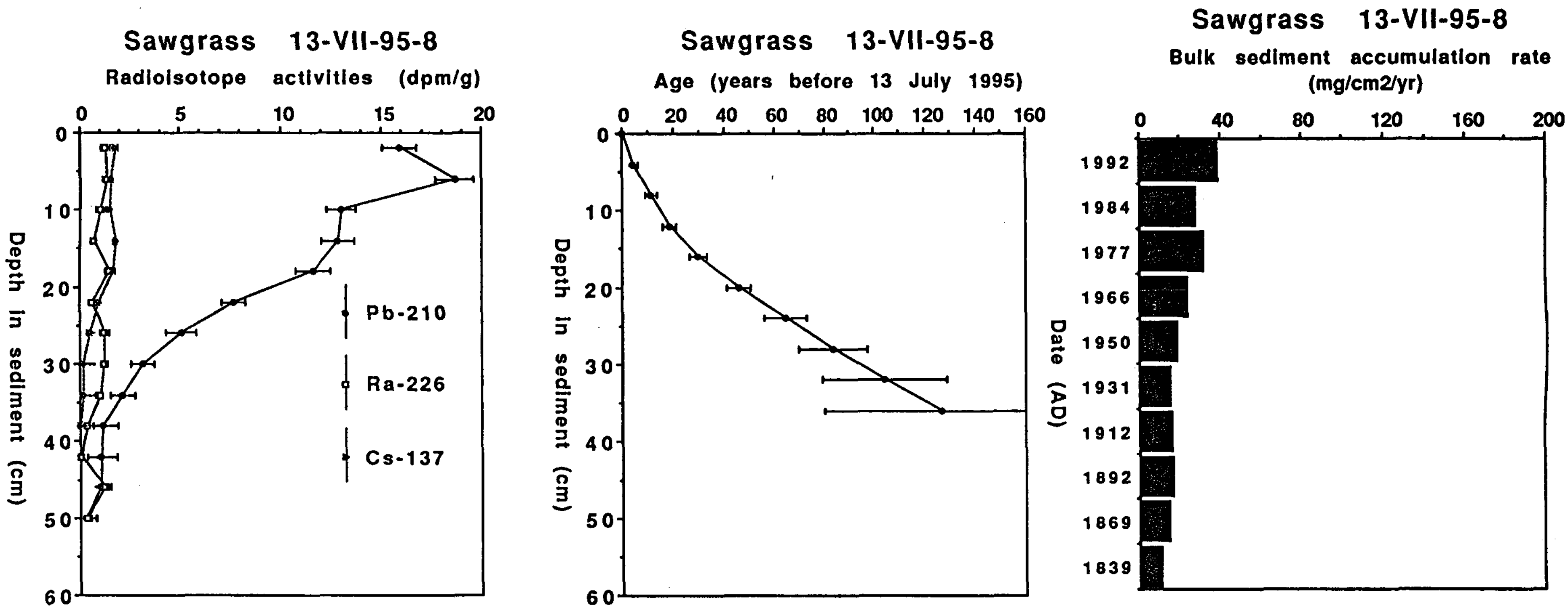



Figure 32. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Sawgrass Lake core 13-VII-95-8. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

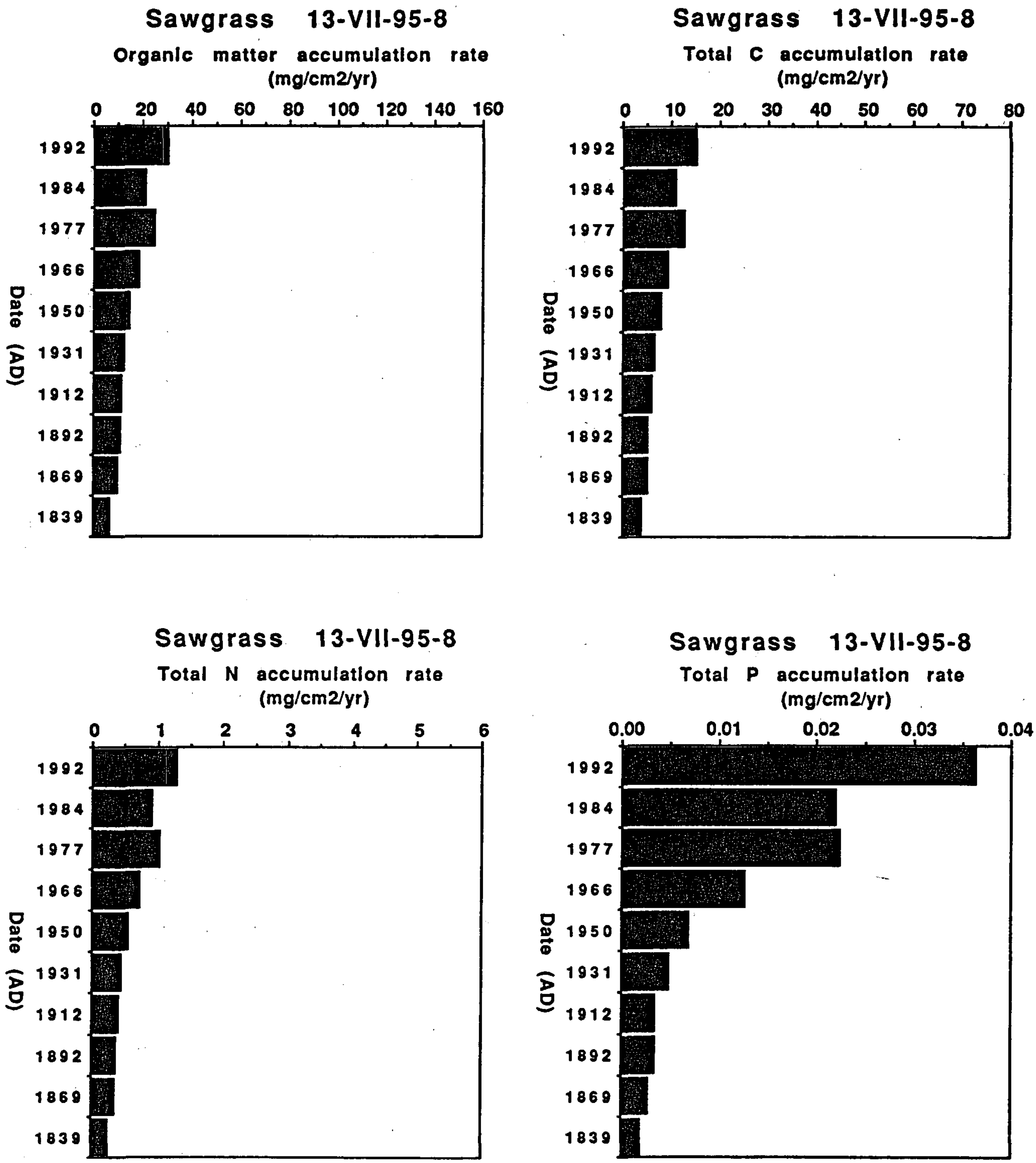



Figure 33. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Sawgrass Lake core 13-VII-95-8.

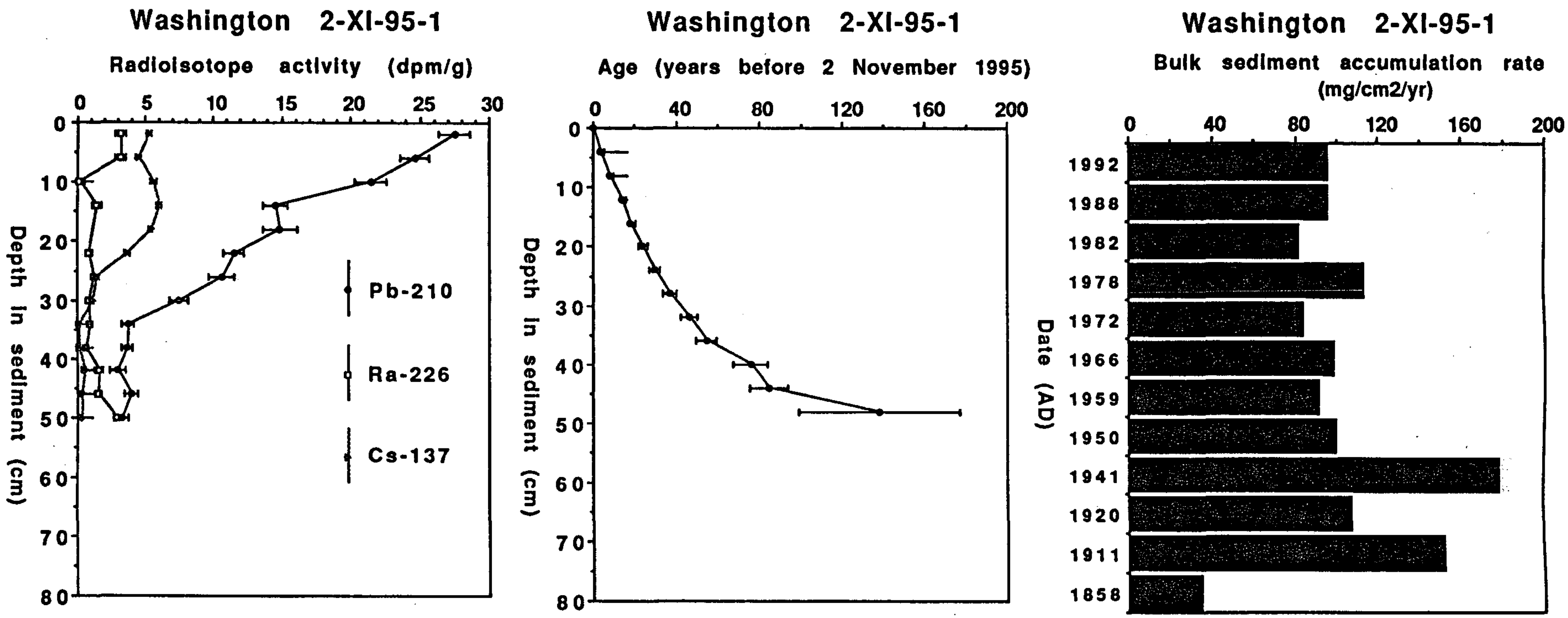



Figure 34. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Lake Washington core 2-XI-95-1. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

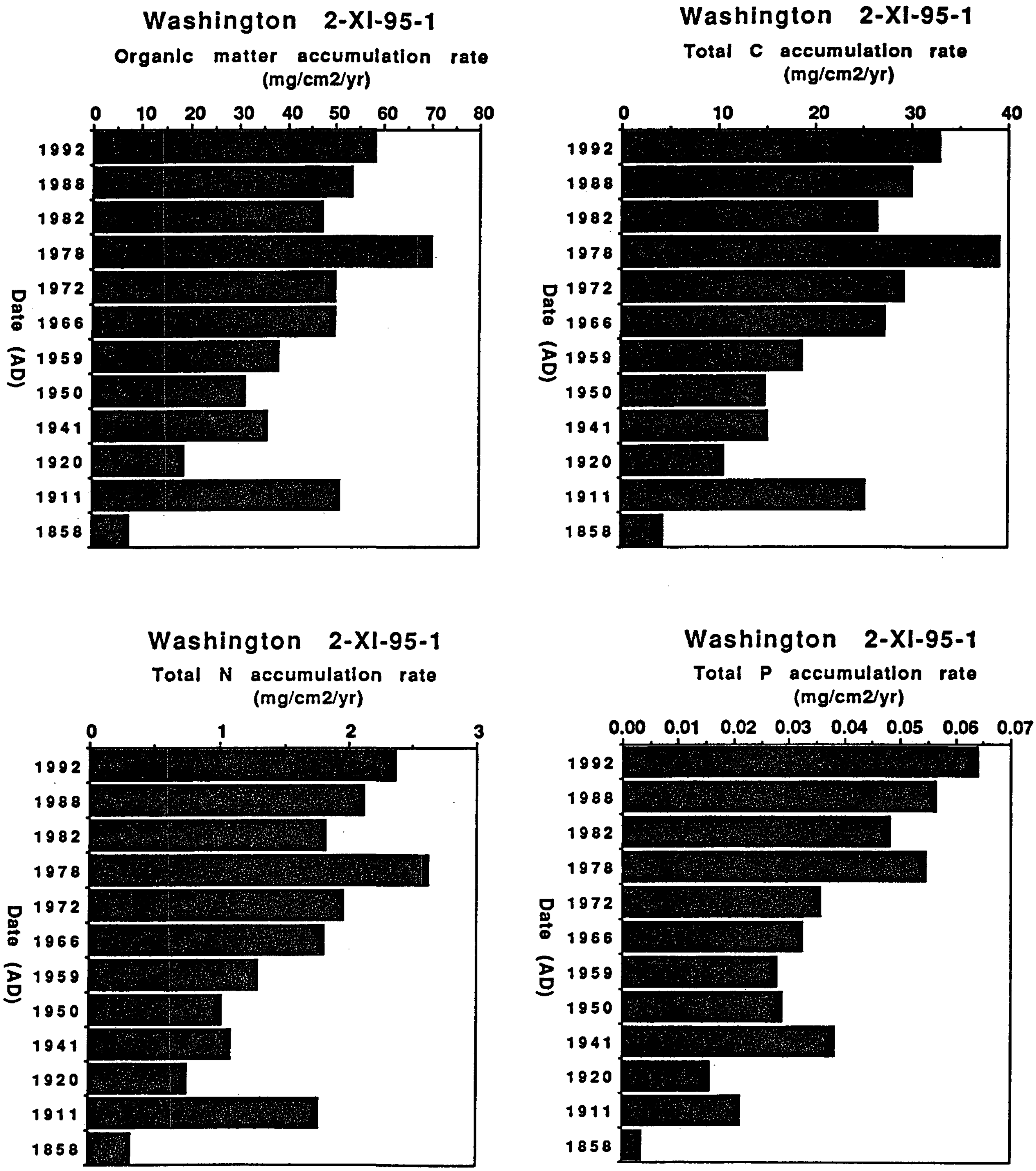



Figure 35. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Lake Washington core 2-XI-95-1.

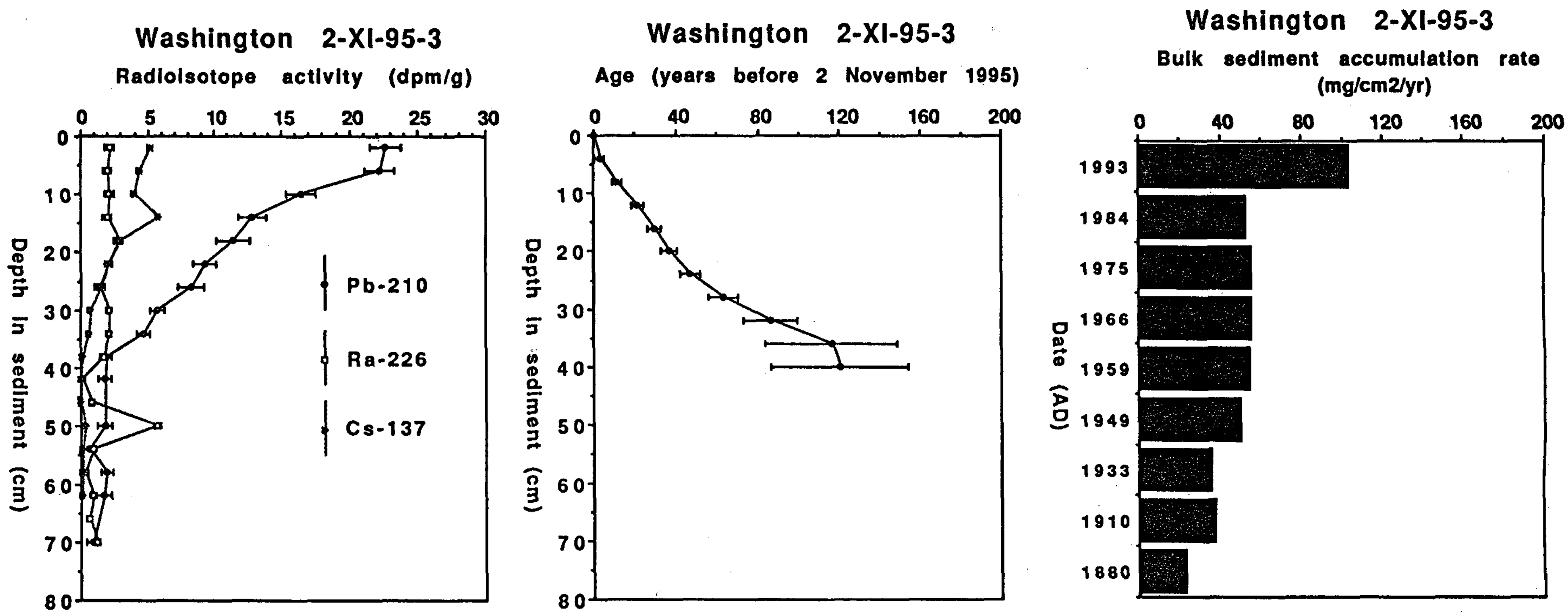



Figure 36. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Lake Washington core 2-XI-95-3. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

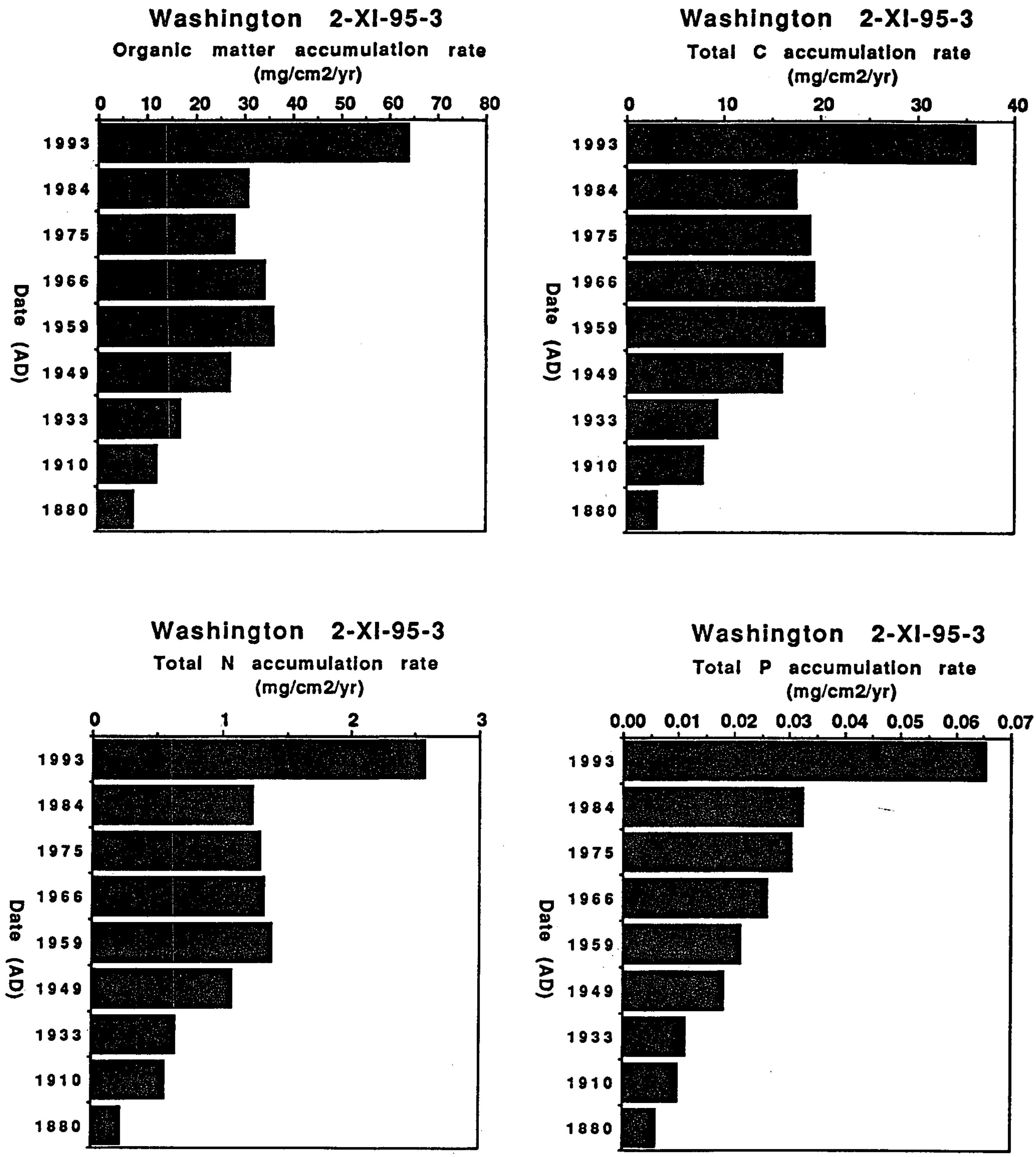



Figure 37. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Lake Washington core 2-XI-95-3.

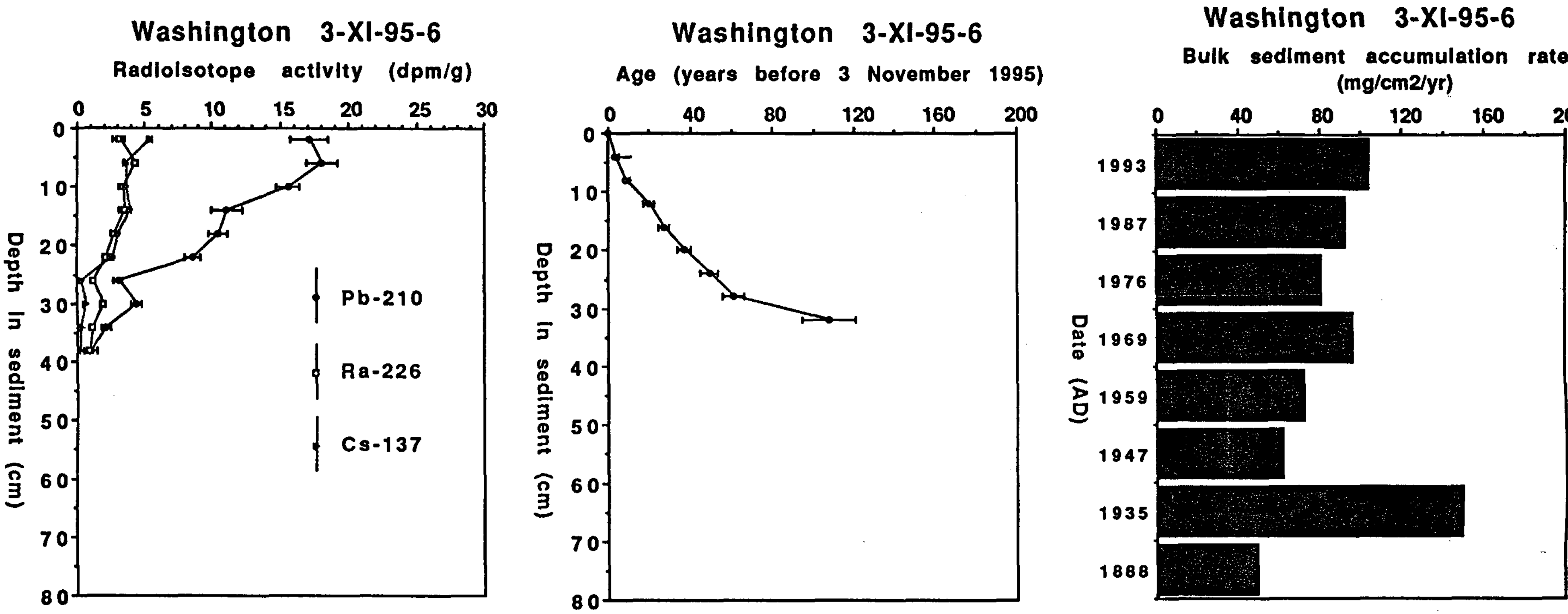



Figure 38. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Lake Washington core 3-XI-95-6. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

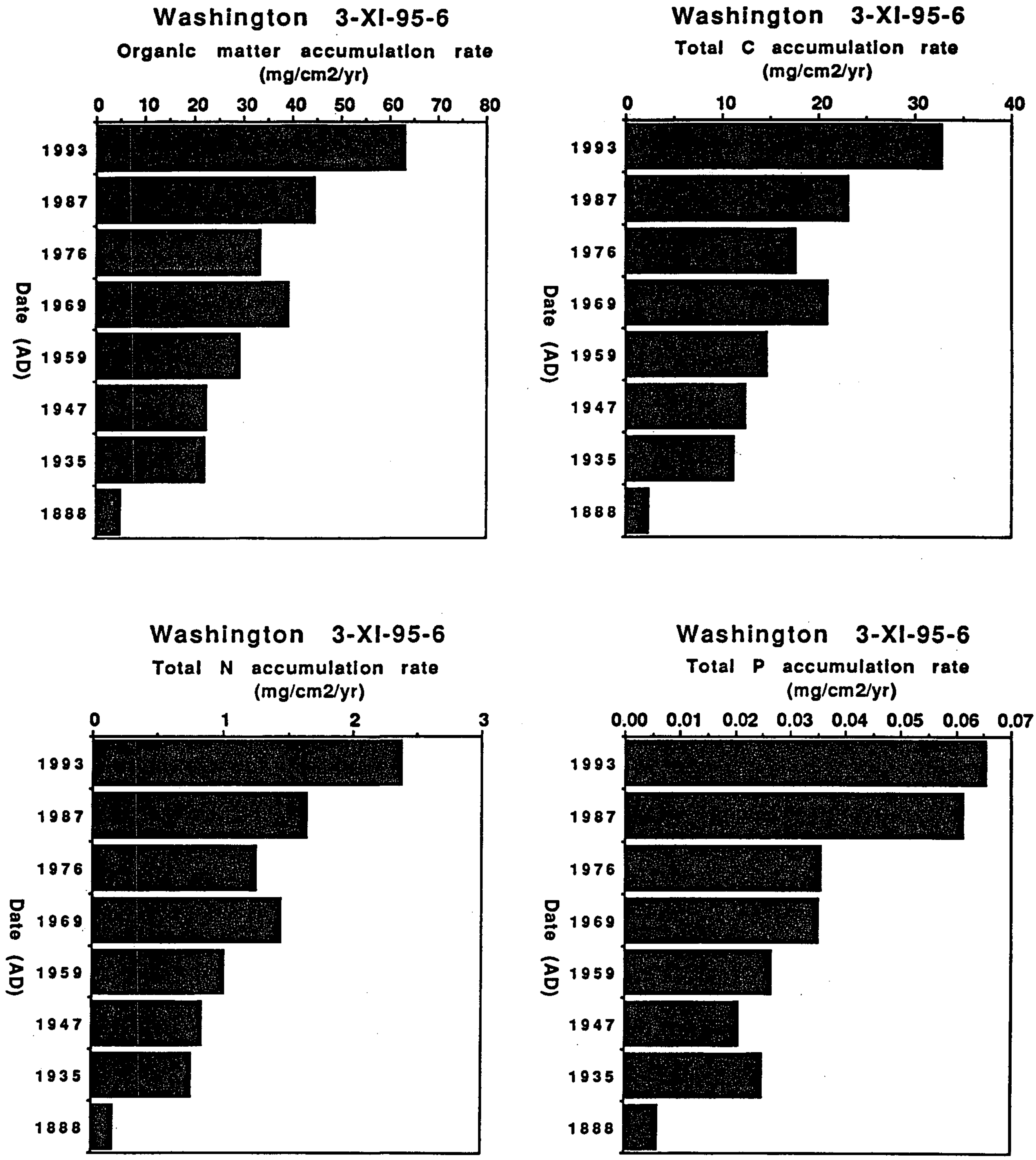



Figure 39. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Lake Washington core 3-XI-95-6.

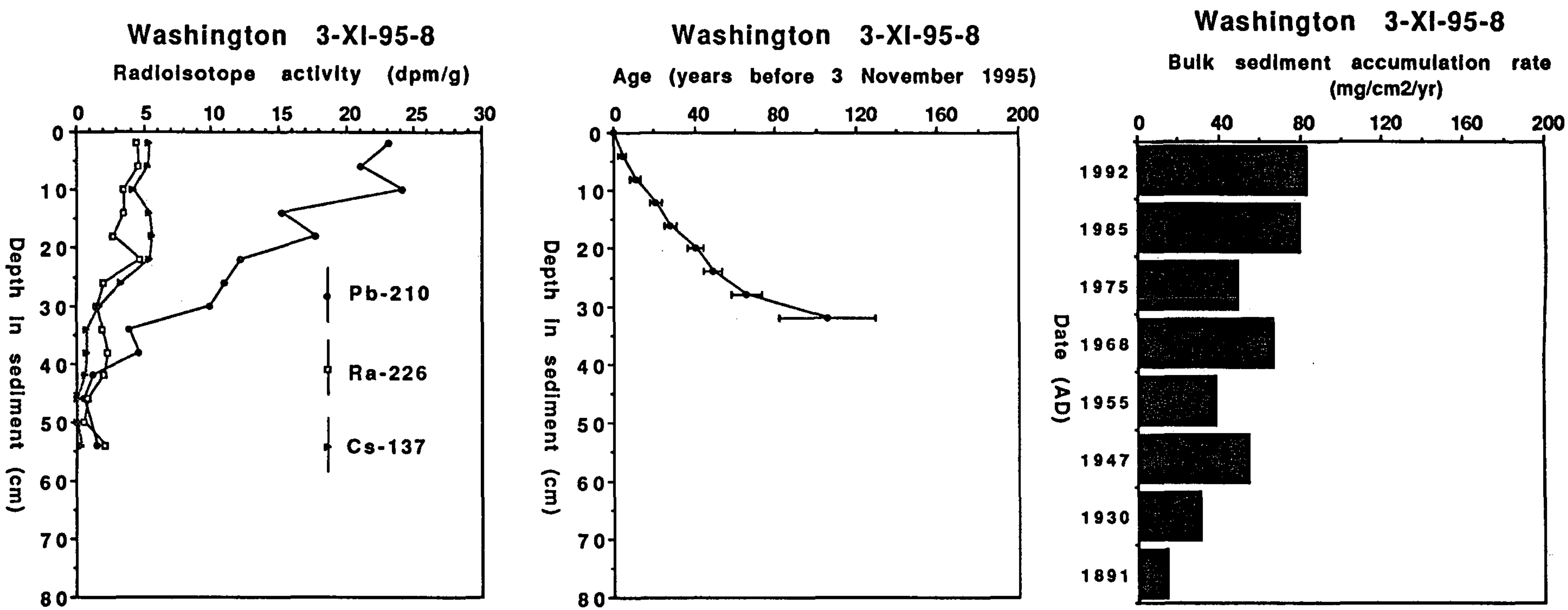



Figure 40. Radioisotope (total $^{210}Pb$, $^{226}Ra$ [i.e. supported $^{210}Pb$], $^{137}Cs$) activities versus depth, age versus depth, and bulk sediment accumulation rate versus date, for Lake Washington core 3-XI-95-8. $^{226}Ra$ activity represents "supported" $^{210}Pb$ activity and was determined from the $^{214}Bi$ activity. The $^{210}Pb$ plot represents total $^{210}Pb$ activity.

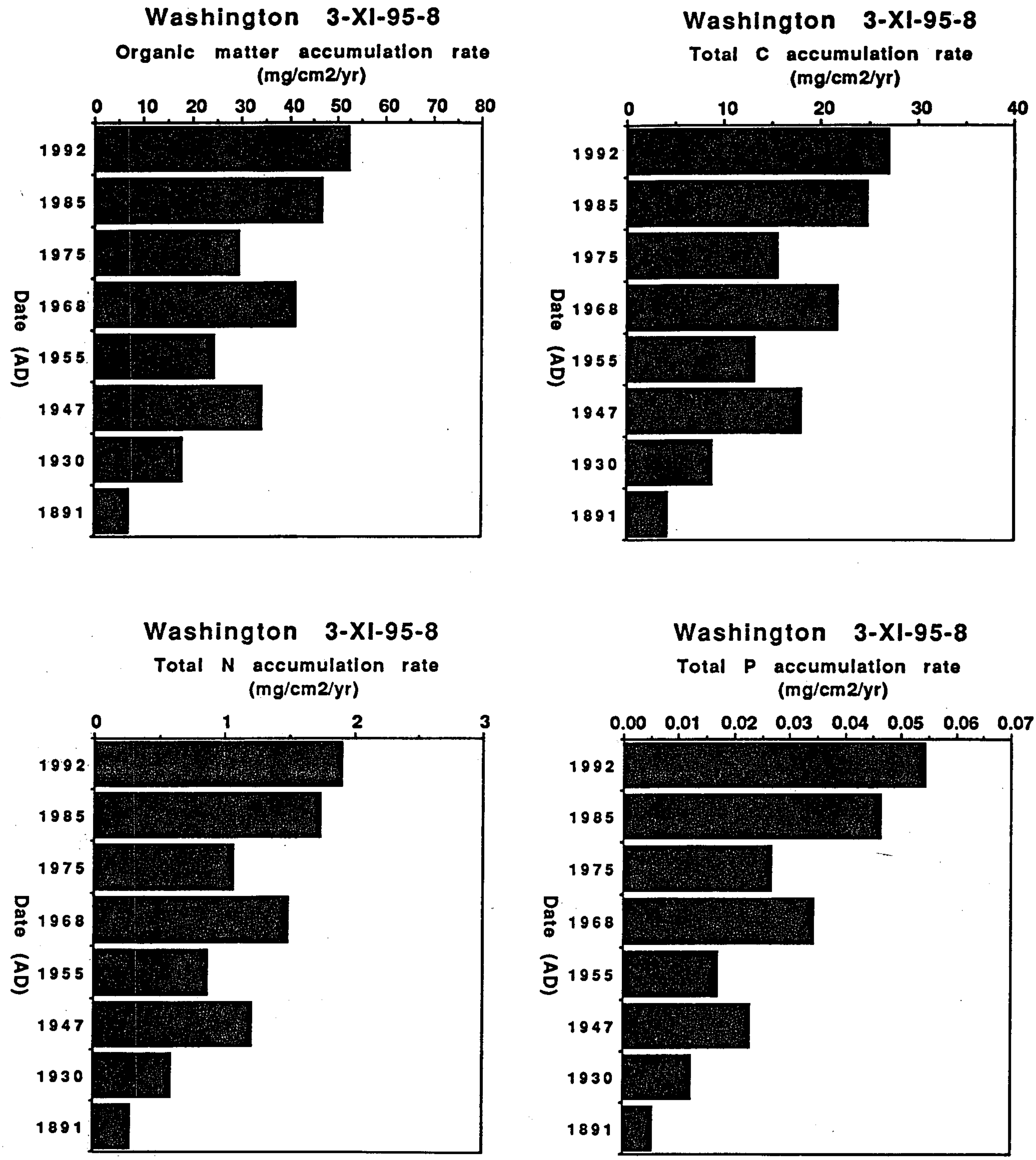



Figure 41. Organic matter, total carbon, total nitrogen, and total phosphorus accumulation rate versus date for Lake Washington core 3-XI-95-8.

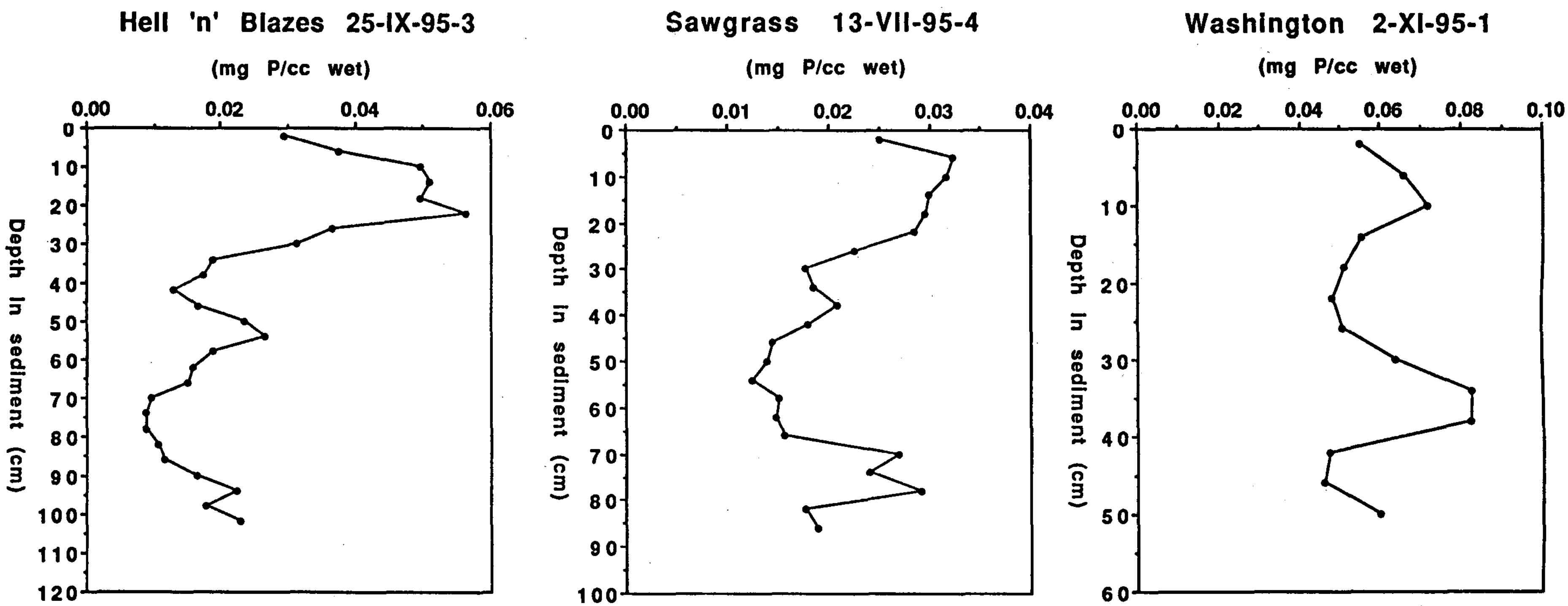



Figure 42. Total phosphorus, expressed per unit wet volume of sediment in selected cores from Lake Hell 'n' Blazes (25-IX-95-3), Sawgrass Lake (13-VII-95-4), and Lake Washington (2-XI-95-1). The curves illustrate that total P concentrations in deeper sediments, when expressed on a volume basis (i.e. per cc wet sediment), are similar to concentrations in surface (0-4 cm) deposits.