DIATOM DATA FROM BRADLEY LAKE, OREGON: DOWNCORE ANALYSES

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ABSTRACT

Displaced marine diatoms provide biostratigraphic evidence for tsunami inundation at Bradley Lake, a small freshwater lake on the south-central Oregon coast. During the past 7,200 years, fine-grained lacustrine deposits in the deep axis of the lake were disturbed 17 times by the erosion and emplacement of coarse-grained gyttja and, in some cases, sand. By identifying diatoms in closely spaced core samples, we determined that 13 of the 17 events (termed "disturbance events") record prehistoric tsunamis in Bradley Lake. We consider the evidence strong for 11 events, based on numbers and diversity of marine taxa: De1, De2, De4, De5, De6, De7, De8, De11, De12, De13, and De17. The evidence is less compelling for an additional 2 events (De9 and De10), although tsunami inundation is likely. Finally, we identified 4 events (De3, De14, De15 and De16) in which there were no marine diatoms to support tsunami inundation, although stratigraphic data shows that the lake bottom was disturbed.

Freshwater diatoms dominate throughout the Bradley Lake record, showing that the lake has remained a freshwater habitat throughout its existence. However, anomalous occurrences of three species of brackish diatoms (*Thalassiosira bramaputrae*, *Cyclotella meneghiniana*, and *Mastogloia smithii*) may be evidence for short-lived periods of slightly elevated salinities in the lake following De16, De13, De12, De11, De9, De8, and De5. With the exception of De12, increased abundances of one or more of the brackish species is coincident with decreased numbers of freshwater diatoms. A temporary rise in salinity, as evidenced by short-lived increases in abundances of brackish species and decreases in abundances of freshwater species, is consistent with tsunami inundation into the lake.

INTRODUCTION

Diatoms are members of the yellow-brown algae of the phylum Bacillariphyta (Round et al. 1990). They produce a set of silt-sized shells, or frustules, made of biogenic silica, which encase the chlorophyl of the single-celled plants, and may accumulate in sediment after the plant has died[1]. It is the production of the fossilizable frustules that make diatoms useful in biostratigraphy, as their accumulation in sediment can provide a lasting record of the paleoecological conditions that existed at the time of deposition.

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1 In this paper, the term "diatom" refers to the fossil remains of the organism (the frustules). References to autecology of various species is based primarily on results of other studies, with some observations of modern distributions in and around Bradley Lake.

Owing to their small size, aquatic habitat, position at the base of the food chain, and propensity to be incorporated in fine-grained sedimentary deposits, diatoms are often displaced from their place of origin. There are numerous records of windblown diatoms being transported great distances from their place of origin. Fine dust coating surfaces in southern France was found to contain diatoms originating from northern African playas (Seyve and Fourtanier, 1989). Pleistocene diatoms in a core from the northeastern Pacific Ocean were likely transported with windblown loess from the Great Basin of the U.S. (Sancetta et al., 1992), and windblown diatoms, primarily from Africa, have been collected in aerosol samples on ships, or found in deep-sea cores, from the Atlantic (Folger, 1970; Melia, 1984; Pokras and Mix, 1985). The eminent Charles Darwin, while sailing off the southern coast of Africa, observed terrestrial diatoms in dust on the sails of the H.M.S. Beagle (Darwin, 1846). Animals, and birds in particular, play a significant role in dispersing diatoms, either by ingesting them or inadvertently transporting them on their feet or bodies (Proctor, 1959; Atkinson, 1972). Diatoms grow in fresh, brackish, and marine water, and therefore may be displaced by the flow of creeks and rivers, ocean currents, tidal currents, or by storm surges which may carry marine species unusually far inland.

Diatoms can also be transported by another mechanism: tsunamis. Estuarine tidal-flat diatoms in silt and sand capping buried lowland soils provide supporting evidence for prehistoric tsunamis, triggered by earthquakes in the Cascadia subduction zone in coastal Oregon and Washington (Darienzo and Peterson, 1990; Hemphill-Haley, 1995; 1996; Atwater and Hemphill-Haley, 1997; Kelsey et al., 1998; Witter et al., 2001). Deposits from historical tsunamis in Newfoundland, Canada (1929) and Flores Island, Indonesia (1992) left extensive deposits containing marine diatoms as well as freshwater species incorporated into the deposits as the tsunamis swept inland (Dawson et al, 1996). Diatom deposits in lakes and ponds have also provided evidence for past tsunamis, as in Lagoon Creek in northern California (Garrison-Laney, 1998), and Kanim and Deserted lakes on Vancouver Island (Hutchinson et al., 1997; 2000). The Storegga tsunami, triggered by a submarine landslide 7200 years ago, deposited an extensive sand sheet containing marine diatoms on the coast of Scotland (Dawson et al., 1988; Long et al, 1989), and washed marine species into small lakes as high as 11 m above sea level on the Norwegian coast (Bondevik et al., 1997a, 1997b). Landward surges by historical and paleotsunamis deposited marine diatoms in freshwater coastal lakes of Japan (Minoura and Nakata, 1994; Minoura et al., 1994).

The purpose of this study was to similarly use occurrences of anomalous marine diatoms in a freshwater lake – Bradley Lake on the south-central Oregon coast – to document past tsunamis from Cascadia subduction-zone earthquakes. The diatom analyses reported here are part of a collaborative effort with our colleagues Alan Nelson[2], Harvey Kelsey[3], and Rob Witter[4] who began the study in 1993 with reconnaissance coring in several lakes on the south-central Oregon coast. The results of that preliminary study showed that Bradley Lake (fig.1) was the best candidate for recording prehistoric tsunamis because: 1) it is a small, protected basin with a thick (> 6 m) accumulation of fine-grained lacustrine mud; and 2) it is positioned too far inland (0.5 km) and too high above sea level (5.5 m) to have an open tidal exchange with the ocean or be inundated by relatively frequent, smaller events such as storms or El Niños. By examining a 14 piston and 13 vibracores from the lake floor, Nelson, Kelsey and Witter showed that fine-grained lacustrine deposits in the deep axis of the lake were disturbed 17 times during the past 7,200 years by the erosion and emplacement of coarse-grained gyttja and, in some cases, sand (Nelson et al., 1998; Kelsey et al., 1999). Using closely spaced samples primarily in core BR-94E, with additional samples from the other cores (fig. 1; appendix 2;), we determined that 13 of the 17 disturbance events included the emplacement of marine diatoms into an otherwise persistent freshwater environment. Considering the various mechanisms by which diatoms can be displaced, the anomalous marine species were likely washed into Bradley Lake by tsunamis.

We use the diatom data to show how it is consistent with tsunami inundation, and how we arrived at our conclusions that tsunamis inundated Bradley Lake. Microfossil data represent a powerful tool for differentiating prehistoric tsunami deposits from other kinds of sediment only when combined with detailed stratigraphic and sedimentological studies, high-precision radiocarbon dating, and regional correlations with other sites showing evidence for past earthquakes and tsunamis. Such analyses are currently being compiled for Bradley Lake, and will be reported elsewhere (Alan Nelson and Harvey Kelsey, pers. comm.).

Roger Lewis processed most of the diatom samples for this report, with additional help from Wendy Ebersole. A description of Lewis' technique for producing quantitative diatom slides, and a list of samples used, are found in Appendices 1 and 2. Eileen Hemphill-Haley identified and counted the diatoms; those data are in Appendices 3 and 4. Descriptive summaries for each of the 17 anomalous depositional events, termed "disturbance events," can be found below beginning on page 9.

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DIATOM GROUPS IMPORTANT FOR THIS STUDY

Diatoms are particularly useful for this study because they proliferate in Bradley Lake as well as the adjacent Pacific Ocean, but distinctly different populations are found in the two environments. To simplify analyses, diatoms were placed in three ecological categories and several subcategories. Individual taxa in these categories are listed in Appendix 4.

Marine diatoms

Marine diatoms include taxa that are presently living in the adjacent coastal waters, or are derived from Tertiary diatomites that form coastal terraces in the area of Bradley Lake. The presence of the diatomites, and the continuous erosion of diatom frustules from them, necessitated separating fossil marine taxa that might arrive in the lake simply through erosion of local rocks from modern taxa that likely record inundation of marine water and sediment from the Pacific Ocean 0.5 km to the west. The diatomites form white, chalky bluffs on Bandon Beach, north of the outflow of Bradley Lake, similar in appearance to exposures of Monterey Formation along portions of the central California coast (e.g., Garrison and Douglas, 1981). According to Whiting and Schrader (1985) some of the best examples of Tertiary diatomites in Oregon are found at this locality. The diatomites added an unexpected complication of an additional source for displaced marine diatoms at Bradley Lake, but Whiting and Schrader's detailed taxa list helped us to determine which species in the lake record might have originated from the diatomites. Where the terrace extends eastward to form the northern shore of Bradley Lake, the buff-colored diatomite grades into a dark gray diatom-rich mudstone which is densely vegetated. Erosion from the north-shore terrace is likely much slower than for the exposed coastal bluffs, but is undoubtedly a major source for fossil marine diatoms in the lake.

Because of the presence of the local diatomite and diatom-rich mudstone, the marine diatoms are subdivided into three groups:

1) *Hm* group: modern marine diatoms from coastal Pacific Ocean.

These diatoms provide the best evidence for tsunami inundation into Bradley Lake. We observed live specimens in surficial sediment of the lower beach and surf zone 0.5 km west of Bradley Lake.

2) *HTm* group: extant marine diatoms found in the modern coastal ocean as well as in Tertiary diatomites.

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Many of the specimens in this group probably originate from modern surficial deposits, but as the same taxa are also found as fossils in the diatomites, it's impossible to separate modern from fossil examples of these species.

3) *Tm* group: extinct marine diatoms from the Tertiary diatomites, not found in the modern coastal ocean.

Diatoms in this group are not living in the modern coastal ocean. However, their fossils are eroding from the terraces on the beach and north shore of Bradley Lake, and thus low numbers are found as a background signal throughout the Bradley Lake record. But since they are abundantly found in surface samples near the terraces – including in the bed of the outflow stream from the lake – large numbers could be expected to be transported and deposited into the lake by a tsunami.

Brackish diatoms

Three prominent "brackish" species appear to proliferate following some disturbance events. These include the planktonic species *Thalassiosira bramaputrae* and *Cyclotella meneghiniana*, and the benthic species *Mastogloia smithii*. Although these species are common in brackish water, they also tolerate fresh water. Thus their presence may record more than just salinity in the lake. Consequently, the significance of these diatoms requires further study. All three species proliferate following some disturbance events but not others, and all do not necessarily respond simultaneously following any given event. Based on observations of detrital peat in core 94E, it is possible that *M. smithii* is associated with expansion of marshes in the shallows of Bradley Lake, and subsequent peat accumulation (see "Significance of a clast of detrital peat in core 94E" on page 16). *C. meneghiniana* may be associated with the expansion of a different kind of habitat – the drowning of riparian vegetation along the shores of the lake (e.g. Parsons, 1998). *C. meneghiniana* is found in a wide range of environments from shallow freshwater ponds to large saline lakes, prefers eutrophic conditions, and also grows well in turbid water (Dr. Sherilyn Fritz, University of Nebraska, pers. comm.). Therefore, abrupt increases in *C. meneghiniana* could be a response to a number of different factors, including increased salinity, expansion of epiphytic habitat, increased turbidity of the lake water, and greater availability of nutrients. Higher nutrient levels would result from increased influx to the lake and/or reduced competition from other species whose numbers may have declined because of any of the aforementioned factors. Also of interest to this study is that both *C. meneghiniana* and *T. bramaputrae* may be halophilic, i.e. their growth is actually stimulated by increases in salt (Foged, 1981).

For the purposes of this report, *C. meneghiniana*, *T. bramaputrae* and *M. smithii* are reported as "brackish" species, with the recognition that their presence may also be recording the influence of other paleoecological factors. Salinity tolerances for these species are shown in Figure 2. The data are based on records from modern lakes in the western U.S. and Canada (Cumming and Smol, 1993, Fritz et al., 1993, Wilson et al. 1995), and estuaries in southern California (Carpelan, 1978) and Australia (John, 1983). It is clear from the data that a wide range of salinities are possible for these taxa, but salinity increases of 1-4 g/L might be a viable explanation for their episodic appearances in Bradley Lake. Closer scrutiny of all diatom assemblages in the Bradley Lake record may reveal other taxa that could provide further insight into paleoecological changes over time. For example, *Cocconeis placentula* var. *euglypta*, *Rhopalodia gibberula*, and *Bacillaria paradoxa*, which were not enumerated for this study, are present in some samples, and might also be indicative of "brackish" conditions.

T. bramaputrae, *C. meneghiniana* and *M. smithii* first appear in the record at De17. *T. bramaputrae* and *C. meneghiniana* are found throughout the Bradley Lake record; *M. smithii* was not observed in deposits younger than De2 (fig. 3). These species are found in low-level concentrations ("background" concentrations, < 10^4 valves/cc) in many samples in and between disturbance events. This is in contrast to the possible "blooms" (large increases in numbers in response to ecological factors) that are observed in sediment above a number of events (Table 1, fig. 3), where abundances reach > 10^4 or even > 10^5 valves/cc (e.g., *C. meneghiniana* in finely laminated mud above De11 and De8).

Freshwater diatoms

Freshwater diatoms are abundant and diverse in Bradley Lake. Planktonic diatoms mainly consist of small centric species of *Cyclotella* and *Aulacoseira*, but also pennate species of *Asterionella* and *Tabellaria*. Benthic populations are very diverse, including small and large species of *Navicula*, *Stauroneis*, *Pinnularia*, *Cymbella*, *Eunotia*, *Fragilaria*, *Synedra*, *Rhopalodia*, *Gomphonema*, *Gomphoneis*, and others. We counted four subcategories of freshwater diatoms as a means of recording broad paleoecological changes in the lake record:

1) *Aulacoseira italica* valves and spores: blooms of this species may possibly record rapid overturning of the lake or some other opportunistic situation that allowed it to out-compete other diatom species for limited nutrients.
2) Planktonic diatoms: indicative of normal planktonic production. Includes a small (< 4 µm diameter) species of *Aulacoseira*, *Cyclotella stelligera*, *Tabellaria* spp., and *Asterionella* spp.
3) Small benthic diatoms: indicative of normal benthic productivity and gradual transport to lake bottom. Includes species of *Eunotia*, *Fragilaria*, *Navicula*, *Cymbella*, etc., that are < 40 µm along the apical (longest) axis.

4) Large benthic diatoms: indicative of rapid transport when concentrated in coarse-grained deposits. Includes species of *Eunotia*, *Gophomeis*, *Navicula*, *Pinnularia*, *Cymbella*, etc., that are > 40 µm along the apical axis.

METHODS: COUNTING TECHNIQUES

The main objective of this study was to identify occurrences of anomalous marine diatoms in the lake deposits. In order to get an overview of changes in lake ecology over time, brackish-water diatoms and broad groups of freshwater diatoms were also enumerated. Diatoms were counted by scanning the slides at magnifications of 650 x to 1250 x with an Olympus BH-2 microscope, using transmitted light and Normarski interference contrast. Numbers of freshwater diatoms were estimated by counting all valves on three vertical traverses, with taxa subdivided into the four subcategories listed above. Marine (Hm, Htm and Tm groups) and brackish diatoms were counted along either 14 or 20 vertical traverses (Appendix 3). In order to compare results from sample to sample, the data were converted from actual number of valves counted ("raw counts", Appendix 4) to estimated numbers of valves per cubic centimeter ("valves/cc", Appendix 3). This was necessary because the number of valves observed will depend on the concentration of the sediment and diatoms on the slide, and provided a more accurate and useful way to view changes in diatom concentration over time. Our sample-preparation technique is based on previously tested techniques that show that counting any area of the slide should give a representative view of the entire sample (Battarbee, 1973; Laws, 1983; Roelofs and Pisias, 1986), and results were calculated by:

$$\text{valves/cc} = D/(A \bullet F)$$

Where D = number of diatom valves counted; A = volume of aliquot used, in cc; F = fraction of total sample observed (= (number of vertical traverses • area of one traverse) / total area of settling chamber).

When present, displaced marine (Hm) diatoms were exceptionally rare relative to the prolific freshwater taxa, in some cases on the order of 1 marine valve per 10,000 valves of freshwater diatoms (e.g., De2, De6). This required slow progress to locate these rare, but significant taxa. Relative to Hm diatoms, the three brackish taxa, *M. smithii*, *T. bramaputrae* and *C. meneghiniana,* were significantly more prominent.

We identified diatoms with the aid of several widely used references for diatom taxonomy, including Hustedt (1930; 1927-1966), Patrick and Reimer (1966; 1975), Germain (1981), Krammer and Lange-Bertalot (1986; 1988; 1991a; 1991b), and the Baltic Marine Biologists Publication series 16a-e

(1993; 1994; 1995; 1996; 1998). Other helpful references included Foged (1981), Hasle (1978), Mahood et al. (1986), Cumming et al. (1995) and Hakansson and Chepurnov (1999).

RESULTS

Based on occurrences of displaced Holocene marine diatoms, we conclude that 13 disturbance events may record past tsunamis in Bradley Lake (Table 1; fig. 3). We consider the evidence strong for 11 events, based on numbers and diversity of marine taxa: De1, De2, De4, De5, De6, De7, De8, De11, De12, De13, and De17. The evidence is less compelling for an additional 2 events (De9 and De10), although tsunami inundation remains a plausible explanation. Finally, we identified 4 events (De3, De14, De15 and De16) in which there were no marine diatoms to support tsunami inundation, although stratigraphic data shows that the lake bottom was disturbed.

SUMMARY OF DISTURBANCE EVENTS

In the following, we describe diatom analyses for each of the 17 disturbance events in the Bradley Lake record, and the evidence we used to conclude which of the events may have included deposition by tsunamis.

General terms for diatom concentrations are:
Very rare: $< 10^3$ valves/cc
Rare: 10^3-10^4 valves/cc
Common: 10^4-10^5 valves/cc
Abundant: $> 10^5$ valves/cc

De1	**250 yr BP**	**Core BR-94E**	**Strong diatom evidence for tsunami**

Disturbance event 1 (De1) is identified in core 94E by a 1-cm-thick bed of woody detritus at 60 cm overlain by massive gyttja and black muddy gyttja from 59 cm to 51 cm (figs. 4 and 5). Freshwater diatoms and sponge spicules are abundant in the detritus and overlying gyttja, which is consistent with redeposition of biogenic debris from the shallow margins of the lake. Freshwater diatom assemblages are diverse, but large, mostly broken benthic taxa are prominent.

Diatom evidence for a tsunami is shown by occurrences of rare marine diatoms (*Hm* and *HTm* groups), which are first observed in massive mud at 50 and 48 cm. The marine taxa consist of species typical of estuaries and the coastal ocean, including *Thalassiosira pacifica*, *Thalassionema* *nitzschioides*, *Actinopytchus senarius*, and *Delphineis karstenii*. Their absence from deposits below 50 cm is the result of differential settling of the smaller marine diatoms relative to the coarser sediment and biogenic particles (including large benthic diatoms and sponge spicules) that comprise the detritus and gyttja.

"Black Soupy" is a deposit of brown and black organic clay at 30-35 cm in core E (fig. 4). Holocene marine diatoms are absent, but *HTm* diatoms are rare at 30 cm. Brackish diatoms are present but rare in "Black Soupy", not exceeding "background" abundances of > 10^4 valves/cc. The freshwater diatoms *Aulacoseira* spp. (particularly *A. italica*) are prominent, possibly recording a rapid overturning of the lake.

De2	995-920 yr BP	Core BR-94E, F	Strong diatom evidence for tsunami

Disturbance event 2 (De2) is identified in core BR-94E as a 1.5-cm-thick bed of muddy sand from 113.5-112 cm (figs. 4 and 6) overlain by massive gyttja from 112 to 100 cm. The stratigraphic evidence for a tsunami associated with De2 is one of the strongest for the entire Bradley Lake record, with an eastward-thinning sand sheet capped by massive gyttja, which, in many cores, is then overlain by finely laminated mud (Nelson et al., 1998.). Diatom evidence also strongly supports a tsunami for De2. All diatoms are rare in the muddy sand because of terrigenous dilution, but marine taxa are present (fig. 6). Marine diatoms are rare to common in the massive gyttja, and include exceptionally fragile specimens of *Thalassiosira* spp. and *Skeletonema costatum* in several samples. Occurrences of these delicate species show that they were deposited and buried quickly to enhance their preservation. An errant valve of an Hm diatom (*T. pacifica*) in massive mud at 80 cm (figs. 4 and 6) would have been deposited many years after De2, and is not associated with the event. Its occurrence is likely the result of gradual reworking over time of the large amount sediment and diatoms brought into the lake by the tsunami.

The post-De2 stratigraphy in most cores we examined in Bradley Lake includes finely laminated mud capping the massive gyttja, which is comparable to older disturbance events that exhibit strong diatom evidence for tsunamis (e.g. De8, De11, De12). However, unlike these older events, there are no brackish diatoms in the finely laminated mud overlying De2. We were not able to examine diatoms in finely laminated mud in core 94E because of sediment disturbance at the break between sections 2 and 3 of the core, but we examined diatoms in core 94F, about 40 m east of core 94E (fig.1). Occurrences of marine diatoms in core 94F are comparable to core 94E. However, no ecological change appears to be associated with the finely laminated unit. A small number of brackish diatoms are found in the massive gyttja of De2 (fig. 6), presumably displaced from epiphytic habitats along the margins of the lake, but there is no evidence for a post-event bloom of these species as they are absent in the finely laminated mud above the disturbance event. *In situ* freshwater populations are about half as abundant in finely laminated mud after De2 than in massive and laminated mud underlying De2. This explains the formation of the finely laminated mud, which differs from “normal” laminated lake mud by thinner dark laminae, i.e., which are organic-rich layers dominantly composed of biogenic particles, especially diatoms. The absence of abundant brackish diatoms may be the result of a number of factors, not the least of which might include less salt water reaching the lake and fewer “seed” species in the lake to originate a bloom.

De3	**1130-980 yr BP**	**Core BR-94E**	**No diatom evidence for tsunami**

Disturbance event 3 (De3) is identified in core 94E as a massive gyttja layer from 120 cm to 124 cm. There is no diatom evidence for a tsunami, as no marine taxa are observed either in or above the gyttja (fig. 7). Instead, the gyttja contains abundant biogenic debris, including large benthic freshwater diatoms and sponge spicules, which would have been displaced from the shallow margins of the lake or the delta of China Creek.

De4	**1510-1320 yr BP**	**Core BR-94E**	**Strong diatom evidence for tsunami**

Disturbance event 4 (De4) is identified in core 94E by a massive gyttja bed between 160 cm and 154 cm. It is overlain by finely laminated mud from 154 cm to152 cm (fig. 8). Marine diatoms (*Hm* group) are rare in massive gyttja between 158.5 cm and 155 cm, as well as in finely laminated mud at 154 cm and laminated mud at 150 cm (figs. 7 and 8). *Hm* diatoms are absent at the base of De4 at 160 cm, but both *HTm* and *Tm* diatoms are present. The brackish diatoms *Thalassiosira bramaputrae* and *Mastogloia smithii* are very rare in the finely laminated mud at 154 cm; *Cyclotella meneghiniana* is absent. The concentrations of these taxa in the finely laminated mud are comparable to the underlying massive gyttja of De4, as well as in pre-De4 lake mud. This shows that the ecological impacts of the earthquake and tsunami were not great enough to cause a post-event bloom of these taxa. However, a post-De4 reduction in numbers of freshwater diatoms (154 cm in core 94E; fig. 8) shows that the tsunami did have at least a temporary ecological impact on *in situ* freshwater lake diatoms.

De5	1820-1600 yr BP	Core BR-94E	Strong diatom evidence for tsunami

Disturbance event 5 (De5) is superjacent to De6 in core 94E, with the emplacement of De5 having formed an erosional contact with massive gyttja of De6 (figs. 9 and 10). The basis for designating De5 and De6 as two distinct events in core 94E include an erosional contact at 200 cm, and a correlation with the same events in core 94M, where De5 and De6 are clearly separated by fine laminated lake mud (Kelsey et al., 1999).

De5 is recognized in core 94E by two separate coarse-grained units (muddy sand from 200.5 cm to 199 cm, and sandy mud from 200 cm to 194 cm) capped by massive gyttja from 194 cm to 188 cm (fig. 10). Similar to other disturbance events, the rapidly deposited sand and massive gyttja of De5 is overlain by finely laminated mud (188-183 cm).

Evidence for a tsunami associated with the emplacement of De5 is shown by occurrences of marine diatoms (*Hm* and *HTm* groups) throughout the sand and massive gyttja between 200-180 cm. They are particularly prominent between 194 and 188 cm, as well as in finely laminated mud at 186 cm. The brackish species *Thalassiosira bramaputrae* and *Mastogloia smithii* are found in all of the De5 and De6 samples between 210-180 cm but reach greatest abundances in the lower part of finely laminated mud at 186 cm. *Cyclotella meneghiniana* is likewise abundant at 186 cm, where it appears abruptly (i.e., unlike *T. bramaputrae* and *M. smithii*, it is absent in underlying deposits). Only a few valves are observed at 184 cm, in contrast to an apparent bloom at 186 cm, suggesting ecological conditions favoring the growth of this species had diminished by the time the upper part of the finely laminated mud was deposited. Higher abundances of brackish diatoms is coincident with lower abundances of freshwater diatoms in the finely laminated mud as compared with overlying mud. Relatively lower numbers of freshwater diatoms in the sand and gyttja of both De5 and De6 are probably the result of terrigenous dilution from rapidly deposited sediment rather than an environmental response from the diatom populations. However, the high number of the brackish diatoms do likely suggest a post-De5 rise in salinity for the lake possibly coupled with a change in diatom habitat (disruption of shore-edge benthic zone? submergence of riparian vegetation?).

De6	1820-1600 yr BP	Core BR-94E	Strong diatom evidence for tsunami

Disturbance event 6 (De6) is identified in core 94E by medium-fine sand from 209 cm to 204.2 , overlain by massive gyttja from 204 cm to 201 cm (fig. 10). The emplacement of sand and gyttja during De5 eroded an unknown amount of sediment emplaced during De6, as well as any sediment that accumulated in the period of time between De6 and De5.

Diatom evidence for a tsunami associated with De6 is shown by rare or very rare occurrences of marine diatoms in the sand and overlying massive gyttja. The brackish diatoms *M. smithii* and *T. bramaputrae* are associated with De6 deposits, and *T. bramaputrae* is relatively prominent in massive gyttja at 202 cm. However, the ecologic significance of their occurrences is equivocal as the sand and gyttja of De6 represent rapid deposition in the deep axis of the lake.

De7	**2860-2750 yr BP**	**Core BR-94E**	**Strong diatom evidence for tsunami**

Disturbance event 7 (De7) is recognized in core BR-94E by a thin layer of muddy sand from 303-301.5 cm, overlain by massive gyttja from 301.5 cm to 297 cm (figs. 11 and 12). The gyttja and sand of De7 are capped by finely laminated mud from 297 cm to 295 cm.

Evidence for a tsunami associated with De7 is shown by occurrences of *Hm* diatoms in the sand and massive gyttja. Marine diatoms, particularly *Thalassiosira pacific*, have highest concentrations at the top of the gyttja at 298 cm.

The brackish diatoms *Thalassiosira bramaputrae* and *Mastogloia smithii* are rare in massive mud at 304 cm, massive gyttja at 301 cm, and laminated mud at 290 cm (fig. 12); *Cyclotella meneghiniana* is absent in these deposits as well as in mud underlying De7. Relative to assemblages in lake mud above and below De7, abundances of freshwater diatoms are an order of magnitude less abundant in finely laminated mud capping De7 at 296 cm (fig. 12). They are also one-half to one-fifth as abundant as the terrigenous-diluted assemblages in gyttja and sand of De7. The three species of brackish diatoms are basically absent from the finely laminated mud (only a few valves of *T. bramaputrae* observed) showing that the paleoecological conditions that favored growth of these particular species following other disturbance events (e.g., De5, De8) did not occur following De7.

De8	**3250-3060 yr BP**	**Core BR-94E**	**Strong diatom evidence for tsunami**

Disturbance event 8 (De8) is recognized in core BR-94E by fine gray sand at 338 cm overlain by muddy sand from 337 cm to 335 cm and massive gyttja from 335 cm to 332 cm (figs. 11 and 13). The De8 deposits are capped by finely laminated mud from 332 cm to 327 cm.

Evidence for a tsunami associated with De8 is shown by occurrences of marine diatoms (*Hm* and *HTm* groups), which are rare but diverse in the muddy sand and massive gyttja, as well as in overlying finely laminated and laminated mud. There are prominent occurrences of taxa derived from adjacent Tertiary diatomites (*Tm* group) in the upper part of De8 and in post-De8 deposits (fig. 11).

A post-De8 change in lake ecology or freshwater habitat is shown by the abundance of *Cyclotella meneghiniana* in finely laminated mud at 330 cm, coincident with a strong reduction in numbers of freshwater diatoms, as compared to assemblages in laminated mud above and below the event. The other brackish diatoms are common in the finely laminated mud, but *C. meneghiniana* is approximately an order of magnitude more abundant. Abundances of freshwater diatoms in the sand and massive gyttja of De8 are relatively low because of terrigenous dilution, and are dominated by large, broken pennate diatoms and siliceous phytoliths, consistent with redeposition of deposits from the shallow margins of the lake.

The freshwater species *Aulacoseira italica* is prominent in laminated and massive lake sediment between 320-305 cm, with concentrations roughly equal to all other freshwater species combined.

De9	**3400-3210 yr BP**	**Core BR-95BB**	**Weak diatom evidence for tsunami**

Disturbance event 9 (De9) is recognized in core 95BB by a 5-cm-thick bed of massive gyttja between 276.5 cm and 271.5 cm (figs. 14 and 15). Large benthic diatoms and sponge spicules are prominent in the gyttja, consistent with redeposition from the shallow margins of the lake. Marine diatoms (*Hm* and *HTm* groups) are very rare in the uppermost part of the gyttja, as well as in an overlying 1-cm-thick unit of finely laminated mud from 271.5 cm to 270.5 cm. The brackish species *Thalassiosira bramaputrae* is rare in the finely laminated mud, indicative of a small, though possibly significant, ecological shift in lake ecology or diatom habitat following the disturbance event. *C. meneghiniana* does not exceed "background" levels in this unit; *M. smithii* was not observed in any samples directly below, within, or directly above De9. A conspicuous concentration of the freshwater diatom *Aulacoseira italica* in the upper part of the gyttja at 272 cm coincides with low numbers of small planktonic diatoms, which then increase by a factor of five in deposits above the gyttja. This may record ecological factors initially favoring a bloom of *A. italica* (destratification and rapid overturning of the lake?) which allowed it to out-compete tiny planktonic species for limited nutrients in the water column. A possible return to a strongly stratified lake, as suggested by deposition of finely laminated mud above De9, may have helped to re-establish populations of small planktonic species. This post-De9 bloom in planktonic diatoms is comparable to the diatom-productivity pattern immediately following De10, as discussed below.

De10	3830-3630 yr BP	Core BR-95BB	Weak diatom evidence for tsunami

Disturbance event 10 (De10) is identified in core 95BB by massive gyttja from 309 cm to 305 cm (figs. 14 and 16). Large pennate diatoms and sponge spicules are abundant in the gyttja, consistent with redeposition from the shallow margins of the lake. Marine diatoms (*Hm* and *HTm* groups) and brackish diatoms are present but very rare (fig. 16). Finely laminated mud between 305 cm and 301.5 cm overlies the gyttja of De10. This juxtaposition of finely laminated mud above coarse-grained deposits is similar to other disturbance events that show evidence for tsunamis, such as De5, De8, De11, De13 and De16. However, the finely laminated mud of De10 differs from some of these other disturbance events in that it does not contain high numbers of brackish diatoms. Also, the finely laminated mud contains an intercalated bed of massive mud (at 303 cm) that was formed by the dense accumulation of tiny planktonic diatoms, particularly *Cyclotella stelligera* and a small (<4-5 µm diameter) species of *Aulacoseira*. We did not observe this kind of massive deposit associated with any other disturbance event. (These small planktonic diatoms are likewise abundant in the overlying sample in the upper section of finely-laminated mud at 302 cm; fig. 16). It is unclear whether this is evidence for continued proliferation of these taxa or reworking of massive numbers of valves produced during an initial growth event. However, as possible evidence for disruption to the lake's shallow, nearshore benthic habitats following the disturbance event, numbers of benthic diatoms are reduced by about half in the finely laminated mud following De1 (between 290 cm and 304 cm) as compared with pre-De10 deposits (between 309 cm and 315 cm).

De11	4280-4000 yr BP	Core BR-94E	Strong diatom evidence for tsunami

Disturbance event 11 (De11) is identified in core 94E by a 2-cm-thick plant detritus bed overlain by 4 cm of massive gyttja (figs. 17 and 18).

Evidence for a tsunami associated with De11 is shown by occurrences of marine diatoms (*Hm* and *HTm* groups) at the top of the gyttja bed and overlying finely laminated mud. The plant detritus bed at 438.5 cm contains abundant large freshwater diatoms and sponge spicules which were redeposited from the shallow margins of the lake. Marine diatoms are only found at the top of the gyttja unit because of differential settling relative to the larger, heavier benthic diatoms, sponge spicules and terrigenous detritus. Brackish diatoms are prominent in finely laminated mud at 433 cm, with *Cyclotella meneghiniana* roughly an order of magnitude more abundant than *M. elliptica* and *T.*

bramaputrae combined (fig. 18). This increase in numbers of brackish species is coincident with a sharp decrease in numbers of typical *in situ* freshwater taxa.

<u>Paleoecological significance of a clast of muddy detrital peat in core 94E.</u>

A clast of muddy detrital peat recovered from core 94E (373-401 cm) may provide some additional insight about post-De11 changes in diatom populations. Based on ^{14}C analyses and stratigraphic correlations (Nelson et al., 1998.), the peat accumulated in a marshy environment 4150-3920 cal yr BP (about the time of De11) but was redeposited at the site of core 94E much later, possibly more than a century after De10 (A. Nelson, pers. comm.). The peat clast can be divided into two subunits based on diatoms: 1) the *FW* subunit (377-400 cm) containing a large variety of freshwater benthic species; and 2) the *BD* subunit (373-377 cm) containing abundant brackish diatoms (Table 2; fig. 19).

The concentration of brackish species in the peat clast records a period following De11 when brackish species flourished while numbers of other freshwater diatoms were reduced (fig. 18). *Mastogloia smithii* is prominent in the *BD* subunit, and other benthic species that can tolerate brackish conditions such as *Rhopalodia gibba*, *Campylosira echineis*, *Tryblionella apiculata*, and *Diploneis smithii* var. *rhombica* are also prevalent. It is noteworthy that *Thalassiosira bramaputrae* and *Cyclotella meneghinian,* both planktonic species, are rare relative to *M. elliptica* and in the peat clast, since the shallow benthic environment represented by the muddy peat would not have been their optimum growth environment. Also, the fact that *C. meneghiniana* significantly outnumbers *M. smithii* in post-De11 deposits in core 94E shows that planktonic taxa were more readily transported to the deep axis of Bradley Lake, simply by filtering out of the water column, than benthic brackish taxa accumulating in marshy areas at the margins of the lake (e.g., in the vicinity of the delta of China Creek on the east side of the lake). This is an important observation for a number of disturbance events in which *M. smithii* tends to be less abundant than either of the planktonic species *C. meneghiniana* or *T. bramaputrae* (De9, De12, De13, De16 and De17).

Diatoms in the *FW* subunit dominantly consist of large benthic and epiphytic species typical of freshwater wetlands, such as *Eunotia formica*, *E. robusta* var. *tetradon*, *Pinnularia microstauron*, *Stauroneis phoenicenteron*, *Cymbella aspera*, *Diploneis smithii*, *D. finmarchia*, *Gomphonema augur*, plus many others. Large species of *Surirella* and *Neidium* are also prominent, as are sponge spicules.

In its present orientation, the clast contains the *BD* subunit at the top, which would indicate a transition from a true freshwater-marsh assemblage to an assemblage dominated by species (e.g., *T. bramaputrae*, *M. smithii*) usually found in brackish water. However, we do not know if the peat is in the correct orientation; it may be upside-down. This is weakly supported by uncalibrated ^{14}C ages which are slightly older at the top of the clast (3740 ± 50 ^{14}C yr BP at 373 cm) than at the bottom (3700 ± 50 ^{14}C yr BP at 401 cm). In the latter case, the clast would record the initial growth of a wetland favorable to brackish species following De11, followed by a return to more typical freshwater assemblages some years after De11.

De12	4410-4230 yr BP	Core BR-94E	Strong diatom evidence for tsunami

Disturbance event 12 (De12) is identified in core 94E by a thin layer of sand and sandy mud at 470 cm to 465 cm, overlain by massive gyttja from 465 cm to 462 cm (fig. 20). *Hm* diatoms are common in the sand and overlying gyttja (figs. 17 and 20), particularly *Thalassiosira pacifica*, a species prolific in coastal waters and prominent in modern surficial deposits of the lower beach proximal to Bradley Lake. Brackish diatoms are present in low numbers in the sand and gyttja of De12 (fig. 20). *T. bramaputrae* is common in overlying finely laminated mud at 460 cm; *M. smithii* is rare and *C. meneghiniana* is very rare in this unit. Brackish diatoms are also found in overlying faintly laminated lake mud, and *T. bramaputrae* and *C. meneghiniana* are particularly prominent at 454 cm, where they reach between 10^4 and 10^5 valves/cc. The 454 cm depth horizon contains an abundance of brackish diatoms whereas abundances of freshwater diatoms are relatively reduced, with the exception of the planktonic species *Aulacoseira italica*. *A. italica* may have bloomed in response to greater availability of limited nutrients in the lake left by diminished benthic populations.

De13	4650-4420 yr BP	Core BR-95X	Strong diatom evidence for tsunami

Disturbance event 13 (De13) is identified in core 95X by a thin, two-layered gyttja bed, with light grayish brown gyttja from 447.9 cm to 448.5 cm overlying dark grayish brown gyttja from 448.5 cm to 449.5 cm (figs. 21 and 22). The dark gyttja layer contains mostly terrigenous material and roughly half as many diatoms as the lighter gyttja layer. The light and dark layers are likely the result of differential settling during the same depositional event, with a denser, more terrigenous-rich dark layer settling to the lake floor in advance of a lighter-colored, diatom-rich layer. The massive gyttja is capped by finely laminated mud (448 cm to 443 cm).

Diatom evidence for a tsunami is shown by common occurrences of *Hm* diatoms in the upper part of the gyttja bed and lower part of the overlying finely laminated mud (fig. 21). *HTm* and *Tm* diatoms are also prominent at these intervals. *Hm* diatoms are present but very rare in the lower, dark-brown gyttja layer. A possible change in lake salinity or diatom habitat following De13 is shown by a massive bloom of *Cyclotella meneghiniana* in finely laminated mud at 444 cm. (In contrast, neither *T. bramaputrae* nor *M. smithii* exceed "background" levels for any samples in or above De13, from 449 cm to 437 cm). The large increase in numbers of *C. meneghiniana* coincides with lower numbers of freshwater taxa, which, with the exception of *Aulacoseira italica*, remain low throughout massive and laminated mud for more than 10 cm above De13, from 437 cm to 444 cm.

De14	**4780-4540 yr BP**	**Core BR-95X**	**No diatom evidence for tsunami**

Disturbance event 14 (De14) is characterized in core 95X by a two-layered gyttja deposit, with dark grayish-brown gyttja from 455.5 cm to 458 cm overlying light grayish brown massive gyttja from 458 cm to 459.5 cm (fig. 23).

Hm diatoms are absent in the gyttja and overlying mud (fig. 23). Freshwater diatoms are rare in the gyttja, and consist mainly of large pennate species and sponge spicules. This is consistent with redeposition of coarse biogenic debris from shallow areas of the lake. There is no obvious difference in concentrations of freshwater diatoms between the light and dark gyttja layers. Fewer benthic freshwater diatoms are found in laminated mud above De14 are lower than in massive lake mud pre-dating De14, possibly indicating a disruption of shallow benthic environments as a result of the disturbance event. Numbers of small planktonic freshwater diatoms also diminish after, as compared to before, De14. An exception to this is the planktonic freshwater species *Aulacoseira italica*, which is abundant at 455 cm. This may record an oportunistic bloom of this species, possibly caused by a rapid overturning of the stratified lake following the emplacement of De14.

De15	**5600-5320 yr BP**	**Core BR-94E**	**No diatom evidence for tsunami**

Disturbance event 15 (De15) is identified in core 94E as a debris layer at 540 cm, overlain by massive gyttja from 538 cm to 536 cm. *Hm* and brackish diatoms are absent in the detritus bed and gyttja (fig. 24). Instead, the diatom assemblage consists of large, mostly broken freshwater diatoms and sponge spicules, with rare occurrences of *HTm* and *Tm* species. The presence of these species, and absence of brackish diatoms in sediment above De15, is consistent with redeposition of sediment and diatoms from the shallow margins of the lake without an influx of marine water or coincident change in diatom habitat or lake ecology.

De16	6510-6310 yr BP	Core BR-94E	No diatom evidence for tsunami

Disturbance event 16 (De16) is identified in core 94E as a woody detritus bed at 609 cm, capped by massive gyttja from 607 cm to 605.5 cm (fig. 25). *Hm* diatoms are absent in the woody detritus bed and massive gyttja, but freshwater diatoms are abundant. This is consistent with redeposition of shallow-water detritus from the margins of the lake.

Compared to other disturbance events, De16 is lithologically and biostratigraphically enigmatic. In all other cases where finely laminated mud is associated with a disturbance event (Table 3), the unit lies directly above the sandy or massive gyttja deposits of the event. However, for De16 a unit of finely laminated mud (594.5-601 cm) is separated from a unit of massive gyttja (607-605.5 cm) by approximately 5 cm of intermittently laminated lake mud (605.5-601 cm; fig. 25). The intermittently laminated mud contains abundant freshwater diatoms, and is lithologically indicative of "normal" lake sedimentation (Kelsey et al., 1999). Compared to assemblages in the "normal" lake mud, freshwater diatoms are two orders of magnitude less abundant in finely laminated mud at 595 cm and 600 cm. Brackish planktonic diatoms (*Cyclotella meneghiniana* and *Thalassiosira bramaputra*)e are prominent in the upper part of the finely laminated mud at 595 cm, as well as in overlying massive mud at 590 cm (fig. 25). The increased abundances of brackish diatoms and decreased abundances of freshwater diatoms in the finely laminated mud is evidence for a period of reduced productivity for *in situ* freshwater populations. In addition to elevated salinity, other mechanisms for this may have included physical disruption of shallow benthic habitats from landslides or an abrupt increase in lake level caused by blockage of the lake outlet.

In addition to abundant freshwater diatoms in the "normal" laminated mud at 602.5 cm, brackish planktonic diatoms (*T. bramaputrae* and *C. meneghiniana*) are also abundant (fig. 25). The benthic species *M. smithii* does not exceed "background" abundances in any samples within or above De16. Although an abundance of freshwater diatoms is consistent with the presence of "normal" laminated mud, concurrent abundances of brackish diatoms appears contradictory. It may be possible that a small increase in salt stimulated the growth of the brackish species, but that the change in salinity was not great enough to immediately disrupt *in situ* freshwater populations. Although anomalous occurrences of brackish diatoms suggests a increase in salinity associated with De16, *Hm* diatoms were not observed. Therefore, we have no evidence, in the form of displaced marine diatoms, for a tsunami having inundated the lake.

The freshwater planktonic diatom *Aulacoseira italica* is prominent in massive mud at 590 cm, but it does not dominate the assemblage as in other events in which massive numbers may show that the species successfully out-competed other taxa for limited nutrients in the lake (e.g., De8, De9, De12). Abundances of freshwater diatoms in the massive gyttja and detritus of De16 are artifacts of redeposition of benthic assemblages in the deep axis of the lake.

De17	7390-7220 yr BP	Core BR-94E	Strong diatom evidence for tsunami

Disturbance event 17 (De17) is identified in core 94E by 2 cm of sand and muddy sand at 635 cm to 633 cm.

The absence of planktonic diatoms in peaty mud below 640 cm, but abundance of freshwater benthic diatoms, shows that the site was a freshwater marsh prior to deposition of De17. First occurrences of freshwater planktonic diatoms above De17 at 630 cm, and presence of poorly preserved finely laminated mud from 628 cm to 632 cm, attest to a transition from freshwater marsh to pond or lake (fig. 26). The depth of this incipient lake is not known, but based on comparisons with other lakes, this probably represents a deepening to at least 5 m (Larsen and MacDonald, 1993).

With the exception of a single valve of *T. bramaputrae* at 636 cm (Appendix 3), no brackish or marine diatoms are observed in core 94E prior to De17 (figs. 24). *Hm* and *HTm* diatoms are first observed in sand at 634 cm, and include species that are likewise associated with succeeding disturbance events, such as *Thalassiosira pacifica*, *Delphineis karstenii*, and *Cocconeis scutellum*. *Hm* and *HTm* diatoms are more frequent in finely laminated mud at 632 cm than in the underlying sand, a pattern also repeated for succeeding disturbance events. *Tm* diatoms are also first observed at 634 cm, which shows that prior to the post-De17 transition from marsh to lake, there was no mechanism to transport diatoms from the nearby diatomite to the site of core 94E. *T. bramaputrae* is common in faint, finely laminated mud between 624-630 cm; *C. meneghiniana* is present but rare above De17 at 630 cm (Fig. 27). This may reflect a small increase in salinity (or change in diatom habitat?) following De17.

CONCLUSIONS

1) Based on occurrences of displaced Holocene marine diatoms, we conclude that 13 disturbance events record past tsunamis in Bradley Lake. We consider the evidence strong for 11 events, based on numbers and diversity of marine taxa: De1, De2, De4, De5, De6, De7, De8, De11, De12, De13, and De17. The evidence is less compelling for an additional 2 events (De9 and De10), although tsunami inundation is likely. Finally, we identified 4 events (De3, De14, De15 and De16) in which there were no marine diatoms to support tsunami inundation, although stratigraphic data shows that the lake bottom was disturbed.

2) Anomalous increases in numbers of three species of brackish diatoms (*Thalassiosira bramaputrae*, *Cyclotella meneghiniana*, and *Mastogloia smithii*) following De16, De13, De12, De11, De9, De8, and De5 may be evidence for short-lived periods of slightly elevated salinities in the lake. With the exception of De12, increased abundances of one or more of the brackish species is coincident with decreased numbers of freshwater diatoms. This is further evidence for a shift in ecological conditions following some events which favored species like *T. bramaputrae* and *C. meneghiniana*, whose growth may be stimulated by small amounts of salt, and *M. smithii*, a benthic species commonly found on muddy estuarine banks and marshes, over *in situ* freshwater diatoms. High numbers of *T. bramaputrae* and *C. meneghiniana*, both planktonic halophilic species, might also be the result of the ability of these taxa to out-compete struggling freshwater benthic populations for limited nutrients in the lake.
3) The fact that freshwater populations, though temporarily diminished following some events, manage to recover and persist throughout the Bradley Lake record is evidence that any salinity increases must have been small (1 g/L? 2 g/L?), and did not persist long enough to permanently destroy *in situ* populations.
4) Large numbers of the brackish taxa listed above are not found in deposits younger than De5, to include De2, which includes common marine diatoms and strong stratigraphic evidence for tsunami incursion. The reason for this is equivocal, but may simply be the result of fewer "seed" species being present in the lake to facilitate a bloom. It is possible that a more detailed accounting of freshwater and euryhaline diatoms throughout the lake record might provide greater insight into small-scale changes in salinity in the lake over time.

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FIGURE CAPTIONS

Figure 1. Location of Bradley Lake, Oregon relative to the Cascadia subduction zone (A) and the Oregon coast (B). The boot-shaped lake (C) formed when coastal dunes blocked the channel of China Creek. Numbers on contour lines are depth in meters; letters show core locations.

Figure 2. Salinity ranges for brackish-water diatoms from Bradley Lake, based on modern occurrences in lakes and estuaries. CYCMEN: *Cyclotella meneghiniana*. THABRA: *Thalassiosira bramaputrae*. MASSMI, MASLAC: *Mastogloia smithii* + *M. smithii* var. *lacustris*. R1: Cumming and Smol, 1993. R2: Wilson et al., 1995. R3: Fritz et al., 993. R4: John, 1983. R5: Carpelan, 1978.

Figure 3. Concentrations of marine, brackish and freshwater diatoms for De1 through De17. *Hm*: marine diatoms from Holocene surficial deposits. Vertical dashed lines for brackish diatoms show an estimated delineation between "background" occurrences and large increases in growth of these taxa. Data are from core BR-94E, BR-94F (90-100 cm), BR-95BB (360-412 cm), and BR-95X (473-498 cm).

Figure 4. Concentrations of marine and brackish diatoms for De1, De2, and an enigmatic post-De1 event ("Black soupy"). *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Data are from core BR-94E, except 90-100 cm, which are from 94F.

Figure 5. Stratigraphy and diatoms for De1, and "Black soupy," an enigmatic deposit of black organic ooze. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Data are from core BR-94E.

Figure 6. Stratigraphy and diatoms for De2. *Hm*: marine diatoms from Holocene surficial deposits. Data are from core BR-94E except for 90-100 cm which are from BR-94F.

Figure 7. Concentrations of marine and brackish diatoms for De3 and De4. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Data are from core BR-94E.

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Figure 11. Concentrations of marine and brackish/high-conductivity diatoms for De7 and De8. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Note the logarithmic scale for "Brackish diatoms." Data are from core BR-94E.

Figure 12. Stratigraphy and diatoms for De7. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Data are from core BR-94E.

Figure 13. Stratigraphy and diatoms for De8. *Hm*: marine diatoms from Holocene surficial deposits. Vertical dashed lines for brackish diatoms show an estimated delineation between "background" occurrences and large increases in growth of these taxa. Data are from core BR-94E.

Figure 14. Concentrations of marine and brackish diatoms for De9 and De10. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Data are from core BR-95BB. Numbers in parentheses represent comparable depths for core BR-94E.

Figure 15. Stratigraphy and diatoms for De9. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Data are from core BR-95BB. Numbers in parentheses represent comparable depths for core BR-94E.

Figure 16. Stratigraphy and diatoms for De10. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Data are from core BR-95BB. Numbers in parentheses represent comparable depths for core BR-94E.

Figure 17. Concentrations of marine and brackish diatoms for De11and De12. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Data are from core BR-94E.

Figure 18. Stratigraphy and diatoms for De11. *Hm*: marine diatoms from Holocene surficial deposits. Note the logarithmic scales for "Brackish diatoms" and "Freshwater diatoms." Data are from core BR-94E.

Figure 19. Stratigraphy and diatoms for a clast of detrital peat recovered from core 94E. Horizontal dashed line shows the contact between peat containing brackish diatoms ("BD subunit") and freshwater diatoms ("FW subunit"). Note the logarithmic scales for "Brackish diatoms." Uncalibrated radiocarbon ages are reported in conventional radiocarbon years before AD 1950. This equates to an average calibrated age for the entire peat clast of 4150-3920 cal yr B.P.

Figure 20. Stratigraphy and diatoms for De12. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Data are from core BR-94E.

Figure 21. Concentrations of marine and brackish diatoms for De13 and De14. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Data are from core BR-95X. Numbers in parentheses represent comparable depths for core BR-94E.

Figure 22. Stratigraphy and diatoms for De13. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Note the logarithmic scales for the brackish and freshwater diatom data. Vertical dashed lines for brackish diatoms show boundary between "background" levels and possible blooms of these taxa. Data are from core BR-95X. Numbers in parentheses represent comparable depths for core BR-94E.

Figure 23. Stratigraphy and freshwater diatoms for De14. Data are from core BR-95X. Numbers in parentheses represent comparable depths for core BR-94E.

Figure 24. Concentrations of marine and brackish diatoms for De15, De16, and De17. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: Extinct marine diatoms from Tertiary diatomites. Data are from core BR-94E.

Figure 25. Stratigraphy and diatoms for De16. *FW*: benthic and planktonic freshwater diatoms. Vertical dashed lines for benthic diatoms show boundary between “background” levels and possible blooms of these taxa. Data are from core BR-94E.

Figure 26. Concentrations of freshwater diatoms and calibrated ages (Nelson et al., 1998) for De15, De16, and De17. The appearance of planktonic diatoms *ca*. 7200 years ago records a transition from marshy wetland to lake. Data are from core BR-94E.

Figure 26. Concentrations of freshwater and brackish diatoms for De15, De16, and De17. Data are from core BR-94E.

TABLE 1

Event	Age (calibrated years BP)	Hm	CYCMEN	THABRA	MASELL
"Black soupy"			•	•	
De1	250	✔			
De2	995-920	✔		•	•
De3	1130-980				
De4	1510-1320	✔		•	•
De5	1820-1600	✔	B	B	B
De6	1820-1600	✔		B	•
De7	2860-2750	✔		•	
De8	3250-3060	✔	B	B	
De9	3400-3210	(✔)	•	B	
De10	3830-3630	(✔)	•	•	•
De11	4280-4000	✔	B	•	B
De12	4410-4230	✔	B	B	•
De13	4650-4420	✔	B	•	•
De14	4780-4540			•	•
De15	5600-5320				•
De16	6510-6310		B	B	•
De17	7390-7220	✔	•	B	•

Table 1. Summary of post-disturbance-event occurrences for modern marine and brackish diatoms. Ages are from Nelson et al., 2000. Hm: modern marine diatoms; parentheses indicate very rare occurrences (>10^3 valves/cc). Brackish diatoms: *Cyclotella meneghiniana* (CYCMEN), *Thalassiosira bramaputrae* (THABRA), and *Mastogloia smithii* (MASSMI). "B" = substantial increases or blooms following events. "•" = numbers not exceeding "background" levels, < 10^4 valves/cc.

TABLE 2

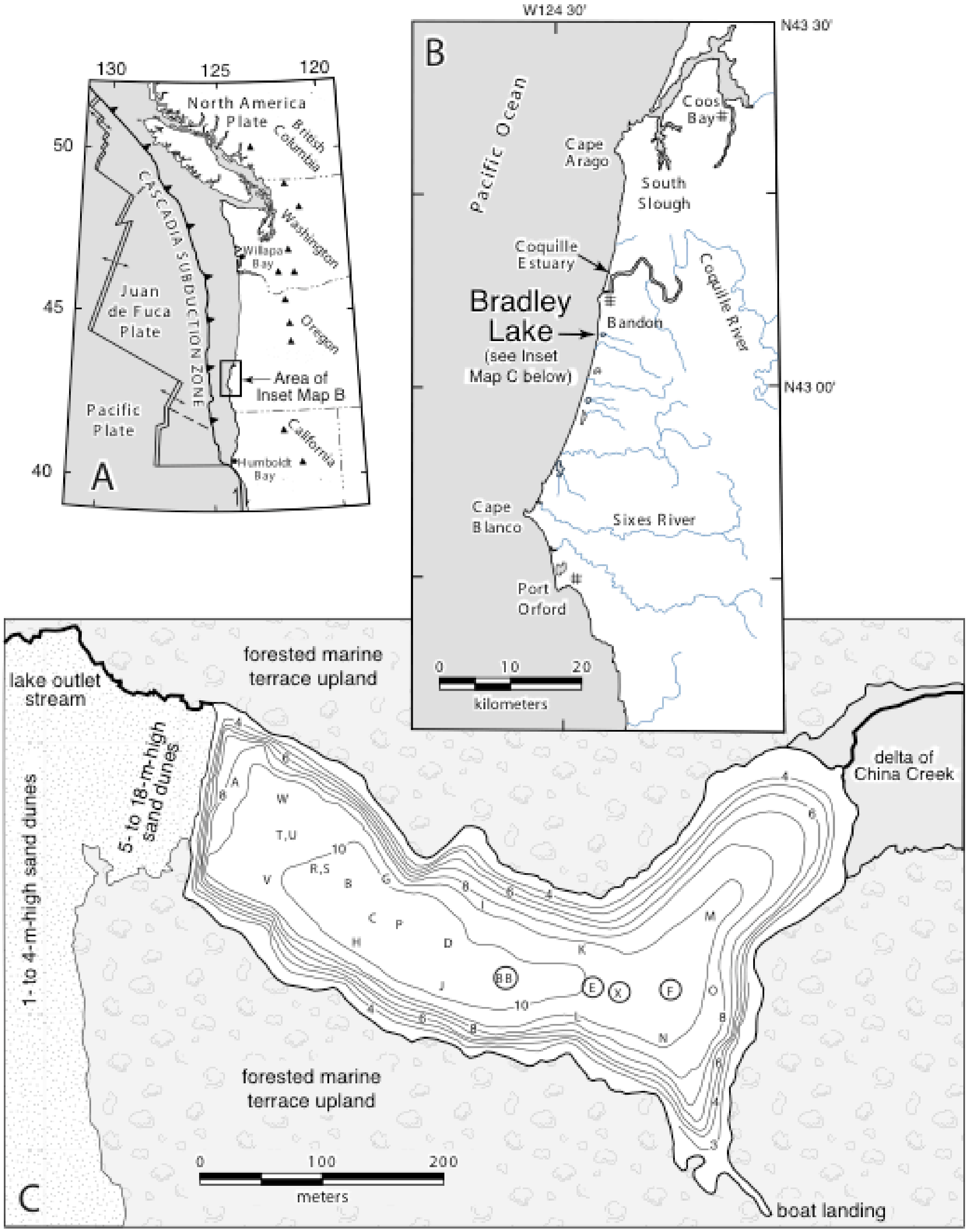
	Sample (BR-94E)	Lithology	Diatoms
	363 cm	Intermittently laminated mud	Diverse freshwater diatoms; rare brackish diatoms
	365 cm	Massive mud	Abundant benthic and planktonic freshwater diatoms; rare brackish diatoms
	370 cm	Transition from muddy detrital peat to massive mud	Abundant benthic and planktonic freshwater diatoms; rare brackish diatoms
Peat clast	375 cm	Muddy detrital peat (*BD* subunit)	Abundant *M. smithii* plus other benthic brackish species; *T. bramaputrae* and *C. meneghiniana* present but rare); rare freshwater diatoms.
Peat clast	380 cm	Muddy detrital peat (*FW* subunit)	Abundant large freshwater marsh diatoms; common sponge spicules; preservation moderate to poor.
Peat clast	385 cm	Muddy detrital peat (*FW* subunit)	Abundant large freshwater marsh diatoms; common sponge spicules; preservation poor (severe valve fragmentation).
Peat clast	390 cm	Muddy detrital peat (*FW* subunit)	Abundant large freshwater marsh diatoms; common sponge spicules; preservation poor (severe valve fragmentation).
Peat clast	395 cm	Muddy detrital peat (*FW* subunit)	Abundant large freshwater marsh diatoms; common sponge spicules; preservation poor (severe valve fragmentation).
Peat clast	400 cm	Muddy detrital peat (*FW* subunit)	Diverse freshwater diatoms and sponge spicules; preservation good.
	402 cm	Intermittently laminated mud	Diatoms rare relative to mud, mostly small freshwater planktonic species; preservation moderate to poor.
	404 cm	Intermittently laminated mud	Diatoms rare relative to mud, mostly small freshwater planktonic species; preservation moderate to poor.

Table 2. Sample descriptions and summary of diatom analyses for a clast of muddy detrital peat recovered from 373 cm to 401 cm in core BR-94E. *BD:* Brackish diatoms. *FW:* Freshwater diatoms.

TABLE 3

Disturbance Event	Finely laminated mud superjacent to De?	Hm diatoms present (i.e., diatom evidence for tsunami?)	Brackish diatoms common in finely laminated mud?	Freshwater diatoms decrease in finely laminated mud?
De2	Y	Y	N	Y
De4	Y	Y	N	Y
De5	Y	Y	Y	Y
De7	Y	Y	N	Y
De8	Y	Y	Y	Y
De9	Y	Y	Y	Y
De10	Y	Y	N	Y
De11	Y	Y	Y	Y
De12	Y	Y	Y	(negligible)
De13	Y	Y	Y	Y
De16	N	N	Y	Y

Table 3. Comparison of disturbance events that have overlying units of finely laminated mud.



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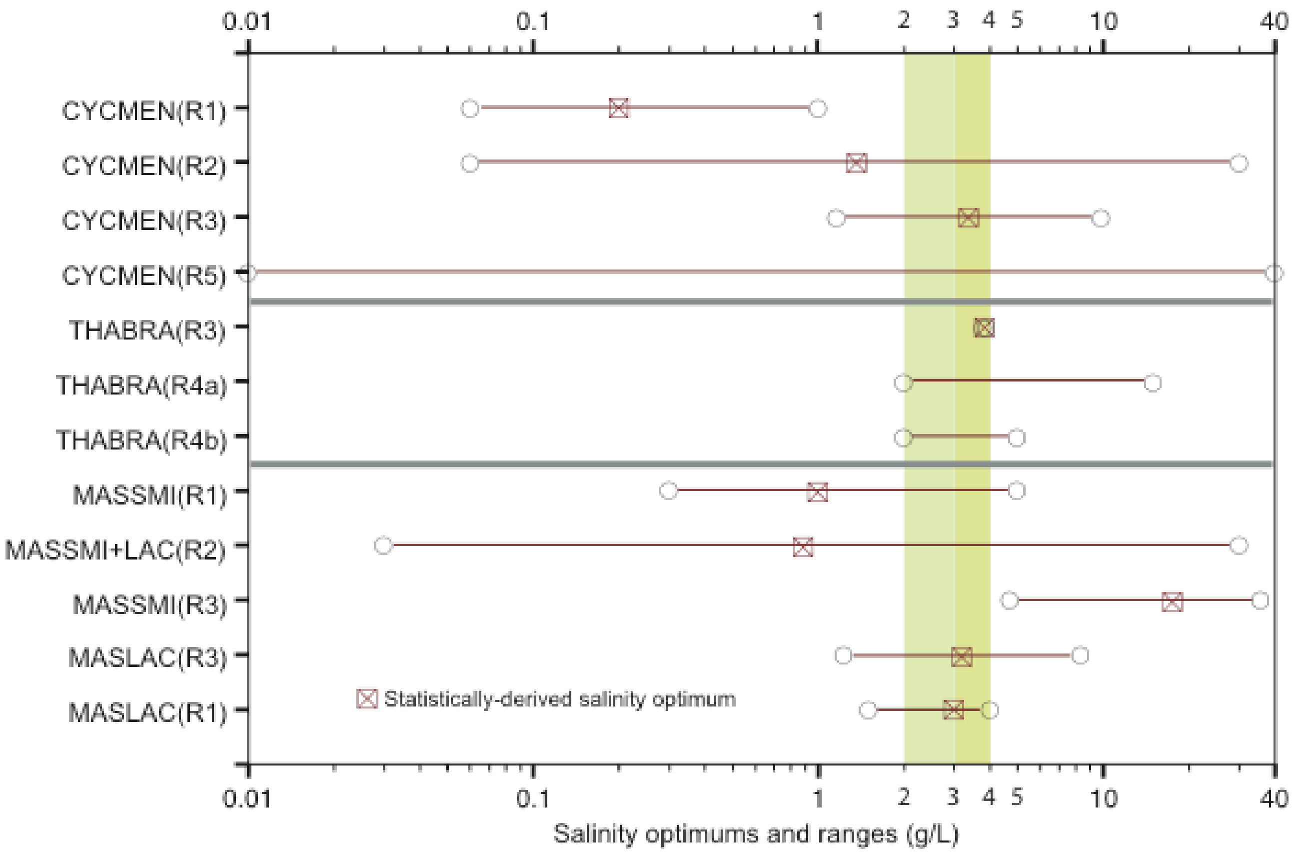

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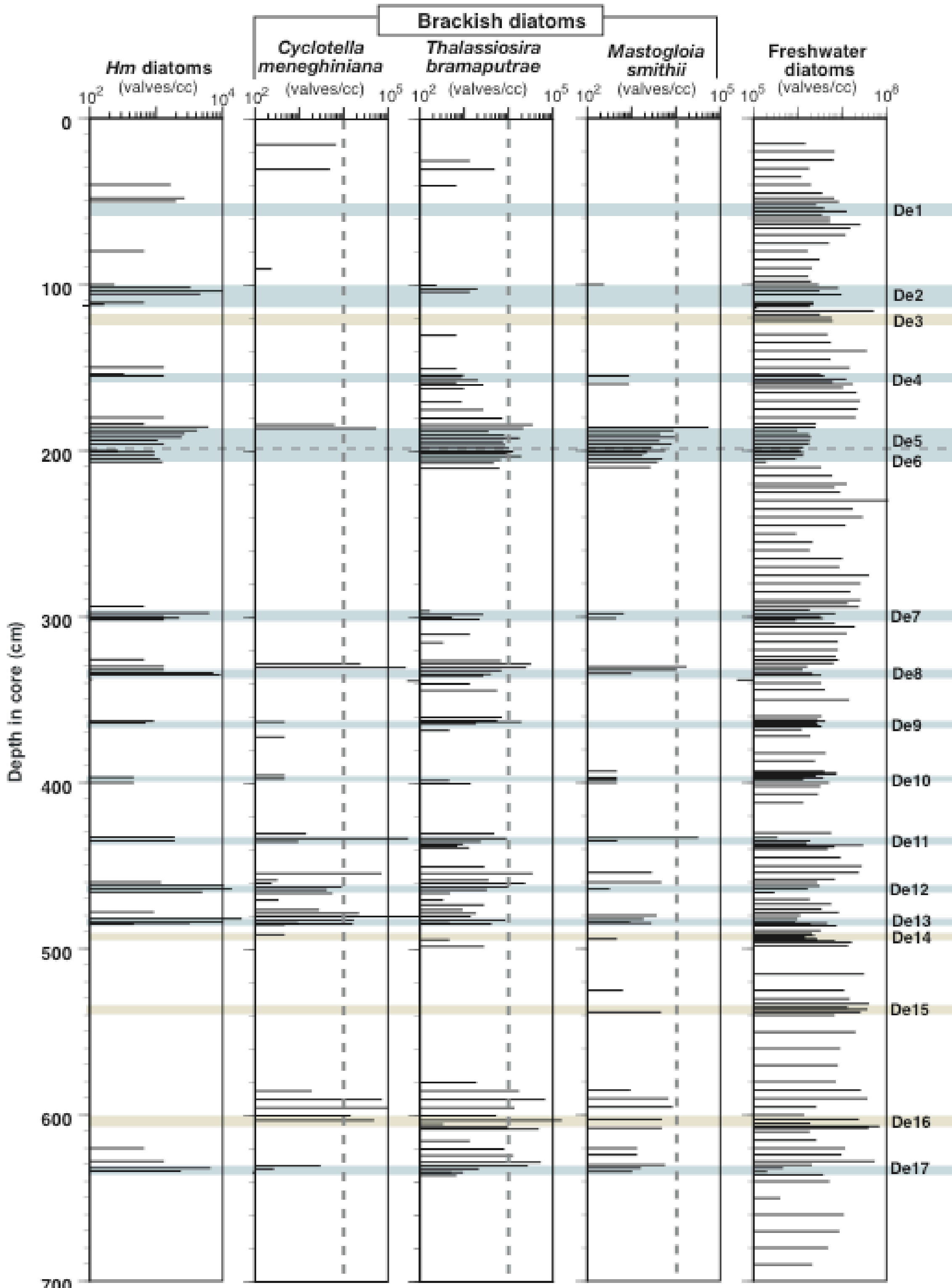

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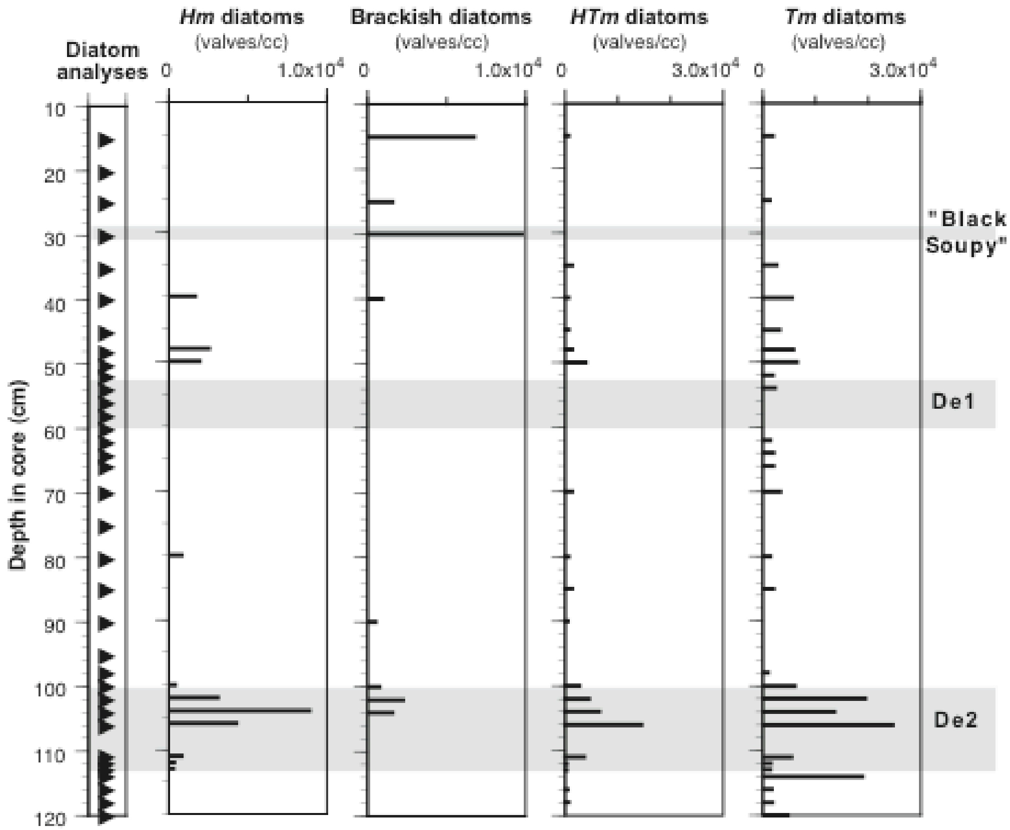

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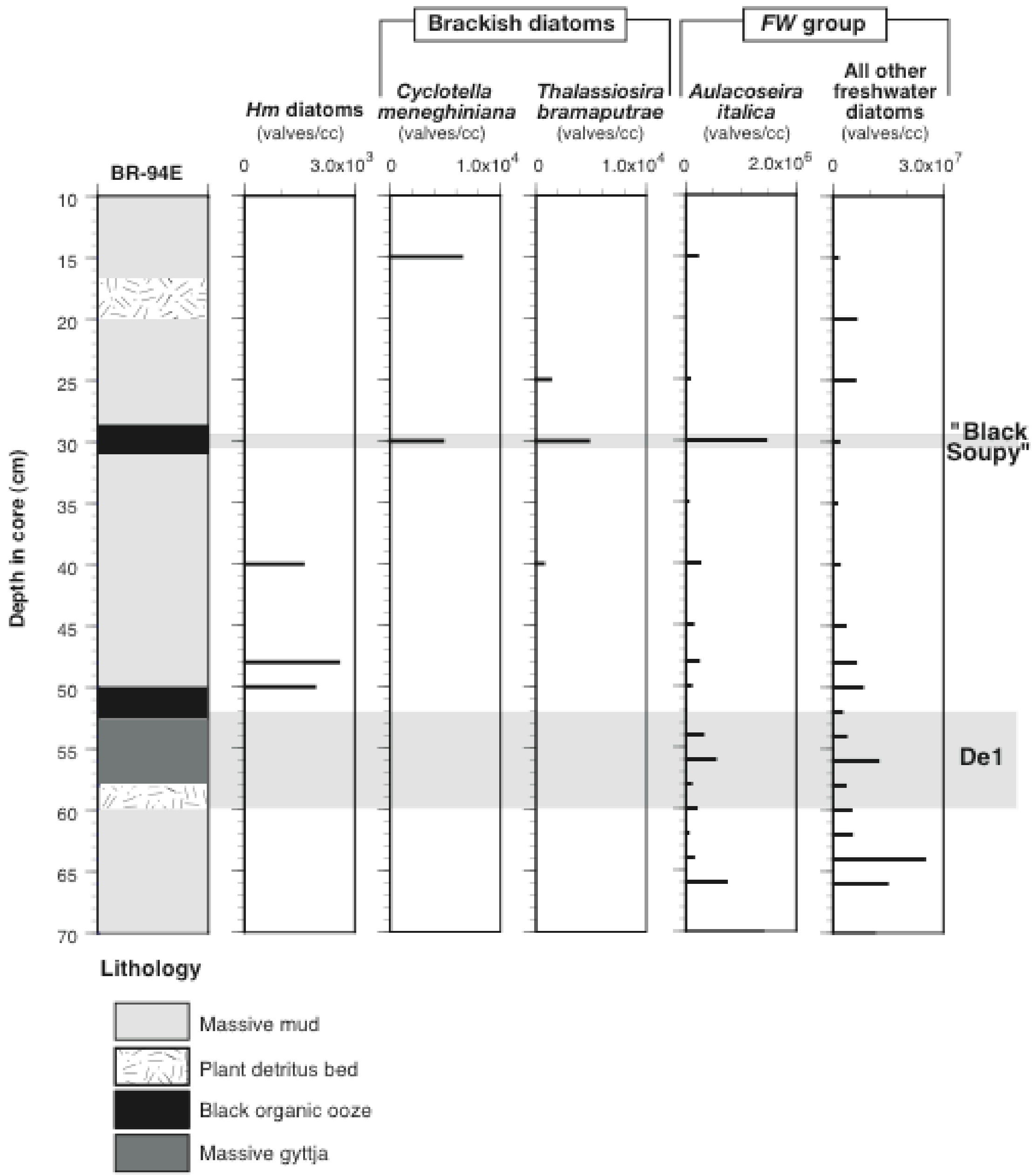

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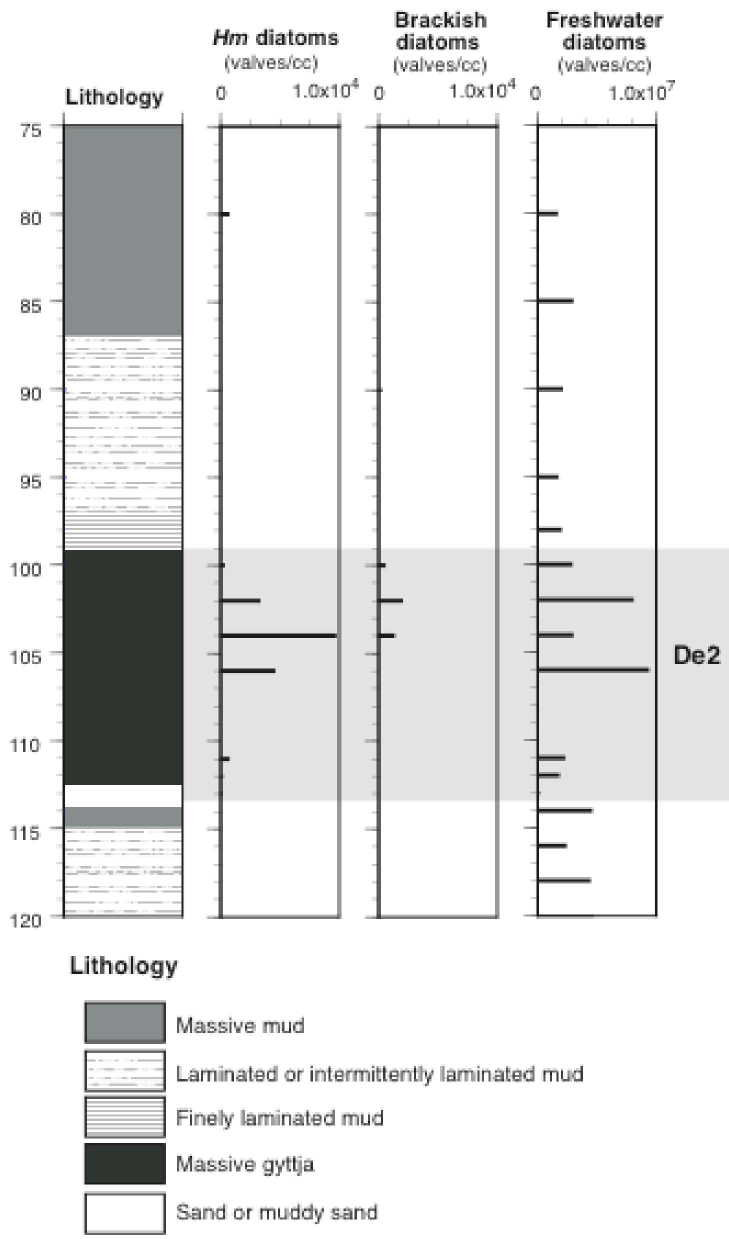

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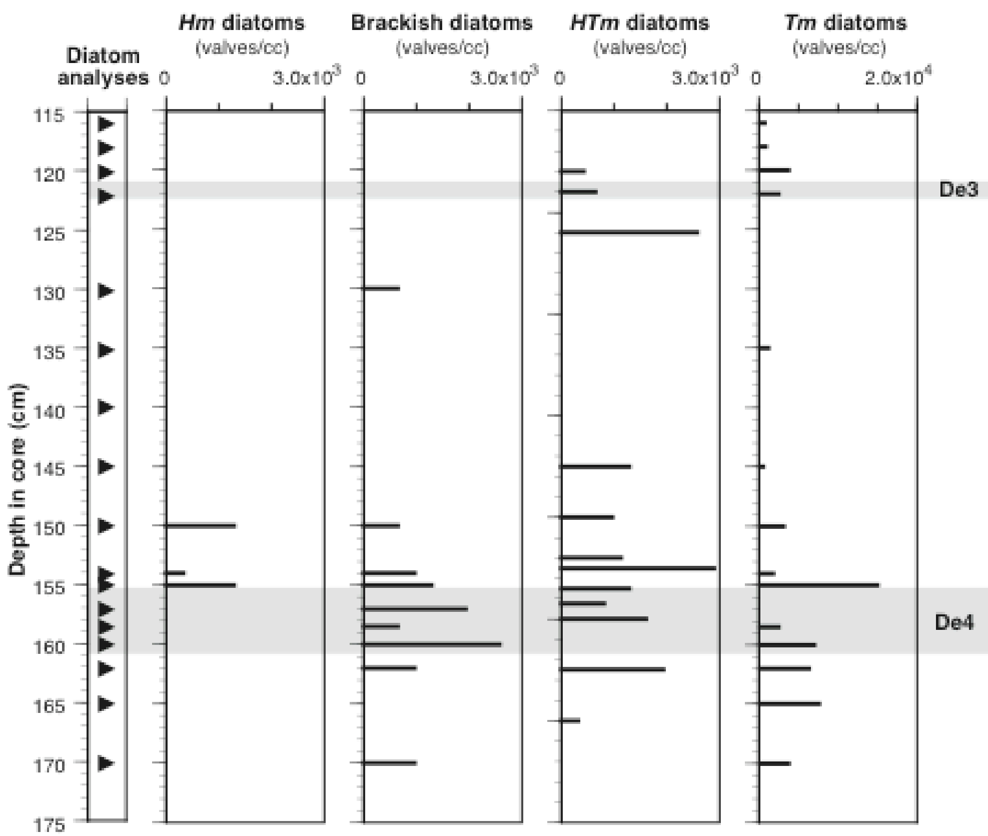

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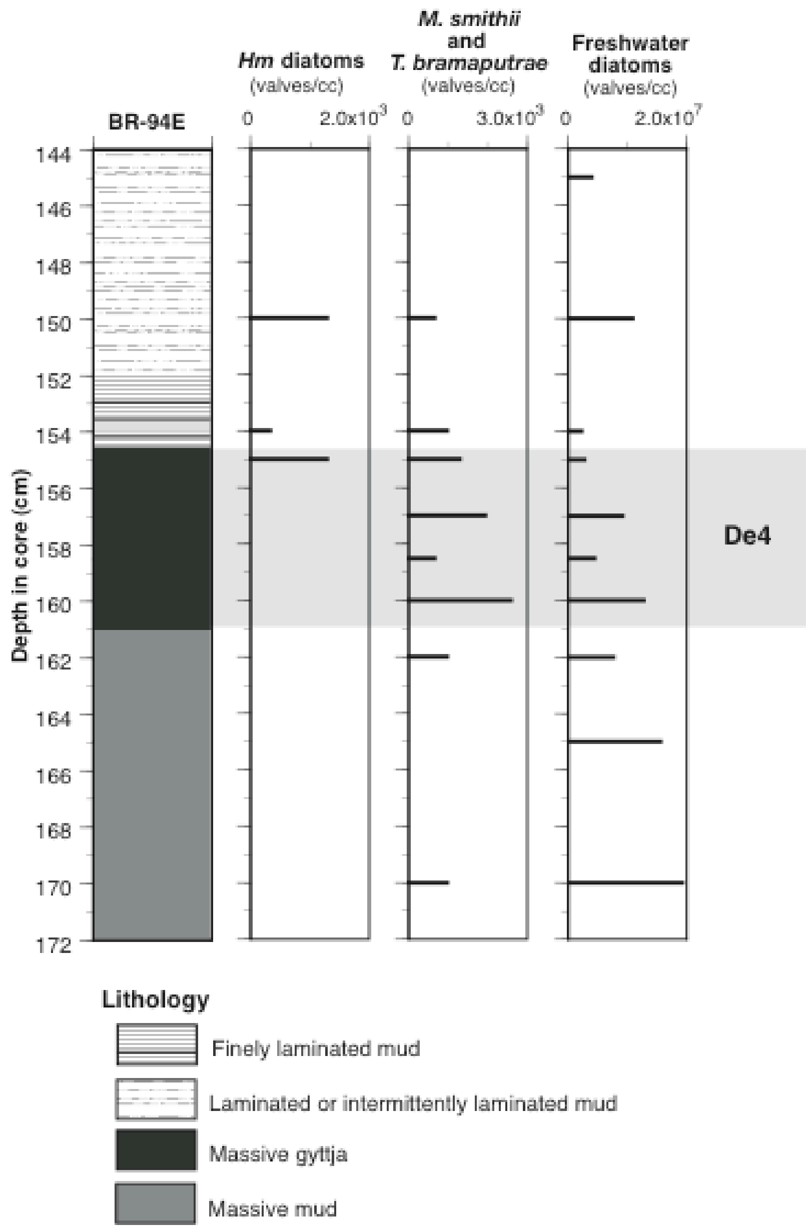
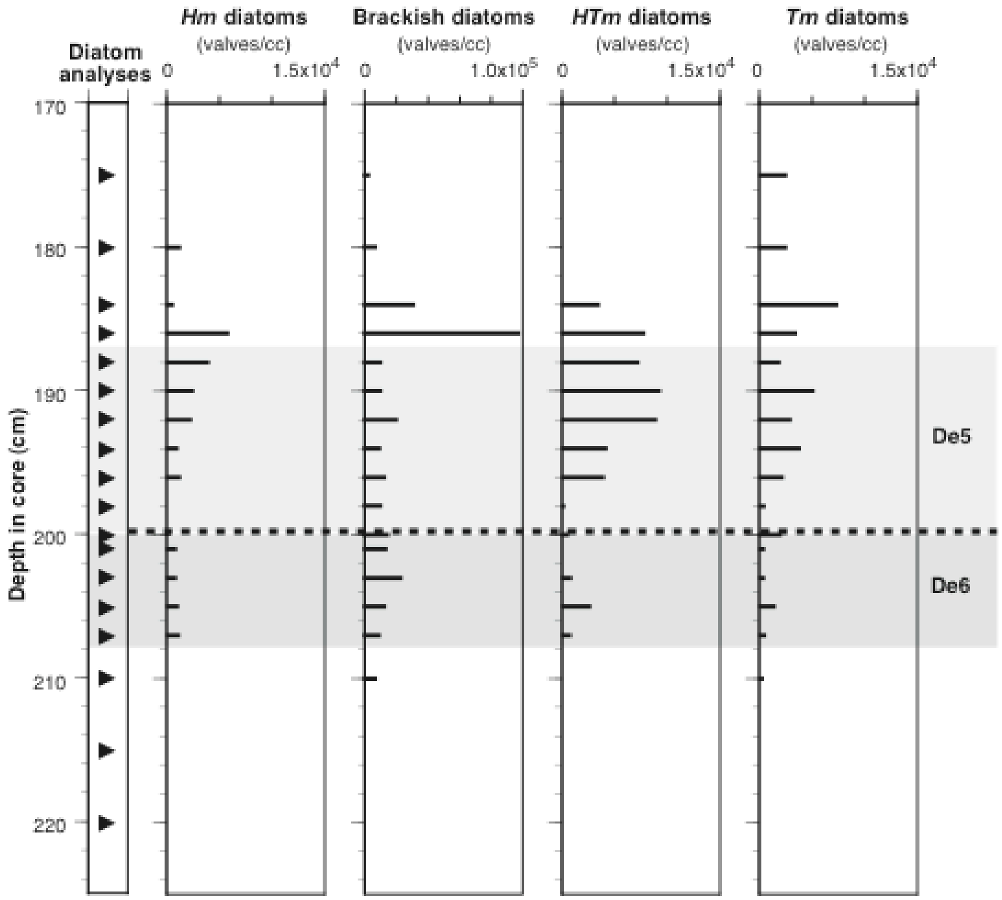


Figure 8. Stratigraphy and diatoms for De4. *Hm*: marine diatoms from Holocene surficial deposits. Data are from core BR-94E.



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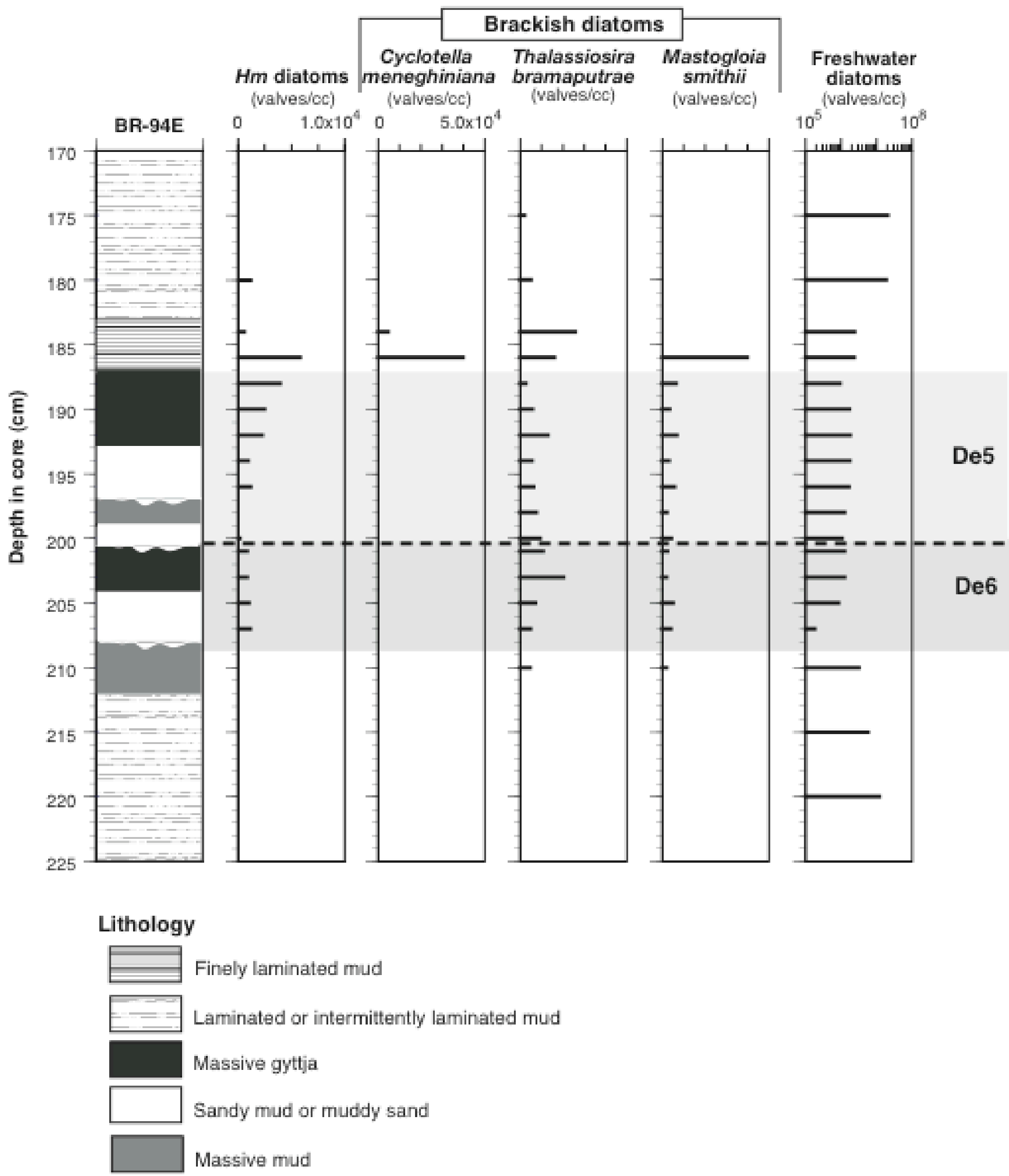

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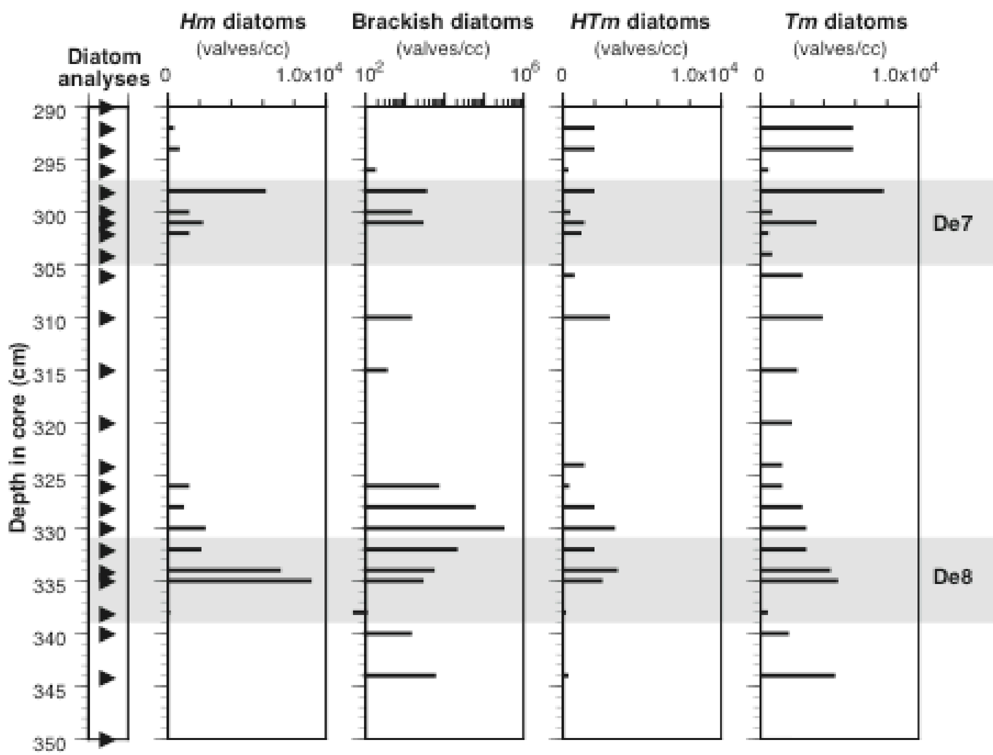

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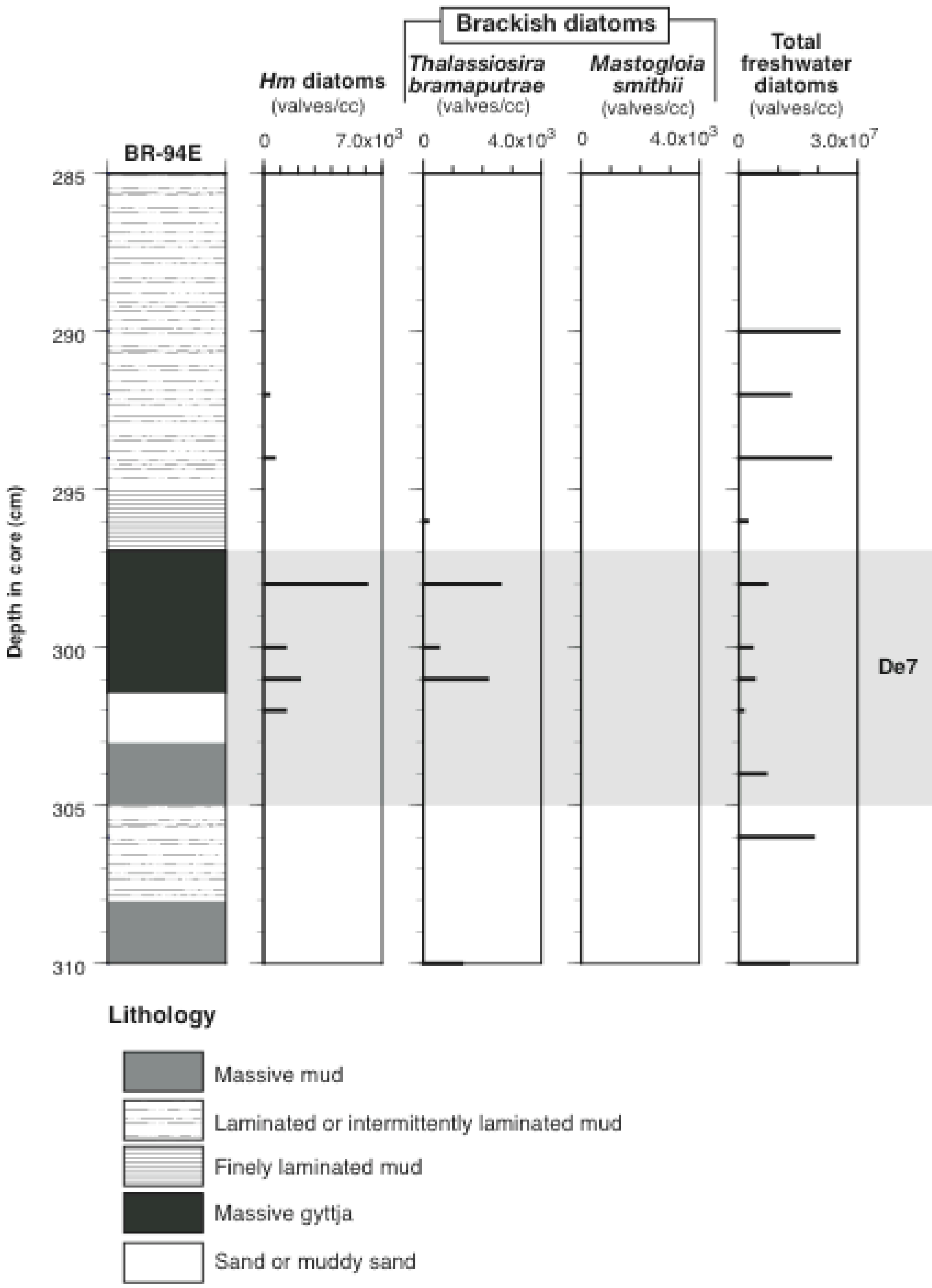

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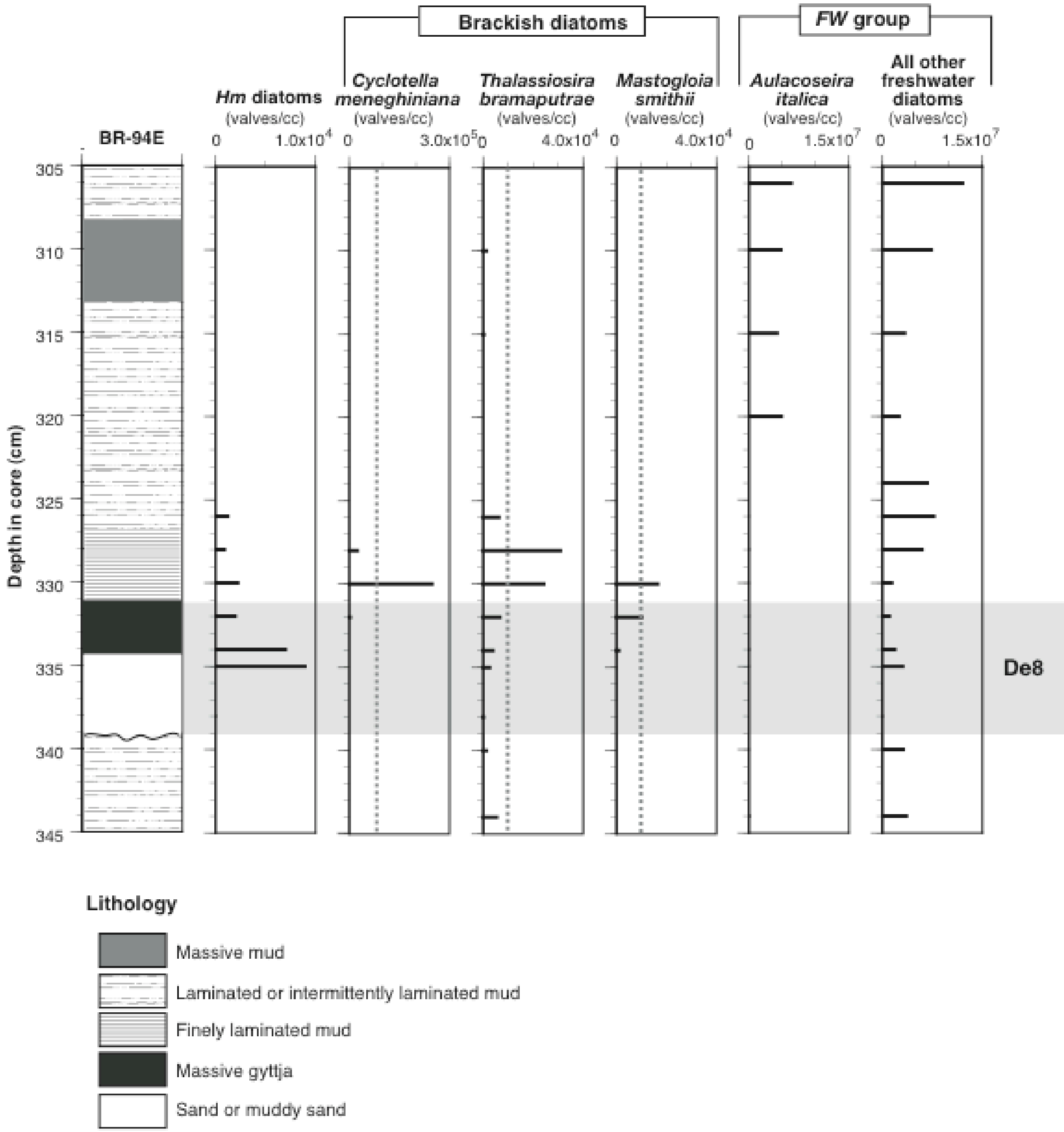

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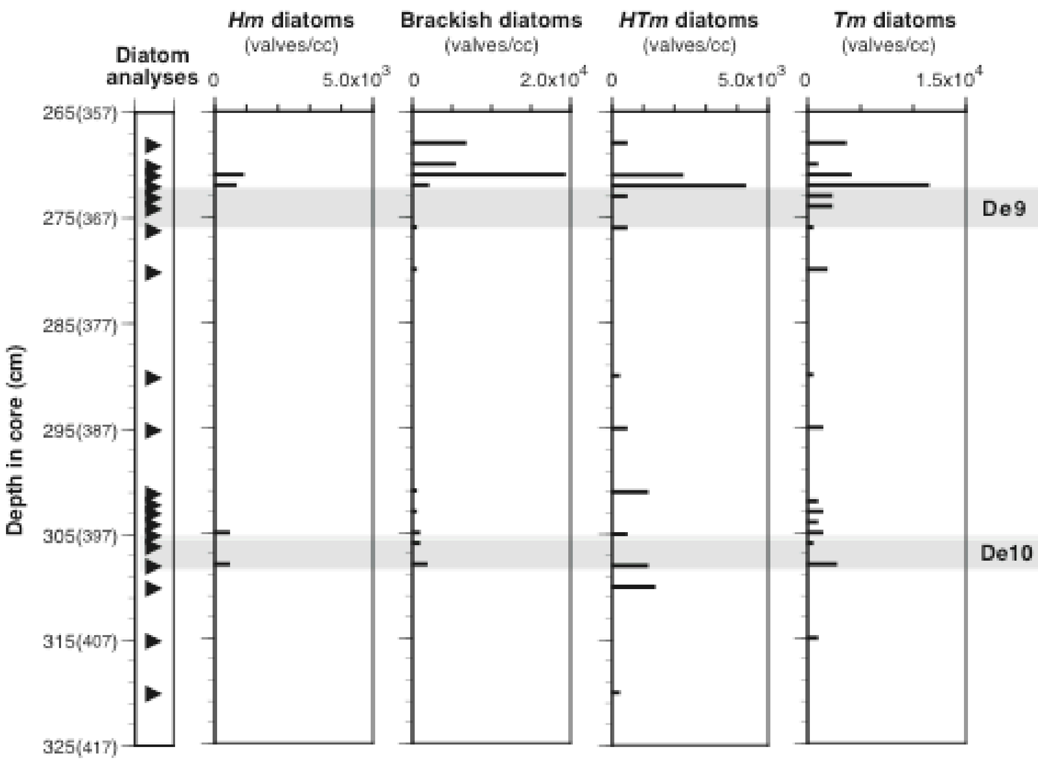

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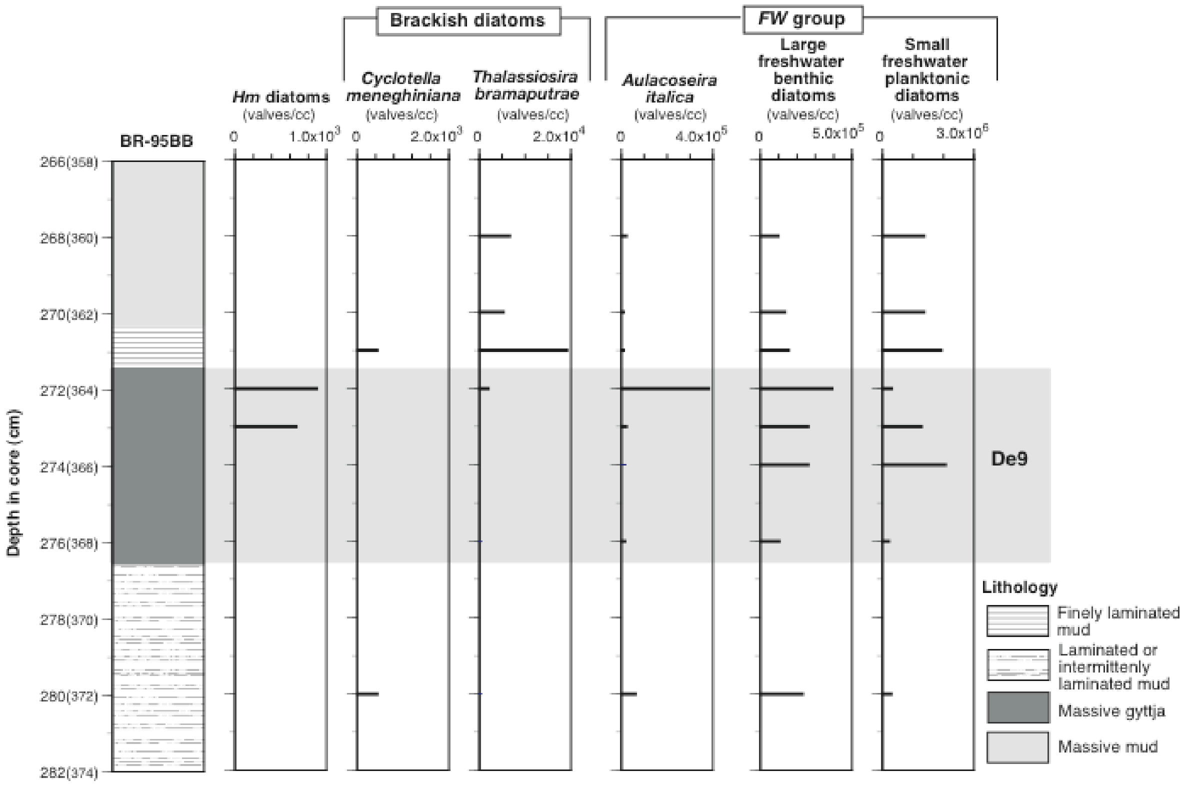

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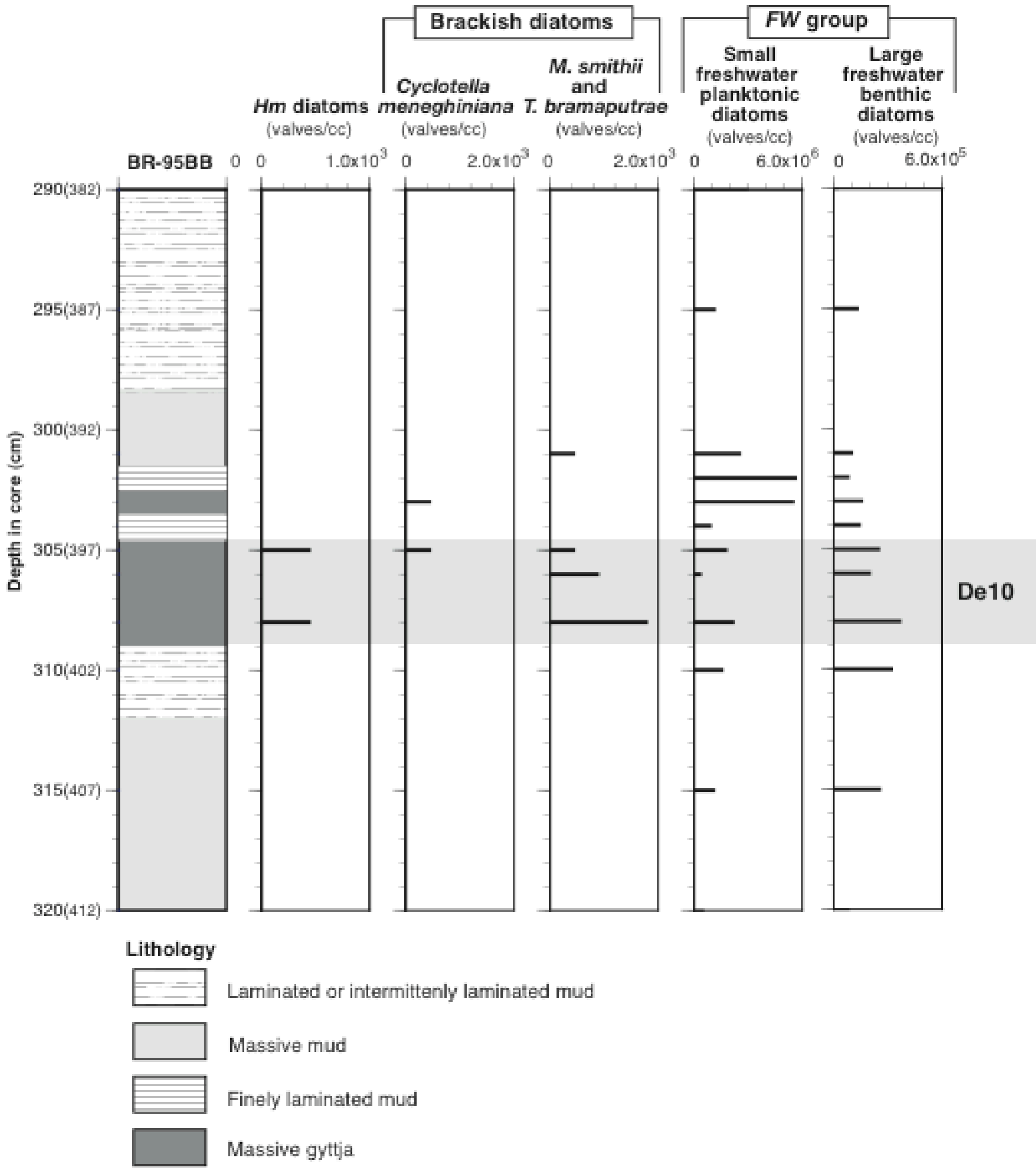

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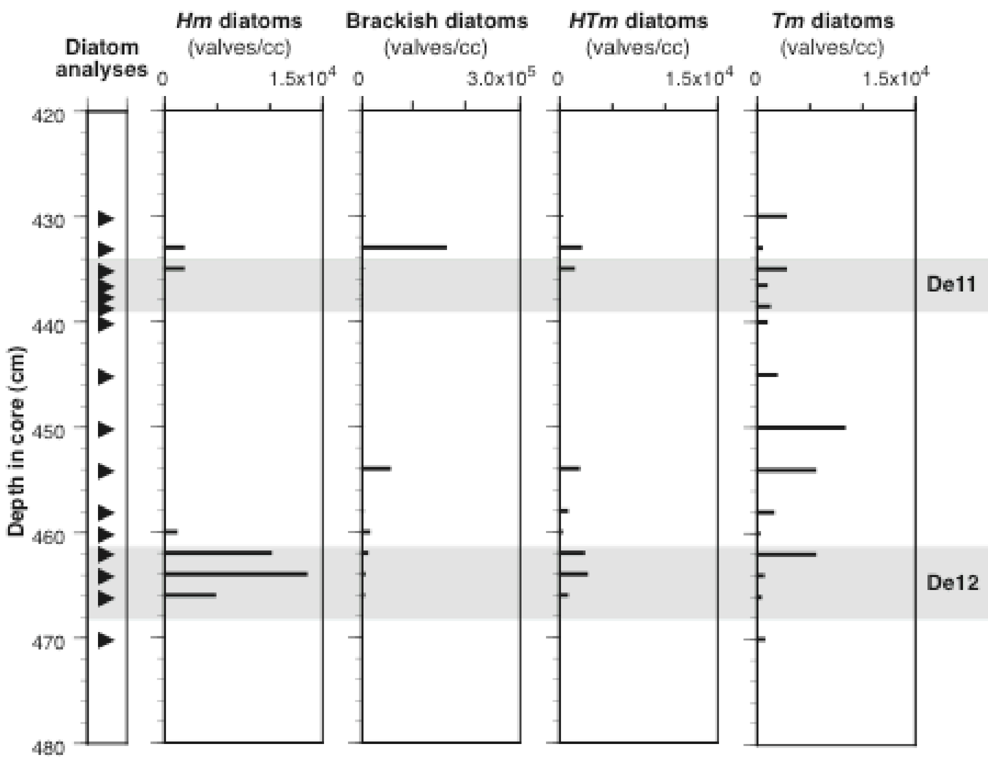

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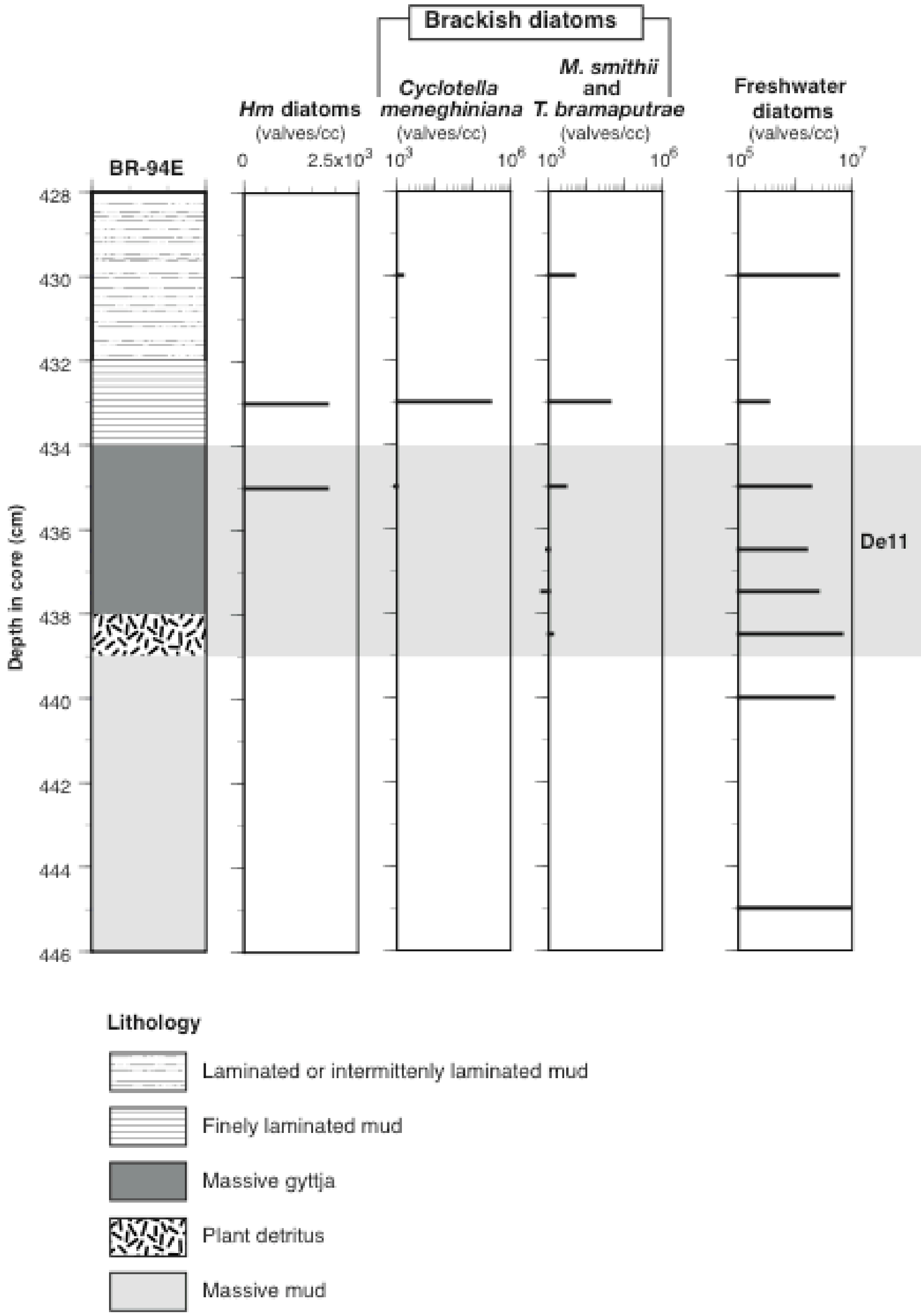

Figure 18. Stratigraphy and diatoms for De11. *Hm*: marine diatoms from Holocene surficial deposits. Note the logarithmic scales for "Brackish diatoms" and "Freshwater diatoms." Data are from core BR-94E.

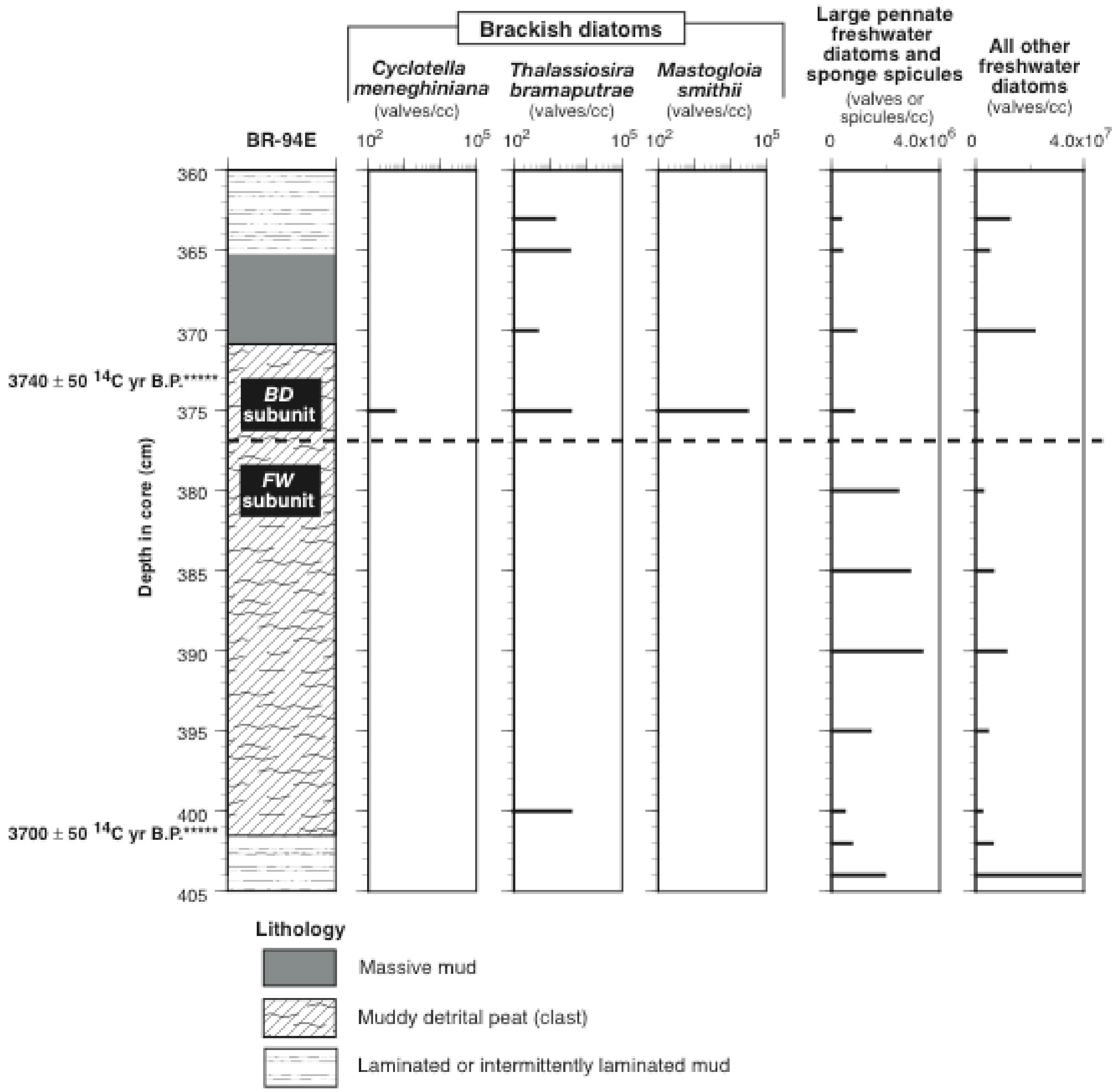

Figure 19. Stratigraphy and diatoms for a clast of detrital peat recovered from core 94E. Horizontal dashed line shows the contact between peat containing brackish diatoms ("BD subunit") and freshwater diatoms ("FW subunit"). Note the logarithmic scales for "Brackish diatoms." Uncalibrated radiocarbon ages are reported in conventional radiocarbon years before AD 1950. This equates to an average calibrated age for the entire peat clast of 4150-3920 cal yr B.P.

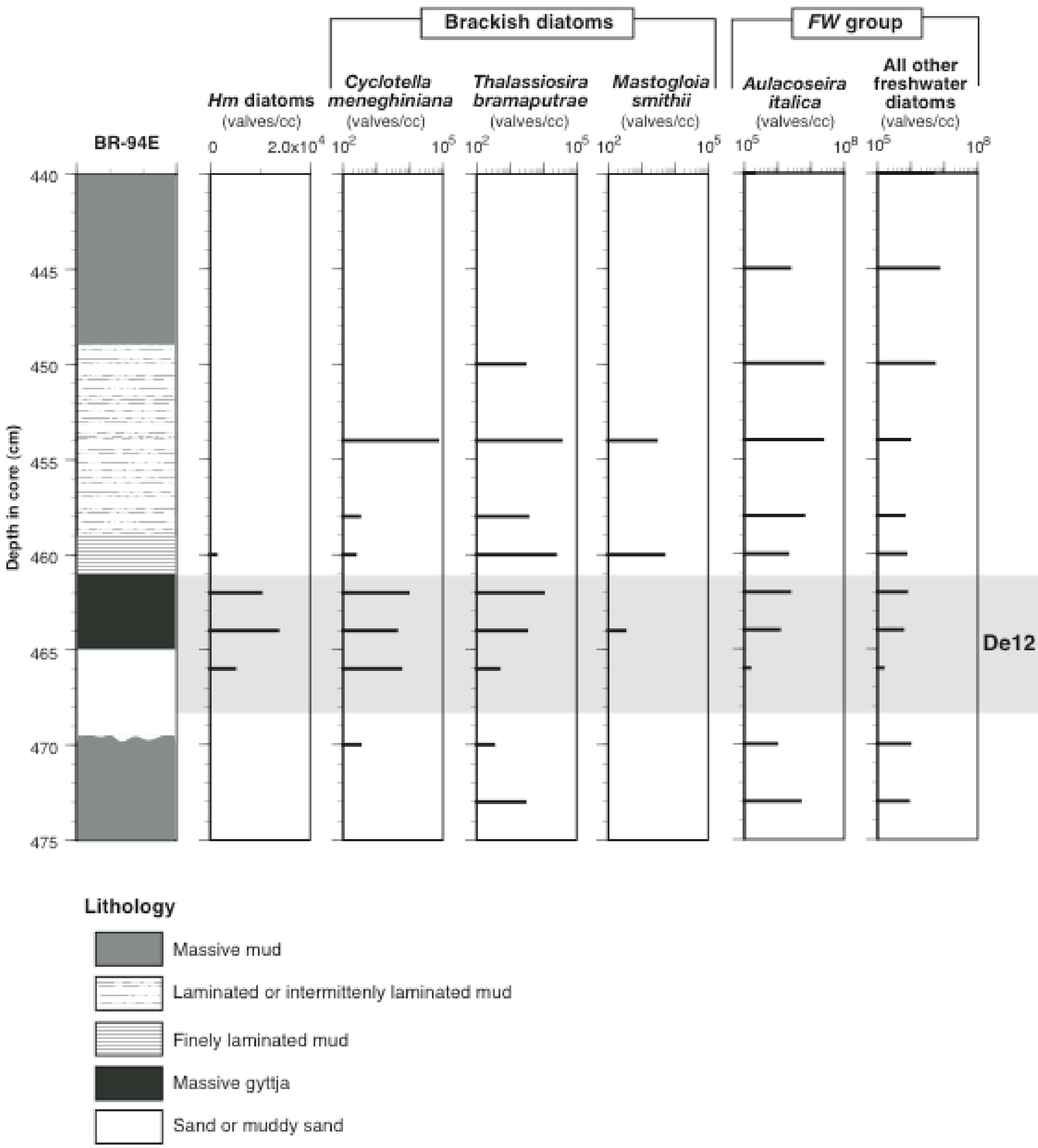

Figure 20. Stratigraphy and diatoms for De12. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Data are from core BR-94E.

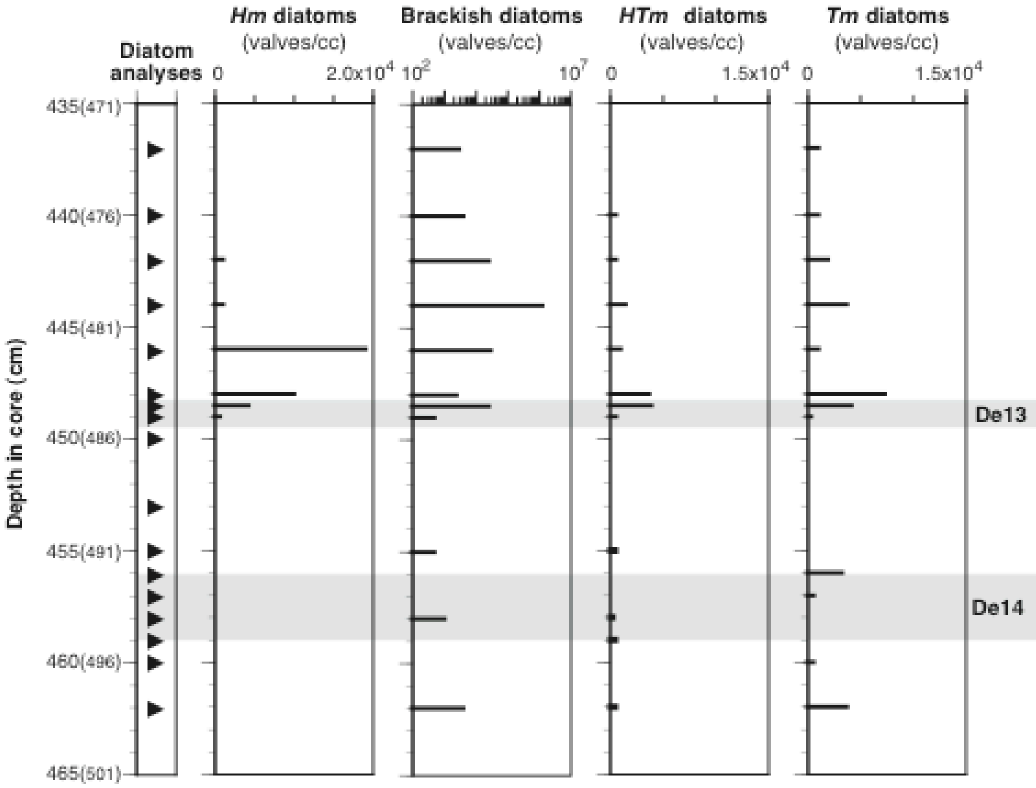

Figure 21. Concentrations of marine and brackish diatoms for De13 and De14. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: extant marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: extinct marine diatoms from Tertiary diatomites. Note logarithmic scale for "Brackish diatoms." Data are from core BR-95X. Numbers in parentheses represent comparable depths for core 94E.

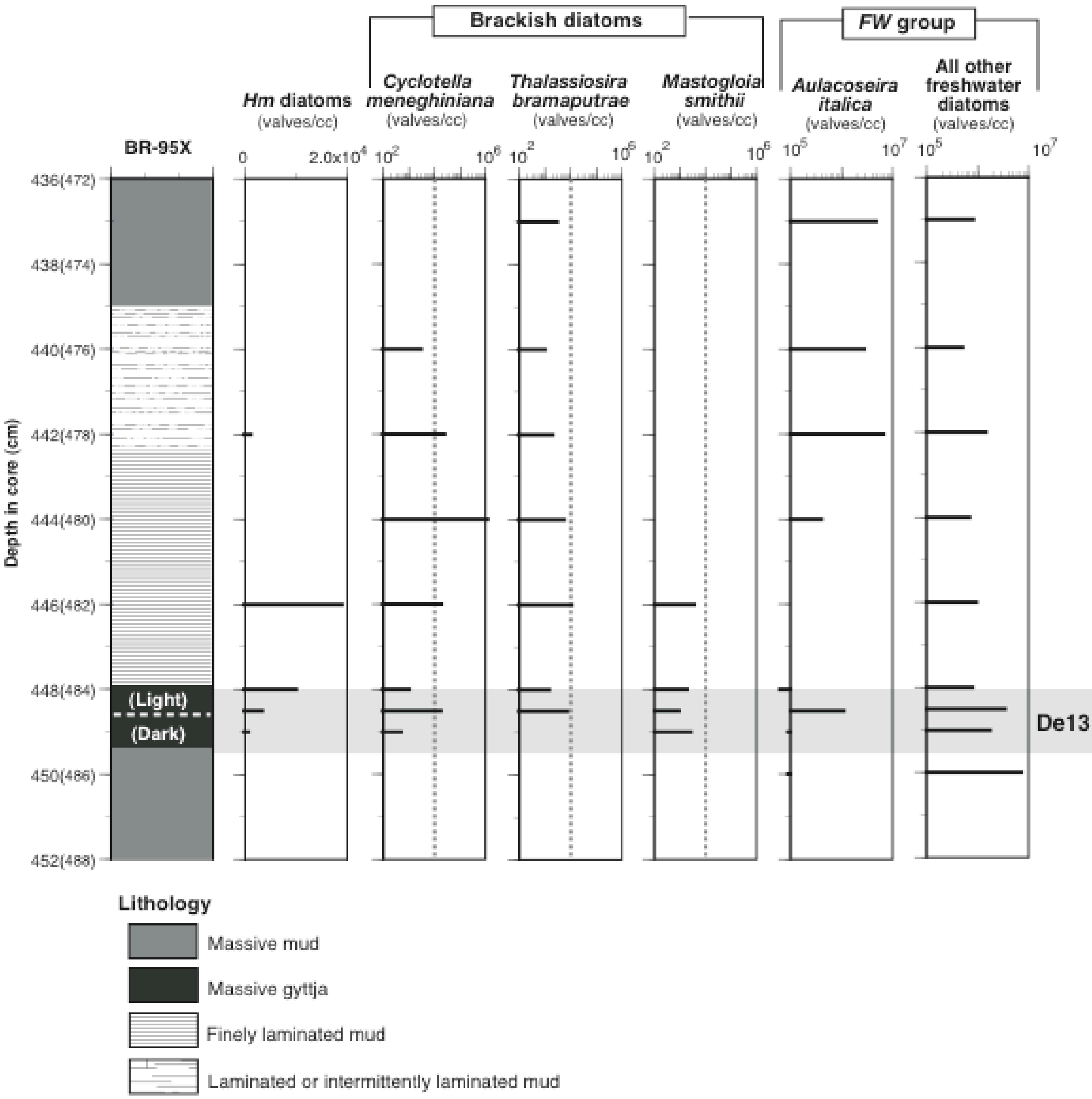

Figure 22. Stratigraphy and diatoms for De13. *Hm*: marine diatoms from Holocene surficial deposits. *FW*: benthic and planktonic freshwater diatoms. Note the logarithmic scales for the brackish and freshwater diatom data. Vertical dashed lines for brackish diatoms show boundary between "background" levels and possible blooms of these taxa. Data are from core BR-95X. Numbers in parentheses represent comparable depths for core 94E.

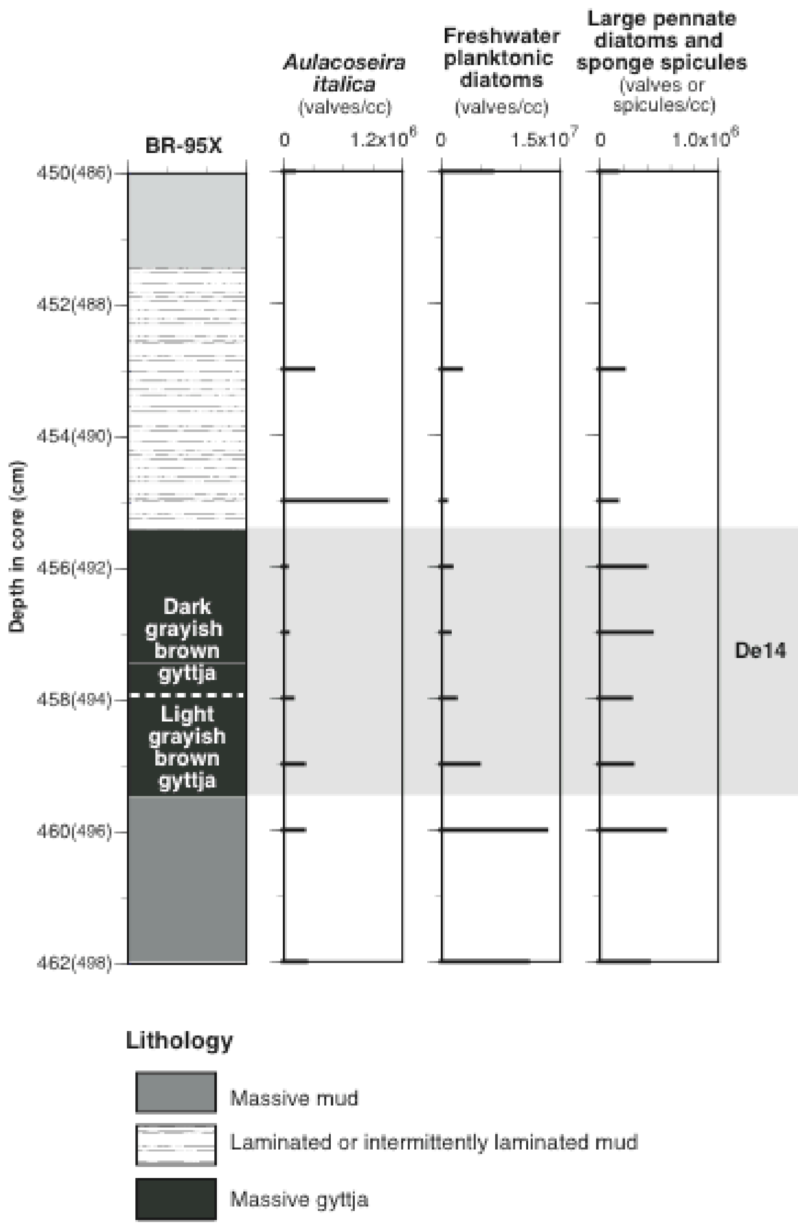

Figure 23. Stratigraphy and freshwater diatoms for De14. Data are from core BR-95X. Numbers in parentheses represent comparable depths for core 94E.

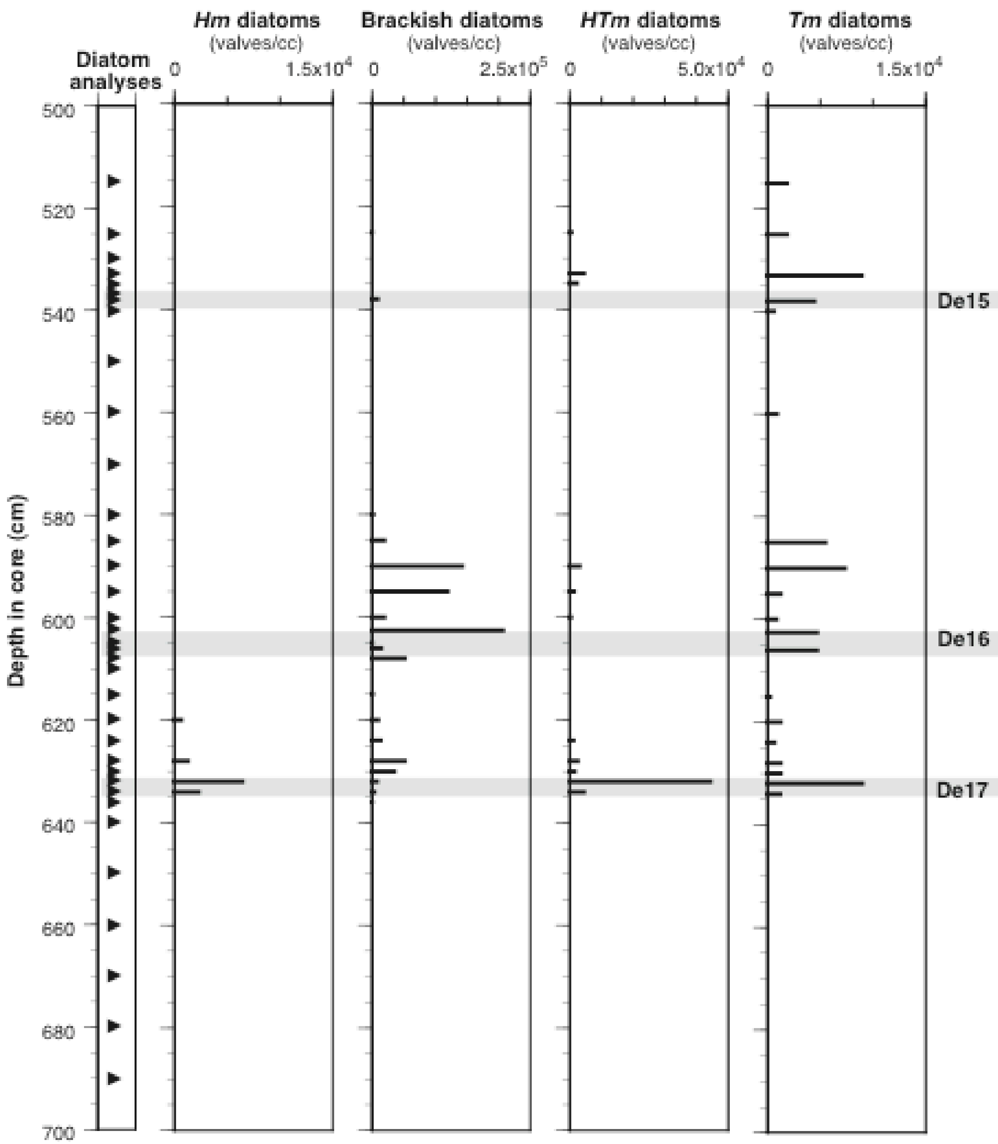

Figure 24. Concentrations of marine and brackish diatoms for De15, De16 and De17. *Hm*: marine diatoms from Holocene surficial deposits. *HTm*: extant marine diatoms from Holocene surficial deposits or Tertiary diatomites. *Tm*: extinct marine diatoms from Tertiary diatomites. Data are from core BR-94E.

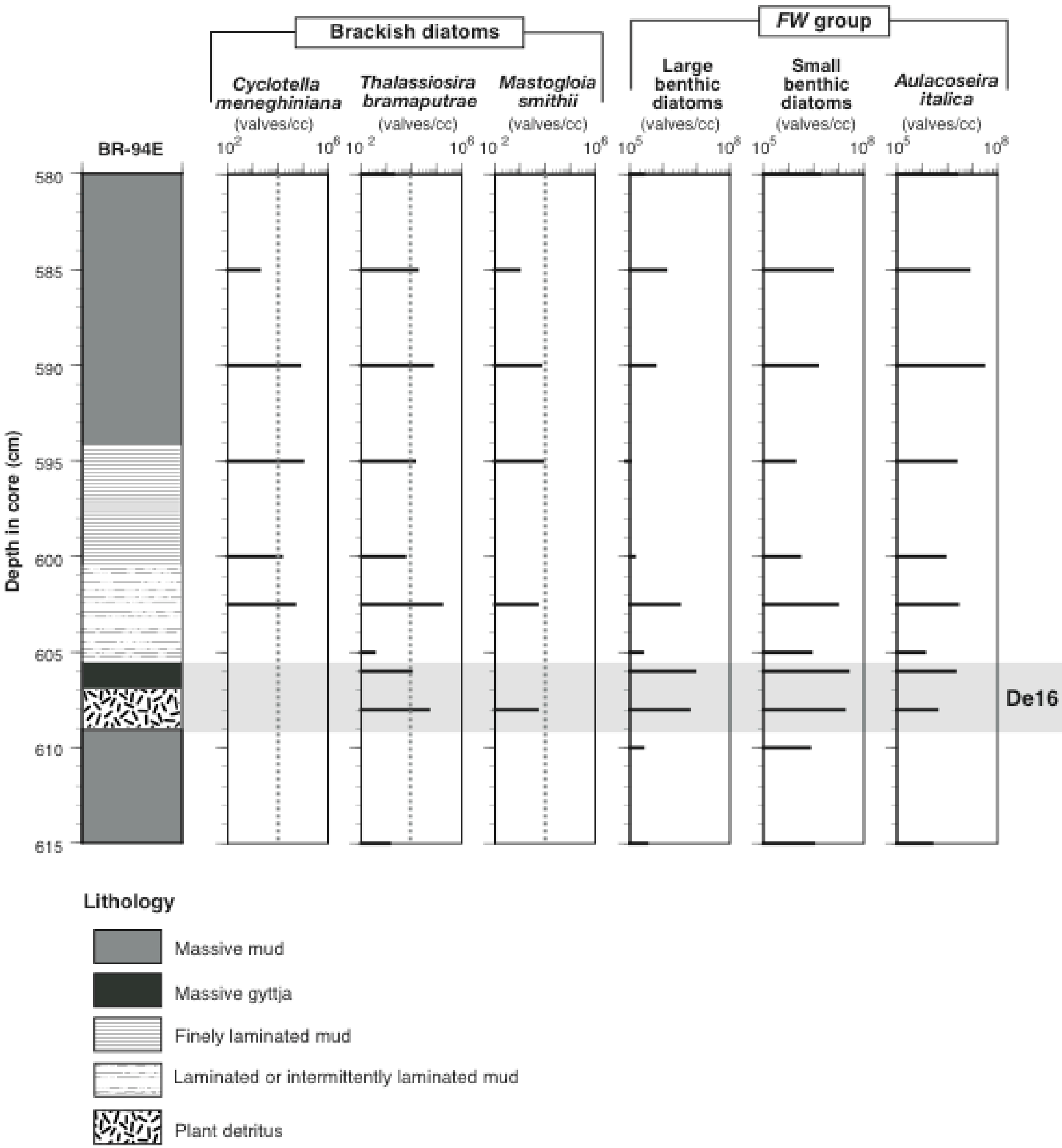

Figure 25. Stratigraphy and diatoms for De16. *FW*: benthic and planktonic freshwater diatoms. Vertical dashed lines show boundary between "background" levels and possible blooms of these taxa. Data are from core BR-94E.

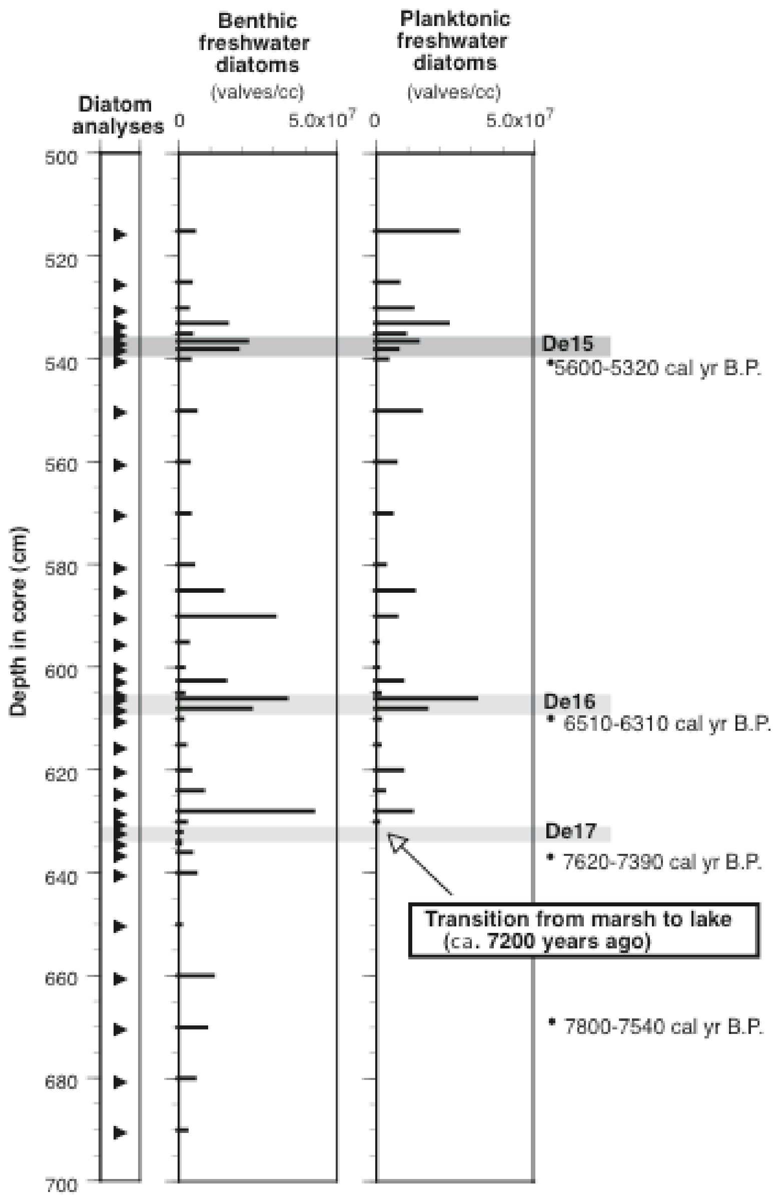

Figure 26. Concentrations of freshwater diatoms and ages (Nelson et al., 1998) for De15, De16 and De17. The appearance of planktonic diatoms ca. 7200 years ago records a transition from marshy wetland to lake. Data are from core BR-94E.

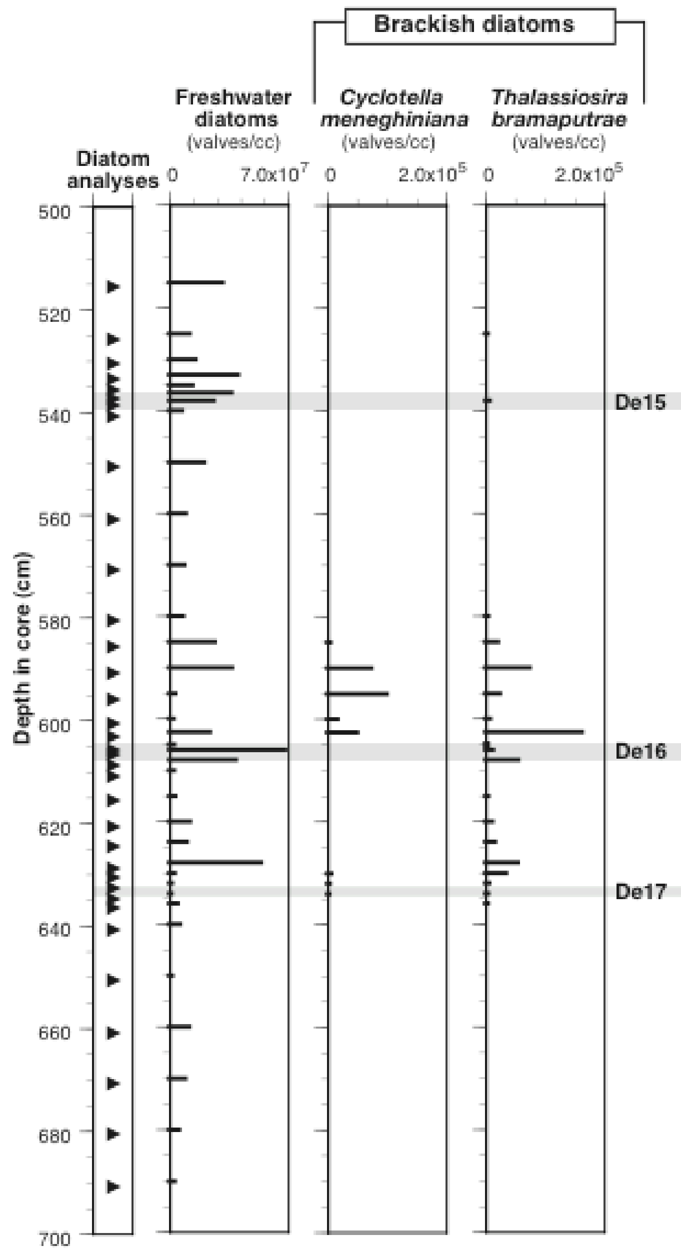

Figure 27. Concentrations of freshwater and brackish diatoms for De15, De16, and De17. Data are from core BR-94E.

APPENDIX 1: METHOD FOR PREPARING QUANTITATIVE DIATOM SLIDES

I. Overview

Quantitative diatom analyses are required for documenting both spatial and temporal, absolute changes in diatom assemblages. Unlike qualitative microfossil-counting methods which unavoidably include inherent internal biases (i.e, "relative abundances"), quantitative analyses allow direct comparison of changes in species composition from sample to sample, since occurrences are measured relative to a standard, e.g., sediment volume.

Here we describe the diatom sample-processing technique we used at the USGS Western Coastal and Marine Geology Micropaleontology Laboratory. Our method is based on the methods described by Battarbee (1973) for diatoms and Moore (1973) and Roelofs and Pisias (1986) for radiolarians. The goal of the technique is to achieve a random distribution of a known volume of sediment by settling the material through a well-mixed fluid column onto glass cover slips in a settling chamber. The common practice of preparing strewn slides by transferring an aliquot of sediment and water directly onto a glass cover slip is known to distribute diatoms non-randomly (Battarbee, 1973), because the surface tension of the drying water may concentrate particles in the center of the cover glass. The result of this uneven distribution is that absolute numbers of diatoms cannot be determined unless the entire sample is scanned. However, when a sample is randomly and evenly distributed, a portion of the sample can be used to represent the entire sample (Roelofs and Pisias, 1986).

The diatom slide preparation consists of three parts: 1) chemical treatment; 2) sediment dispersal; and 3) cover-glass mounting. During chemical treatment, the sample is gently disaggregated and cleaned of organic matter. The sediment is then evenly dispersed on cover slips in a settling chamber. Finally, the cover slips are permanently fixed to glass slides for viewing with a light microscope.

II. Procedure

A. Chemical treatment

Materials needed:

1. Distilled water
2. 1-3 cc of sample
3. 100 ml Pyrex beaker
4. 50 ml graduated centrifuge tube

5. 10 ml of 30% Hydrogen Peroxide per sample
6. 5-10 ml of 30% Hydrochloric Acid per sample
7. pH test paper

Step A1. Place about 2cc of sample into a 100 ml beaker with 10 ml of distilled water. Allow the sample to disaggregate a few minutes. Make sure that the beakers are spaced at least 5 cm apart and add 10ml of hydrogen peroxide to the samples. The samples may react rapidly in the first 10 minutes, but can be squirted with deionized water to prevent splattering or boiling over. Allow the reactions to proceed for at least two hours.

Step A2. Place the beakers on a hot plate on low temperature (70° C) and allow the reaction to continue for an additional hour. If the samples are organic-rich, the sample may begin reacting strongly with the addition of heat, so it is important to watch the samples carefully during approximately the first 20 minutes of this step. If the samples begin to react violently or boil over, add more distilled water, and reduce the temperature of the hot plate.

Step A3. Once the reaction has ceased and all organic matter has been oxidized, add three drops of 30% hydrochloric acid (HCl) to rid the sample of any calcium carbonate. How vigorous the sample reacts to the acid will depend on how much carbonate is present in the sample. Watch the reaction for several minutes, and as it slows, add more acid at a rate of about two drops per minute until the initial, violent reaction has ceased. When the reaction has slowed to the point at which there is no danger of boiling over, add an additional 2 ml of HCl and allow the reaction to continue for about 20 minutes.

Step A4. Remove the beakers from the hot plate and allow to cool. Using a water bottle filled with distilled water, rinse the sample into a 50 ml graduated centrifuge tube, and add enough water to fill the tube to 45 ml. Centrifuge at 800 RPM for 10 minutes.

Step A5. Decant the supernatant, refill the tube with distilled water, mix thoroughly, and centrifuge again. Rinse until the supernatant is neutral, as determined with pH test paper.

B. Sediment dispersal

Materials needed:

1. 22x30mm cover glass (two per sample)
2. 250ml beakers (one per sample)
3. 5cm diameter glass disk
4. rubber cement

5. Knots gelatin powder (optional) (1 g powder dissolved in 20 cc distilled water)
6. small spatula
7. mechanical pipette and disposable tips
8. capillary tubes, thin plastic tubing and vacuum system

Step B1. Mount two cover glasses to a 5cm glass disk with rubber cement and allow to dry for 30 minutes.

Step B2. (Optional)[5] Prepare a gelatin solution by dissolving 1 g of Knot's gelatin powder in 20 cc distilled water. Place one drop of gelatin solution on the cover glass and distribute it evenly across the cover with a small spatula, keeping the coating as thin as possible. The gelatin will obscure optics if applied too thickly. If any small bumps form as the gelatin is drying, smooth them out with a small spatula. Place a small dot in the corner of one of the cover glasses with a permanent-ink marking pen to identify the gelatin-coated slide from the plain slide (our standard procedure is to mark the gelatin-coated slide).

Step B3. Attach a hose with an inner diameter of about 1.5 mm to a capillary tube and tape it to the inside wall of the 250 ml beaker. The tip of the capillary tube should be one centimeter from the bottom of the beaker. Pour 50 ml distilled water into the beaker and submerge the glass disk with the cover glasses facing up.

Step B4. Centrifuge down a cleaned pH-neutral sample and adjust the ratio of water to compacted sediment to 10:1. Place the centrifuge tube in a stand and suspend the sample by stirring.

Step B5. With a mechanical pipette, draw a 40-60 µl aliquot while continuing to stir the mixture. The volume of the aliquot will depend on the material being used[6], but our experience shows that 40 µl is usually adequate. Transfer the aliquot to the 250 ml beaker.

Step B6. Suspend the sample in the beaker by adding an additional 200 ml of distilled water with a spray nozzle or squirt bottle. Allow the sediment to settle undisturbed eight to twelve hours.

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[5] This gelatin-coating step is optional, but we have found that it is useful for preventing sediment from clumping on the cover slips, particularly in clay-rich material. The gelatin does, however, obscure the optics of the slide somewhat, which is a problem for photomicroscopy.

[6] The amount of sediment on the cover slips will be the same from sample to sample as long as one uses the same sediment-to-water ratio, aliquot volume, beaker diameter, and cover slip size. For example, our samples from Bradley Lake contain abundant diatoms (usually > 10^5 diatoms/cc), and we have had excellent results dispersing a 40 µl aliquot in a 250 ml beaker (settling chamber). Using a 40 µl aliquot, each slide (using a 22 mm x 30 mm cover slip) will contain 8 x 10^{-4} of cleaned sediment.

Step B7. After the sediment has settled, use a vacuum bottle to slowly draw down the water to a level 1 cm above the cover glass. Be careful not to disturb the sample, and allow the remaining water to evaporate. We recommend allowing the samples to air dry in a fume hood as this reduces the likelihood that the sediment particles will clump together on the cover glass. If heat lamps are used to speed up the evaporation process, keep them at least 20 cm above the beakers so that convection currents do not form to disturb the samples.

C. Cover-slip mounting

Materials needed:

1. 3" x 1" plain glass microscope slide
2. Mounting medium like Hyrax or Naphrax with refractive index of 1.74.
3. 200 ml Hydrogen Peroxide (30%)

Step C1. Preclean microscope slides by placing them in 30 percent hydrogen peroxide for about a day, rinse thoroughly in deionized water and allow to dry. We find that this preliminary step improves the optics for the slides, even for those that are chemically pretreated at the factory.

Step C2. Place a small drop of mounting medium on the center of the cleaned microscope slide. Place the cover glass, sediment side down, on the drop of mounting medium. Place the slide on a cool hotplate, and slowly increase the temperature to about 65-75° C. The mounting medium will lose viscosity, and then bubbles will form as solvents are released. The process is complete when bubbles no longer form (about two minutes), and upon cooling the mounting medium will harden to permanently affix the cover slip to the slide.

Note: It is not advisable to heat the slide too rapidly or at too high of a temperature, as the mounting medium will discolor and become brittle. As an easy test, the temperature is too high if water sizzles on the hotplate. If done properly, the mounting medium should be a light straw color when dried, should not be brittle or crack easily, and should provide an archive-quality slide that could be stored for many years.

Step C3. The slides can be labeled either with printed adhesive paper labels or with a permanent-marker pen.

Appendix 2. Core samples analyzed for diatoms.

Sample ID	Depth in composite core (cm)	Lithology	Disturbance event (De)
BR94E-15	15	Massive mud	
BR94E-20	20	Plant detritus bed	
BR94E-25	25	Massive mud	
BR94E-30	30	Black organic ooze	"Black soupy"
BR94E-35	35	Massive mud	
BR94E-40	40	Massive mud	
BR94E-45	45	Massive mud	
BR94E-48	48	Massive mud	
BR94E-50	50	Massive mud	
BR94E-52	52	Black organic ooze	De1
BR94E-54	54	Massive gyttja	De1
BR94E-56	56	Massive gyttja	De1
BR94E-58	58	Massive gyttja	De1
BR94E-60	60	Plant detritus bed	De1
BR94E-62	62	Massive mud	
BR94E-64	64	Massive mud	
BR94E-66	66	Massive mud	
BR94E-70	70	Massive mud	
BR94E-75	75	Massive mud	
BR94E-80	80	Massive mud	
BR94E-85	85	Massive mud	
BR94F-90	90	Intermittently laminated mud	
BR94F-95	95	Intermittently laminated mud	
BR94F-98	98	Finely laminated mud	
BR94F-100	100	Massive gyttja	De2
BR94E-102	102	Massive gyttja	De2
BR94E-104	104	Massive gyttja	De2
BR94E-106	106	Massive gyttja	De2
BR94E-111	111	Massive gyttja	De2
BR94E-112	112	Massive gyttja	De2
BR94E-113	113	Sand or sandy mud	De2
BR94E-114	114	Massive mud	
BR94E-116	116	Laminated mud	
BR94E-118	118	Laminated mud	
BR94E-120	119.5	Laminated mud	
BR94E-122	122	Massive gyttja	De3
BR94E-130	130	Laminated mud	
BR94E-135	135	Laminated mud	
BR94E-140	140	Laminated mud	
BR94E-145	145	Laminated mud	

Appendix 2. Core samples analyzed for diatoms.

Sample ID	Depth in composite core (cm)	Lithology	Disturbance event (De)
BR94E-150	150	Laminated mud	
BR94E-154	154	Finely laminated mud	
BR94E-155	155	Massive gyttja	De4
BR94E-157	157	Massive gyttja	De4
BR94E-159	158.5	Massive gyttja	De4
BR94E-160	160	Massive gyttja	De4
BR94E-162	162	Massive mud	
BR94E-165	165	Massive mud	
BR94E-170	170	Massive mud	
BR94E-175	175	Intermittently laminated mud	
BR94E-180	180	Intermittently laminated mud	
BR94E-184	184	Finely laminated mud	
BR94E-186	186	Finely laminated mud	
BR94E-188	188	Massive gyttja	De5
BR94E-190	190	Massive gyttja	De5
BR94E-192	192	Massive gyttja	De5
BR94E-194	194	Sandy mud	De5
BR94E-196	196	Sandy mud	De5
BR94E-198	198	Massive mud	De5
BR94E-200	200	Muddy sand	De5
BR94E-201	201	Massive gyttja	De6
BR94E-203	203	Massive gyttja	De6
BR94E-205	205	Medium-fine sand	De6
BR94E-207	207	Medium-fine sand	De6
BR94E-210	210	Massive mud	
BR94E-215	215	Laminated mud	
BR94E-220	220	Laminated mud	
BR94E-222	222	Laminated mud	
BR94E-225	225	Laminated mud	
BR94E-230	230	Massive mud	
BR94E-235	235	Laminated mud	
BR94E-240	240	Laminated mud	
BR94E-245	245	Laminated mud	
BR94E-250	250	Laminated mud	
BR94E-255	255	Laminated mud	
BR94E-260	260	Laminated mud	
BR94E-265	265	Laminated mud	
BR94E-270	270	Laminated mud	
BR94E-275	275	Laminated mud	
BR94E-280	280	Laminated mud	

Appendix 2. Core samples analyzed for diatoms.

Sample ID	Depth in composite core (cm)	Lithology	Disturbance event (De)
BR94E-285	285	Laminated mud	
BR94E-290	290	Laminated mud	
BR94E-292	292	Laminated mud	
BR94E-294	294	Laminated mud	
BR94E-296	296	Finely laminated mud	
BR94E-298	298	Massive gyttja	De7
BR94E-300	300	Massive gyttja	De7
BR94E-301	301	Massive gyttja	De7
BR94E-302	302	Sand or sandy mud	De7
BR94E-304	304	Massive mud	
BR94E-306	306	Laminated mud	
BR94E-310	310	Massive mud	
BR94E-315	315	Laminated mud	
BR94E-320	320	Intermittently laminated mud	
BR94E-324	324	Intermittently laminated mud	
BR94E-326	326	Laminated mud	
BR94E-328	328	Finely laminated mud	
BR94E-330	330	Finely laminated mud	
BR94E-332	332	Massive gyttja	De8
BR94E-334	334	Massive gyttja	De8
BR94E-335	335	Sand or sandy mud	De8
BR94E-338	338	Sand or sandy mud	De8
BR94E-340	340	Intermittently laminated mud	
BR94E-344	344	Intermittently laminated mud	
BR94E-350	350	Laminated mud	
BR95BB-268	360	Massive mud	
BR95BB-270	362	Massive mud	
BR95BB-271	363	Finely laminated mud	
BR95BB-272	364	Massive gyttja	De9
BR95BB-273	365	Massive gyttja	De9
BR95BB-274	366	Massive gyttja	De9
BR95BB-276	368	Massive gyttja	De9
BR95BB-280	372	Laminated mud	
BR95BB-290	382	Laminated mud	
BR95BB-295	387	Laminated mud	
BR95BB-301	393	Massive mud	
BR95BB-302	394	Finely laminated mud	
BR95BB-303	395	Massive gyttja	
BR95BB-304	396	Finely laminated mud	
BR95BB-305	397	Massive gyttja	De10

Appendix 2. Core samples analyzed for diatoms.

Sample ID	Depth in composite core (cm)	Lithology	Disturbance event (De)
BR95BB-306	398	Massive gyttja	De10
BR95BB-308	400	Massive gyttja	De10
BR95BB-310	402	Intermittently laminated mud	
BR95BB-315	407	Massive mud	
BR95BB-320	412	Massive mud	
BR94E-430	430	Intermittently laminated mud	
BR94E-433	433	Finely laminated mud	
BR94E-435	435	Massive gyttja	De11
BR94E-437	436.5	Massive gyttja	De11
BR94E-438	437.5	Massive gyttja	De11
BR94E-439	438.5	Plant detritus bed	De11
BR94E-440	440	Massive mud	
BR94E-445	445	Massive mud	
BR94E-450	450	Laminated mud	
BR94E-454	454	Intermittently laminated mud	
BR94E-458	458	Laminated mud	
BR94E-460	460	Finely laminated mud	
BR94E-462	462	Massive gyttja	De12
BR94E-464	464	Massive gyttja	De12
BR94E-466	466	Sand or sandy mud	De12
BR94E-470	470	Massive mud	
BR95X-437	473	Massive mud	
BR95X-440	476	Laminated mud	
BR95X-442	478	Laminated mud	
BR95X-444	480	Finely laminated mud	
BR95X-446	482	Finely laminated mud	
BR95X-448	484	Finely laminated mud	
BR95X-449	484.5	Massive gyttja	De13
BR95X-449	485	Massive gyttja	De13
BR95X-450	486	Massive mud	
BR95X-453	489	Intermittently laminated mud	
BR95X-455	491	Intermittently laminated mud	
BR95X-456	492	Massive gyttja	De14
BR95X-457	493	Massive gyttja	De14
BR95X-458	494	Massive gyttja	De14
BR95X-459	495	Massive gyttja	De14
BR95X-460	496	Massive mud	
BR95X-462	498	Massive mud	
BR94E-515	515	Massive mud	
BR94E-525	525	Laminated mud	

Appendix 2. Core samples analyzed for diatoms.

Sample ID	Depth in composite core (cm)	Lithology	Disturbance event (De)
BR94E-530	530	Laminated mud	
BR94E-533	533	Laminated mud	
BR94E-535	535	Laminated mud	
BR94E-537	536.5	Massive gyttja	De15
BR94E-538	538	Massive gyttja	De15
BR94E-540	540	Plant detritus bed	De15
BR94E-550	550	Laminated mud	
BR94E-560	560	Intermittently laminated mud	
BR94E-570	570	Intermittently laminated mud	
BR94E-580	580	Intermittently laminated mud	
BR94E-585	585	Massive mud	
BR94E-590	590	Massive mud	
BR94E-595	595	Finely laminated mud	
BR94E-600	600	Finely laminated mud	
BR94E-603	602.5	Intermittently laminated mud	
BR94E-605	605	Intermittently laminated mud	
BR94E-607	607	Massive gyttja	De16
BR94E-608	608	Plant detritus bed	De16
BR94E-610	610	Massive mud	
BR94E-615	615	Massive mud	
BR94E-620	620	Massive mud	
BR94E-624	624	Massive mud	
BR94E-628	628	Finely laminated mud (very faint)	
BR94E-630	630	Finely laminated mud (very faint)	
BR94E-632	632	Finely laminated mud (very faint)	
BR94E-634	634	Sand or sandy mud	De17
BR94E-636	636	Massive mud	
BR94E-640	640	Muddy peat	
BR94E-650	650	Muddy peat	
BR94E-660	660	Muddy peat	
BR94E-670	670	Muddy peat	
BR94E-680	680	Muddy peat	
BR94E-690	690	Muddy peat	

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Disturbance event**	**Hm group** (marine diatoms found in Holocene suficial deposits)	**HTm group** (marine diatoms found in Holocene deposits or Neogene diatomites)	**Tm group** (marine diatoms found in Neogene diatomites)	Total **Brackish group**	*Thalassiosira bramaputrae*	*Mastogloia smithii*	*Cyclotella meneghiniana*	Misc. euryhaline diatoms
15	BR94E-15			6.4E+02	1.3E+03	6.4E+03			6.4E+03	
20	BR94E-20									
25	BR94E-25				6.4E+02	1.3E+03	1.3E+03			
30	BR94E-30	"BS"				9.5E+03	4.7E+03		4.7E+03	
35	BR94E-35			1.3E+03	1.9E+03					
40	BR94E-40		1.6E+03	6.4E+02	4.8E+03	6.4E+02	6.4E+02			
45	BR94E-45			6.4E+02	2.6E+03					
48	BR94E-48		2.6E+03	1.3E+03	5.2E+03					
50	BR94E-50		1.9E+03	3.9E+03	5.8E+03					
52	BR94E-52	De1			1.3E+03					
54	BR94E-54	De1			1.6E+03					
56	BR94E-56	De1								
58	BR94E-58	De1								
60	BR94E-60	De1								
62	BR94E-62				6.4E+02					
64	BR94E-64				1.3E+03					
66	BR94E-66				1.3E+03					
70	BR94E-70			1.3E+03	2.6E+03					
75	BR94E-75									
80	BR94E-80		6.4E+02	6.4E+02	6.4E+02					
85	BR94E-85			1.3E+03	1.3E+03					
90	BR94F-90			4.6E+02		2.3E+02			2.3E+02	
95	BR94F-95									
98	BR94F-98				2.3E+02					
100	BR94F-100	De2	2.3E+02	2.6E+03	5.3E+03	4.6E+02	2.3E+02	2.3E+02		
102	BR94E-102	De2	3.2E+03	4.5E+03	1.9E+04	1.9E+03	1.9E+03			
104	BR94E-104	De2	9.7E+03	6.4E+03	1.3E+04	1.3E+03	1.3E+03			
106	BR94E-106	De2	4.5E+03	1.4E+04	2.4E+04					
111	BR94E-111	De2	6.4E+02	3.5E+03	4.5E+03					
112	BR94E-112	De2	1.6E+02	3.2E+02	6.4E+02					
113	BR94E-113	De2	8.1E+01	2.8E+02	5.6E+02					
114	BR94E-114				1.8E+03					
116	BR94E-116			4.3E+02	8.6E+02					
118	BR94E-118			6.4E+02	9.7E+02					
120	BR94E-120				3.9E+03					
122	BR94E-122	De3		2.6E+03	2.6E+03					
130	BR94E-130					6.4E+02	6.4E+02			
135	BR94E-135				1.3E+03					
140	BR94E-140									
145	BR94E-145			1.3E+03	6.4E+02					
150	BR94E-150		1.3E+03	9.7E+02	3.2E+03	6.4E+02	6.4E+02			
154	BR94E-154		3.2E+02	1.1E+03	1.9E+03	9.7E+02	9.7E+02			
155	BR94E-155	De4	1.3E+03	2.9E+03	1.5E+04	1.7E+03	8.6E+02	8.6E+02		

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Disturbance event**	**Hm group** (marine diatoms found in Holocene suficial deposits)	**HTm group** (marine diatoms found in Holocene deposits or Neogene diatomites)	**Tm group** (marine diatoms found in Neogene diatomites)	Total **Brackish group**	*Thalassiosira bramaputrae*	*Mastogloia smithii*	*Cyclotella meneghiniana*	Misc. euryhaline diatoms
157	BR94E-157	De4		1.3E+03		1.9E+03	1.9E+03			
158.5	BR94E-159	De4		8.1E+02	2.6E+03	6.5E+02	6.5E+02			
160	BR94E-160	De4		1.6E+03	7.1E+03	3.4E+03	2.6E+03	8.6E+02		
162	BR94E-162				6.5E+03	9.7E+02	9.7E+02			
165	BR94E-165			1.9E+03	7.7E+03					
170	BR94E-170			3.2E+02	3.9E+03	1.3E+03	8.6E+02			4.3E+02
175	BR94E-175				2.6E+03	2.6E+03	2.6E+03			
180	BR94E-180		1.3E+03		2.6E+03	8.6E+03	6.9E+03			1.7E+03
184	BR94E-184		6.4E+02	3.5E+03	7.4E+03	4.0E+04	3.4E+04		6.0E+03	
186	BR94E-186		5.9E+03	7.8E+03	3.4E+03	1.3E+05	2.1E+04	5.3E+04	5.3E+04	2.3E+03
188	BR94E-188	De5	4.0E+03	7.2E+03	1.9E+03	1.3E+04	3.4E+03	8.6E+03		6.4E+02
190	BR94E-190	De5	2.6E+03	9.3E+03	5.2E+03	1.3E+04	7.7E+03	4.3E+03		8.6E+02
192	BR94E-192	De5	2.4E+03	9.0E+03	3.0E+03	2.7E+04	1.7E+04	9.2E+03		2.9E+02
194	BR94E-194	De5	1.0E+03	4.3E+03	3.9E+03	1.2E+04	7.2E+03	4.1E+03		6.9E+02
196	BR94E-196	De5	1.3E+03	4.0E+03	2.3E+03	1.7E+04	8.2E+03	7.7E+03		6.4E+02
198	BR94E-198	De5		2.6E+02	5.2E+02	1.3E+04	1.0E+04	2.7E+03		1.7E+02
200	BR94E-200	De5	2.6E+02	6.4E+02	2.1E+03	1.9E+04	1.2E+04	5.5E+03		1.2E+03
201	BR94E-201	De6	9.2E+02		4.6E+02	1.2E+04	9.9E+03	2.1E+03		4.3E+02
203	BR94E-203	De6	9.2E+02	9.2E+02	4.6E+02	2.1E+04	1.9E+04	1.7E+03		
205	BR94E-205	De6	1.1E+03	2.8E+03	1.5E+03	1.1E+04	6.5E+03	4.8E+03		
207	BR94E-207	De6	1.2E+03	8.4E+02	5.4E+02	8.2E+03	4.4E+03	3.7E+03		
210	BR94E-210				3.2E+02	8.6E+03	6.0E+03	2.6E+03		
215	BR94E-215									
220	BR94E-220									
222	BR94E-222				2.6E+03					
225	BR94E-225									
230	BR94E-230				2.6E+03					
235	BR94E-235				2.6E+03					
240	BR94E-240				2.6E+03					
245	BR94E-245				2.6E+03					
250	BR94E-250			3.2E+02	3.2E+03					
255	BR94E-255									
260	BR94E-260									
265	BR94E-265									
270	BR94E-270			2.1E+02	3.0E+03					
275	BR94E-275				1.9E+03	6.4E+02				6.4E+02
280	BR94E-280				6.4E+02					
285	BR94E-285			3.2E+02	4.5E+03					
290	BR94E-290									
292	BR94E-292			1.9E+03	5.8E+03	3.2E+02				3.2E+02
294	BR94E-294		6.4E+02	1.9E+03	5.8E+03					
296	BR94E-296			2.4E+02	4.0E+02	1.6E+02	1.6E+02			
298	BR94E-298	De7	6.1E+03	2.6E+03	7.7E+03	3.2E+03	2.6E+03	6.4E+02		

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Disturbance event**	**Hm group** (marine diatoms found in Holocene suficial deposits)	**HTm group** (marine diatoms found in Holocene deposits or Neogene diatomites)	**Tm group** (marine diatoms found in Neogene diatomites)	Total **Brackish group**	*Thalassiosira bramaputrae*	*Mastogloia smithii*	*Cyclotella meneghiniana*	Misc. euryhaline diatoms
300	BR94E-300	De7	1.3E+03	3.9E+02	6.4E+02	1.3E+03	5.2E+02			7.7E+02
301	BR94E-301	De7	2.1E+03	2.1E+03	3.4E+03	3.4E+03	2.1E+03	4.3E+02		8.6E+02
302	BR94E-302	De7	1.3E+03	1.5E+03	4.3E+02					
304	BR94E-304				6.4E+02					
306	BR94E-306			6.4E+02	2.6E+03					
310	BR94E-310			2.9E+03	3.9E+03	1.3E+03	1.3E+03			
315	BR94E-315				2.3E+03	3.2E+02	3.2E+02			
320	BR94E-320				1.9E+03					
324	BR94E-324			1.3E+03	1.3E+03					
326	BR94E-326		6.4E+02	9.7E+02	1.3E+03	8.4E+03	6.4E+03			1.9E+03
328	BR94E-328			2.9E+03	2.6E+03	5.6E+04	3.1E+04		2.3E+04	1.6E+03
330	BR94E-330		1.3E+03	4.0E+03	2.8E+03	2.9E+05	2.4E+04	1.6E+04	2.5E+05	6.4E+02
332	BR94E-332	De8	1.3E+03	1.9E+03	2.8E+03	2.0E+04	6.7E+03	1.0E+04		3.6E+03
334	BR94E-334	De8	7.1E+03	3.4E+03	4.3E+03	5.3E+03	3.9E+03	9.7E+02		4.8E+02
335	BR94E-335	De8	9.0E+03	2.4E+03	4.8E+03	2.9E+03	2.6E+03			3.2E+02
338	BR94E-338	De8	1.1E+02	1.1E+02	3.8E+02	5.4E+01	5.4E+01			
340	BR94E-340				1.7E+03	1.3E+03	1.3E+03			
344	BR94E-344			2.6E+02	4.6E+03	5.4E+03	5.4E+03			
350	BR94E-350				1.9E+03					
360	BR95BB-268			4.5E+02	3.6E+03	6.7E+03	6.7E+03			
362	BR95BB-270				9.0E+02	5.4E+03	5.4E+03			
363	BR95BB-271		9.0E+02	2.2E+03	4.0E+03	1.9E+04	1.9E+04		4.5E+02	
364	BR95BB-272	De9	6.7E+02	4.3E+03	1.1E+04	2.0E+03	1.8E+03			2.2E+02
365	BR95BB-273	De9		4.5E+02	2.2E+03					
366	BR95BB-274	De9			2.2E+03					
368	BR95BB-276	De9		4.5E+02	4.5E+02	4.5E+02	4.5E+02			
372	BR95BB-280				1.8E+03	4.5E+02			4.5E+02	
382	BR95BB-290			2.2E+02	4.5E+02					
387	BR95BB-295			4.5E+02	1.3E+03					
393	BR95BB-301			1.1E+03		4.5E+02		4.5E+02		
394	BR95BB-302				9.0E+02					
395	BR95BB-303				1.3E+03	4.5E+02			4.5E+02	
396	BR95BB-304				9.0E+02					
397	BR95BB-305	De10	4.5E+02	4.5E+02	1.3E+03	9.0E+02		4.5E+02	4.5E+02	
398	BR95BB-306	De10			4.5E+02	9.0E+02	4.5E+02	4.5E+02		
400	BR95BB-308	De10	4.5E+02	1.1E+03	2.7E+03	1.8E+03	1.3E+03	4.5E+02		
402	BR95BB-310			1.3E+03						
407	BR95BB-315				9.0E+02					
412	BR95BB-320			2.2E+02						
430	BR94E-430			2.3E+02	2.8E+03	6.0E+03	4.6E+03		1.4E+03	
433	BR94E-433		1.8E+03	1.6E+03	4.6E+02	3.2E+05	8.7E+03	3.1E+04	2.8E+05	4.6E+02
435	BR94E-435	De11	1.8E+03	1.4E+03	2.8E+03	3.7E+03	2.3E+03	4.6E+02	9.2E+02	
436.5	BR94E-437	De11			9.2E+02	9.2E+02	9.2E+02			

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Disturbance event**	**Hm group** (marine diatoms found in Holocene suficial deposits)	**HTm group** (marine diatoms found in Holocene deposits or Neogene diatomites)	**Tm group** (marine diatoms found in Neogene diatomites)	Total **Brackish group**	*Thalassiosira bramaputrae*	*Mastogloia smithii*	*Cyclotella meneghiniana*	Misc. euryhaline diatoms
437.5	BR94E-438	De11				6.7E+02	6.7E+02			
438.5	BR94E-439	De11			1.2E+03	1.2E+03	1.2E+03			
440	BR94E-440				9.2E+02					
445	BR94E-445				1.8E+03					
450	BR94E-450				8.3E+03	2.8E+03	2.8E+03			
454	BR94E-454			1.8E+03	5.5E+03	1.1E+05	3.4E+04	2.8E+03	6.9E+04	
458	BR94E-458			7.7E+02	1.5E+03	3.7E+03	3.4E+03		3.1E+02	
460	BR94E-460		1.2E+03	2.3E+02	2.3E+02	2.9E+04	2.3E+04	4.6E+03	2.3E+02	9.2E+02
462	BR94E-462	De12	1.1E+04	1.8E+03	5.5E+03	2.0E+04	9.7E+03		8.7E+03	1.4E+03
464	BR94E-464	De12	1.4E+04	2.6E+03	6.1E+02	7.4E+03	3.1E+03	3.1E+02	4.0E+03	
466	BR94E-466	De12	4.8E+03	7.5E+02	3.5E+02	6.0E+03	4.6E+02		5.4E+03	1.2E+02
470	BR94E-470				6.4E+02	6.4E+02	3.2E+02		3.2E+02	
473	BR95X-437				9.0E+02	2.7E+03	2.7E+03			
476	BR95X-440			4.5E+02	9.0E+02	3.6E+03	9.0E+02		2.7E+03	
478	BR95X-442		9.0E+02	4.5E+02	1.8E+03	2.3E+04	1.8E+03		2.2E+04	
480	BR95X-444		9.0E+02	1.3E+03	3.6E+03	1.1E+06	1.3E+03	3.6E+03	1.1E+06	
482	BR95X-446		1.9E+04	9.0E+02	9.0E+02	2.7E+04	8.1E+03	1.8E+03	1.6E+04	9.0E+02
484	BR95X-448		9.9E+03	3.6E+03	7.2E+03	2.2E+03	4.5E+02	9.0E+02	9.0E+02	
484.5	BR95X-449	De13	3.6E+03	3.8E+03	4.0E+03	2.3E+04	4.0E+03	2.7E+03	1.6E+04	4.5E+02
485	BR95X-449	De13	4.5E+02	4.5E+02	2.2E+02	4.5E+02			4.5E+02	
486	BR95X-450									
489	BR95X-453									
491	BR95X-455			4.5E+02		4.5E+02			4.5E+02	
492	BR95X-456	De14			3.1E+03					
493	BR95X-457	De14			4.5E+02					
494	BR95X-458	De14		2.2E+02		9.0E+02	4.5E+02	4.5E+02		
495	BR95X-459	De14		4.5E+02						
496	BR95X-460				4.5E+02					
498	BR95X-462			4.5E+02	3.6E+03	3.6E+03	2.7E+03			9.0E+02
515	BR94E-515				1.8E+03					
525	BR94E-525			6.1E+02	1.8E+03	6.1E+02		6.1E+02		
530	BR94E-530									
533	BR94E-533			4.5E+03	9.0E+03					
535	BR94E-535			2.3E+03						
536.5	BR94E-537	De15								
538	BR94E-538	De15			4.5E+03	4.5E+03		4.5E+03		
540	BR94E-540	De15			6.1E+02					
550	BR94E-550									
560	BR94E-560				9.2E+02					
570	BR94E-570									
580	BR94E-580					1.8E+03	1.8E+03			
585	BR94E-585				5.5E+03	1.9E+04	1.7E+04	9.2E+02	1.8E+03	
590	BR94E-590			3.2E+03	7.4E+03	1.4E+05	6.5E+04	6.4E+03	7.1E+04	

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Disturbance event**	**Hm group** (marine diatoms found in Holocene suficial deposits)	**HTm group** (marine diatoms found in Holocene deposits or Neogene diatomites)	**Tm group** (marine diatoms found in Neogene diatomites)	Total **Brackish group**	*Thalassiosira bramaputrae*	*Mastogloia smithii*	*Cyclotella meneghiniana*	Misc. euryhaline diatoms
595	BR94E-595			1.4E+03	1.3E+03	1.2E+05	1.3E+04	8.2E+03	9.6E+04	
600	BR94E-600			4.3E+02	8.6E+02	1.9E+04	5.2E+03		1.4E+04	
602.5	BR94E-603				4.7E+03	2.1E+05	1.6E+05	4.7E+03	4.7E+04	
605	BR94E-605					3.2E+02	3.2E+02			
606	BR94E-607	De16			4.7E+03	9.4E+03	9.4E+03			
608	BR94E-608	De16				5.2E+04	4.7E+04	4.7E+03		
610	BR94E-610									
615	BR94E-615				2.6E+02	1.3E+03	1.3E+03			
620	BR94E-620		6.4E+02		1.3E+03	9.0E+03	7.7E+03	1.3E+03		
624	BR94E-624			1.3E+03	6.4E+02	1.4E+04	1.2E+04	1.3E+03		
628	BR94E-628		1.3E+03	2.6E+03	1.3E+03	5.2E+04	5.2E+04			
630	BR94E-630			1.6E+03	1.3E+03	3.5E+04	2.6E+04	5.5E+03	2.9E+03	4.8E+02
632	BR94E-632		6.4E+03	4.5E+04	9.0E+03	3.9E+03	2.1E+03	1.5E+03	2.6E+02	4.1E+03
634	BR94E-634	De17	2.3E+03	4.6E+03	1.2E+03	2.0E+03	9.2E+02	1.0E+03	9.2E+01	1.6E+03
636	BR94E-636					6.4E+02	6.4E+02			
640	BR94E-640									
650	BR94E-650									
660	BR94E-660									
670	BR94E-670									
680	BR94E-680									
690	BR94E-690									

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Freshwater diatoms**	*Aulacoseira italica*	*Aulacoseira* sp. 1 (small valves)	*Cyclotella* cf. *stelligera*	Miscellaneous large pennates	Miscellaneous small pennates	*Tabellaria* spp.	Total freshwater diatoms
15	BR94E-15		2.2E+05	1.3E+05	1.5E+05	6.4E+04	7.9E+05	9.0E+04	1.4E+06
20	BR94E-20			4.1E+06	6.4E+04	2.8E+05	1.5E+06	4.4E+05	6.4E+06
25	BR94E-25		7.7E+04	1.5E+06		3.4E+05	2.7E+06	1.4E+06	6.1E+06
30	BR94E-30		1.5E+06	4.3E+04	4.3E+03	3.9E+04	1.6E+05	3.4E+04	1.7E+06
35	BR94E-35		5.2E+04	1.3E+05		2.6E+05	5.2E+05	1.9E+05	1.1E+06
40	BR94E-40		2.7E+05			3.6E+05	1.0E+06	2.6E+05	1.9E+06
45	BR94E-45		1.4E+05	1.3E+05		4.4E+05	2.4E+06	4.0E+05	3.5E+06
48	BR94E-48		2.4E+05	9.0E+05		6.6E+05	3.5E+06	1.0E+06	6.3E+06
50	BR94E-50		1.0E+05	3.2E+06		5.3E+05	3.3E+06	1.0E+06	8.2E+06
52	BR94E-52		6.4E+03	6.4E+04	1.0E+06	3.8E+05	1.0E+06	3.2E+04	2.5E+06
54	BR94E-54		3.2E+05		3.9E+05	1.6E+06	1.4E+06	5.2E+04	3.8E+06
56	BR94E-56		5.4E+05	5.2E+05	3.6E+06	1.5E+06	5.8E+06	3.9E+05	1.2E+07
58	BR94E-58		1.0E+05		2.1E+06	2.2E+05	9.9E+05	6.4E+04	3.4E+06
60	BR94E-60		1.9E+05	1.3E+04	2.7E+06	3.0E+05	1.8E+06	1.3E+05	5.1E+06
62	BR94E-62		5.2E+04	1.3E+05	3.7E+06	1.3E+05	1.1E+06	7.7E+04	5.2E+06
64	BR94E-64		1.5E+05	1.3E+07	2.1E+06	5.9E+05	7.1E+06	1.7E+06	2.5E+07
66	BR94E-66		7.5E+05	2.6E+05	4.9E+06	1.0E+06	6.6E+06	1.5E+06	1.5E+07
70	BR94E-70		1.4E+06	5.2E+05	1.0E+05	1.5E+06	6.9E+06	1.1E+06	1.1E+07
75	BR94E-75			2.1E+06		3.4E+05	2.3E+06	2.8E+05	4.9E+06
80	BR94E-80		1.3E+04	2.6E+04		2.8E+05	1.2E+06	1.0E+05	1.6E+06
85	BR94E-85		1.5E+05	1.3E+05		3.4E+05	2.0E+06	3.4E+05	2.9E+06
90	BR94F-90		6.4E+04	5.2E+05	1.3E+04	2.1E+05	1.1E+06	1.2E+05	2.0E+06
95	BR94F-95		1.9E+04	6.4E+04	9.0E+04	1.9E+05	1.2E+06	1.2E+05	1.7E+06
98	BR94F-98		2.6E+04	6.4E+04	4.5E+05	7.7E+04	1.1E+06	2.1E+05	1.9E+06
100	BR94F-100		5.2E+04	1.4E+06	1.7E+05	1.9E+05	9.9E+05	9.0E+04	2.8E+06
102	BR94E-102		2.6E+04	3.1E+06	5.2E+05	3.4E+05	3.6E+06	4.1E+05	8.0E+06
104	BR94E-104		2.6E+04	2.3E+05	2.1E+05	4.6E+05	1.8E+06	2.3E+05	2.9E+06
106	BR94E-106		1.3E+05	2.2E+06	5.9E+05	9.8E+05	4.3E+06	1.2E+06	9.3E+06
111	BR94E-111		7.7E+04	1.0E+05	2.8E+05	1.8E+05	1.4E+06	1.3E+05	2.2E+06
112	BR94E-112		3.9E+04	1.4E+05	2.3E+05	1.0E+05	1.0E+06	2.4E+05	1.8E+06
113	BR94E-113			1.3E+04	9.7E+03	6.4E+03	6.8E+04	1.9E+04	1.2E+05
114	BR94E-114		7.2E+05	3.0E+06	2.1E+07	3.4E+06	1.7E+07	5.5E+06	5.0E+07
116	BR94E-116		7.7E+04	3.4E+05		3.4E+05	2.0E+06	3.0E+05	3.0E+06
118	BR94E-118		7.1E+04	3.7E+06	6.4E+03	3.2E+05	1.5E+06	1.3E+04	5.6E+06
120	BR94E-120			6.6E+05	8.0E+05	7.2E+05	3.6E+06	1.4E+05	5.9E+06
122	BR94E-122		2.6E+05	2.6E+06	7.2E+05	1.5E+06	7.5E+06	5.2E+05	1.3E+07
130	BR94E-130		1.9E+05	1.7E+06	4.4E+05	2.8E+05	1.8E+06	1.8E+05	4.6E+06
135	BR94E-135		7.7E+04	2.8E+06	1.3E+05	2.3E+05	2.1E+06	2.6E+04	5.4E+06
140	BR94E-140		1.5E+05	1.9E+07	1.4E+06	1.5E+06	1.2E+07	4.1E+05	3.4E+07
145	BR94E-145		1.0E+05	2.7E+06	2.6E+04	1.9E+05	1.8E+06	3.4E+05	5.2E+06
150	BR94E-150		7.2E+05	2.6E+06	3.4E+06	7.7E+05	5.9E+06	8.8E+05	1.4E+07
154	BR94E-154		2.3E+05	2.6E+05	3.2E+05	2.1E+05	1.8E+06	3.1E+05	3.1E+06
155	BR94E-155		3.9E+05	2.6E+05	2.6E+05	9.0E+05	1.7E+06	2.3E+05	3.8E+06

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Freshwater diatoms**	*Aulacoseira italica*	*Aulacoseira* sp. 1 (small valves)	*Cyclotella* cf. *stelligera*	Miscellaneous large pennates	Miscellaneous small pennates	*Tabellaria* spp.	Total freshwater diatoms
157	BR94E-157		1.3E+06	1.5E+06	7.7E+04	1.8E+06	6.4E+06	8.8E+05	1.2E+07
158.5	BR94E-159		5.7E+05	1.5E+06	3.9E+04	4.1E+05	3.1E+06	3.5E+05	5.9E+06
160	BR94E-160		1.7E+06	5.2E+06	2.6E+04	1.3E+06	7.2E+06	1.2E+06	1.7E+07
162	BR94E-162		3.3E+05	3.7E+06	2.6E+04	5.5E+05	4.7E+06	7.6E+05	1.0E+07
165	BR94E-165		2.4E+06	1.2E+07	1.0E+05	6.2E+05	4.0E+06	1.2E+06	2.0E+07
170	BR94E-170		3.0E+06	1.6E+07	7.0E+05	3.2E+05	4.3E+06	6.6E+05	2.5E+07
175	BR94E-175		3.1E+05	1.7E+07	5.5E+05	4.5E+05	2.5E+06	5.3E+05	2.1E+07
180	BR94E-180		3.1E+05	1.4E+07		9.3E+05	3.9E+06	5.9E+05	2.0E+07
184	BR94E-184		4.5E+05	7.7E+05	5.2E+04	5.5E+05	6.1E+05	5.2E+04	2.5E+06
186	BR94E-186		1.3E+04	1.8E+06	1.7E+04	9.9E+04	4.9E+05	4.3E+04	2.4E+06
188	BR94E-188		1.4E+05	3.2E+05	1.2E+05	6.4E+04	2.9E+05		9.4E+05
190	BR94E-190		4.3E+05	5.8E+05	1.9E+05	5.8E+04	4.6E+05	2.6E+04	1.7E+06
192	BR94E-192		3.7E+05	7.7E+05	2.0E+05	8.6E+04	4.3E+05	4.3E+04	1.9E+06
194	BR94E-194		2.8E+05	7.7E+05	1.6E+05	5.2E+04	4.9E+05	4.1E+04	1.8E+06
196	BR94E-196		2.2E+05	7.1E+05	2.3E+05	4.5E+04	5.1E+05	2.6E+04	1.7E+06
198	BR94E-198		5.2E+03	4.6E+05	3.9E+05	2.1E+04	3.9E+05	3.1E+04	1.3E+06
200	BR94E-200		5.2E+03	6.7E+05	1.2E+05	2.6E+04	2.6E+05	5.2E+03	1.1E+06
201	BR94E-201		6.4E+03	6.4E+04	5.2E+05	9.7E+04	5.9E+05	4.5E+04	1.3E+06
203	BR94E-203		1.3E+04	5.2E+05	1.2E+05	1.8E+05	4.6E+05	1.3E+04	1.3E+06
205	BR94E-205		5.7E+04	3.6E+05	4.1E+04	6.2E+04	3.1E+05	4.1E+04	8.8E+05
207	BR94E-207		5.6E+04	2.1E+04	3.7E+04	6.4E+03	6.9E+04		1.9E+05
210	BR94E-210		6.4E+04	6.4E+05	1.4E+06	1.9E+05	8.6E+05	9.0E+04	3.2E+06
215	BR94E-215		1.8E+06	1.3E+06	1.5E+06	2.6E+04	1.1E+06	5.2E+04	5.8E+06
220	BR94E-220		1.9E+06	3.9E+06	5.6E+06	1.2E+05	7.7E+05	1.3E+04	1.2E+07
222	BR94E-222		2.1E+07	1.8E+06	1.8E+06	7.7E+04	5.4E+05	5.2E+04	6.4E+06
225	BR94E-225		3.1E+07	1.3E+06	2.6E+06	2.1E+05	1.6E+06	1.0E+05	8.8E+06
230	BR94E-230		1.0E+08	1.5E+06	1.3E+06	3.4E+05	2.9E+06	5.2E+04	1.1E+08
235	BR94E-235		3.6E+05	9.5E+06	4.6E+06	2.1E+05	1.8E+06	1.0E+05	1.7E+07
240	BR94E-240		2.6E+06	2.1E+07	1.8E+06	7.7E+04	3.1E+06	2.6E+04	2.8E+07
245	BR94E-245		5.7E+06	2.6E+06	1.3E+06	2.3E+05	1.4E+06	1.3E+05	1.1E+07
250	BR94E-250		1.8E+05	2.3E+05	5.2E+04	2.6E+04	3.9E+05	1.3E+04	8.9E+05
255	BR94E-255		1.2E+06	4.6E+05	2.6E+04	5.2E+04	3.6E+05	2.6E+04	2.1E+06
260	BR94E-260		3.4E+05	7.7E+05	9.0E+04	6.4E+04	4.8E+05	5.2E+04	1.8E+06
265	BR94E-265		6.2E+05	5.0E+06	2.6E+06	2.2E+05	1.2E+06	6.4E+04	9.7E+06
270	BR94E-270		2.1E+06	3.9E+06	2.6E+05	2.6E+05	1.7E+06	2.6E+04	8.3E+06
275	BR94E-275		4.2E+06	2.6E+07	5.4E+06	3.9E+05	2.7E+06	1.3E+05	3.9E+07
280	BR94E-280		1.5E+07	6.4E+06	9.1E+05	9.0E+05	2.3E+06	5.2E+04	2.5E+07
285	BR94E-285		4.5E+06	6.7E+06	5.2E+05	4.5E+05	2.5E+06	1.7E+05	1.5E+07
290	BR94E-290		6.5E+06	6.2E+06	5.2E+05	1.1E+06	1.0E+07	5.2E+05	2.5E+07
292	BR94E-292		3.9E+05	5.4E+06	1.0E+06	5.8E+05	5.1E+06	2.6E+05	1.3E+07
294	BR94E-294		2.2E+06	7.0E+06	7.7E+05	9.0E+05	1.2E+07	5.7E+05	2.3E+07
296	BR94E-296		7.3E+05	9.7E+04	1.6E+05	8.4E+04	6.3E+05	6.1E+04	1.8E+06
298	BR94E-298		2.1E+06	1.4E+06	7.7E+05	5.4E+05	1.9E+06	6.4E+04	6.8E+06

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Freshwater diatoms**	*Aulacoseira italica*	*Aulacoseira* sp. 1 (small valves)	*Cyclotella* cf. *stelligera*	Miscellaneous large pennates	Miscellaneous small pennates	*Tabellaria* spp.	Total freshwater diatoms
300	BR94E-300		6.2E+05	9.3E+05	2.4E+05	2.1E+05	1.0E+06	7.7E+04	3.1E+06
301	BR94E-301		1.1E+06	7.7E+05	4.3E+05	1.7E+05	1.1E+06	7.7E+04	3.7E+06
302	BR94E-302		3.0E+05	8.6E+04	8.6E+04	5.2E+04	3.3E+05	1.7E+04	8.7E+05
304	BR94E-304		5.2E+05	2.6E+06	2.1E+06	2.2E+05	1.2E+06	2.6E+04	6.6E+06
306	BR94E-306		6.5E+06	3.6E+06	5.2E+05	7.7E+05	6.0E+06	1.3E+06	1.9E+07
310	BR94E-310		5.0E+06	3.9E+06	7.7E+05	5.7E+05	1.9E+06	3.9E+05	1.2E+07
315	BR94E-315		4.4E+06	1.5E+06		3.6E+05	1.4E+06	2.3E+05	7.9E+06
320	BR94E-320		5.0E+06	7.7E+05		4.5E+05	1.4E+06	9.0E+04	7.7E+06
324	BR94E-324			5.0E+06		2.1E+05	1.4E+06	2.6E+05	6.9E+06
326	BR94E-326		2.6E+04	4.6E+06		3.4E+05	2.8E+06	1.0E+05	7.9E+06
328	BR94E-328		1.0E+05	3.2E+06		6.2E+05	2.1E+06	9.0E+04	6.2E+06
330	BR94E-330		2.6E+04	8.8E+05		6.2E+04	5.6E+05	5.2E+04	1.6E+06
332	BR94E-332		5.2E+03		1.0E+04	1.8E+05	1.0E+06	5.2E+04	1.2E+06
334	BR94E-334		6.4E+04	3.3E+05	3.0E+05	2.4E+05	1.1E+06	6.4E+04	2.0E+06
335	BR94E-335		2.6E+04	6.1E+05	9.9E+05	1.8E+05	1.3E+06	1.4E+05	3.3E+06
338	BR94E-338			6.4E+03	1.7E+04		1.9E+04	2.1E+03	4.5E+04
340	BR94E-340		2.6E+04	2.6E+05	2.1E+05	2.7E+05	2.4E+06	1.0E+05	3.3E+06
344	BR94E-344		1.9E+05	5.1E+05	6.6E+05	3.0E+05	2.1E+06	2.0E+05	3.9E+06
350	BR94E-350		1.2E+06	2.2E+06	1.3E+06	8.1E+05	8.0E+06	3.0E+05	1.4E+07
360	BR95BB-268		2.5E+04	1.3E+05	1.3E+06	1.0E+05	1.7E+06	1.1E+05	3.3E+06
362	BR95BB-270		1.3E+04	1.3E+05	1.3E+06	1.4E+05	1.1E+06	8.2E+04	2.7E+06
363	BR95BB-271		1.3E+04	9.4E+05	1.0E+06	1.6E+05	1.9E+06	5.7E+04	4.0E+06
364	BR95BB-272		3.8E+05	1.3E+05	1.9E+05	4.0E+05	1.5E+06	3.8E+04	2.6E+06
365	BR95BB-273		2.5E+04	8.2E+05	4.7E+05	2.6E+05	1.1E+06	9.4E+04	2.8E+06
366	BR95BB-274		1.9E+04	1.1E+06	9.4E+05	2.6E+05	8.4E+05	1.2E+05	3.3E+06
368	BR95BB-276		1.9E+04	1.3E+04	2.1E+05	1.1E+05	7.7E+05	6.9E+04	1.2E+06
372	BR95BB-280		6.3E+04	1.3E+05	1.8E+05	2.3E+05	1.0E+06	1.9E+05	1.8E+06
382	BR95BB-290		1.9E+04	2.0E+06	9.5E+05	1.9E+04	1.0E+06	8.8E+04	4.1E+06
387	BR95BB-295		1.3E+04	9.4E+05	2.5E+05	1.3E+05	9.7E+05	7.5E+04	2.4E+06
393	BR95BB-301		1.2E+05	2.2E+06	3.8E+05	1.0E+05	8.7E+05	1.2E+05	3.8E+06
394	BR95BB-302		6.3E+04	5.1E+06	5.0E+05	8.2E+04	1.3E+06	1.3E+05	7.2E+06
395	BR95BB-303		5.7E+04	3.7E+06	1.8E+06	1.6E+05	1.3E+06	1.8E+05	7.3E+06
396	BR95BB-304		6.9E+04	5.0E+05	4.4E+05	1.4E+05	1.1E+06	1.6E+05	2.4E+06
397	BR95BB-305		5.7E+04	9.4E+05	8.8E+05	2.5E+05	1.4E+06	1.1E+05	3.6E+06
398	BR95BB-306		6.3E+04	1.9E+05	1.9E+05	2.0E+05	5.9E+05	6.9E+04	1.3E+06
400	BR95BB-308		1.9E+05	9.4E+05	1.3E+06	3.7E+05	2.0E+06	2.3E+05	4.9E+06
402	BR95BB-310		8.2E+04	9.4E+05	6.3E+05	3.2E+05	1.0E+06	8.2E+04	3.1E+06
407	BR95BB-315		8.2E+04	8.8E+05	2.5E+05	2.6E+05	1.2E+06	1.0E+05	2.8E+06
412	BR95BB-320		6.3E+04	3.8E+05	1.3E+05	8.2E+04	5.6E+05	7.5E+04	1.3E+06
430	BR94E-430		4.4E+05	2.2E+06	5.2E+05	2.9E+05	1.9E+06	1.4E+05	5.5E+06
433	BR94E-433		9.7E+04	1.3E+04		4.5E+04	1.8E+05		3.4E+05
435	BR94E-435		5.3E+05	1.3E+04		4.0E+05	7.6E+05	1.4E+05	1.8E+06
436.5	BR94E-437		1.9E+05	2.1E+05	1.5E+05	9.0E+04	7.7E+05	1.2E+05	1.5E+06

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Freshwater diatoms**	*Aulacoseira italica*	*Aulacoseira* sp. 1 (small valves)	*Cyclotella* cf. *stelligera*	Miscellaneous large pennates	Miscellaneous small pennates	*Tabellaria* spp.	Total freshwater diatoms
437.5	BR94E-438		2.7E+06	1.1E+07	3.0E+06	1.5E+06	9.4E+06	1.2E+06	2.9E+07
438.5	BR94E-439		5.8E+05	2.3E+06	1.1E+05	3.7E+05	2.5E+06	5.5E+05	6.5E+06
440	BR94E-440		1.9E+05	2.4E+06	2.0E+05	2.6E+05	1.3E+06	2.8E+05	4.6E+06
445	BR94E-445		2.2E+06	1.7E+06	5.4E+05	2.1E+05	4.0E+06	2.8E+05	8.9E+06
450	BR94E-450		2.2E+07	2.2E+06		3.1E+05	1.9E+06	4.6E+05	2.7E+07
454	BR94E-454		2.2E+07		2.6E+04	4.3E+05	4.0E+05	2.6E+04	2.3E+07
458	BR94E-458		6.0E+06			1.7E+05	3.5E+05	9.0E+04	6.6E+06
460	BR94E-460		1.9E+06		3.2E+03	1.7E+05	5.1E+05	6.4E+03	2.6E+06
462	BR94E-462		2.3E+06	6.4E+04	1.9E+04	1.7E+05	4.5E+05	1.9E+04	3.0E+06
464	BR94E-464		1.1E+06	2.1E+04	3.0E+04	9.9E+04	3.9E+05	2.6E+04	1.6E+06
466	BR94E-466		1.4E+05	1.6E+04	8.1E+03	1.9E+04	9.7E+04	3.2E+03	2.9E+05
470	BR94E-470		9.0E+05	6.4E+04	7.1E+04	1.6E+05	5.7E+05	3.2E+04	1.8E+06
473	BR95X-437		4.6E+06	1.3E+05	1.3E+04	5.0E+04	6.3E+05		5.5E+06
476	BR95X-440		2.8E+06			5.0E+04	4.3E+05	2.5E+04	3.3E+06
478	BR95X-442		6.6E+06	6.3E+04		1.0E+05	9.7E+05	2.5E+04	8.1E+06
480	BR95X-444		4.0E+05	6.3E+04		1.5E+05	3.8E+05	1.3E+04	1.1E+06
482	BR95X-446			1.3E+05	3.6E+05	5.0E+04	4.0E+05		9.4E+05
484	BR95X-448		6.3E+04	3.8E+05		7.5E+04	3.3E+05	1.3E+04	8.5E+05
484.5	BR95X-449		1.1E+06	2.5E+05	1.6E+05	7.0E+05	2.0E+06	2.5E+05	4.5E+06
485	BR95X-449		8.8E+04	7.5E+05	2.1E+05	1.4E+05	5.5E+05	1.0E+05	1.8E+06
486	BR95X-450		8.8E+04	5.3E+06	7.5E+05	1.0E+05	8.8E+05	1.9E+05	7.3E+06
489	BR95X-453		2.9E+05	1.6E+06	5.4E+05	1.1E+05	5.4E+05	5.0E+04	3.2E+06
491	BR95X-455		1.0E+06	2.5E+05	7.5E+04	1.1E+05	4.9E+05	5.0E+04	2.0E+06
492	BR95X-456		1.3E+04	3.8E+05	5.5E+05	2.6E+05	1.1E+06	8.8E+04	2.4E+06
493	BR95X-457		2.5E+04	3.8E+05	3.4E+05	2.6E+05	3.6E+05	5.0E+04	1.4E+06
494	BR95X-458		7.5E+04	1.0E+06	4.8E+05	1.1E+05	8.8E+05	1.0E+05	2.7E+06
495	BR95X-459		1.9E+05	2.5E+06	1.6E+06	1.9E+05	1.8E+06	3.6E+05	6.7E+06
496	BR95X-460		1.9E+05	6.7E+06	6.2E+06	4.3E+05	2.3E+06	2.3E+05	1.6E+07
498	BR95X-462		2.1E+05	5.3E+06	5.1E+06	2.8E+05	2.0E+06	2.8E+05	1.3E+07
515	BR94E-515		2.6E+05	2.2E+07	3.3E+06	6.7E+05	3.6E+06	5.8E+05	3.0E+07
525	BR94E-525		4.9E+05	4.6E+06	2.1E+06	5.9E+05	2.4E+06	5.2E+05	1.1E+07
530	BR94E-530		2.9E+05	1.0E+07	9.0E+05	1.5E+05	2.0E+06	6.4E+05	1.4E+07
533	BR94E-533		8.2E+05	1.7E+07	5.2E+06	3.1E+06	1.1E+07	2.4E+06	3.9E+07
535	BR94E-535		1.8E+05	7.9E+06	8.2E+05	8.4E+05	2.6E+06	4.3E+05	1.3E+07
536.5	BR94E-537		6.9E+05	1.1E+07	2.0E+06	8.1E+06	1.2E+07	1.6E+06	3.6E+07
538	BR94E-538		3.1E+06	4.4E+06	1.9E+06	7.4E+06	7.7E+06	6.3E+05	2.5E+07
540	BR94E-540		4.4E+05	2.5E+06	6.0E+05	5.6E+05	2.2E+06	1.6E+05	6.4E+06
550	BR94E-550		2.8E+05	1.0E+07	3.5E+06	9.5E+05	3.7E+06	9.0E+05	2.0E+07
560	BR94E-560		4.5E+05	5.4E+06	2.7E+05	4.6E+05	1.9E+06	1.5E+05	8.7E+06
570	BR94E-570		8.0E+05	3.6E+06	9.3E+05	2.3E+05	2.1E+06	1.3E+05	7.8E+06
580	BR94E-580		2.3E+06	2.2E+06	1.8E+05	2.6E+05	1.7E+06	3.4E+05	6.9E+06
585	BR94E-585		6.9E+06	1.1E+07	2.2E+05	1.2E+06	5.4E+06	6.7E+05	2.6E+07
590	BR94E-590		2.8E+07	5.9E+06	9.0E+04	5.5E+05	1.4E+06	3.9E+04	3.6E+07

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	**Freshwater diatoms**	*Aulacoseira italica*	*Aulacoseira* sp. 1 (small valves)	*Cyclotella* cf. *stelligera*	Miscellaneous large pennates	Miscellaneous small pennates	*Tabellaria* spp.	Total freshwater diatoms
595	BR94E-595		2.2E+06	4.3E+04		7.7E+04	1.8E+05	1.3E+04	2.5E+06
600	BR94E-600		7.9E+05	1.3E+05	8.6E+03	1.3E+05	2.7E+05	8.6E+03	1.3E+06
602.5	BR94E-603		2.6E+06	6.6E+06	1.2E+06	3.0E+06	8.7E+06	9.4E+05	2.3E+07
605	BR94E-605		1.2E+05	5.8E+05	4.5E+04	2.4E+05	7.6E+05	7.7E+04	1.8E+06
606	BR94E-607		2.0E+06	2.9E+07	2.0E+06	8.7E+06	2.3E+07	2.3E+06	6.7E+07
608	BR94E-608		3.8E+05	1.4E+07	1.4E+06	5.9E+06	1.6E+07	9.4E+04	3.8E+07
610	BR94E-610			7.9E+05	8.2E+04	2.5E+05	6.6E+05	5.2E+03	1.8E+06
615	BR94E-615		2.4E+05	6.7E+05	7.2E+04	3.3E+05	1.0E+06	1.6E+05	2.5E+06
620	BR94E-620		5.3E+05	7.7E+06	2.6E+04	7.5E+05	2.0E+06	1.4E+05	1.1E+07
624	BR94E-624		4.7E+06	1.9E+06	7.7E+04	8.1E+05	1.8E+06	6.4E+04	9.4E+06
628	BR94E-628		3.7E+07	9.8E+06	1.1E+06	9.0E+05	4.7E+06	1.5E+05	5.3E+07
630	BR94E-630		1.6E+06	6.4E+04	1.1E+05	9.0E+04	1.9E+05	6.4E+03	2.0E+06
632	BR94E-632		7.7E+04			1.2E+05	2.5E+05		4.5E+05
634	BR94E-634		2.2E+04			4.1E+04	1.3E+05	3.7E+03	2.0E+05
636	BR94E-636					6.3E+05	3.0E+06		3.7E+06
640	BR94E-640					4.3E+05	4.6E+06	1.3E+04	5.1E+06
650	BR94E-650					1.3E+04	3.7E+05		3.9E+05
660	BR94E-660					1.2E+06	9.3E+06		1.0E+07
670	BR94E-670		1.3E+04			9.8E+05	7.3E+06		8.3E+06
680	BR94E-680		1.5E+05			1.8E+05	4.4E+06		4.7E+06
690	BR94E-690		1.8E+05			3.2E+05	1.5E+06	5.2E+04	2.1E+06

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	Number of traverses (22 mm * 0.4 mm) counted	Area of slide observed (mm^2)	Area of settling chamber (mm^2)	Aliquot volume (µl) + 10x dilution	Percentage of sample scanned for marine diatoms
15	BR94E-15	20	176	1134	0.01	16%
20	BR94E-20	20	176	1134	0.01	16%
25	BR94E-25	20	176	1134	0.01	16%
30	BR94E-30	20	176	1134	0.03	16%
35	BR94E-35	20	176	1134	0.01	16%
40	BR94E-40	20	176	1134	0.01	16%
45	BR94E-45	20	176	1134	0.01	16%
48	BR94E-48	20	176	1134	0.01	16%
50	BR94E-50	20	176	1134	0.01	16%
52	BR94E-52	20	176	1134	0.02	16%
54	BR94E-54	20	176	1134	0.01	16%
56	BR94E-56	20	176	1134	0.005	16%
58	BR94E-58	20	176	1134	0.01	16%
60	BR94E-60	20	176	1134	0.01	16%
62	BR94E-62	20	176	1134	0.01	16%
64	BR94E-64	20	176	1134	0.005	16%
66	BR94E-66	20	176	1134	0.005	16%
70	BR94E-70	20	176	1134	0.005	16%
75	BR94E-75	20	176	1134	0.005	16%
80	BR94E-80	20	176	1134	0.01	16%
85	BR94E-85	20	176	1134	0.01	16%
90	BR94F-90	20	176	1134	0.01	16%
95	BR94F-95	20	176	1134	0.01	16%
98	BR94F-98	20	176	1134	0.01	16%
100	BR94F-100	20	176	1134	0.01	16%
102	BR94E-102	20	176	1134	0.01	16%
104	BR94E-104	20	176	1134	0.01	16%
106	BR94E-106	20	176	1134	0.01	16%
111	BR94E-111	20	176	1134	0.01	16%
112	BR94E-112	20	176	1134	0.02	16%
113	BR94E-113	20	176	1134	0.08	16%
114	BR94E-114	20	176	1134	0.0025	16%
116	BR94E-116	20	176	1134	0.015	16%
118	BR94E-118	20	176	1134	0.02	16%
120	BR94E-120	20	176	1134	0.01	16%
122	BR94E-122	20	176	1134	0.0025	16%
130	BR94E-130	20	176	1134	0.01	16%
135	BR94E-135	20	176	1134	0.005	16%
140	BR94E-140	20	176	1134	0.0025	16%
145	BR94E-145	20	176	1134	0.01	16%
150	BR94E-150	20	176	1134	0.01	16%
154	BR94E-154	20	176	1134	0.02	16%
155	BR94E-155	20	176	1134	0.01	16%

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	Number of traverses (22 mm * 0.4 mm) counted	Area of slide observed (mm^2)	Area of settling chamber (mm^2)	Aliquot volume (µl) + 10x dilution	Percentage of sample scanned for marine diatoms
157	BR94E-157	20	176	1134	0.01	16%
158.5	BR94E-159	20	176	1134	0.02	16%
160	BR94E-160	10	176	1134	0.01	16%
162	BR94E-162	20	176	1134	0.02	16%
165	BR94E-165	20	176	1134	0.005	16%
170	BR94E-170	20	176	1134	0.01	16%
175	BR94E-175	20	176	1134	0.01	16%
180	BR94E-180	20	176	1134	0.005	16%
184	BR94E-184	20	176	1134	0.01	16%
186	BR94E-186	20	176	1134	0.03	16%
188	BR94E-188	20	176	1134	0.02	16%
190	BR94E-190	20	176	1134	0.02	16%
192	BR94E-192	20	176	1134	0.015	16%
194	BR94E-194	20	176	1134	0.025	16%
196	BR94E-196	20	176	1134	0.02	16%
198	BR94E-198	20	176	1134	0.025	16%
200	BR94E-200	20	176	1134	0.025	16%
201	BR94E-201	14	123.2	1134	0.02	12%
203	BR94E-203	14	123.2	1134	0.01	12%
205	BR94E-205	14	123.2	1134	0.025	12%
207	BR94E-207	14	123.2	1134	0.06	12%
210	BR94E-210	20	176	1134	0.02	16%
215	BR94E-215	20	176	1134	0.005	16%
220	BR94E-220	20	176	1134	0.01	16%
222	BR94E-222	20	176	1134	0.005	16%
225	BR94E-225	20	176	1134	0.005	16%
230	BR94E-230	20	176	1134	0.005	16%
235	BR94E-235	20	176	1134	0.005	16%
240	BR94E-240	20	176	1134	0.005	16%
245	BR94E-245	20	176	1134	0.005	16%
250	BR94E-250	20	176	1134	0.01	16%
255	BR94E-255	20	176	1134	0.005	16%
260	BR94E-260	20	176	1134	0.01	16%
265	BR94E-265	20	176	1134	0.01	16%
270	BR94E-270	20	176	1134	0.015	16%
275	BR94E-275	20	176	1134	0.01	16%
280	BR94E-280	20	176	1134	0.01	16%
285	BR94E-285	20	176	1134	0.01	16%
290	BR94E-290	20	176	1134	0.005	16%
292	BR94E-292	20	176	1134	0.01	16%
294	BR94E-294	20	176	1134	0.005	16%
296	BR94E-296	20	176	1134	0.04	16%
298	BR94E-298	20	176	1134	0.01	16%

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	Number of traverses (22 mm * 0.4 mm) counted	Area of slide observed (mm^2)	Area of settling chamber (mm^2)	Aliquot volume (μl) + 10x dilution	Percentage of sample scanned for marine diatoms
300	BR94E-300	20	176	1134	0.025	16%
301	BR94E-301	20	176	1134	0.015	16%
302	BR94E-302	20	176	1134	0.015	16%
304	BR94E-304	20	176	1134	0.01	16%
306	BR94E-306	20	176	1134	0.01	16%
310	BR94E-310	20	176	1134	0.01	16%
315	BR94E-315	20	176	1134	0.02	16%
320	BR94E-320	20	176	1134	0.01	16%
324	BR94E-324	20	176	1134	0.005	16%
326	BR94E-326	20	176	1134	0.01	16%
328	BR94E-328	20	176	1134	0.01	16%
330	BR94E-330	20	176	1134	0.025	16%
332	BR94E-332	20	176	1134	0.025	16%
334	BR94E-334	20	176	1134	0.02	16%
335	BR94E-335	20	176	1134	0.02	16%
338	BR94E-338	20	176	1134	0.12	16%
340	BR94E-340	20	176	1134	0.015	16%
344	BR94E-344	20	176	1134	0.025	16%
350	BR94E-350	20	176	1134	0.01	16%
360	BR95BB-268	14	123.2	3316	0.06	4%
362	BR95BB-270	14	123.2	3316	0.06	4%
363	BR95BB-271	14	123.2	3316	0.06	4%
364	BR95BB-272	14	123.2	3316	0.06	4%
365	BR95BB-273	14	123.2	3316	0.06	4%
366	BR95BB-274	14	123.2	3316	0.06	4%
368	BR95BB-276	14	123.2	3316	0.06	4%
372	BR95BB-280	15	123.2	3316	0.06	4%
382	BR95BB-290	14	123.2	3316	0.06	4%
387	BR95BB-295	14	123.2	3316	0.06	4%
393	BR95BB-301	14	123.2	3316	0.06	4%
394	BR95BB-302	14	123.2	3316	0.06	4%
395	BR95BB-303	14	123.2	3316	0.06	4%
396	BR95BB-304	14	123.2	3316	0.06	4%
397	BR95BB-305	14	123.2	3316	0.06	4%
398	BR95BB-306	14	123.2	3316	0.06	4%
400	BR95BB-308	14	123.2	3316	0.06	4%
402	BR95BB-310	14	123.2	3316	0.06	4%
407	BR95BB-315	14	123.2	3316	0.06	4%
412	BR95BB-320	14	123.2	3316	0.06	4%
430	BR94E-430	14	123.2	1134	0.02	11%
433	BR94E-433	14	123.2	1134	0.02	11%
435	BR94E-435	14	123.2	1134	0.02	11%
436.5	BR94E-437	14	123.2	1134	0.01	11%

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	Number of traverses (22 mm * 0.4 mm) counted	Area of slide observed (mm^2)	Area of settling chamber (mm^2)	Aliquot volume (µl) + 10x dilution	Percentage of sample scanned for marine diatoms
437.5	BR94E-438	14	123.2	3316	0.006	4%
438.5	BR94E-439	14	123.2	1134	0.015	11%
440	BR94E-440	14	123.2	1134	0.03	11%
445	BR94E-445	14	123.2	1134	0.01	11%
450	BR94E-450	14	123.2	1134	0.01	11%
454	BR94E-454	14	123.2	1134	0.01	11%
458	BR94E-458	14	123.2	1134	0.03	11%
460	BR94E-460	14	123.2	1134	0.04	11%
462	BR94E-462	14	123.2	1134	0.02	11%
464	BR94E-464	14	123.2	1134	0.03	11%
466	BR94E-466	14	123.2	1134	0.08	11%
470	BR94E-470	14	123.2	1134	0.03	16%
473	BR95X-437	14	123.2	3316	0.06	4%
476	BR95X-440	14	123.2	3316	0.06	4%
478	BR95X-442	14	123.2	3316	0.06	4%
480	BR95X-444	14	123.2	3316	0.06	4%
482	BR95X-446	14	123.2	3316	0.06	4%
484	BR95X-448	14	123.2	3316	0.06	4%
484.5	BR95X-449	14	123.2	3316	0.06	4%
485	BR95X-449	14	123.2	3316	0.06	4%
486	BR95X-450	14	123.2	3316	0.06	4%
489	BR95X-453	14	123.2	3316	0.06	4%
491	BR95X-455	14	123.2	3316	0.06	4%
492	BR95X-456	14	123.2	3316	0.06	4%
493	BR95X-457	14	123.2	3316	0.06	4%
494	BR95X-458	14	123.2	3316	0.06	4%
495	BR95X-459	14	123.2	3316	0.06	4%
496	BR95X-460	14	123.2	3316	0.06	4%
498	BR95X-462	14	123.2	3316	0.06	4%
515	BR94E-515	14	123.2	1134	0.01	11%
525	BR94E-525	14	123.2	1134	0.015	11%
530	BR94E-530	14	123.2	1134	0.015	11%
533	BR94E-533	14	123.2	3316	0.006	4%
535	BR94E-535	14	123.2	1134	0.01	11%
536.5	BR94E-537	14	123.2	3316	0.006	4%
538	BR94E-538	14	123.2	3316	0.006	4%
540	BR94E-540	14	123.2	1134	0.015	11%
550	BR94E-550	14	123.2	1134	0.01	11%
560	BR94E-560	14	123.2	1134	0.01	11%
570	BR94E-570	14	123.2	1134	0.005	11%
580	BR94E-580	14	123.2	1134	0.01	11%
585	BR94E-585	14	123.2	1134	0.01	11%
590	BR94E-590	14	123.2	1134	0.01	11%

Appendix 3. Downcore diatom data from Bradley Lake (diatom concentration in valves per cc of sediment).

Depth in core (cm)	Sample ID	Number of traverses (22 mm * 0.4 mm) counted	Area of slide observed (mm^2)	Area of settling chamber (mm^2)	Aliquot volume (µl) + 10x dilution	Percentage of sample scanned for marine diatoms
595	BR94E-595	20	176	1134	0.03	16%
600	BR94E-600	20	176	1134	0.03	16%
602.5	BR94E-603	20	176	3316	0.004	5%
605	BR94E-605	20	176	1134	0.02	16%
606	BR94E-607	20	176	3316	0.004	5%
608	BR94E-608	20	176	3316	0.004	5%
610	BR94E-610	20	176	1134	0.025	16%
615	BR94E-615	20	176	1134	0.025	16%
620	BR94E-620	20	176	1134	0.01	16%
624	BR94E-624	20	176	1134	0.01	16%
628	BR94E-628	20	176	1134	0.005	16%
630	BR94E-630	20	176	1134	0.02	16%
632	BR94E-632	20	176	1134	0.025	16%
634	BR94E-634	20	176	1134	0.07	16%
636	BR94E-636	20	176	1134	0.01	16%
640	BR94E-640	20	176	1134	0.01	16%
650	BR94E-650	20	176	1134	0.01	16%
660	BR94E-660	20	176	1134	0.005	16%
670	BR94E-670	20	176	1134	0.01	16%
680	BR94E-680	20	176	1134	0.01	16%
690	BR94E-690	20	176	1134	0.01	16%

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Sample ID	**Hm diatoms**	*Actinocyclus normanii*	*Actinoptychus marmoreus*	*Caloneis brevis*	*Cerataulus turgidus*	*Cyclotella litoralis*	*Grammatophora oceanica*	*Hantzschia virgata*	*Hyalodiscus scoticus*	*Nitzschia socialis*	*Odontella obtusa*	*Paralia sol*		
15	BR94E-15														
20	BR94E-20														
25	BR94E-25														
30	BR94E-30														
35	BR94E-35														
40	BR94E-40														
45	BR94E-45														
48	BR94E-48														
50	BR94E-50														
52	BR94E-52														
54	BR94E-54														
56	BR94E-56														
58	BR94E-58														
60	BR94E-60														
62	BR94E-62														
64	BR94E-64														
66	BR94E-66														
70	BR94E-70														
75	BR94E-75														
80	BR94E-80														
85	BR94E-85														
90	BR94F-90														
95	BR94F-95														
98	BR94F-98														
100	BR94F-100														
102	BR94E-102							1							
104	BR94E-104														
106	BR94E-106														
111	BR94E-111														
112	BR94E-112														
113	BR94E-113														
114	BR94E-114														
116	BR94E-116														
118	BR94E-118														
120	BR94E-120														
122	BR94E-122														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Sample ID	**Hm diatoms**	*Actinocyclus normanii*	*Actinoptychus marmoreus*	*Caloneis brevis*	*Cerataulus turgidus*	*Cyclotella litoralis*	*Grammatophora oceanica*	*Hantzschia virgata*	*Hyalodiscus scoticus*	*Nitzschia socialis*	*Odontella obtusa*	*Paralia sol*		
130	BR94E-130														
135	BR94E-135														
140	BR94E-140														
145	BR94E-145														
150	BR94E-150														
154	BR94E-154							1							
155	BR94E-155														
157	BR94E-157														
158.5	BR94E-159														
160	BR94E-160														
162	BR94E-162														
165	BR94E-165														
170	BR94E-170														
175	BR94E-175														
180	BR94E-180														
184	BR94E-184														
186	BR94E-186				1			1	1.5		2				
188	BR94E-188				1				1						
190	BR94E-190				1										
192	BR94E-192		1												
194	BR94E-194				1						1				
196	BR94E-196														
198	BR94E-198														
200	BR94E-200														
201	BR94E-201														
203	BR94E-203														
205	BR94E-205				1										
207	BR94E-207												1		
210	BR94E-210														
215	BR94E-215														
220	BR94E-220														
222	BR94E-222														
225	BR94E-225														
230	BR94E-230														
235	BR94E-235														
240	BR94E-240														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Sample ID	**Hm diatoms**	*Actinocyclus normanii*	*Actinoptychus marmoreus*	*Caloneis brevis*	*Cerataulus turgidus*	*Cyclotella litoralis*	*Grammatophora oceanica*	*Hantzschia virgata*	*Hyalodiscus scoticus*	*Nitzschia socialis*	*Odontella obtusa*	*Paralia sol*		
245	BR94E-245														
250	BR94E-250														
255	BR94E-255														
260	BR94E-260														
265	BR94E-265														
270	BR94E-270														
275	BR94E-275														
280	BR94E-280														
285	BR94E-285														
290	BR94E-290														
292	BR94E-292														
294	BR94E-294		0.5												
296	BR94E-296														
298	BR94E-298														
300	BR94E-300														
301	BR94E-301										1				
302	BR94E-302														
304	BR94E-304														
306	BR94E-306														
310	BR94E-310														
315	BR94E-315														
320	BR94E-320														
324	BR94E-324														
326	BR94E-326														
328	BR94E-328														
330	BR94E-330														
332	BR94E-332														
334	BR94E-334														
335	BR94E-335														
338	BR94E-338														
340	BR94E-340														
344	BR94E-344														
350	BR94E-350														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Sample ID	**Hm diatoms**	*Actinocyclus normanii*	*Actinoptychus marmoreus*	*Caloneis brevis*	*Cerataulus turgidus*	*Cyclotella litoralis*	*Grammatophora oceanica*	*Hantzschia virgata*	*Hyalodiscus scoticus*	*Nitzschia socialis*	*Odontella obtusa*	*Paralia sol*		
360	BR95BB-268														
362	BR95BB-270														
363	BR95BB-271														
364	BR95BB-272														
365	BR95BB-273														
366	BR95BB-274														
368	BR95BB-276														
372	BR95BB-280														
382	BR95BB-290														
387	BR95BB-295														
393	BR95BB-301														
394	BR95BB-302														
395	BR95BB-303														
396	BR95BB-304														
397	BR95BB-305														
398	BR95BB-306														
400	BR95BB-308														
402	BR95BB-310														
407	BR95BB-315														
412	BR95BB-320														
430	BR94E-430														
433	BR94E-433														
435	BR94E-435														
436.5	BR94E-437														
437.5	BR94E-438														
438.5	BR94E-439														
440	BR94E-440														
445	BR94E-445														
450	BR94E-450														
454	BR94E-454														
458	BR94E-458														
460	BR94E-460														
462	BR94E-462														
464	BR94E-464														
466	BR94E-466								1						
470	BR94E-470														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Sample ID	**Hm diatoms**	*Actinocyclus normanii*	*Actinoptychus marmoreus*	*Caloneis brevis*	*Cerataulus turgidus*	*Cyclotella litoralis*	*Grammatophora oceanica*	*Hantzschia virgata*	*Hyalodiscus scoticus*	*Nitzschia socialis*	*Odontella obtusa*	*Paralia sol*		
473	BR95X-437														
476	BR95X-440														
478	BR95X-442														
480	BR95X-444														
482	BR95X-446														
484	BR95X-448														
484.5	BR95X-449						1								
485	BR95X-449														
486	BR95X-450														
489	BR95X-453														
491	BR95X-455														
492	BR95X-456														
493	BR95X-457														
494	BR95X-458														
495	BR95X-459														
496	BR95X-460														
498	BR95X-462														
515	BR94E-515														
525	BR94E-525														
530	BR94E-530														
533	BR94E-533														
535	BR94E-535														
536.5	BR94E-537														
538	BR94E-538														
540	BR94E-540														
550	BR94E-550														
560	BR94E-560														
570	BR94E-570														
580	BR94E-580														
585	BR94E-585														
590	BR94E-590														
595	BR94E-595														
600	BR94E-600														
602.5	BR94E-603														
605	BR94E-605														
606	BR94E-607														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Sample ID	**Hm diatoms**	*Actinocyclus normanii*	*Actinoptychus marmoreus*	*Caloneis brevis*	*Cerataulus turgidus*	*Cyclotella litoralis*	*Grammatophora oceanica*	*Hantzschia virgata*	*Hyalodiscus scoticus*	*Nitzschia socialis*	*Odontella obtusa*	*Paralia sol*		
608	BR94E-608														
610	BR94E-610														
615	BR94E-615														
620	BR94E-620														
624	BR94E-624														
628	BR94E-628									1					
630	BR94E-630														
632	BR94E-632					1	2					3			
634	BR94E-634														
636	BR94E-636														
640	BR94E-640														
650	BR94E-650														
660	BR94E-660														
670	BR94E-670														
680	BR94E-680														
690	BR94E-690														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Hm diatoms (cont.)**	*Pseudoeunotia doliolus*	*Rhopalodia acuminata*	*Skeletonema costatum*	*Synedra fasciculata*	*Thalassiosira*	*Thalassiosira* cf. *decipiens*	*Thalassiosira decipiens*	*Thalassiosira eccentrica*	*Thalassiosira nordenskoldii*	*Thalassiosira oestrupii*	*Thalassiosira pacifica*						
15																		
20																		
25																		
30																		
35																		
40						0.5			1			1						
45																		
48												4						
50												3						
52																		
54																		
56																		
58																		
60																		
62																		
64																		
66																		
70																		
75																		
80												1						
85																		
90																		
95																		
98																		
100											1							
102												4						
104				11								4						
106						1	1		2			3						
111										1								
112									0.5									
113											1							
114																		
116																		
118																		
120																		
122																		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Hm diatoms (cont.)**	*Pseudoeunotia doliolus*	*Rhopalodia acuminata*	*Skeletonema costatum*	*Synedra fasciculata*	*Thalassiosira*	*Thalassiosira* cf. *decipiens*	*Thalassiosira decipiens*	*Thalassiosira eccentrica*	*Thalassiosira nordenskoldii*	*Thalassiosira oestrupii*	*Thalassiosira pacifica*						
130																		
135																		
140																		
145																		
150												1						
154																		
155									1									
157																		
158.5																		
160																		
162																		
165																		
170																		
175																		
180												1						
184												1						
186							3					13						
188		1					1		1.5			7						
190		1					1				1	4						
192						1			0.5			3						
194												2						
196					2							2						
198																		
200												1						
201												1						
203												1						
205												2						
207												7						
210																		
215																		
220																		
222																		
225																		
230																		
235																		
240																		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Hm diatoms (cont.)**	*Pseudoeunotia doliolus*	*Rhopalodia acuminata*	*Skeletonema costatum*	*Synedra fasciculata*	*Thalassiosira*	*Thalassiosira* cf. *decipiens*	*Thalassiosira decipiens*	*Thalassiosira eccentrica*	*Thalassiosira nordenskoldii*	*Thalassiosira oestrupii*	*Thalassiosira pacifica*						
245																		
250																		
255																		
260																		
265																		
270																		
275																		
280																		
285																		
290																		
292																		
294																		
296																		
298						1			1			6.5						
300												5						
301									1			1						
302								1				1						
304																		
306																		
310																		
315																		
320																		
324																		
326												1						
328																		
330												5						
332												5						
334						2			1			19						
335								1				27						
338								1				1						
340																		
344																		
350																		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Hm diatoms (cont.)**	*Pseudoeunotia doliolus*	*Rhopalodia acuminata*	*Skeletonema costatum*	*Synedra fasciculata*	*Thalassiosira*	*Thalassiosira* cf. *decipiens*	*Thalassiosira decipiens*	*Thalassiosira eccentrica*	*Thalassiosira nordenskoldii*	*Thalassiosira oestrupii*	*Thalassiosira pacifica*						
360																		
362																		
363												2						
364									0.5			1						
365																		
366																		
368																		
372																		
382																		
387																		
393																		
394																		
395																		
396																		
397												1						
398																		
400												1						
402																		
407																		
412																		
430																		
433												3						
435												4						
436.5																		
437.5																		
438.5																		
440																		
445																		
450																		
454																		
458																		
460												5						
462												22						
464							2		1			41						
466										1		40						
470																		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Hm diatoms (cont.)**	*Pseudoeunotia doliolus*	*Rhopalodia acuminata*	*Skeletonema costatum*	*Synedra fasciculata*	*Thalassiosira*	*Thalassiosira* cf. *decipiens*	*Thalassiosira decipiens*	*Thalassiosira eccentrica*	*Thalassiosira nordenskoldii*	*Thalassiosira oestrupii*	*Thalassiosira pacifica*						
473																		
476																		
478												2						
480																		
482												42						
484												22						
484.5											1	5						
485							1											
486																		
489																		
491																		
492																		
493																		
494																		
495																		
496																		
498																		
515																		
525																		
530																		
533																		
535																		
536.5																		
538																		
540																		
550																		
560																		
570																		
580																		
585																		
590																		
595																		
600																		
602.5																		
605																		
606																		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Hm diatoms (cont.)**	*Pseudoeunotia doliolus*	*Rhopalodia acuminata*	*Skeletonema costatum*	*Synedra fasciculata*	*Thalassiosira*	*Thalassiosira* cf. *decipiens*	*Thalassiosira decipiens*	*Thalassiosira eccentrica*	*Thalassiosira nordenskoldii*	*Thalassiosira oestrupii*	*Thalassiosira pacifica*						
608																		
610																		
615																		
620												1						
624																		
628																		
630																		
632			2		1							16						
634			3				1					21						
636																		
640																		
650																		
660																		
670																		
680																		
690																		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms**	*Actinocyclus curvatulus**	*Actinocyclus ochotensis**	*Actinoptychus senarius*	*Asteromphalus robustus*	*Aulacodiscus kittoni**	*Chaetoceros* spp.	*Coscinodiscus radiatus**	*Delphineis* cf. *angusta*	*Delphineis* cf. *surirella*	*Delphineis karstenii*	*Endictya hendeyi**	*Hyalodiscus laevis*	*Lithodesmium undulatum**	*Odontella aurita*	*Paralia sulcata*	
15					1												
20																	
25																	
30																	
35																	
40				1													
45															1		
48							1										
50				3			1									1	
52																	
54																	
56																	
58																	
60																	
62																	
64																	
66																	
70																	
75																	
80																	
85							1										
90			1													1	
95																	
98																	
100				1							1					1.5	
102				1			1				1	1	2				
104				1			2			1	2		1				
106				1			12			1	1	1			1		
111		2					3										
112							1										
113												0.5					
114																	
116												1					
118							1			1							
120																	
122																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms**	*Actinocyclus curvatulus**	*Actinocyclus ochotensis**	*Actinoptychus senarius*	*Asteromphalus robustus*	*Aulacodiscus kittoni**	*Chaetoceros* spp.	*Coscinodiscus radiatus**	*Delphineis* cf. *angusta*	*Delphineis* cf. *surirella*	*Delphineis karstenii*	*Endictya hendeyi**	*Hyalodiscus laevis*	*Lithodesmium undulatum**	*Odontella aurita*	*Paralia sulcata*	
130																	
135																	
140																	
145		1					1										
150								0.5					1				
154							2				0.5	1					
155				0.5				1				1	1				
157													1			1	
158.5		1											1				
160																1	
162																	
165							1										
170				0.5													
175																	
180																	
184							2										
186				1			5		0.5	1			19		4		
188			1	1			3				10.5						
190				6			2			3	6						
192		0.5		1			6			3	3				2		
194				3.5			3				1						
196		1					4				2						
198				1													
200				0.5			1										
201																	
203																	
205							1										
207							1										
210																	
215																	
220																	
222																	
225																	
230																	
235																	
240																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms**	*Actinocyclus curvatulus**	*Actinocyclus ochotensis**	*Actinoptychus senarius*	*Asteromphalus robustus*	*Aulacodiscus kittoni**	*Chaetoceros* spp.	*Coscinodiscus radiatus**	*Delphineis* cf. *angusta*	*Delphineis* cf. *surirella*	*Delphineis karstenii*	*Endictya hendeyi**	*Hyalodiscus laevis*	*Lithodesmium undulatum**	*Odontella aurita*	*Paralia sulcata*	
245																	
250																	
255																	
260																	
265																	
270				0.5													
275																	
280																	
285																	
290																	
292											1	1					
294							1	0.5									
296																1	
298		1								1			1				
300		0.5													1		
301				1.5			1						2				
302							1						1				
304																	
306																1	
310				2													
315																	
320																	
324							1										
326													1				
328													1.5				
330				3.5			1				2	1	3				
332				1			2				0.5			3			
334		1		2			1			3.5	1				1		
335			1				1				1					1	
338																	
340																	
344				1													
350																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms**	*Actinocyclus curvatulus**	*Actinocyclus ochotensis**	*Actinoptychus senarius*	*Asteromphalus robustus*	*Aulacodiscus kittoni**	*Chaetoceros* spp.	*Coscinodiscus radiatus**	*Delphineis* cf. *angusta*	*Delphineis* cf. *surirella*	*Delphineis karstenii*	*Endictya hendeyi**	*Hyalodiscus laevis*	*Lithodesmium undulatum**	*Odontella aurita*	*Paralia sulcata*	
360																	
362																	
363				3													
364		1					1					3					
365				1													
366																	
368																	
372																	
382																	
387				1													
393								1				1.5					
394																	
395																	
396																	
397											1						
398																	
400				1												1	
402							1					2					
407																	
412																	
430											0.5						
433				z									1				
435							1										
436.5																	
437.5																	
438.5																	
440																	
445																	
450																	
454				1													
458				1													
460																	
462				1									1		1		
464						1					3						
466												1			1		
470																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms**	*Actinocyclus curvatulus**	*Actinocyclus ochotensis**	*Actinoptychus senarius*	*Asteromphalus robustus*	*Aulacodiscus kittoni**	*Chaetoceros* spp.	*Coscinodiscus radiatus**	*Delphineis* cf. *angusta*	*Delphineis* cf. *surirella*	*Delphineis karstenii*	*Endictya hendeyi**	*Hyalodiscus laevis*	*Lithodesmium undulatum**	*Odontella aurita*	*Paralia sulcata*	
473																	
476												1					
478				1													
480				2									2				
482											2						
484			2														
484.5				2.5				1			1		1				
485																	
486																	
489																	
491																	
492																	
493																	
494																	
495																	
496																	
498																	
515																	
525				1													
530																	
533																	
535							2										
536.5																	
538																	
540																	
550																	
560																	
570																	
580																	
585																	
590													1			1	
595							2						4				
600											1			1			
602.5																	
605																	
606																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms**	*Actinocyclus curvatulus**	*Actinocyclus ochotensis**	*Actinoptychus senarius*	*Asteromphalus robustus*	*Aulacodiscus kittoni**	*Chaetoceros* spp.	*Coscinodiscus radiatus**	*Delphineis* cf. *angusta*	*Delphineis* cf. *surirella*	*Delphineis karstenii*	*Endictya hendeyi**	*Hyalodiscus laevis*	*Lithodesmium undulatum**	*Odontella aurita*	*Paralia sulcata*	
608																	
610																	
615																	
620																	
624							1										
628							1										
630							2				0.5						
632				1			7	3		56	78	2			2		
634				1			1			15	24	2	1				
636																	
640																	
650																	
660																	
670																	
680																	
690																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms (cont.)**	*Paralia sulcata* (sm)	*Rhaphoneis amphiceros*	*Rhaphoneis margaritalimbata*	*Rhaphoneis psammicola*	*Rhizosolenia styliformis**	*Stellarima stellaris*	*Stephanopyxis dimorpha*	*Thalassionema nitzschioides parva*	*Thalassionema nitzschioides*	*Thalassiosira leptopus*		**Tm diatoms**	*Actinocyclus ingens*	*Actinocyclus oceanicus*		
15																	
20																	
25																	
30																	
35			1		0.5					0.5							
40																	
45																	
48					1												
50										1							
52																	
54																	
56																	
58																	
60																	
62																	
64																	
66																	
70					1												
75																	
80										1							
85										1							
90																	
95																	
98																	
100		1			3					2							
102					3												
104			2		1					1				1			
106		1	2		1					1.5					1		
111			0.5														
112																	
113					1					2							
114																	
116																	
118																	
120																	
122						1											

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms (cont.)**	*Paralia sulcata (sm)*	*Rhaphoneis amphiceros*	*Rhaphoneis margaritalimbata*	*Rhaphoneis psammicola*	*Rhizosolenia styliformis**	*Stellarima stellaris*	*Stephanopyxis dimorpha*	*Thalassionema nitzschioides parva*	*Thalassionema nitzschioides*	*Thalassiosira leptopus*		**Tm diatoms**	*Actinocyclus ingens*	*Actinocyclus oceanicus*		
130																	
135																	
140																	
145																	
150																	
154																	
155										1							
157																	
158.5			0.5														
160					1						0.5						
162																	
165										0.5							
170																	
175																	
180																	
184			1		1					1.5							
186		1	1		1					3							
188										7							
190			1		1.5					8.5	1						
192		1			1					3.5							
194				2	4					3							
196					3					2.5							
198																	
200			1														
201																	
203										1							
205				4	0.5					1	1			1			
207			1	3						0.5							
210																	
215																	
220																	
222																	
225																	
230																	
235																	
240																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms (cont.)**	*Paralia sulcata (sm)*	*Rhaphoneis amphiceros*	*Rhaphoneis margaritalimbata*	*Rhaphoneis psammicola*	*Rhizosolenia styliformis**	*Stellarima stellaris*	*Stephanopyxis dimorpha*	*Thalassionema nitzschioides parva*	*Thalassionema nitzschioides*	*Thalassiosira leptopus*		**Tm diatoms**	*Actinocyclus ingens*	*Actinocyclus oceanicus*		
245																	
250										0.5							
255																	
260																	
265																	
270																	
275																	
280																	
285										0.5							
290																	
292			1														
294																	
296					0.5												
298					1												
300																	
301										0.5							
302		1								0.5							
304																	
306																	
310										2.5							
315																	
320																	
324																	
326										0.5							
328		1		1	0.5					0.5							
330		1								4							
332										1							
334										1							
335					1					2.5							
338									1	1							
340																	
344																	
350																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms (cont.)**	*Paralia sulcata (sm)*	*Rhaphoneis amphiceros*	*Rhaphoneis margaritalimbata*	*Rhaphoneis psammicola*	*Rhizosolenia styliformis**	*Stellarima stellaris*	*Stephanopyxis dimorpha*	*Thalassionema nitzschioides parva*	*Thalassionema nitzschioides*	*Thalassiosira leptopus*		**Tm diatoms**	*Actinocyclus ingens*	*Actinocyclus oceanicus*		
360					1												
362																	
363										2							
364					1					3.5					1		
365																	
366																	
368		1															
372																	
382										0.5							
387																	
393																	
394																	
395																	
396																	
397																	
398																	
400										0.5							
402																	
407																	
412										0.5							
430																	
433			1		2					0.5							
435			1		1												
436.5																	
437.5																	
438.5																	
440																	
445																	
450																	
454					0.5					0.5							
458				1						0.5							
460				1													
462			1	1													
464			1	1						1.5	1						
466			2	1						1.5							
470																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms (cont.)**	*Paralia sulcata (sm)*	*Rhaphoneis amphiceros*	*Rhaphoneis margaritalimbata*	*Rhaphoneis psammicola*	*Rhizosolenia styliformis**	*Stellarima stellaris*	*Stephanopyxis dimorpha*	*Thalassionema nitzschioides parva*	*Thalassionema nitzschioides*	*Thalassiosira leptopus*		**Tm diatoms**	*Actinocyclus ingens*	*Actinocyclus oceanicus*		
473																	
476																	
478																	
480										1							
482																	
484					4					2							
484.5			1							3				2	1		
485										1							
486																	
489																	
491										1							
492																	
493																	
494										0.5							
495										1							
496																	
498										1							
515																	
525																	
530																	
533		1															
535										0.5							
536.5																	
538																	
540																	
550																	
560																	
570																	
580																	
585																	
590			0.5	1													
595										0.5							
600																	
602.5																	
605																	
606																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**HTm diatoms (cont.)**	*Paralia sulcata* (sm)	*Rhaphoneis amphiceros*	*Rhaphoneis margaritalimbata*	*Rhaphoneis psammicola*	*Rhizosolenia styliformis**	*Stellarima stellaris*	*Stephanopyxis dimorpha*	*Thalassionema nitzschioides parva*	*Thalassionema nitzschioides*	*Thalassiosira leptopus*		**Tm diatoms**	*Actinocyclus ingens*	*Actinocyclus oceanicus*		
608																	
610																	
615																	
620																	
624		1															
628										1							
630										2.5							
632		1	2	1	2			1	1	16				3			
634						2				4							
636																	
640																	
650																	
660																	
670																	
680																	
690																	

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Actinocyclus ochtoensis?*	*Actinocyclus* sp.1 after Whiting and Schrader (1986)	*Aulacodiscus probalis*	*Azpeitia nodulifer**	*Coscinodiscus marginatus*	*Coscinodiscus oculus-iridis*	*Coscinodiscus radiatus*	*Cyclotella iris*	*Neodenticula kamtschatica*	*Rhaphoneis angularis*	*Rhizosolenia barboi*	*Stephanopyxis cf turris*	*Stephanopyxis* sp.1 after Whiting and Schrader (1986)	
15						1									
20															
25															
30															
35															
40						1	1				1.5				
45						1									
48		1					1								
50		1													
52													1		
54						1	1.5								
56															
58															
60															
62															
64		1													
66						1									
70															
75															
80						1									
85						1									
90															
95															
98						1									
100						6	5								
102						8	2						1	1	
104						3	3						2		
106		1				12	6						1		
111							5								
112						2									
113						2									
114		1				2						1			
116						1									
118															
120						1									
122															

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Actinocyclus ochtoensis?*	*Actinocyclus* sp.1 after Whiting and Schrader (1986)	*Aulacodiscus probalis*	*Azpeitia nodulifer**	*Coscinodiscus marginatus*	*Coscinodiscus oculus-iridis*	*Coscinodiscus radiatus*	*Cyclotella iris*	*Neodenticula kamtschatica*	*Rhaphoneis angularis*	*Rhizosolenia barboi*	*Stephanopyxis cf turris*	*Stephanopyxis* sp.1 after Whiting and Schrader (1986)	
130															
135		1													
140															
145															
150		0.5					1								
154						1							1		
155						9	7.5								
157															
158.5		1				3	1								
160						7	1								
162						7	2						1		
165						2	1								
170			1			3									
175						1									
180															
184						6		0.5							
186						5									
188						3									
190						2	1								
192						3									
194				1		9									
196															
198													1		
200						1									
201															
203								0.5							
205								2							
207						1.5									
210						1									
215															
220															
222															
225															
230															
235															
240															

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Actinocyclus ochtoensis?*	*Actinocyclus* sp.1 after Whiting and Schrader (1986)	*Aulacodiscus probalis*	*Azpeitia nodulifer**	*Coscinodiscus marginatus*	*Coscinodiscus oculus-iridis*	*Coscinodiscus radiatus*	*Cyclotella iris*	*Neodenticula kamtschatica*	*Rhaphoneis angularis*	*Rhizosolenia barboi*	*Stephanopyxis cf turris*	*Stephanopyxis* sp.1 after Whiting and Schrader (1986)	
245															
250															
255															
260															
265															
270		5				2									
275															
280															
285						5									
290															
292						4		1							
294						1	1.5								
296						1.5									
298		1				4	2								
300						1	0.5								
301						1				1					
302						1									
304															
306															
310															
315						1									
320															
324															
326															
328						1	1								
330						2							1		
332						2	1								
334						4	2.5		1						
335						3	1							1	
338															
340											1		2		
344					1		1					1			
350															

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Actinocyclus ochtoensis?*	*Actinocyclus* sp.1 after Whiting and Schrader (1986)	*Aulacodiscus probalis*	*Azpeitia nodulifer**	*Coscinodiscus marginatus*	*Coscinodiscus oculus-iridis*	*Coscinodiscus radiatus*	*Cyclotella iris*	*Neodenticula kamtschatica*	*Rhaphoneis angularis*	*Rhizosolenia barboi*	*Stephanopyxis cf turris*	*Stephanopyxis* sp.1 after Whiting and Schrader (1986)	
360						2								1	
362						1	1								
363						2	3								
364			1			5	5	1			0.5		1		
365							2								
366															
368															
372							2								
382							1								
387													1		
393															
394						1									
395															
396															
397															
398															
400						2	1								
402															
407															
412															
430						2	1								
433															
435						1							1		
436.5						1									
437.5															
438.5															
440															
445						1									
450							2								
454						3	1								
458						2	1								
460															
462			2		1	5									
464							1								
466						2									
470					1										

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Actinocyclus ochtoensis?*	*Actinocyclus* sp.1 after Whiting and Schrader (1986)	*Aulacodiscus probalis*	*Azpeitia nodulifer**	*Coscinodiscus marginatus*	*Coscinodiscus oculus-iridis*	*Coscinodiscus radiatus*	*Cyclotella iris*	*Neodenticula kamtschatica*	*Rhaphoneis angularis*	*Rhizosolenia barboi*	*Stephanopyxis cf turris*	*Stephanopyxis* sp.1 after Whiting and Schrader (1986)	
473												2			
476															
478															
480						2									
482						2									
484						4									
484.5						1									
485															
486															
489															
491															
492						2	4								
493						1									
494															
495															
496											1				
498						2						2			
515															
525					1	1	1								
530															
533						1									
535															
536.5															
538						1									
540															
550															
560						1									
570															
580															
585						5									
590						3	1								
595							1								
600						3									
602.5															
605															
606															

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Actinocyclus ochtoensis?*	*Actinocyclus* sp.1 after Whiting and Schrader (1986)	*Aulacodiscus probalis*	*Azpeitia nodulifer**	*Coscinodiscus marginatus*	*Coscinodiscus oculus-iridis*	*Coscinodiscus radiatus*	*Cyclotella iris*	*Neodenticula kamtschatica*	*Rhaphoneis angularis*	*Rhizosolenia barboi*	*Stephanopyxis cf turris*	*Stephanopyxis* sp.1 after Whiting and Schrader (1986)	
608															
610															
615															
620															
624															
628															
630						1									
632					1	8	1						2		
634						4		1		1		1			
636															
640															
650															
660															
670															
680															
690															

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Stephanopyxis? sp.*	*Stephanopyxis* sp.4 after Whiting and Schrader (1986)	*Stephanopyxis* sp.5 after Whiting and Schrader (1986)	*Thalassiosira multipora*	*Thalassiosira oestrupii* after Whiting and Schrader (1986)	*Thalassiosira antiqua*	*Thalassiosira plicata*	*Thalassiosira* sp.		**Brackish diatoms**	*Thalassiosira bramaputrae*	*Cyclotella meneghiniana*	*Mastogloia smithii*		
15							1						10			
20																
25							1					2				
30												22	22			
35							3									
40							4					1				
45							3									
48							6									
50							8									
52							3									
54																
56																
58																
60																
62							1									
64																
66																
70							2									
75																
80																
85							1									
90													1			
95																
98																
100					1		11					1		1		
102							17					3				
104							11					2				
106			1				15									
111							2									
112																
113							4		1							
114							3									
116							1									
118						1	2									
120							5									
122							1									

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Stephanopyxis? sp.*	*Stephanopyxis* sp.4 after Whiting and Schrader (1986)	*Stephanopyxis* sp.5 after Whiting and Schrader (1986)	*Thalassiosira multipora*	*Thalassiosira oestrupii* after Whiting and Schrader (1986)	*Thalassiosira antiqua*	*Thalassiosira plicata*	*Thalassiosira* sp.		**Brackish diatoms**	*Thalassiosira bramaputrae*	*Cyclotella meneghiniana*	*Mastogloia smithii*		
130												1				
135																
140																
145							1									
150							3		0.5			1				
154							4					3				
155							7					1		1		
157												3				
158.5							3					2				
160							3					3		1		
162			1				9					3				
165						1	2									
170							2					1				
175							3					3				
180							2					4				
184							5					40	7			
186							11					74	185	185		
188							3					8		20		
190							13					18		10		
192							4					30		16		
194							5					21		12		
196							7					19		18		
198							1					29		8		
200			1				6					36		16		
201							1					23		5		
203												22		2		
205							1					19		14		
207							2					31		26		
210												14		6		
215																
220																
222							2									
225																
230							2									
235							2									
240							2									

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Stephanopyxis? sp.*	*Stephanopyxis* sp.4 after Whiting and Schrader (1986)	*Stephanopyxis* sp.5 after Whiting and Schrader (1986)	*Thalassiosira multipora*	*Thalassiosira oestrupii* after Whiting and Schrader (1986)	*Thalassiosira antiqua*	*Thalassiosira plicata*	*Thalassiosira* sp.		**Brackish diatoms**	*Thalassiosira bramaputrae*	*Cyclotella meneghiniana*	*Mastogloia smithii*		
245							2									
250							5									
255																
260																
265																
270																
275							3									
280							1									
285							2									
290																
292							4									
294							2									
296							1					1				
298							5					4		1		
300							1					2	3			
301							6					5		1		
302																
304							1									
306							4									
310						1	5					2				
315							6					1				
320							3									
324							1									
326							2					10				
328							2					48	36			
330							8					94	960	64		
332							8					26	9	39		
334							6					12		3		
335							10					8				
338							7					1				
340				1								3				
344				1			14					21				
350							3									

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Stephanopyxis? sp.*	*Stephanopyxis* sp.4 after Whiting and Schrader (1986)	*Stephanopyxis* sp.5 after Whiting and Schrader (1986)	*Thalassiosira multipora*	*Thalassiosira oestrupii* after Whiting and Schrader (1986)	*Thalassiosira antiqua*	*Thalassiosira plicata*	*Thalassiosira* sp.		**Brackish diatoms**	*Thalassiosira bramaputrae*	*Cyclotella meneghiniana*	*Mastogloia smithii*		
360							5					15				
362												12				
363							4					42	1			
364							11					4				
365							3									
366							5									
368							1					1				
372							2						1			
382																
387							2									
393														1		
394							1									
395							3						1			
396							2									
397							3						1	1		
398							1					1		1		
400					1		2					3		1		
402																
407							2									
412																
430							3					10	3			
433							1					19	605	67		
435							4					5	2	1		
436.5												1				
437.5												1				
438.5							2					2				
440							2	1								
445							1									
450							7					3				
454							2					37	75	3		
458							2					11	1			
460							1					99	1	20		
462							4					21	19			
464							1					10	13	1		
466							1					4	47			
470							1					1	1			

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Stephanopyxis? sp.*	*Stephanopyxis* sp.4 after Whiting and Schrader (1986)	*Stephanopyxis* sp.5 after Whiting and Schrader (1986)	*Thalassiosira multipora*	*Thalassiosira oestrupii* after Whiting and Schrader (1986)	*Thalassiosira antiqua*	*Thalassiosira plicata*	*Thalassiosira* sp.		**Brackish diatoms**	*Thalassiosira bramaputrae*	*Cyclotella meneghiniana*	*Mastogloia smithii*		
473												6				
476							2					2	6			
478							4					4	48			
480							6					3	2518	8		
482												18	36	4		
484							12					1	2	2		
484.5							5					9	35	6		
485							0.5						1			
486																
489																
491													1			
492							1									
493																
494												1		1		
495																
496																
498							4					6				
515							2									
525														1		
530																
533							1									
535																
536.5																
538														1		
540							1									
550																
560																
570																
580												2				
585							1					18	2	1		
590							4					71	77	7		
595							5					61	448	38		
600							1					24	64			
602.5							1					33	10	1		
605												1				
606							1					2				

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Tm diatoms (cont.)**	*Stephanopyxis? sp.*	*Stephanopyxis* sp.4 after Whiting and Schrader (1986)	*Stephanopyxis* sp.5 after Whiting and Schrader (1986)	*Thalassiosira multipora*	*Thalassiosira oestrupii* after Whiting and Schrader (1986)	*Thalassiosira antiqua*	*Thalassiosira plicata*	*Thalassiosira* sp.		**Brackish diatoms**	*Thalassiosira bramaputrae*	*Cyclotella meneghiniana*	*Mastogloia smithii*		
608												10		1		
610																
615							1					5				
620							2					12		2		
624							1					19		2		
628							1					40				
630							3					82	9	17		
632							20					8	1	6		
634							6					10	1	11		
636												1				
640																
650																
660																
670																
680																
690																

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Misc. euryhaline diatoms**	*Bacillaria paradoxa*	*Campylosira echineis*	*Cocconeis scutellum*	*Cocconeis scutellum parva*	*Diploneis interrupta*	*Diploneis smithii rhombica*	*Rhopalodia musculus*	*Tryblionella apiculata*	*Tryblionella granulata*	*Tryblionella hungarica*	*Tryblionella plana*		
15														
20														
25														
30														
35														
40														
45														
48														
50														
52														
54														
56														
58														
60														
62														
64														
66														
70														
75														
80														
85														
90														
95														
98														
100														
102														
104														
106														
111														
112														
113														
114														
116														
118														
120														
122														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Misc. euryhaline diatoms**	*Bacillaria paradoxa*	*Campylosira echineis*	*Cocconeis scutellum*	*Cocconeis scutellum parva*	*Diploneis interrupta*	*Diploneis smithii rhombica*	*Rhopalodia musculus*	*Tryblionella apiculata*	*Tryblionella granulata*	*Tryblionella hungarica*	*Tryblionella plana*		
130														
135														
140														
145														
150														
154														
155														
157														
158.5														
160														
162														
165														
170														
175														
180					1									
184														
186			2											
188					1									
190					0.5							1		
192												0.5		
194												2		
196												1.5		
198														
200					2.5									
201					1									
203														
205														
207														
210														
215														
220														
222														
225														
230														
235														
240														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	***Misc. euryhaline diatoms***	*Bacillaria paradoxa*	*Campylosira echineis*	*Cocconeis scutellum*	*Cocconeis scutellum parva*	*Diploneis interrupta*	*Diploneis smithii rhombica*	*Rhopalodia musculus*	*Tryblionella apiculata*	*Tryblionella granulata*	*Tryblionella hungarica*	*Tryblionella plana*		
245														
250														
255														
260														
265														
270														
275														
280														
285														
290														
292				0.5										
294														
296														
298														
300														
301														
302														
304														
306														
310														
315														
320														
324														
326														
328														
330					1									
332					3									
334														
335														
338														
340														
344														
350														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Misc. euryhaline diatoms**	*Bacillaria paradoxa*	*Campylosira echineis*	*Cocconeis scutellum*	*Cocconeis scutellum parva*	*Diploneis interrupta*	*Diploneis smithii rhombica*	*Rhopalodia musculus*	*Tryblionella apiculata*	*Tryblionella granulata*	*Tryblionella hungarica*	*Tryblionella plana*		
360														
362														
363														
364														
365														
366														
368														
372														
382														
387														
393														
394														
395														
396														
397														
398														
400														
402														
407														
412														
430														
433			1											
435														
436.5														
437.5														
438.5														
440														
445														
450														
454														
458														
460					3									
462		1	1		1									
464														
466														
470														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Misc. euryhaline diatoms**	*Bacillaria paradoxa*	*Campylosira echineis*	*Cocconeis scutellum*	*Cocconeis scutellum parva*	*Diploneis interrupta*	*Diploneis smithii rhombica*	*Rhopalodia musculus*	*Tryblionella apiculata*	*Tryblionella granulata*	*Tryblionella hungarica*	*Tryblionella plana*		
473														
476														
478														
480														
482														
484														
484.5		1												
485														
486														
489														
491														
492														
493														
494														
495														
496														
498														
515														
525														
530														
533														
535														
536.5														
538														
540														
550														
560														
570														
580														
585														
590														
595		1	3		4									
600					3.5									
602.5														
605														
606														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	***Misc. euryhaline diatoms***	*Bacillaria paradoxa*	*Campylosira echineis*	*Cocconeis scutellum*	*Cocconeis scutellum parva*	*Diploneis interrupta*	*Diploneis smithii rhombica*	*Rhopalodia musculus*	*Tryblionella apiculata*	*Tryblionella granulata*	*Tryblionella hungarica*	*Tryblionella plana*		
608														
610														
615														
620														
624														
628														
630					0.5									
632		3	12											
634		3	10		0.5									
636														
640														
650														
660														
670														
680														
690														

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Freshwater diatoms:**	*Aulacoseira italica*	*Aulacoseira* spp. (small valves)	*Cyclotella* cf. *compta*	Miscellaneous large pennate diatoms	Miscellaneous small pennate diatoms	*Tabellaria* spp.		**TOTAL DIATOM COUNTS**	**Hm diatoms**	**HTm diatoms**	**Tm diatoms**	**EE diatoms**	**Freshwater diatoms**		
15		17	10	12	5	61	7				1	2	10	112		
20			321	5	22	117	34							499		
25		6	120		26	213	111					1	2	476		
30		340	10	1	9	37	8						44	405		
35		4	10		20	40	15				2	3		89		
40		21			28	79	20			2.5	1	7.5	1	148		
45		11	10		34	185	31				1	4		271		
48		19	70		51	270	80			4	2	8		490		
50		8	250		41	256	81			3	6	9		636		
52		1	10	160	59	158	5					4		393		
54		25		30	125	109	4					2.5		293		
56		21	20	140	58	225	15							479		
58		8		160	17	77	5							267		
60		15	1	209	23	139	10							397		
62		4	10	290	10	83	6					1		403		
64		6	520	80	23	277	67					1		973		
66		29	10	190	40	255	57					1		581		
70		55	20	4	59	267	41				1	2		446		
75			80		13	88	11							192		
80		1	2		22	93	8			1	1	1		126		
85		12	10		26	153	26				2	2		227		
90		20	160	4	64	342	36				2		1	626		
95		6	20	28	60	362	38							514		
98		8	20	140	24	338	66					1		596		
100		16	420	54	58	306	28			1	11.5	23	2	882		
102		2	240	40	26	280	32			5	7	29	3	620		
104		2	18	16	36	138	18			15	10	20	2	228		
106		10	168	46	76	332	90			7	22.5	37		722		
111		6	8	22	14	110	10			1	5.5	7		170		
112		6	22	36	16	158	38			0.5	1	2		276		
113			8	6	4	42	12			1	3.5	7		72		
114		14	58	408	66	322	106					7		974		
116		9	40		39	230	35				1	2		353		
118		11	580	1	50	230	2				2	3		874		
120			51	62	56	280	11					6		460		
122		5	50	14	29	145	10				1	1		253		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Freshwater diatoms:**	*Aulacoseira italica*	*Aulacoseira* spp. (small valves)	*Cyclotella* cf. *compta*	Miscellaneous large pennate diatoms	Miscellaneous small pennate diatoms	*Tabellaria* spp.		**TOTAL DIATOM COUNTS**	**Hm diatoms**	**HTm diatoms**	**Tm diatoms**	**EE diatoms**	**Freshwater diatoms**		
130		15	130	34	22	142	14						1	357		
135		3	110	5	9	81	1					1		209		
140		3	370	28	30	230	8							669		
145		8	210	2	15	143	26				2	1		404		
150		56	200	260	60	456	68			2	0.5	5	1	1100		
154		35	40	50	32	273	48			1	3.5	6	3	478		
155		30	20	20	70	135	18			2	3.5	23.5	2	293		
157		104	120	6	137	494	68			1	1		3	929		
158.5		89	230	6	63	476	55			1	1.5	8	2	919		
160		133	400	2	100	560	96				2.5	11	4	1291		
162		51	570	4	86	723	118					20	3	1552		
165		95	460	4	24	157	46				1.5	6		786		
170		231	1240	54	25	332	51				0.5	6	1.5	1933		
175		24	1320	43	35	196	41					4	3	1659		
180		12	540		36	150	23			2		2	4	761		
184		35	60	4	43	47	4			1	5.5	11.5	47	193		
186		3	410	4	23	113	10			42.5	17.5	16	450	563		
188		22	50	19	10	45				13.5	22.5	6	28.5	146		
190		66	90	30	9	71	4			9.5	29	16	28.5	270		
192		43	90	23	10	50	5			6	21	7	46	221		
194		54	150	32	10	95	8			6	16.5	15	33	349		
196		34	110	35	7	79	4			5.5	12.5	7	37	269		
198		1	90	75	4	75	6				1	2	37.5	251		
200		1	130	24	5	50	1			3.5	2.5	8	53	211		
201		1	10	80	15	91	7			2		1	28	204		
203		1	40	9	14	36	1			1	1	0.5	24	101		
205		11	70	8	12	61	8			3	7.5	4	33	170		
207		26	10	17	3	32				8	5.5	3.5	57	88		
210		10	100	212	30	134	14					1	20	500		
215		70	50	60	1	42	2							225		
220		147	300	436	9	60	1							953		
222		820	70	71	3	21	2					2		249		
225		1200	50	100	8	61	4							343		
230		3900	60	50	13	112	2					2		4137		
235		14	370	180	8	68	4					2		644		
240		101	800	70	3	120	1					2		1095		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Freshwater diatoms:**	*Aulacoseira italica*	*Aulacoseira* spp. (small valves)	*Cyclotella* cf. *compta*	Miscellaneous large pennate diatoms	Miscellaneous small pennate diatoms	*Tabellaria* spp.		**TOTAL DIATOM COUNTS**	**Hm diatoms**	**HTm diatoms**	**Tm diatoms**	**EE diatoms**	**Freshwater diatoms**		
245		222	100	50	9	55	5					2		441		
250		14	18	4	2	30	1				0.5	5		69		
255		46	18	1	2	14	1							82		
260		26	60	7	5	37	4							139		
265		48	390	200	17	93	5							753		
270		250	450	30	30	199	3				0.5	7		962		
275		327	2025	420	30	206	10					3		3018		
280		1140	500	71	70	175	4					1		1960		
285		353	520	40	35	193	13				0.5	7		1154		
290		251	240	20	44	402	20							977		
292		30	420	80	45	395	20			0.5	3	9		990		
294		85	270	30	35	451	22			0.5	1.5	4.5		893		
296		228	30	50	26	196	19				1.5	2.5	1	549		
298		166	110	60	42	145	5			9.5	3	12	4	528		
300		120	180	47	41	200	15			5	1.5	2.5	2	603		
301		125	90	50	20	131	9			5	3	8	5	425		
302		35	10	10	6	38	2			3	2.5	1		101		
304		40	200	161	17	95	2					1		515		
306		501	280	40	60	466	98				1	4		1445		
310		386	300	60	44	144	30				4.5	6	2	964		
315		676	240		56	212	36					7	1	1220		
320		390	60		35	106	7					3		598		
324			195		8	55	10				1	1		268		
326		2	360		26	218	8			2	0.5	2	10	614		
328		8	250		48	165	7			1.5	3	4	84	478		
330		5	170		12	109	10			9	12.5	11	1054	306		
332		1		2	34	194	10			8	7.5	11	26	241		
334		10	51	47	37	163	10			22	10.5	13.5	12	318		
335		4	95	154	28	203	22			28	7.5	15	8	506		
338			6	16		18	2			2	2	7	1	42		
340		3	30	24	32	280	12					4	3	381		
344		37	98	128	58	402	38				1	18	21	761		
350		92	174	98	63	620	23					3		1070		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Freshwater diatoms:**	*Aulacoseira italica*	*Aulacoseira* spp. (small valves)	*Cyclotella* cf. *compta*	Miscellaneous large pennate diatoms	Miscellaneous small pennate diatoms	*Tabellaria* spp.		**TOTAL DIATOM COUNTS**	**Hm diatoms**	**HTm diatoms**	**Tm diatoms**	**EE diatoms**	**Freshwater diatoms**		
360		4	20	200	16	270	17				1	8	15	527		
362		2	20	200	22	175	13					2	12	432		
363		2	150	160	25	296	9			2	5	9	43	642		
364		61	20	30	63	236	6			1.5	9.5	25.5	4.5	416		
365		4	130	75	42	178	15				1	5		444		
366		3	180	150	42	134	19					5		528		
368		3	2	33	17	123	11				1	1	1	189		
372		10	20	28	37	167	30					4	1	292		
382		3	319	152	3	159	14				0.5	1		650		
387		2	150	40	21	154	12				1	3		379		
393		19	350	60	16	139	19				2.5		1	603		
394		10	820	80	13	205	21					2		1149		
395		9	590	290	25	214	28					3	1	1156		
396		11	80	70	23	179	26					2		389		
397		9	150	140	40	219	17			1	1	3	2	575		
398		10	30	30	32	94	11					1	2	207		
400		31	150	200	59	311	36			1	2.5	6	4	787		
402		13	150	101	51	162	13				3			490		
407		13	140	40	41	192	16					2		442		
412		10	60	20	13	89	12				0.5			204		
430		68	340	80	45	297	21				0.5	6	13	851		
433		15	2		7	28				5	3.5	1	624	52		
435		82	2		62	118	21			4	3	6	7	285		
436.5		15	16	12	7	60	9					1	1	119		
437.5		29	120	32	16	100	13						1	310		
438.5		68	270	13	43	294	64					2	2	752		
440		45	550	47	61	304	65					3		1072		
445		174	130	42	16	310	22					2		694		
450		1740	170		24	151	36					9	3	2121		
454		1720		2	33	31	2				2	6	112	1788		
458		1390			40	82	21				2.5	5	12	1533		
460		600		1	54	159	2			8	1	1	100	816		
462		350	10	3	26	70	3			26	4	12	40	462		
464		250	5	7	23	91	6			44	8.5	2	23	377		
466		90	10	5	12	60	2			42	6.5	3	52	179		
470		140	10	11	25	88	5					2	2	279		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Freshwater diatoms:**	*Aulacoseira italica*	*Aulacoseira* spp. (small valves)	*Cyclotella* cf. *compta*	Miscellaneous large pennate diatoms	Miscellaneous small pennate diatoms	*Tabellaria* spp.		**TOTAL DIATOM COUNTS**	**Hm diatoms**	**HTm diatoms**	**Tm diatoms**	**EE diatoms**	**Freshwater diatoms**		
473		740	20	2	8	100						2	6	870		
476		448			8	68	4				1	2	8	528		
478		1058	10		16	154	4			2	1	4	52	1288		
480		64	10		24	60	2			2	3	8	2529	174		
482			20	58	8	64				42	2	2	58	150		
484		10	60		12	52	2			22	8	16	5	136		
484.5		178	40	26	112	324	40			9	8.5	9	50	720		
485		14	120	34	22	88	16			1	1	0.5	1	294		
486		14	840	120	16	140	30							1160		
489		46	260	86	18	86	8							504		
491		164	40	12	18	78	8				1		1	320		
492		2	60	88	42	170	14					7		376		
493		4	60	54	42	58	8					1		226		
494		12	160	76	18	140	16				0.5		2	422		
495		30	400	260	30	284	58				1			1062		
496		30	1060	980	68	366	36					1		2540		
498		34	840	820	44	326	44				1	8	6	2108		
515		20	1710	254	52	277	45					2		2358		
525		57	540	243	69	278	60				1	3	1	1247		
530		34	1180	105	18	233	75							1645		
533		13	270	83	49	174	38				1	2		627		
535		14	610	64	65	204	33				2.5			990		
536.5		11	170	32	129	199	26							567		
538		50	70	31	118	122	10					1	1	401		
540		51	290	70	65	253	19					1		748		
550		22	790	273	74	288	70							1517		
560		35	420	21	36	150	12					1		674		
570		31	140	36	9	81	5							302		
580		175	170	14	20	132	26						2	537		
585		538	870	17	90	422	52					6	21	1989		
590		2170	460	7	43	109	3			1	2.5	8	155	2792		
595		518	10		18	41	3			12	2.5	6	547	590		
600		183	30	2	31	64	2			3.5	2	4	88	312		
602.5		28	70	13	32	92	10					1	44	245		
605		19	90	7	38	118	12						1	284		
606		21	310	21	92	245	24					1	2	713		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	**Freshwater diatoms:**	*Aulacoseira italica*	*Aulacoseira* spp. (small valves)	*Cyclotella* cf. *compta*	Miscellaneous large pennate diatoms	Miscellaneous small pennate diatoms	*Tabellaria* spp.		**TOTAL DIATOM COUNTS**	**Hm diatoms**	**HTm diatoms**	**Tm diatoms**	**EE diatoms**	**Freshwater diatoms**		
608		4	150	15	63	171	1						11	404		
610			153	16	48	128	1							346		
615		46	130	14	64	199	32					1	5	485		
620		41	600	2	58	158	11			1		2	14	870		
624		367	150	6	63	136	5				2	1	21	727		
628		1420	380	41	35	181	6			1	2	1	40	2063		
630		242	10	17	14	29	1			0.5	5	4	108	313		
632		15			24	48				40	173	35	15	87		
634		12			22	70	2			39.5	49	13	22	106		
636					49	235							1	284		
640					33	359	1							393		
650					1	29								30		
660					46	359								405		
670		1			76	566								643		
680		12			14	341								367		
690		14			25	117	4							160		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Additional siliceous microfossils	Sponge spicules	**Radiolarians**	**Silicoflagellates**	
15		1			
20					
25		2			
30					
35		1			
40		2			
45					
48		1			
50		4		2	
52		7			
54		6			
56		12			
58		4			
60		2			
62		3			
64		2		1	
66		3			
70		14			
75		4			
80				1	
85					
90		16			
95		12			
98		10			
100		24		1	
102		8			
104		8	1		
106		6	1	1	
111		2			
112		4			
113		2			
114		4			
116		4			
118		3			
120		1			
122		4			

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Additional siliceous microfossils	Sponge spicules	Radiolarians	Silicoflagellates
130		5		
135		2		
140		1		
145		3		
150		17		
154		5		1
155		14		1
157		17		
158.5		11		
160		13		0.5
162		16		1
165		4		
170		4		1
175		7		
180		5		
184		6		1
186		1		2
188		4		3
190		4	1	2
192		7		1.5
194		8		1
196		9		
198		4		
200		5		
201		5		
203		10		
205		4		
207		4		
210		3		
215		4		
220		6		
222				
225		4		
230		13		
235		1		
240		1		

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Additional siliceous microfossils	Sponge spicules	**Radiolarians**	**Silicoflagellates**	
245					
250		1			
255		1			
260		2			
265		8			
270		18			
275		18			
280		5			
285		12			
290		10			
292		4			
294		18		1	
296		9			
298		39			
300		13			
301		14			
302		14			
304		14			
306		10			
310		36		1	
315		20			
320		3			
324					
326		4			
328		8			
330		3		1	
332		2			
334		14			
335		14		2	
338		1			
340		1			
344		6		1	
350		11			

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Additional siliceous microfossils	Sponge spicules	Radiolarians	Silicoflagellates	
360		4			
362		7			
363		8		1	
364		11		1	
365		8			
366		3			
368		9			
372		5			
382		1			
387		6			
393		7			
394		2			
395		2			
396		5			
397		24			
398		19			
400		44			
402		7			
407		11			
412		7			
430		6			
433		1			
435		20			
436.5		5			
437.5		6			
438.5		40			
440		27			
445		7			
450		5			
454		1			
458		9			
460		3			
462		6		1	
464		2			
466		4			
470		4			

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Additional siliceous microfossils	Sponge spicules	Radiolarians	Silicoflagellates	
473		8			
476		6			
478		4			
480		6		2	
482					
484		4			
484.5		14		1	
485		10			
486		6			
489		12			
491		4			
492		18			
493		26			
494		22			
495		12			
496		18			
498		20			
515		18			
525		16			
530		10			
533		5			
535		16			
536.5		47			
538		5			
540		23			
550		8			
560		7		1	
570					
580		2			
585		22			
590		13			
595		5			
600		6		1	
602.5		2			
605		7			
606		4			

Appendix 4. Downcore diatom data from Bradley Lake (raw counts).

Depth in core (cm)	Additional siliceous microfossils	Sponge spicules	**Radiolarians**	**Silicoflagellates**	
608		14			
610		6			
615		11			
620		11			
624		6			
628		5			
630					
632		3		3	
634		5			
636					
640					
650					
660					
670		2			
680					
690		1			