DIATOM EVIDENCE FOR TSUNAMI INUNDATION FROM LAGOON CREEK, A COASTAL FRESHWATER POND, DEL NORTE COUNTY, CALIFORNIA

by

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ABSTRACT

Diatoms preserved in sand layers deposited in a coastal freshwater pond in Del Norte County, California, record repeated inundation by tsunamis. The pond deposits at Lagoon Creek contain primarily peat interbedded with landward-thinning and landward-fining layers of sand. Diatom samples from six vibracores confirm that the peat formed in a primarily freshwater environment. The sand layers, however, contain allochthonous marine diatom species, and in some cases allochthonous brackish-marine diatom species in muddy rip-up clasts. Many of the marine diatoms found in the sand sheets are also found living in the surf zone of the modern beach adjacent to the site. The brackish-marine diatoms consist of many species that are also found living on modern intertidal mudflats.

Marine diatoms have been found in sand layers as far inland as 1,400 m, allowing an estimate of landward inundation during tsunami events at the site. The brackish-marine mudflat species are interpreted to have lived in a short-lived saline layer at the bottom of the pond that was emplaced during tsunami inundation events.

Accelerator mass spectrometry (AMS) radiocarbon dating of primarily twigs and spruce cones indicates that the pond sediment record spans approximately 3,000 years of deposition. Additional age control came from the identification of

the 0.93 - 1.3 ka tephra from Little Glass Mountain, deposited between two of the sand layers. Ages from the sand layers agree well with ages documented for tsunamis and earthquakes in tidal wetland stratigraphy and lakes elsewhere along the Cascadia subduction zone.

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INTRODUCTION

Stratigraphic investigations in tidal wetlands have supported the hypothesis of great subduction zone earthquakes in the Pacific Northwest along the Cascadia subduction zone by recording sudden subsidence events (Atwater, 1987; Atwater and Yamaguchi, 1991; Atwater, 1992, Nelson, 1992; Clarke and Carver, 1992; Clague and Bobrowsky, 1994a; Carver and McCalpin, 1996). In addition, stratigraphic and sedimentologic evidence supports tsunami generation during these seismic events (Reinhart and Bourgeois, 1989; Atwater and Moore, 1992; and Clague and Bobrowsky, 1994a). Micropaleontologic analyses of tidal wetland stratigraphy in such areas have supported the interpretations of both subsidence events and tsunami deposition along the Cascadia subduction zone (Darienzo and Peterson, 1990; Li, 1992; Mathewes and Clague, 1994; Hemphill-Haley, 1995a and 1995b; Hemphill-Haley, 1996; and Nelson et al., 1996a).

Hemphill-Haley (1995a) used fossil diatoms to support sedimentary evidence of a subsidence event and tsunami that occurred in southwestern Washington 300 yr ago (Atwater and Yamaguchi, 1991). By identifying groups of diatoms that occupy particular elevational levels in the intertidal zone, small-scale sea-level changes have been identified in the sedimentary record as coseismic subsidence events (Hemphill-Haley, 1995b; Nelson et al., 1996a).

Diatoms are also useful for answering specific questions about tsunami inundation. Hemphill-Haley (1996) describes a variety of techniques to approach such questions related to tsunami deposits. Degree of valve preservation has emerged as a major piece of evidence, with good preservation supporting rapid deposition, which should accompany a tsunami. Delicate species that would otherwise become fragmented or dissolve may be relatively abundant in tsunami deposits. A high degree of preservation with a large percentage of broken valves may also be indicative of tsunami deposition. During turbulent flow of sandy water, diatom valves may be mechanically broken (Dawson et al., 1997).

Comparison of diatom samples from a tsunami deposit with samples from possible source areas gives evidence of the origin of the source material, and possibly shows differences between local and remote tsunami deposits. Hemphill-Haley (1996) used diatom evidence to suggest that the source area for a tsunami deposit in the Copalis River estuary, Washington, was not the adjacent sand spit, but rather the sand flats of the lower estuary. This evidence led to the interpretation that the tsunami did not overtop the spit, but instead flowed up the river channel.

Additionally, diatoms have been used to indicate the landward extent of the tsunami surge. At the Niawiakum River, Washington, the most recent tsunami deposit overlies a buried soil, and can be followed 3 km inland in cut banks and cores. By following the top of the buried soil and sampling at this horizon, Hemphill-Haley (1996) used diatoms to demonstrate that the landward extent of tsunami inundation was at least 1 km further inland than the limit of sand deposition.

Diatoms can be used to identify tsunami surges into freshwater ponds or lakes by detecting brackish to marine diatom species in an otherwise freshwater environment (Minoura et al., 1994; Hemphill-Haley, 1996; Nelson et al., 1996b; and Hutchinson et al., 1997). Nelson et al. (1996b) studied Cascadia tsunamis by examining the sediment record of Bradley Lake, a low-lying coastal lake in southern Oregon. They identified 14 disturbance events, represented by sand or massive gyttja layers in otherwise laminated silts, in a 6-meter section of lake sediments that spanned 7.5 ky. By comparison, Hutchinson et al. (1997) observed evidence for only one tsunami event in the last 3-4 ky in Kanim Lake, Vancouver, Island. They attribute the absence of deposits indicating other tsunami events to an emerging coast at the site, and to a thick forest stand between the shore and Kanim Lake.

The purpose of my study was to examine the diatom biostratigraphy of suspected tsunami-deposited sand layers at Lagoon Creek, a coastal freshwater pond in northern California. Coastal lakes or ponds at low elevations should trap and preserve tsunami deposits. When tsunami inundation occurs, a distinctive layer of beach sand may be left in the pond. When present, these sand layers should contain allochthonous marine diatoms that were derived from the beach. This study employs diatom and radiocarbon evidence to evaluate the late Holocene history of marine inundations at Lagoon Creek.

STUDY AREA

Lagoon Creek is a freshwater pond located 4.5 km north of the mouth of the Klamath River in Del Norte County, northern California (Figure 1). The pond is 1000 m long and 100 m wide, and is dammed by a beach berm, a log pile, and a small man-made dam. The seaward edge of the pond is 300 m from the surf zone on the beach, and the beach berm is 5 m in height. Two small freshwater creeks feed the pond, and a small creek drains from the pond out to the adjacent beach. The long axis of the pond is roughly perpendicular to the shoreline, thereby providing a good environment in which to measure the inland extent of tsunami inundation (Figure 2).

Lagoon Creek is fresh, supporting cattail (*Typha latifolia*), bulrush (*Scirpus microcarpus*), horsetail (*Equisetum arvense*), sedge (*Carex* spp.), and yellow pond lily (*Nuphar polysepalum*) around the perimeter and in densely-vegetated shallow inland areas. The water depth in the pond varies from 4.3 m at the open seaward (north) side to less than 1 m on the shallow inland marshy areas (south side). Two sinuous channels about 2 m deep wind across the inland marshy areas (Figures 2 and 3).

Crescent Plywood Mill was operated at the seaward edge of the pond in the 1940's through mid-1950's. Although the structures are gone, there remains an approximately 2-m-wide by 1-m-high wooden dam on the outlet stream. This dam raised

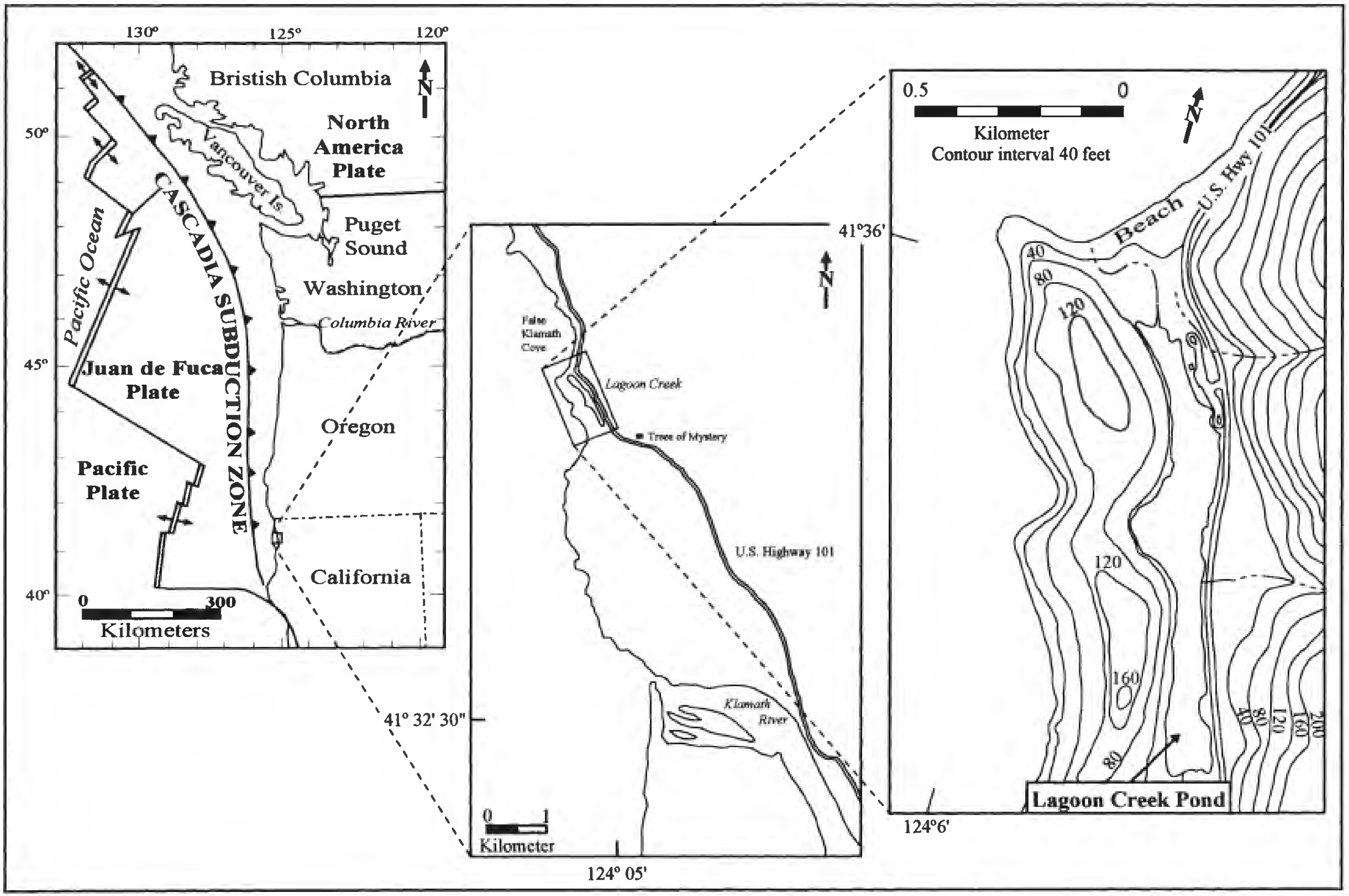

Figure 1. Location of study, showing study site in relation to the southern end of the Cascadia subduction zone.

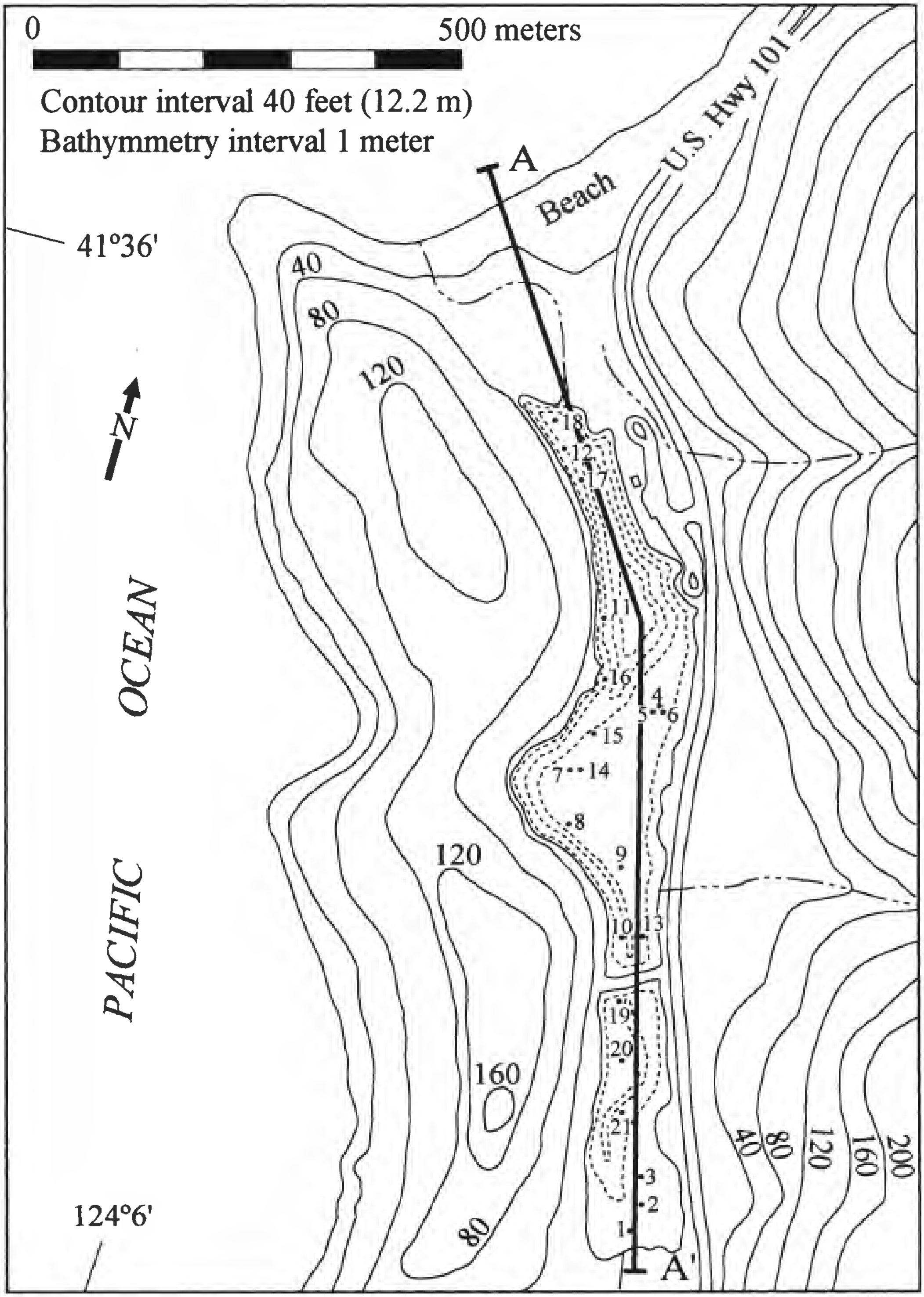

Figure 2. Detailed site map with pond bathymmetry. Numbered dots show vibracore locations. A to A' is the cross section shown in Figure 3.

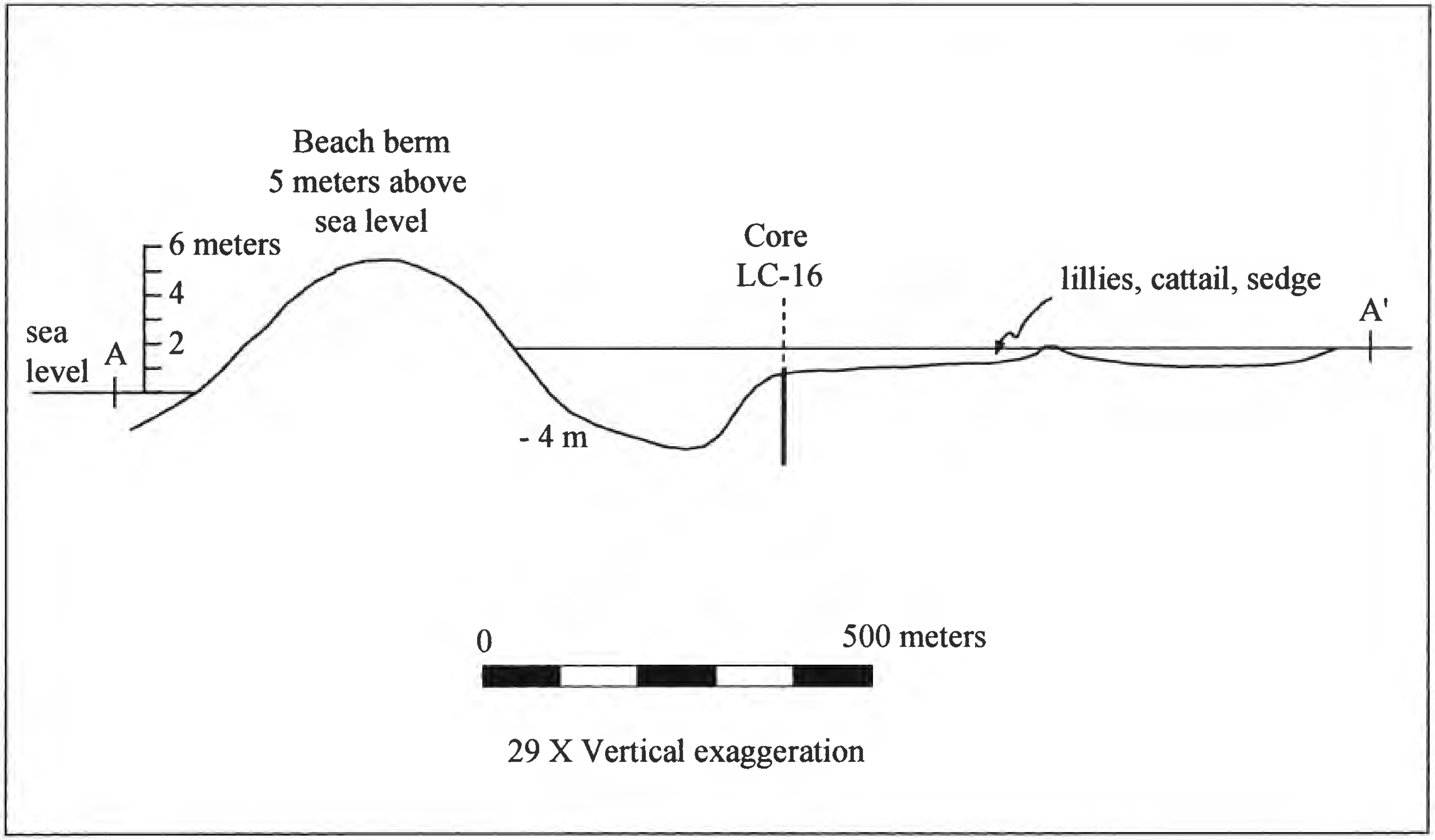

Figure 3. Cross section of Lagoon Creek pond from A to A' showing the deep seaward (north) side of the pond, the shallow inland (south) side of the pond, and the location of core LC-16 .

the water level in the pond about 1 m. The resulting rise in pond level probably increased the length of the pond upvalley (Figures 2 and 3).

METHODS

Twenty-one vibracores measuring 7.5 cm in diameter were taken in the pond in a rough transect north to south (Figures 2, 3, and 4). Of the 21 cores, 6 were selected for diatom study based on even spacing along the transect in the pond and completeness of their sedimentary record (Figure 4). One core (LC-16, Figure 6), which was representative of the site's complete stratigraphy, was chosen for the most thorough diatom examination. From the other five cores suspected tsunami sand deposits and adjacent sediments were examined. Cores were split, described, and sampled for diatoms and radiocarbon in the lab.

Fossil diatoms from 113 samples were counted, with at least 400 diatom valves counted per slide. Many additional samples were examined qualitatively. Fossil diatom samples were processed and prepared for study by: (1) recording the weight and volume (~ 1 cc) of each sample; (2) heating each sample in about 30 ml of 35% concentration hydrogen peroxide until the organics were removed; (3) rinsing any remaining hydrogen peroxide out of the sample; (4) diluting the sample to about 20 ml in distilled water; (5) settling about 2 drops of sample slurry onto coverslips in the bottom of 100 ml beakers of water; (6) gently siphoning off most of the water after 24 hours, and air drying the coverslips for 24 hours; and finally (7) gluing the coverslips onto slides with Meltmount. The settling method was used to produce slides with randomly distributed diatom valves

(Battarbee, 1973) and a statistically random subsample that represents all sizes of particles equally (Laws, 1983; Scherer, 1994).

Modern diatoms were sampled from several different environments within and around the pond. The sampling localities are shown in Figure A1 (Appendix 1). Sediments were sampled from the marsh edges and from a sediment trap from the center of the marsh. Different algae growing on rocks in the adjacent surf zone were sampled. Soil near the marsh, sand from the swash zone, and sea water from the surf zone were also sampled. Eighteen modern diatom samples were used to classify modern diatom environments in and near the study pond.

Modern diatom samples were prepared by: (1) diluting ~1 cc of sample in 20 ml of distilled water; (2) adding formaldehyde and green cytoplasm stain to preserve and stain the living diatoms; and (3) preparing slides using the settling method described for the fossil samples. When counting modern samples, living diatoms (identified by green stain) were counted as two because of the two valves that become separated after death. Empty diatom valves were each counted as one.

Diatom species were identified using the following references: (Barron, 1985; Cleve, 1894-96; Cupp, 1943; Foged, 1981; Hemphill-Haley, 1993, 1995b, 1996; Hemphill-Haley and Lewis, 1995; Hustedt, 1930-66; Hustedt, 1955; Jensen, 1985; Krammer and Lange-Bertalot, 1985; Laws, 1988; Patrick and Reimer, 1966; Rao and Lewin, 1976; Round et al., 1990; Schmidt, 1875-1944; Tynni, 1986; and Van Heurck, 1896). In addition, several identifications were verified by E. Hemphill-Haley between 1996-1998.

The modern diatom data was used to classify the modern diatom distribution using Q-mode factor analysis techniques appropriate to micropaleontologic studies (e.g. Imbrie and Kipp, 1971; McIntire, 1973; McIntire and Overton, 1971). The analysis was run on Cabfac II software written by Philip J. Howell, Brown University, 1993.

All of the radiocarbon dates reported here are calibrated intervals given in "yr old," which refers to years before A.D. 2000. Radiocarbon ages were processed by Beta Analytic, Coral Gables, Florida. Most samples were dated using accelerator mass spectrometry (AMS) methods. Calibrations were made using Calib version 3.0.3A (Stuiver and Reimer, 1993) using a lab error multiplier of 1.6. Table 1 lists all radiocarbon-dated samples used in this study.

RESULTS

Figure 4 shows the simplified stratigraphy and correlation between the 21 vibracores taken at Lagoon Creek. The sand layers are more numerous and thicker on the north (seaward) edge of the pond. There are at least four and possibly six sand layers in the stratigraphy that probably represent tsunami inundation into the pond (Table 2). The letter-designated names of the sand layers are those established by Atwater and Hemphill-Haley (1997) for similar-aged events from Willapa Bay, Washington.

The biostratigraphy of Lagoon Creek is based on the ecology, preservation, and physical condition (quantity broken) of diatoms sampled from the six cores. In Figures 5 through 10 relative percentages of diatoms are broken down into freshwater (oligohalobous), brackish-marine (mesohalobous-polyhalobous), and "beach" species. "Beach" refers to both planktic (lives floating in water) and epipsammic (lives in or attached to sand grains) marine species. This designation includes those species that occupy the source area of the tsunami deposit (i.e. marine water and beach sand) and includes many species observed living in the swash zone of the modern beach adjacent to the Lagoon Creek pond. Salinity ranges used to classify diatoms are summarized in Table 3.

Many of the modern diatom species collected in and near the Lagoon Creek pond are the same as those found in the study cores. Freshwater species collected in the pond that

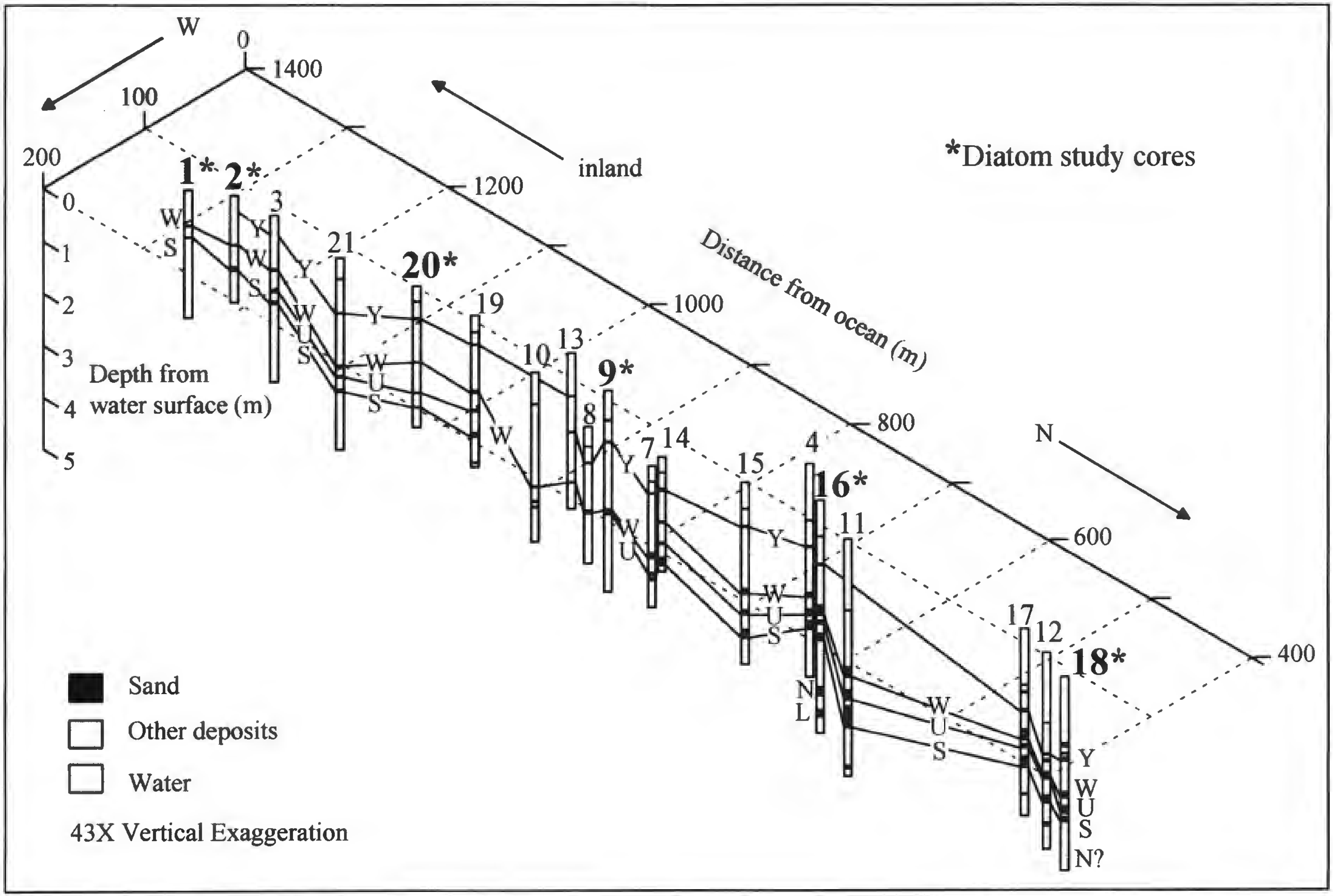

Figure 4. Fence diagram of all Lagoon Creek vibracores, diatom study cores denoted with bold type and an asterisk.

TABLE 1. SUMMARY OF LAGOON CREEK RADIOCARBON SAMPLES

Layer	Conventional ^{14}C age BP	Calibrated Age* BP	$^{13}C/^{12}C$ ratio o/oo	Core / Sample #	Beta Lab Number	Material	Method	Context
Y	370±70	0-550	-29.2	LC1-B6 (gouge core)	B-91553	bulk peat	RM	just below sand layer
W	1270±40	1300-1060	-28.3	LC-16- RC2	B-107490	twig with bark	AMS	detrital wood at top of sand layer
W	1300±40	1310-1060	-28.8	LC-18 - RC2	B-113416	sticks	AMS	top of sand
W	1330±40	1330-1080	-27.8	LC-3 - RC3	B-101544	spruce cone	AMS	in sand layer
W	1400±40	1400-1180	-30.7	LC-21 - RC1	B-113419	stick	AMS	above sand layer
U	1370±40	1360-1170	-24.7	LC-4 - RC2	B-101543	wood chunk	AMS	in mud 3 cm above sand
U	1520±40	1540-1290	-32.4	LC-16 - RC3	B-107491	twig	AMS	in sand layer
U	1530±40	1540-1300	-31.8	LC-21 - RC2	B-113420	twig	AMS	in sand layer
U	1590±40	1610-1330	-27.7	LC-18 - RC3	B-113417	twigs with bark	AMS	top of sand
diamicton	1520±50	1550-1280	-27.8	LC-9 - RC4	B-107495	stick with bark	AMS	in diamicton
S	1230±70†	1330-930	-24.9	LC-16 - RC4	B-107492	wood chunk	AMS	in mud just above sand layer
S	1640±60	1730-1320	-29.2	LC-4 - RC1	B-101547	wood chunk	RM	in muddy peat below sand layer
S	1720±40	1800-1500	-26.8	LC-18 - RC4	B-113418	twigs with bark	AMS	in top of sand layer
S	1790±40	1870-1540	-26.4	LC-2 - RC3	B-113415	spruce cone	AMS	in sand layer
S	3040±50§	3390-2970	-37.0	LC-3 - RC1	B-101539	small seed	AMS	in sand layer
N	2550±50	2780-2360	-25.0	LC-16 - RC5	B-107493	bark	AMS	in sand layer
L	3140±50	3540-3120	-28.6	LC-16 - RC6	B-107494	twig	AMS	in top of sand layer
basal mud	2910±40	3250-2860	-24.8	LC-3 - RC2	B-101545	spruce cones	AMS	not associated with sand layer

*Years before A.D. 2000, calibrated using 1.6 lab error multiplier and 2 σ age range (Stuiver and Reimer, 1993)
†Erroneously young date?
§Erroneously old date?

were also found as fossils in the study cores included *Cymbella cuspidata*, *Staurosira construens* var. *venter*, *Fragilaria exigua*, *Sellaphora pupula*, *Tabellaria fenestrata*, and *T. flocculosa*. Many of the diatom species found in and above the sand layers were found living in the swash zone of the modern beach, including *Coscinodiscus marginatus*, *Stephanodiscus carconensis*, *Thalassionema nitzschoides*, and *Thalassiosira pacifica*. Appendix 1 contains the results of the Lagoon Creek modern diatom study.

Diatom preservation varied from very good-excellent to fair-poor in the study samples. Very good to excellent preservation describes samples where there are both delicate and heavily-silicified species present with sharp valve features, implying very little to no dissolution or reworking. Fair to poor preservation indicates that delicate species are missing from the sample, it consists of mostly heavily-silicified frustules, and there is evidence for dissolution of the valves. There may also be evidence that the sediment was reworked such as abrasion of the valves. Moderate preservation in a sample indicates the there is some deterioration to the valves, but there is still a range of delicate to heavily-silicified valves in the sample.

Diatom preservation is very good to excellent throughout most of the study cores (Figure 5-10). In and above some of the sand layers there is a decline to moderate preservation, but samples in and above most sand layers had very good to excellent preservation. Diatom preservation is moderate for most of the rip-up clasts within the sand layers.

TABLE 2. SAND LAYER ATTRIBUTES

Sand layer	Depth (cm)	Thickness variation (cm)	^{14}C age range (yr ago)*	Inland extent (m)
Y	29-53	0†-4.5	0-550	1,320
W	68.5-174.5	0.3-16.5	1060-1400	1400
U	123-184.5	0.5-12.5	1170-1610	1300
S	139-204	0.03-13	1320-1870§	1400
N	203-292	15-22(?)	2780-2360	1400 (?)
L	337	9.5	3540-3120	625 (min.)

* Years before A.D. 2000.
† Stratigraphic horizon traceable inland beyond limit of sand deposition.
§ Age range reported without suspected erroneous dates from Table 1.

TABLE 3. SALINITY TERMINOLOGY

Term	Salinity Range
polyhalobous = "marine"	>30 ‰
mesohalobous = "brackish"	0.2 - 30 ‰
oligohalobous = "freshwater"	<0.2 ‰

(Modified from Hemphill-Haley, 1993)

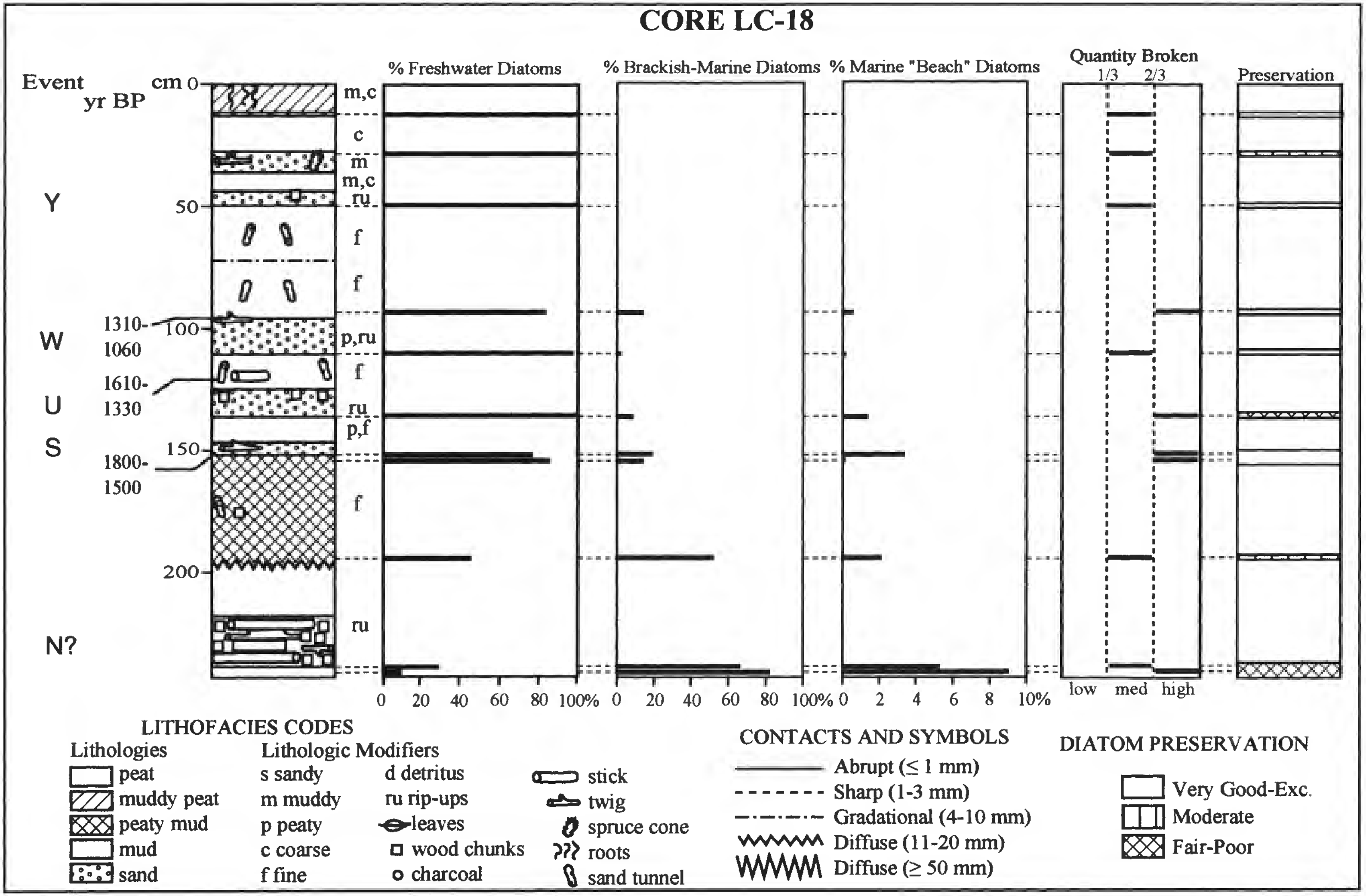

Figure 5. Stratigraphy of Core LC-18, showing the designated names of each sand layer; the ages of dated material; relative percentages of freshwater, brackish-marine, and marine "beach" diatom species in and adjacent to sand layers; and quantity broken and valve preservation of diatoms for each sample.

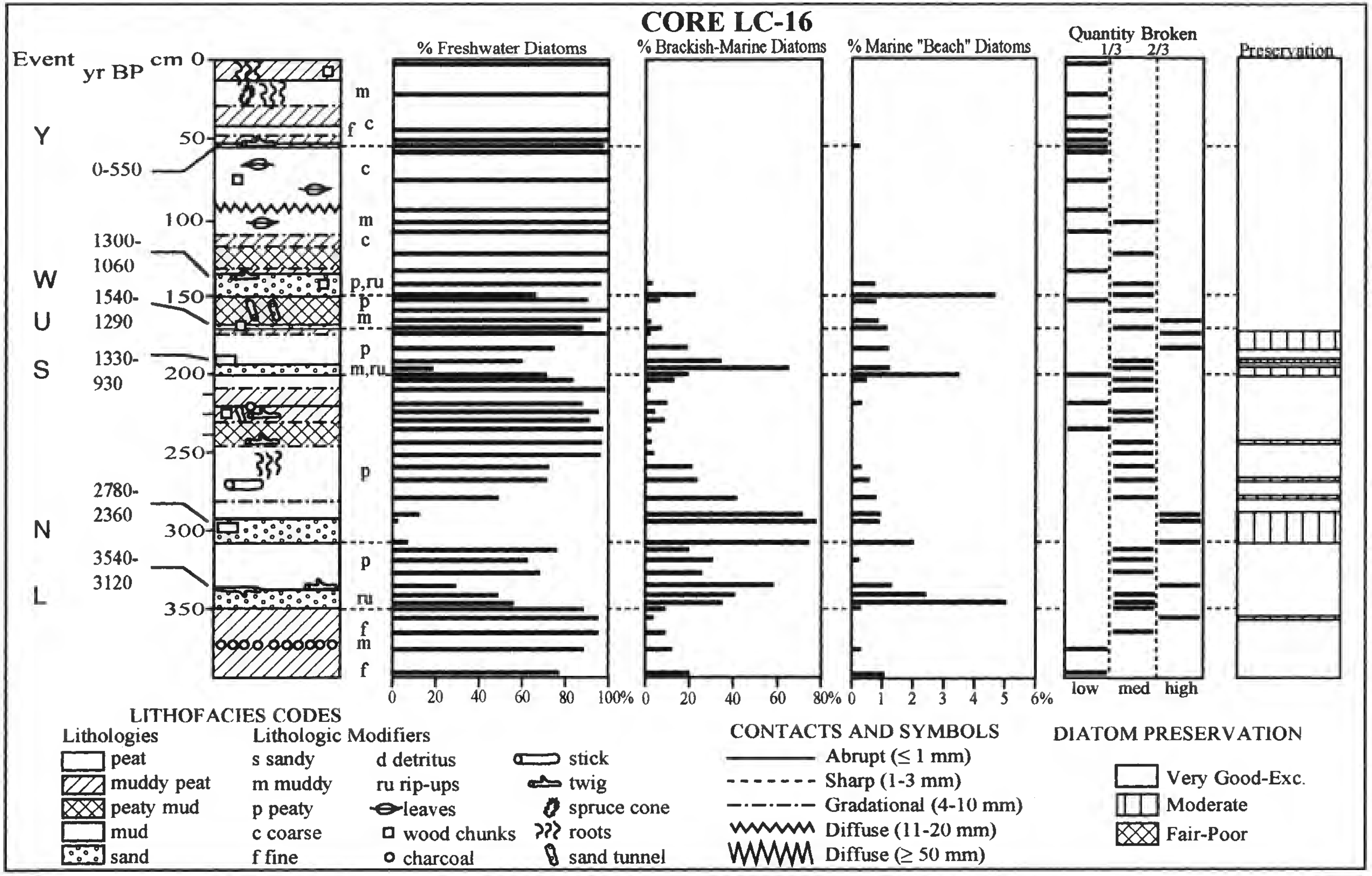

Figure 6. Stratigraphy of Core LC-16, showing the designated names of each sand layer; the ages of dated material; relative percentages of freshwater, brackish-marine, and marine "beach" diatom species; and quantity broken and valve preservation of diatoms for each sample.

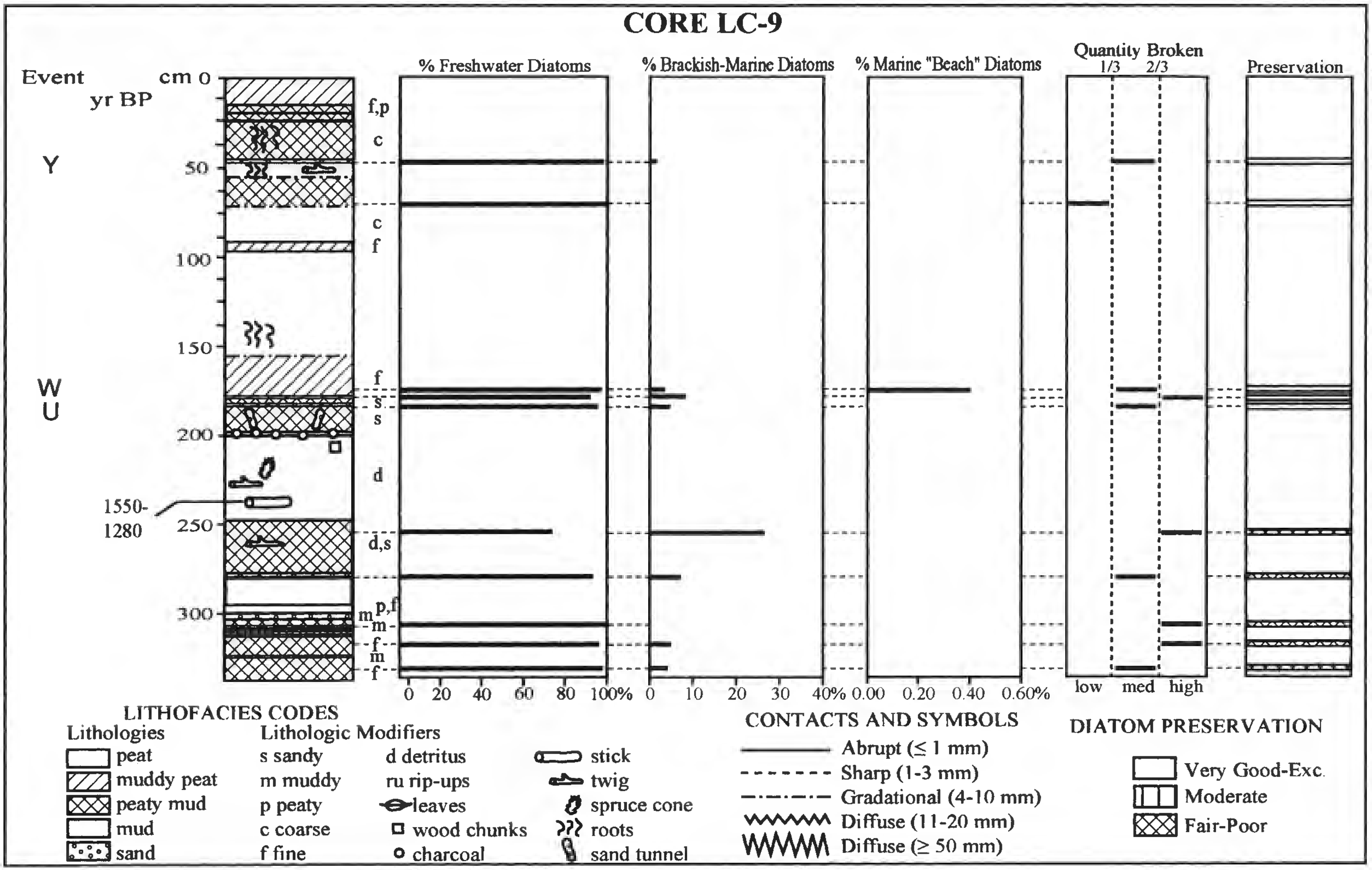

Figure 7. Stratigraphy of Core LC-9, showing the designated names of each sand layer; the ages of dated material; relative percentages of freshwater, brackish-marine, and marine "beach" diatom species in and adjacent to sand layers; and quantity broken and valve preservation of diatoms for each sample.

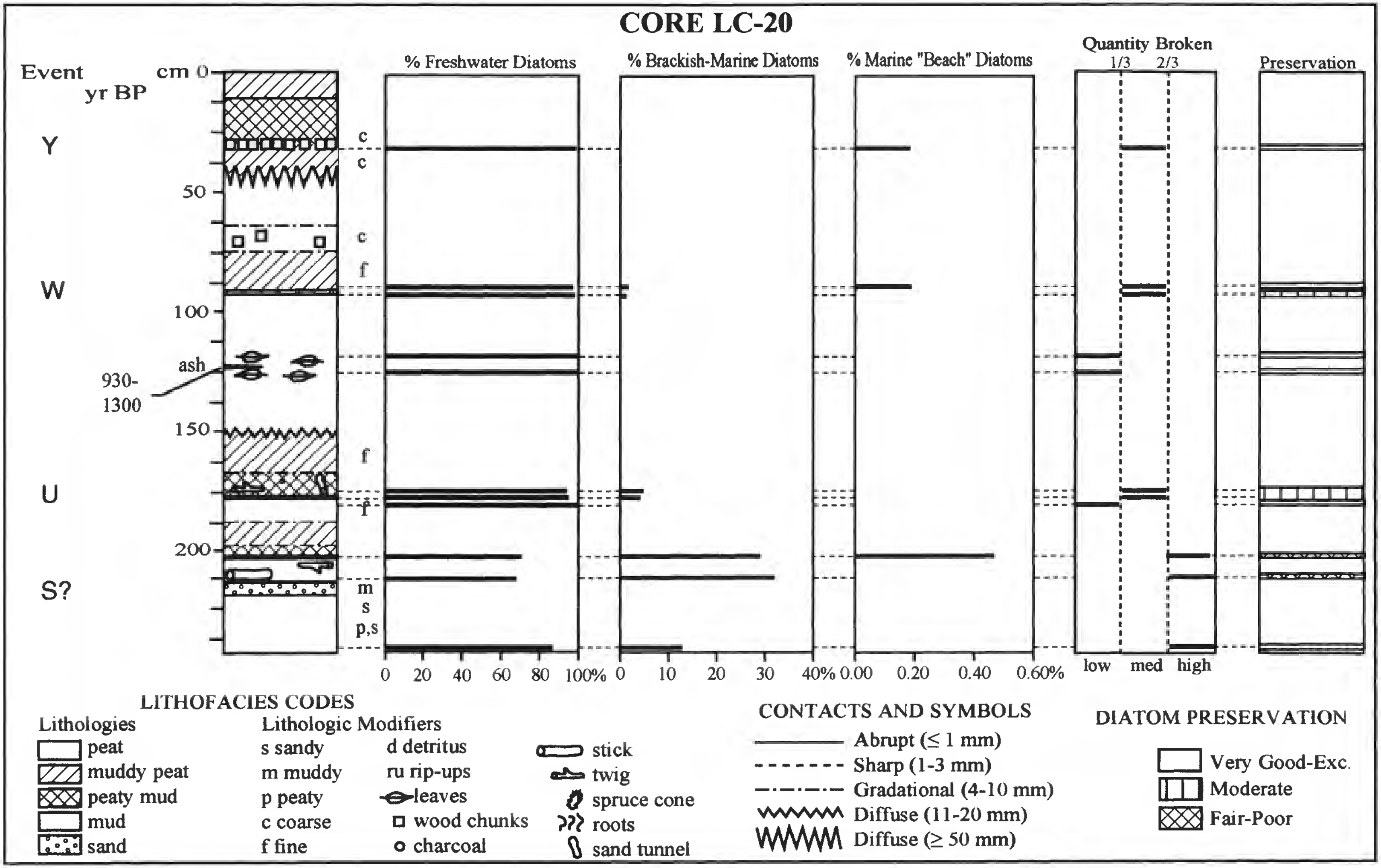

Figure 8. Stratigraphy of Core LC-20, showing the designated names of each sand layer; the ages of dated material; relative percentages of freshwater, brackish-marine, and marine "beach" diatom species in and adjacent to sand layers; and quantity broken and valve preservation of diatoms for each sample.

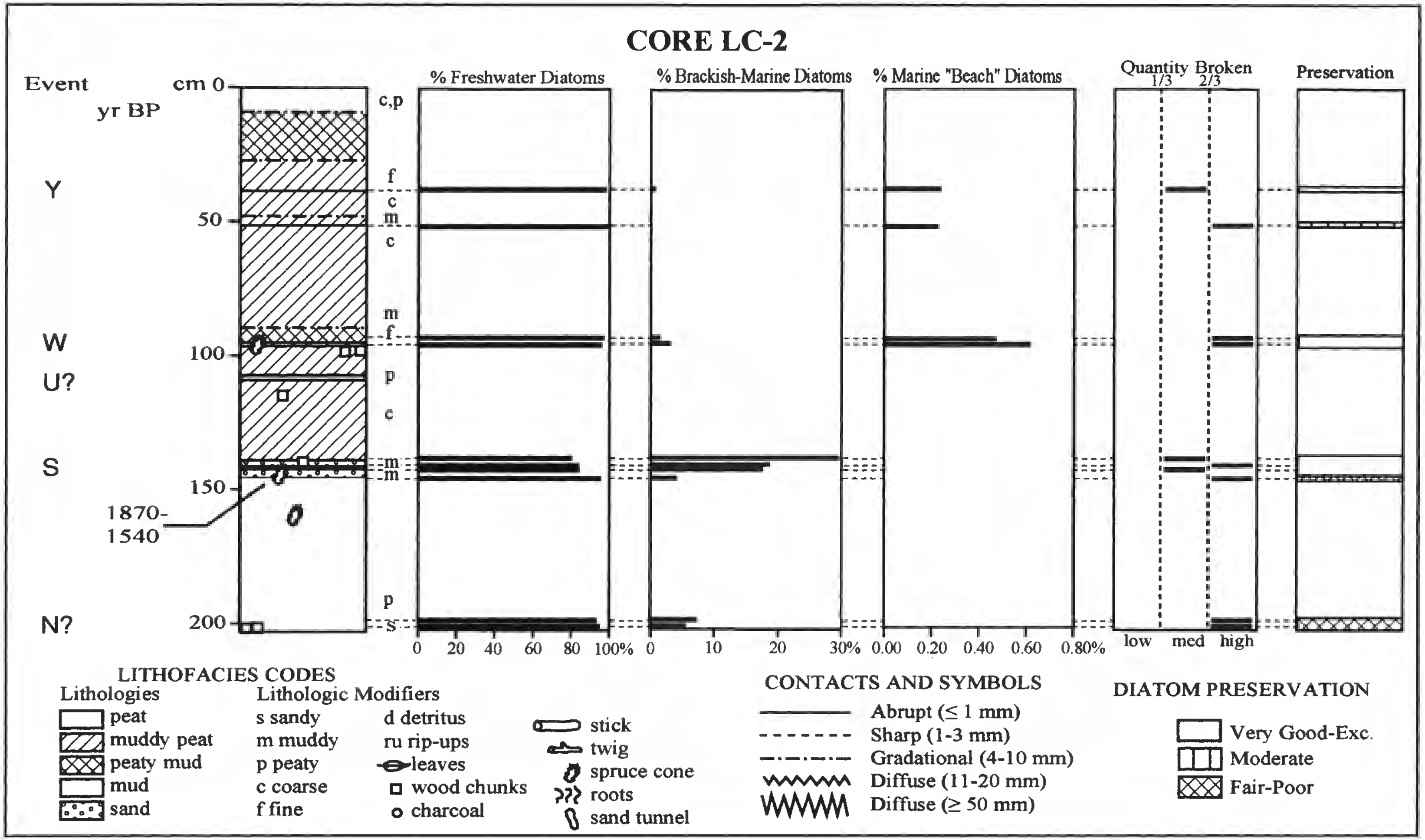

Figure 9. Stratigraphy of Core LC-2, showing the designated names of each sand layer; the ages of dated material; relative percentages of freshwater, brackish-marine, and marine "beach" diatom species in and adjacent to sand layers; and quantity broken and valve preservation of diatoms for each sample.

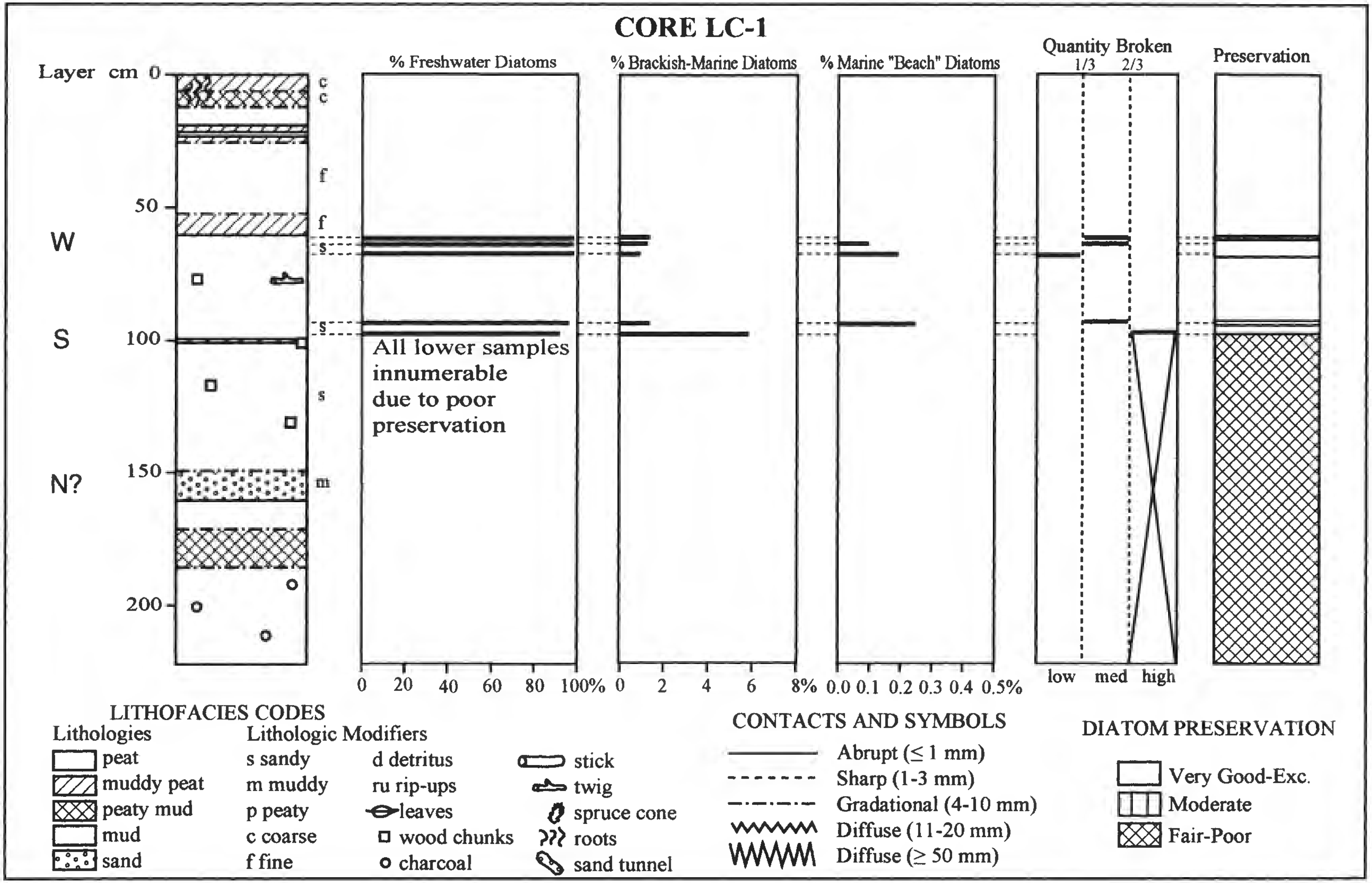

Figure 10. Stratigraphy of Core LC-1, showing the designated names of each sand layer; relative percentages of freshwater, brackish-marine, and marine "beach" diatom species in and adjacent to sand layers; and quantity broken and valve preservation of diatoms for each sample.

The quantity of broken diatoms noticeably jumps to more than 2/3 of the valves broken in and just above most sand layers (high quantity broken, Figure 5-10). The highest concentration of broken diatoms is in muddy deposits directly above the sand layers, and in some cases at the base of the sand layers. There is a low (less than 1/3 broken) to medium (between 1/3 to 2/3 broken; see Figures 5-10) amount of broken diatom valves elsewhere in the study cores, especially in the top meter of section.

Sand Layer Y

The youngest sand layer is layer Y (between 0-550 yr), which consists of clean, medium-grained sand. The sand can be traced inland to about 900 m from the surf zone on the beach. In core LC-20 (Figure 8), the stratigraphic horizon of layer Y consists of a layer of wood chunks, pieces of pond lily, and coarse black organic debris. The stratigraphic horizon changes further inland so that at core LC-3 (Figure 4), it is represented by a horizontally-oriented matted layer of deciduous leaves, and 17 m farther inland at core LC-2 (Figure 9) the same stratigraphic level is represented by only by a sharp contact between reddish-brown peat (below) and brownish-gray muddy peat (above). Beyond the deposition of sand, the stratigraphic horizon of event Y can be traced to about 1,320 m inland, an additional 420 m.

Diatoms common in the peat located below sand layer Y include the freshwater species *Staurosira construens* var. *venter*, *Tabellaria fenestrata*, and *T. flocculosa*. Diatoms from sand layer Y include freshwater species found in the underlying peat, and the brackish-marine epipelic (living in or on mud) species *Navicula margalithii, Navicula* *salinarum,* and *Nitzschia scapelliformis*. Also present are the "beach" species *Actinoptychus senarius, Endictya hendeyi,* and *Hyalodiscus laevis.* Brackish-marine diatoms are found at this same stratigraphic horizon up to 1,320 m inland. Above layer Y in the overlying muddy unit diatoms return to freshwater species similar to those immediately below the sand.

Sand Layer W

Sand layer W (between 1,060-1,400 yr) extends to the inland (south) edge of the pond. It is clean, medium-grained sand containing woody debris, pine needles, spruce cones, twigs, and peat and mud rip-up clasts. Below the sand layer in many locations is a reddish-brown muddy peat, often with 0.5 to 1 cm diameter vertical sand-filled tunnels which may be liquefaction features. Above sand layer W is either a muddy peat or peaty mud with incorporated sticks and twigs that grades upward into reddish-brown peat. In seven of the total 21 cores, sand W is located above a 0.5 cm thick unconsolidated ash of the Little Glass Mountain eruption that dates to between 930-1,300 yr (Sarna-Wojcicki, pers. comm., 1996)

The peat located immediately below layer W contains freshwater diatoms including *Aulacosiera islandica, Cymbella lunata, Staurosira construens* var. *venter*, *Gomphonema parvulum*, *Pinnularia braunii* var. *amphicephala*, *Tabellaria fenestrata*, and *T. flocculosa*. Sand layer W contains the freshwater species found in the subjacent peat, and also the brackish-marine epipelic species *Nitzschia scapelliformis, Nitzschia sigma*, and *Tryblionella accuminata*. Also present in sand layer W are the "beach" species *Coscinodiscus marginatus, Endictya hendeyi, Hyalodiscus laevis,* and *Thalassiosira pacifica*. A peaty mud rip-up in the sand contains a relative abundance of 28% brackish-marine species including *Achnanthes hauckiana*, *Cocconeis scutellum* var. *parva, Endictya hendeyi, Navicula margalithii*, and *Synedra faciculata*. The muddy peat above the sand contains a mixture of brackish-marine and "beach" species including *Cocconeis scutellum* var. *parva*, *Gyrosigma balticum, Navicula salinarum, Synedra fasciculata, Thalassiosira pacifica*, and *Tryblionella accuminata*. This unit grades into a brown peaty mud that contains freshwater diatoms similar to those found below layer W.

Sand Layer U

Sand layer U (between 1,170-1,610 yr) can be traced inland to about 1,300 m, but disappears by about 1,320 m inland. The sand is clean and medium-grained, and contains woody debris, twigs, and peaty rip-up clasts. Below layer U is a gray fine-textured muddy peat containing several small (0.5 - 1.0 cm in diameter) vertical sand-filled tunnels. Above layer U is a brown peaty mud, which grades upward into a peat or muddy peat in most locations.

Diatoms from the peaty mud below sand layer U include the freshwater species *Amphora subturgida, Cyclotella meneghiniana, Fragilaria exigua, Staurosira construens* var. *venter, Synedra ulna*, and *Tabellaria flocculosa*. In the seaward cores LC-18 and LC-16, however, the peaty mud contains the brackish-marine epipelic and epiphytic species *Cocconeis scutellum* var. *parva, Navicula margalithii, Synedra fasciculata,* and *S. rumpens*. Sand layer U contains primarily freshwater diatom species, but also some of the same brackish-marine species occurring in samples from below the sand, including *Cocconeis scutellum* var. *parva, Gyrosigma balticum*, *Melosira nummuloides, Navicula margalithii, Nitzschia scapelliformis*, and *Tryblionella circumsuta*. Also present in sand layer U are the "beach" species *Rhaphoneis psammicola, Thalassiosira hendeyi,* and *T. pacifica*. The peaty mud directly above sand layer U has predominately freshwater species like those found below layer U in most locations, but also contains a mixture of brackish-marine epipelic, and marine epipsammic ("beach") diatom species including, *Bacillaria paradoxa, Endictya hendeyi,* and *Hyalodiscus laevis*. Five cm upsection the peaty mud contains only freshwater diatom species.

Sand Layer S

Sand layer S (between 1,320-1,870 yr, excluding suspected erroneous dates, see Table 1) can be traced to the back edge of the pond, about 1,400 m from the beach. The sand varies from 13 cm to 3 mm in thickness, is clean and medium-grained, and contains gray mud rip-ups on the seaward side of the pond. Layer S generally overlies peat or muddy peat on the seaward side of the pond and mud on the inland side of the pond, and is overlain by mud or peaty mud. Landslide deposits from the adjacent hillside are located just below sand layers U and S in cores landward of LC-9 (Figure 4).

Diatoms below layer S are mostly freshwater species, but include a few brackish-marine epipelic species, including *Cocconeis scutellum* var. *parva, Navicula margalithii, Navicula salinarum, Nitzschia sigma*, and *Synedra fasciculata*. From the sand layer, the same brackish-marine species occurring in samples from below the sand are present. In addition, the marine "beach" species *Coscinodiscus radiatus, Rhaphoneis amphiceros, R. psammicola, Thalassiosira eccentrica*, and *T. pacifica* were found. Above the sand layer, diatoms have a brackish-marine component, but gradually grade upward in the core back to an assemblage consisting of almost all freshwater species.

Sand Layer N

A possible tsunami deposit, layer N (between 2,360-2,780 yr), is best preserved in core LC-16 (Figure 6). Other deposits that may correlate to this were identified in cores LC-18 (Figure 5), and LC-2 (Figure 9). The sand is clean and fine- to medium-grained containing gray mud rip-up clasts. Below the sand is peaty mud, and above the sand is mud. About 20% of the total diatoms below layer N are brackish-marine epipelic and epiphytic species, including *Cocconeis scutellum* var. *parva, Navicula margalithii*, and *N. salinarum*. In and above the sand there are about 75% brackish-marine, and 2% "beach" species, including *Cocconeis scutellum* var. *parva, Endictya hendeyi, Gyrosigma balticum,* and *Nitzschia sigma*. Further above sand N, the diatom assemblages grade up to units containing almost entirely freshwater species.

Sand Layer L

Another possible tsunami deposit is layer L (between 3,120-3,540 yr), the oldest sand layer found in any of the cores. It is only preserved in core LC-16 (Figure 6). The deposit is clean medium-grained sand mixed with muddy and peaty rip-up clasts. The diatoms below layer L are about 9% total brackish-marine, with no "beach" species present. In and directly above the sand they increase to about 57% brackish-marine species (*Cocconeis scutellum* var. *parva, Navicula margalithii, N. salinarum, Synedra fasciculata,* and *Tryblionella accuminata*), and 5% "beach" species (*Endictya hendeyi, Thalassionema nitzschiodes,* and *Thalassiosira pacifica*). Upsection, the diatoms decline to about 25% brackish-marine species, but consist of the same brackish-marine species found within layer L. There were no "beach" species present.

DISCUSSION

The inland extent of brackish-marine diatoms, the distribution of broken diatom valves, the preservation of diatom valves, the distribution of brackish-marine and "beach" diatoms in the stratigraphy, the sedimentary pattern of the sand deposits, and the ages of the sand layers in Lagoon Creek pond strongly suggest a model of tsunami inundation at this site.

Inland Extent Of Sand And "Beach" Diatoms

Inland extent of sand deposition exceeded 1000 m for four of the tsunami events at this site. The most recent sand layer, sand Y, is inferred to represent the tsunami generated by the large Cascadia plate boundary rupture 300 yr ago (Nelson et al., 1995). Although the sand layer only extends about 900 m inland, the stratigraphic horizon of the tsunami event can be traced to about 1,320 m inland by the presence of marine "beach" diatoms on the contact between the underlying peat and overlying muddy peat. Hemphill-Haley (1996) used a similar technique in Willapa Bay, Washington, to show that tsunami inundation for the 300 yr ago event was 1 km upvalley of the limit of sand deposition. For event Y, 1,320 meters is a maximum inundation extent, and for event U, 1,300 m is the maximum inundation extent. In contrast, sand layers W and S can be traced about 1,400 m inland, to the inland (southernmost) edge of the pond. For events W and S, 1,400 meters is the minimum of inland inundation.

Valve Preservation And Quantity Broken

Diatom valve preservation and condition may also provide additional evidence for tsunami deposition. Valve preservation is very good to excellent in, and especially above, the sand layers. In addition, the highest concentration of broken diatoms are in muddy deposits directly above the sand layer, and in some cases at the base of the sand layer. This implies that the diatoms were both mechanically broken and rapidly deposited, conditions that would be consistent with deposition by a tsunami (Hemphill-Haley, 1996; Dawson et al., 1997).

Distribution Of Allochthonous Diatoms

Diatom analysis confirms the source area for the sand layers in Lagoon Creek was the adjacent beach. Marine "beach" species found in the sand layers were also found living on the modern beach. The "beach" species transported into the pond by tsunamis are rare relative to the abundant *in situ* freshwater population. In the upper 2 m of section from the cores freshwater diatoms far outnumber brackish-marine diatoms in and above the sand layers (>100:1 in some samples). The diatom pattern from tsunami deposits in Bradley Lake (Hemphill-Haley, 1996) showed similar small percentages of brackish-marine species compared to the total freshwater species. In addition, similar to Bradley Lake, the highest concentration of marine species are found above, rather than within, the sand layer.

With very low percentages of marine species in comparison to freshwater species in the upper sand deposits, it is possible that some of the marine diatoms seen were blown into the pond. However, if marine diatoms were being blown from the beach into the pond, they should be found throughout the section, not just in and above the sand layers (e.g., Bucknam et al., 1992).

Emplacement of Saline Water into the Pond by Tsunami Inundation

Muddy intervals above sand layers from the inland, shallower end of the pond are thinner than from the deeper (seaward) end of the pond. If the overlying muds from all parts of the pond contain brackish-marine mudflat species seen in core LC-16, that would suggest that sections of the deeper end of the pond maintain a brackish-marine environment for longer periods following tsunami inundation.

Brackish-marine diatom species are found in mud and peaty mud rip-up clasts and in the mud deposits from the bottom of cores on the seaward end of the pond. Inland, the rip-up clasts are fewer and generally peatier than clasts found in sand layers closer to the oceanward edge of the pond. The rip-up clasts decrease landward. This indicates that the source for the mud rip-up clasts was most likely the deeper end of the pond. This supports deposition of such clasts by a flow that had more erosive power at the seaward edge of the pond than on the inland edge of the pond, as would be expected from a tsunami surge.

Several species found in mud deposits in the lower parts of the section are intertidal to subtidal mudflat species, such as *Cocconeis scutellum* var. *parva*, *Synedra fasciculata*, and *Tryblionella accuminata (*Atwater and Hemphill-Haley, 1997). These species account for no more than 30% of the total observed species in periods between inundation events. Other diatoms from these samples include the freshwater species *Staurosira construens* var. *venter, Fragilaria exigua, Navicula capitata* var. *hungarica*, and *Synedra ulna* (Patrick and Reimer, 1966; Foged, 1981; Hemphill-Haley, 1993).

At present there is no source in or near the site for intertidal mud flat diatoms. The open coastline presently at the site could not allow intertidal to subtidal mudflats to form. Assuming similar conditions for the past 3,000 years, the only likely source area for such diatoms would be from the bottom of the pond.

This mixture of primarily freshwater benthic, epiphytic, and planktic diatom species and brackish-marine epipelic diatoms could form in a sustained saltwater hypolimnion following tsunami inundation in an otherwise freshwater pond. A hypolimnion is a cold, relatively dense bottom layer in a lake or pond (Wetzel, 1983). The saline water may have persisted in the bottom of the pond long enough to provide an environment for brackish-marine mudflat diatoms to grow. Many of these diatoms species also live attached to eelgrass (*Zostera nana*) and other intertidal plants. These diatoms could have been introduced during the tsunami, and continued to survive after being introduced to the freshwater pond, or they may have been introduced later perhaps transported by birds who feed on mudflats.

The formation of a post-tsunami saline hypolimnion would explain the stratigraphy and diatom evidence found in many of the study cores. Figure 11 shows detail of core LC-16 between 117 and 203 cm below the pond floor, and lists the diatom species found in the sedimentary units from different parts of the core. Figure 12 shows photographs of the species listed in Figure 11. Figure 13 depicts a cross-section of the Lagoon Creek pond, with a possible location and thickness (1.5 m) of the hypolimnion. Figure 13 also shows probable sources of diatoms found in the deposits inferred to have formed at the floor of the deepest part of the pond.

An alternative to the stratified water column hypothesis is that the pond subsided wholly into the intertidal zone during coseismic subsidence of the coastal area. However, such an event would have produced a steady brackish-marine diatom environment, not a freshwater environment. The tendency for freshening following marine inundation supports a prompt return to a freshwater pond and argues against the formation of an intertidal marsh. There is currently no saline hypolimnion in the pond, but there has probably been 300 years since the last known marine incursion, which deposited layer Y.

Position Of Lagoon Creek Pond Over Time

The Lagoon Creek pond has probably become increasingly higher relative to sea level in the late Holocene as uplift has outpaced sea level rise. The 300 yr old tsunami deposit shows a much thinner sand layer than previous events, but this tsunami has left a considerable stratigraphic signature along the length of the Cascadia subduction zone Jacoby et al., 1995; Clague and Bobrowsky, 1994a; Atwater and Yamaguchi, 1991; Darienzo and Peterson, 1990). Although the last tsunami event may have been smaller than the previous events, the sand deposit may be thinner and less extensive not because the generating earthquake was smaller but rather because the pond was higher relative to sea level at the time of the most recent tsunami. Further evidence for emergence of the pond is the fact that the marine influence persists for less time in the pond after the last two events (Y and W).

Storm Deposition

One possible explanation for some of the sand layers is that they are storm deposits. The current height of the berm is 5 m, suggesting that presently only the largest storms would inundate the pond, storms much larger than any seen historically. It is likely that tsunami events not only left marine water in the pond but damaged the berm as well, perhaps allowing more storm surges into the pond after the event, especially if coseismic subsidence also had occurred. Storm surge deposition cannot be discounted for near-shore sands such as layers N and L (Figure 6), and for some of the small sand layers

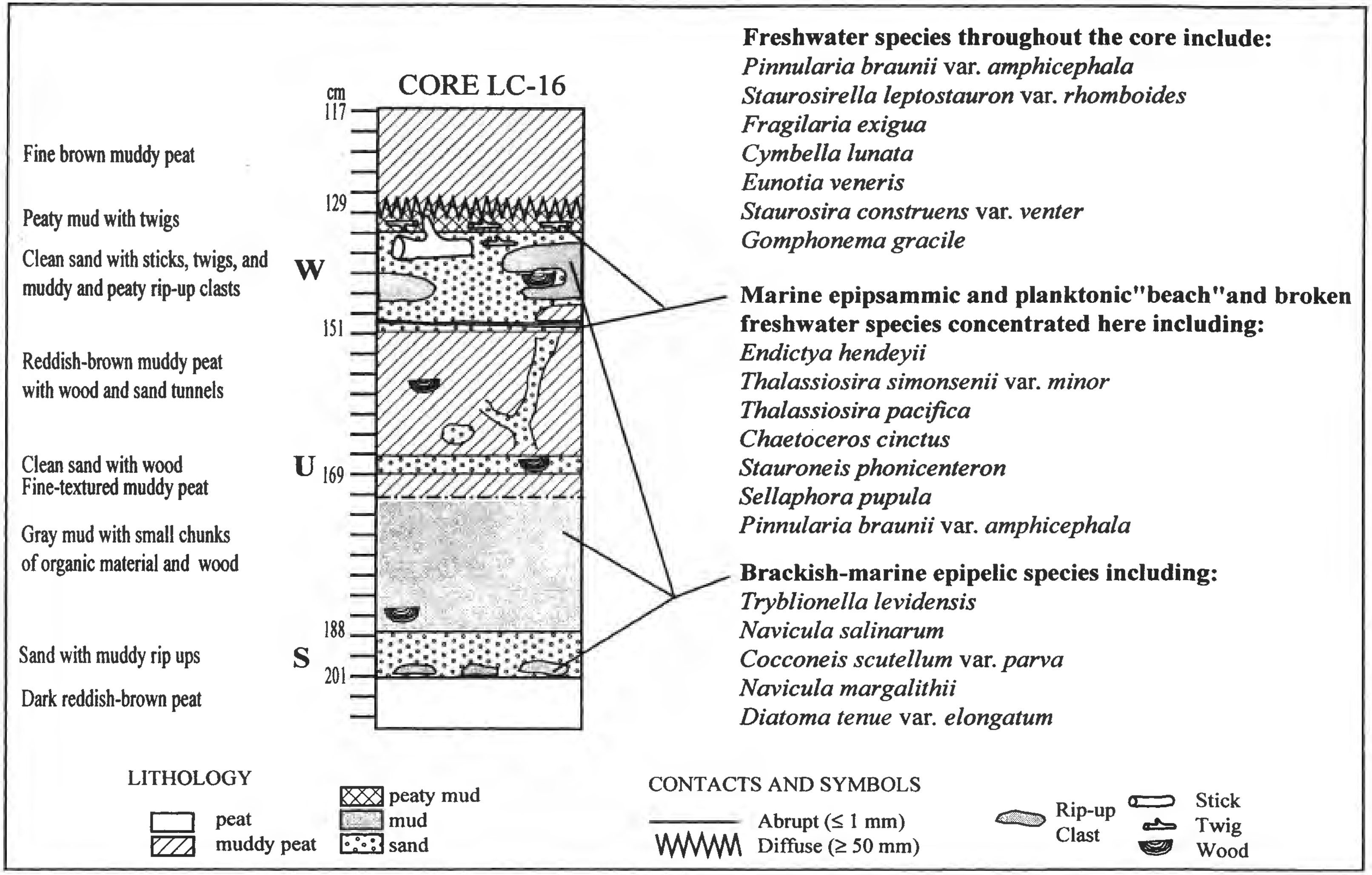

Figure 11. A section of Core LC-16, showing detailed stratigraphy of tsunami deposits W, U, and S. Different groups of diatom species are listed that are found in specific parts of the stratigraphy.

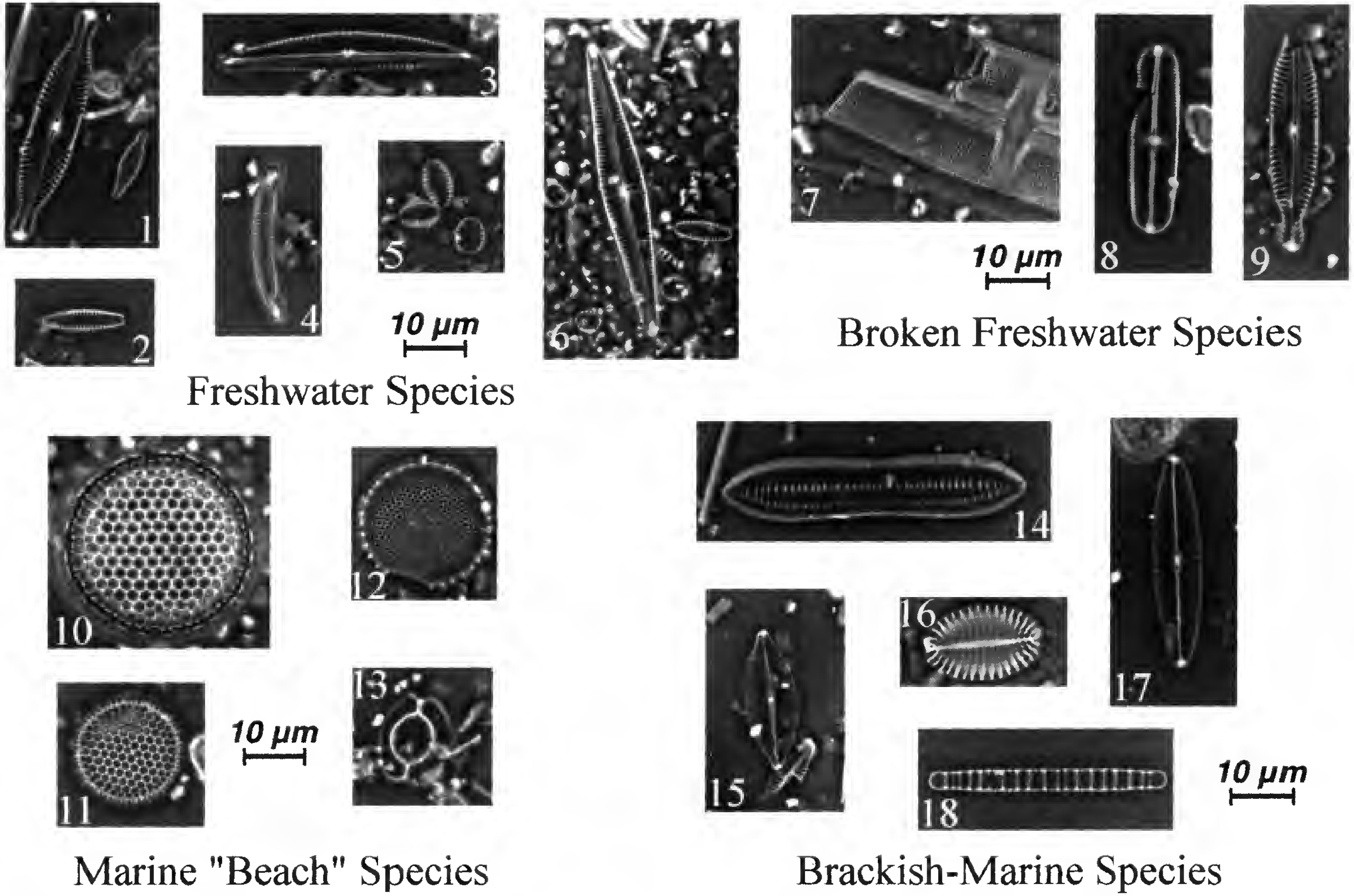

Figure 12. Diatom species listed by environment from Figure 11 (see page 37 for description).

Figure 12, continued. Diatom species representative of the different sedimentary units illustrated in Figure 11: 1. *Pinnularia braunii var. amphicephala* (A. Mayer) Husted, 1930 (left) and *Staurosirella leptostauron* var. *rhomboides* (Grunow in Van Heurck) Williams and Round, 1987 (right); 2. *Fragilaria exigua* Grunow in Cleve and Möller 1878; 3. *Cymbella lunata* Wm. Smith var. lunata, 1855; 4. *Eunotia veneris* (Kütz.) O. Müller, 1892; 5. *Staurosira construens* var. *venter* (Ehr.) Williams and Round, 1987; 6. *Gomphonema gracile* Ehr. emend. V.H. var. *gracile*, 1885; 7. broken valve *Stauroneis phonicenteron* (Nitz.) Ehr., 1843; 8. broken valve *Sellaphora pupula* (Kütz.) Mereschkowsky, 1902; 9. broken valve *Pinnularia braunii* var. *amphicephala* (A. Mayer) Husted, 1930; 10. *Endictya hendeyii* E. Hemphill-Haley sp. nov., 1997; 11. *Thalassiosira simonsenii* var. *minor* Hemphill-Haley n. var., 1995; 12. *Thalassiosira pacifica* Gran. and Angst, 1931; 13. *Chaetoceros cinctus* Gran., 1897 spore; 14. *Tryblionella levidensis* Wm. Smith, 1856; 15. *Navicula salinarum* Grunow in Cleve and Grunow 1880; 16. *Cocconeis scutellum* var. *parva* Grunow ex Cleve, 1895; 17. *Navicula margalithii* Lange-Bertalot nov. spec. 1985; 18. *Diatoma tenue* var. *elongatum* Lyngb., 1819.

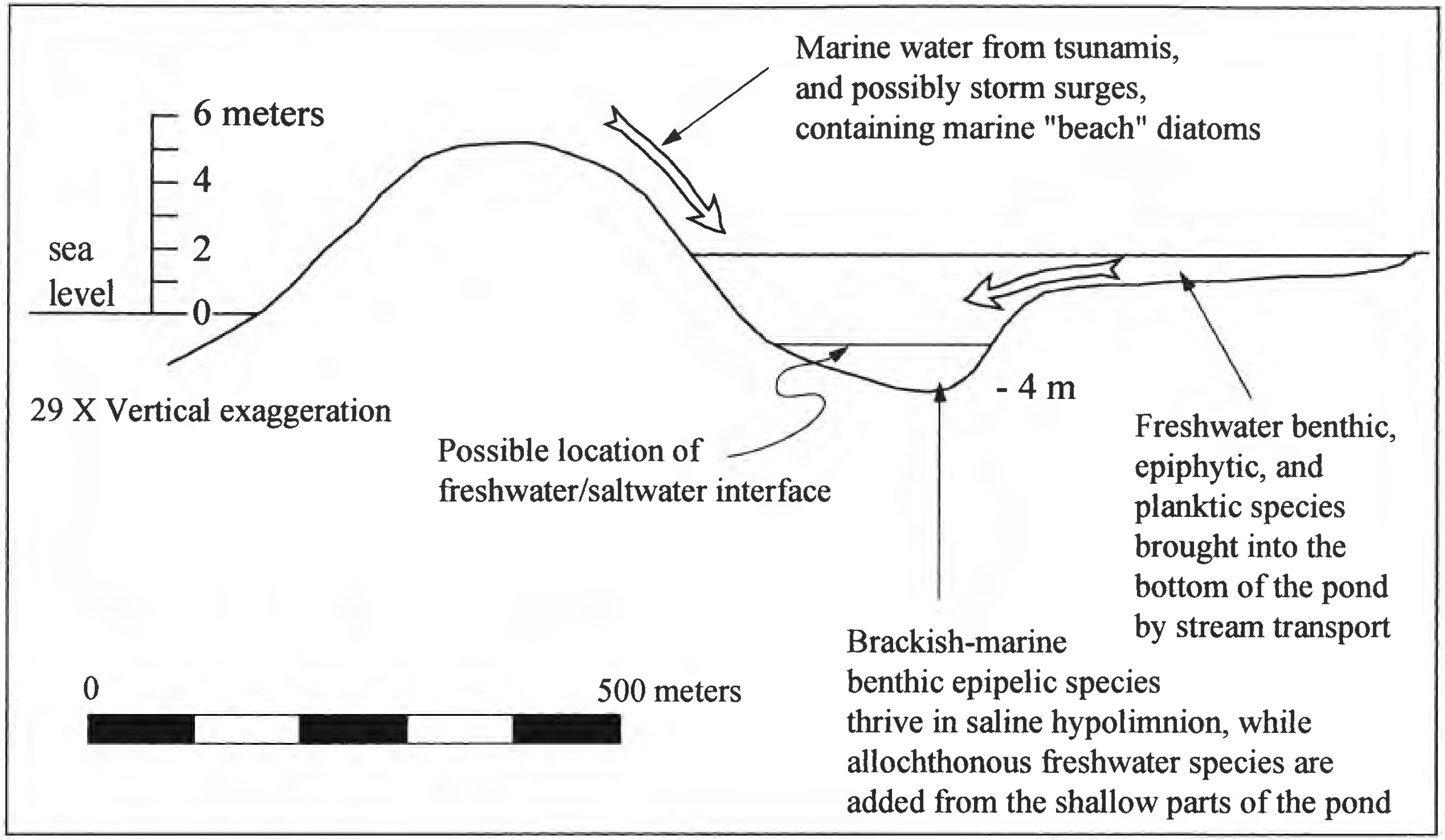

Figure 13. Cross section of the Lagoon Creek pond showing a potential location of the saline hypolimnion and source areas for the other diatom species found in mud rip-up clasts within tsunami sand deposits and mud from the lower sections of the pond stratigraphy.

near the top of cores LC-18, LC-12, and LC-17 (Figure 4). These particular sand layers (uncorrelatable sands in seaward cores LC-18, LC-12, and LC-17, Figures 4 and 5) may be storm deposits formed during intervals of heavy surf and wave washover, perhaps following damage to the berm by the 300 yr Cascadia tsunami.

Sedimentary Pattern Of Tsunami Deposits

The concentration of brackish-marine diatoms in the cores provides additional evidence for tsunamis. Many of the tsunami deposits from Lagoon Creek show a distinctive stratigraphy in that there is a muddy layer above the sand where the greatest percentage of brackish to marine diatoms are found. Figure 14 shows a generalized diagram of the disturbance pattern most often observed.

This distinctive stratigraphy may be the result of turbulent mixing of sand and other fine-grained material (including silt-sized diatoms) during tsunami emplacement. When the surges of water lost their ability to carry the sand in suspension, the sand was deposited immediately, but the suspended silt and clay-sized material was deposited gradually over days to weeks. The resultant mix of mud and organic debris that caps the sand is where the "beach" and brackish-marine diatoms are concentrated.

"Beach" and brackish-marine diatoms were also found concentrated at the basal contact of the sand layer and underlying material. This may be explained by the silt-sized diatoms gradually settling through the sand grains, and getting trapped at the typically finer-grained material at the base of the sand (Hemphill-Haley, pers. comm., 1996).

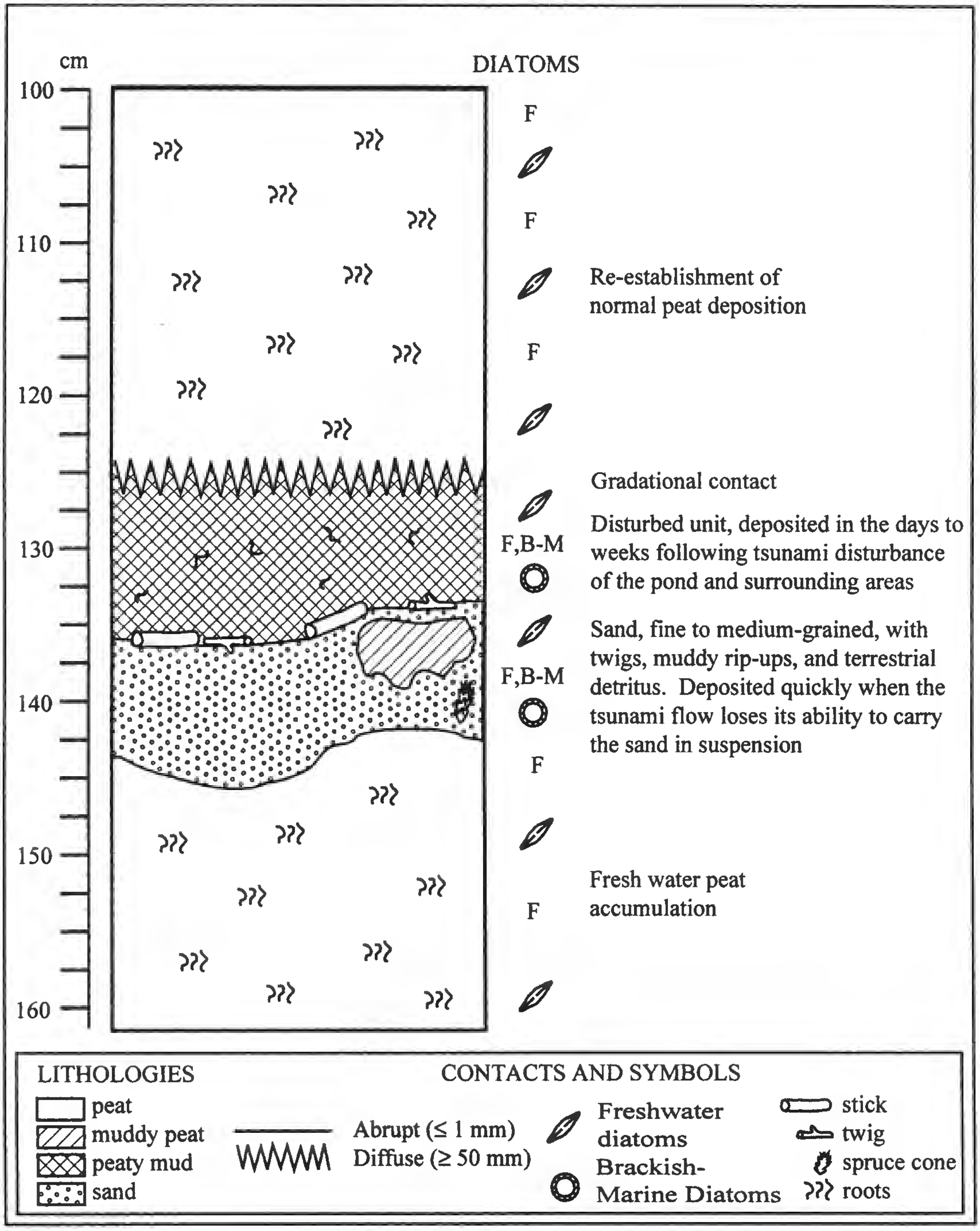

Figure 14. Generalized stratigraphy of a tsunami deposit from Lagoon Creek. The floor of the pond is eroded by the turbulent flow of the tsunami, resulting in a deposit with incorporated rip-up clasts. Following the rapid sand deposition, the finer material settles on top of the sand layer.

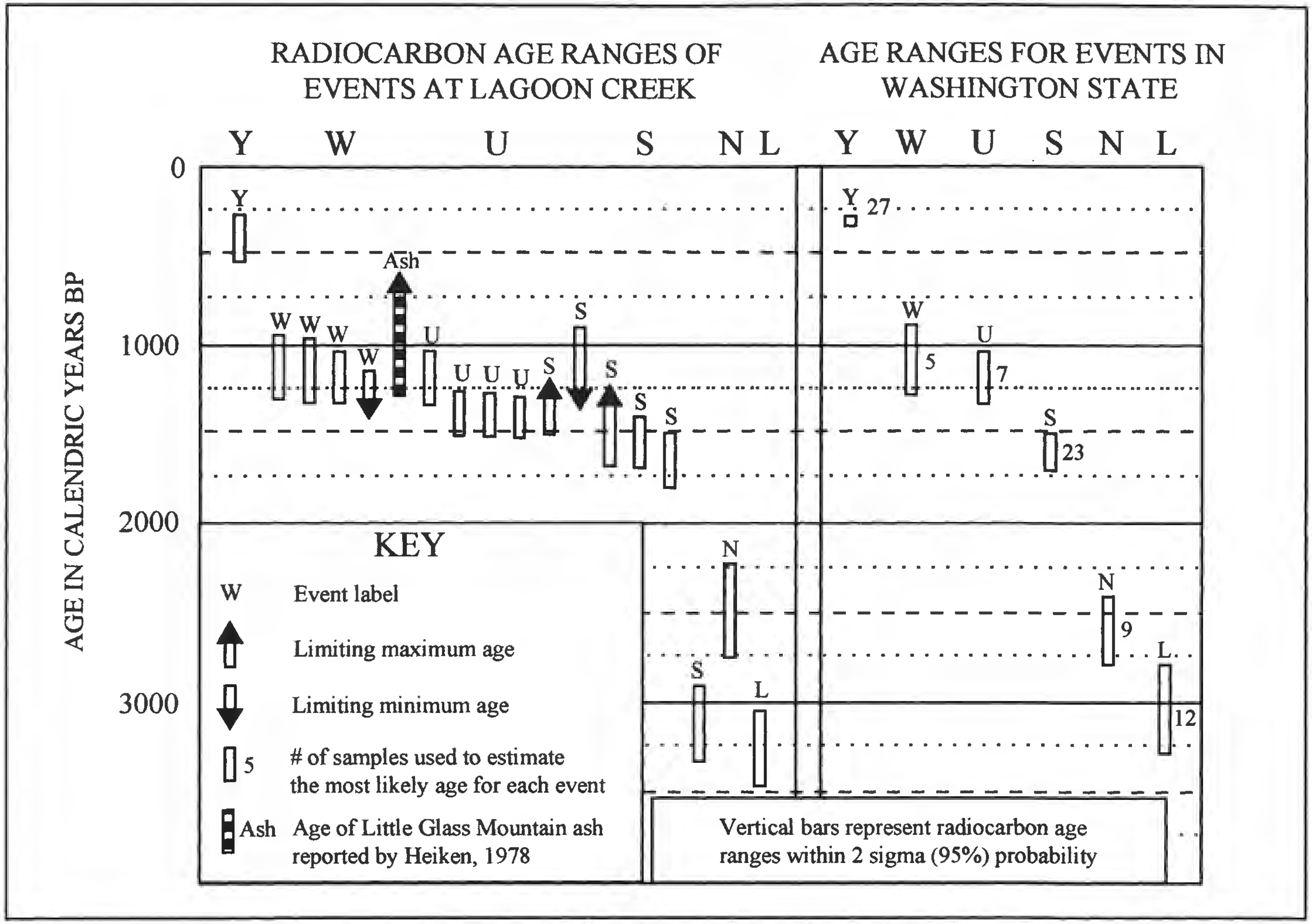

Figure 15. Radiocarbon ages of sand layers at Lagoon Creek (at left, with letter name indicated) compared to estimated age ranges for events in Washington State (Atwater and Hemphill-Haley, 1997).

Comparison of Tsunami Sands to Other Subsidence Events: Radiocarbon Evidence

Compelling evidence that the sand layers at Lagoon Creek record past tsunamis is the age of the events. AMS ^{14}C dates from Lagoon Creek events agree quite well with the ages of Cascadia earthquakes as determined by other investigators (Atwater and Hemphill-Haley, 1997; and Darienzo and Peterson, 1990). Figure 15 shows the timing of events at Lagoon Creek in comparison with the events that have been dated at Willapa Bay, Washington (Atwater and Hemphill-Haley, 1997). The close agreement of ages suggests synchronous tsunami events from the northern to southern end of the Cascadia subduction zone or subduction zone earthquakes on adjacent segments of the margin that are spaced apart by hours, days, week, or a few years.

CONCLUSIONS

Diatom evidence supports tsunami deposition of the sand layers in the Lagoon Creek pond stratigraphy. Diatom evidence indicates that the environment has been primarily a freshwater setting for the last 3,000 years, with sharp increases in populations of brackish to marine diatoms coinciding with episodes of sand deposition. Sand layers typically have a disturbed muddy layer above them that was deposited shortly after the sand (days to weeks), and probably represents the aftermath of tsunami disturbance in and around the pond. The excellent preservation of delicate allochthonous "beach" species and a higher occurrence of broken valves in the sand deposits and in the muddy deposits above the sand indicates turbulent, rapid deposition, as would be consistent with a tsunami.

Two different types of allochthonous diatoms are found in the tsunami sand deposits: marine "beach" species found living in the modern surf zone are found in and above the tsunami sand deposit; and brackish-marine species found living on modern mudflats are found in mud above the sand layers and in muddy rip-up clasts within the tsunami sand deposit. Diatom species found living in the surf zone of the adjacent beach were found in and above sand deposits as far as 1,400 m inland. Because there is no source near the site for the mudflat species, it is likely that a temporary saline hypolimnion formed in the deepest part of the pond after tsunami inundation events, and the brackish-marine diatoms lived in the hypolimnion on the muddy sediment. Muddy deposits containing *in situ* mudflat-type diatoms were eroded from the bottom of the pond by the turbulent flow of the tsunami and incorporated into the sand deposits as rip-up clasts.

Other evidence for tsunami deposition includes the general pond deposit stratigraphy of clean sand layers in peaty deposits. There are at least four and possibly six tsunami events at Lagoon Creek in the last 3,000 years. The presence of mud and peaty mud rip-up clasts within the sand deposits testify to the erosive nature of the process by which the sand layers were deposited. Storm surge deposition of sand layers may be possible for some of the thin sand layers from the seaward side of the pond, but is unlikely for far inland (in excess of 1,000 m) deposits such as layers Y, W, U, and S. Finally, the timing of the deposition of the sand layers at Lagoon Creek is not inconsistent with a tsunamigenic origin, based on the agreement of their ages with buried soils at other sites on the Cascadia subduction zone (Atwater and Hemphill-Haley, 1997).

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APPENDIX 1 -- MODERN DIATOM FACTOR ANALYSIS

The modern diatom total counts are in Appendix 2. For the factor analysis, the modern diatom data is first arranged in a matrix of samples and 40 most common species from the total (Table A1-1). The output of eigenvalues generated by the Q-Mode factor analysis shows that 8 factors are needed to explain 78.95% of the variance in the data (Table A1-2). In this type of analysis, having about 80% of the variance explained by the factors is about the best to expect (Hemphill-Haley, E., personal communication). This means that 8 different assemblages of diatoms may be represented in the modern samples collected.

The Varimax Factor Matrix shows the 8 requested factors and which samples have the strongest scores in each factor. From the Scaled Varimax Factor Scores, the highest scoring species for each factor can be examined. The combination of these two results allows an assignment of species to each factor, and along with considering where the samples were collected that best represent each factor, an assignment of factor name or description. Table A1-3 shows the 8 factors named with a list of species that is diagnostic of each factor. The results of the 8 factor analysis indicates that 8 factors are more than is needed to explain the data. Examining the sample collection localities and species makeup of each sample showed ways to combine certain factors. The species count for the sample of dry beach sand (LC-M-17) was quite low, and the diagnostic

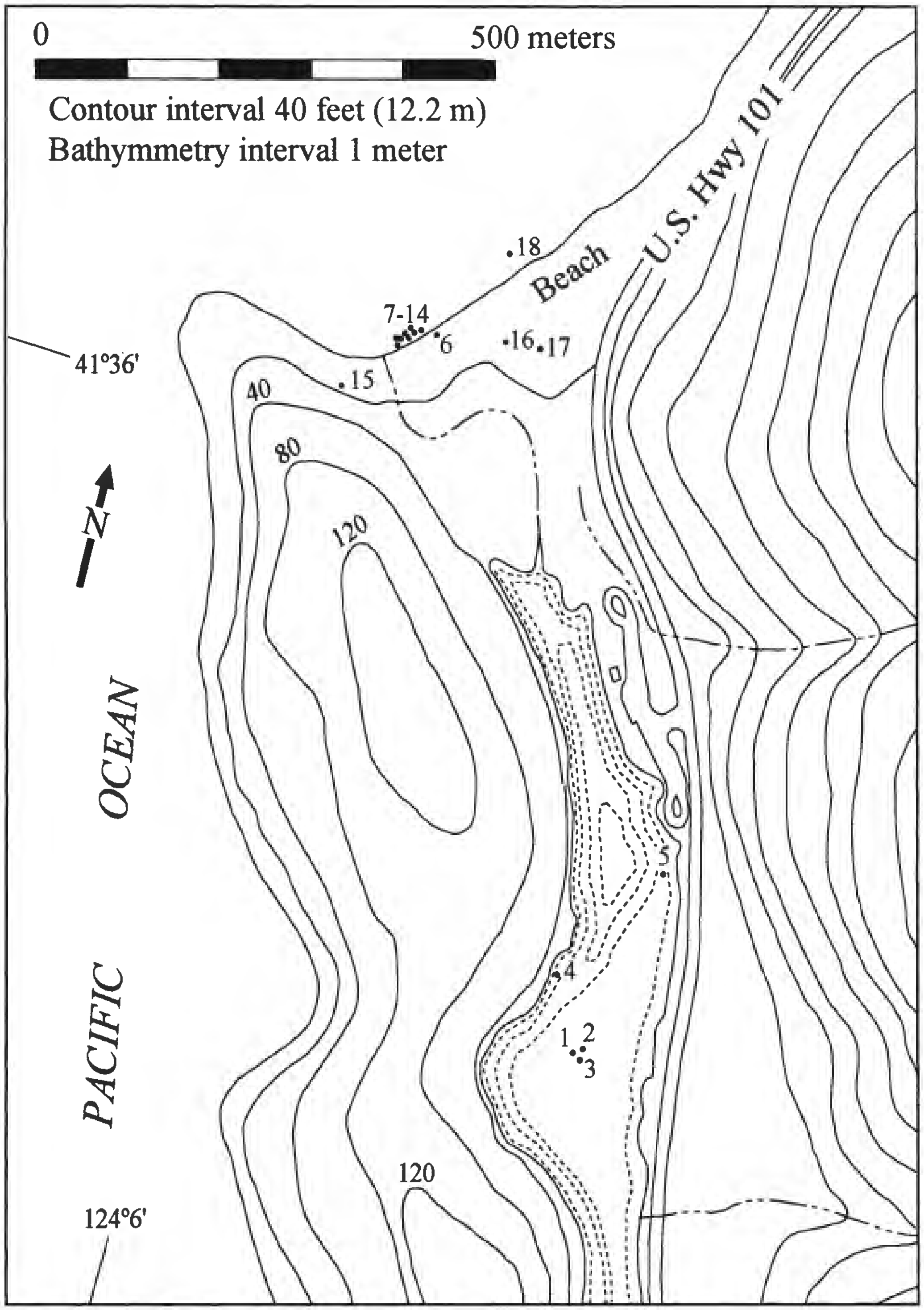

Figure A1-1. Modern diatom sampling localities. Sample collection sites are marked with numbered dots.

TABLE A1-1: INPUT DATA FOR CABFAC II Q-MODE FACTOR ANALYSIS 40 MOST ABUNDANT MODERN DIATOM SPECIES FROM TOTAL COUNT

Sample Number	*Fragilaria (Staurosira) construens var. venter*	*Fragilaria construens var. pumila*	*Navicula cryptotenella*	*Thalassiosira pacifica*	*Navicula cryptocephaloides*	*Fragilaria brevistriata*	*Nitzschia hantzschia*	*Licomphora gracilis*	*Thalassionema nitzschoides*	*Odonella aurita*	*Nitzschia frustulum var. subsalina*	*Achnanthes lanceolata*	*Opephora pacifica*	*Cymbella cuspidata*	*Aulacoseira islandica*	*Amphora veneta*	*Chaeteroceros fucellatus*	*Cocconeis scutellum var. parva*	*Luticola muticoides*	*Gomphonema parvulum*
LC-M-1A	464	213	0	0	0	39	0	0	0	0	0	0	0	14	22	0	0	0	0	22
LC-M-2	91	50	0	0	0	26	0	0	0	0	0	0	0	2	0	0	0	0	0	5
LC-M-3A	982	268	0	0	0	173	0	0	0	0	0	0	0	17	13	0	0	0	0	14
LC-M-4A	887	268	0	0	0	64	0	0	0	0	0	0	0	22.5	0	0	0	0	0	2
LC-M-5A	788	177	0	0	0	153	0	0	0	0	0	0	0	18	29	0	0	0	0	6
LC-M-6	0	0	0	88.5	0	0	0	0	7.5	1	0	0	0	0	0	0	0	0	0	0
LC-M-7	0	0	122	11	0	0	0	29	39	16.5	0	0	15	0	0	0	0	4	0	0
LC-M-8	0	0	22	94	0	0	0	10	14	16	0	2	55	0	0	0	1	25	0	0
LC-M-9	0	0	374	3	0	0	0	6	23	1.5	0	0	0	0	0	0	0	3	0	0
LC-M-10	0	0	17	1	584	0	0	62	0	76	0	0	0	0	0	0	0	3	0	0
LC-M-11	0	0	58	1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-12	0	0	33	10	0	0	34	66	0	0	0	0	0	0	0	0	0	18	0	0
LC-M-13	0	0	2	9.5	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0
LC-M-14	0	0	10	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-15	0	0	15	0	0	0	159	0	0	0	118	85	0	0	0	60	0	0	54	0
LC-M-16	0	0	11	305	0	0	0	2	30.5	3	0	5	0	0	0	0	0	0	0	0
LC-M-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-18	0	0	5	88	0	0	0	0	9.5	3	0	2	9	0	0	0	57.5	3	0	0

Sample Number	*Triblionella debilis*	*Stephanodiscus carconensis*	*Eunotia pectinalis*	*Gomphonema olivaceum*	*Navicula ammophila*	*Sellaphora pupula*	*Eunotia lunaris*	*Sellaphora seminulum*	*Navicula accomoda*	*Coscinodiscus marginatus*	*Opephora marina*	*Hantzschia amphioxys*	*Achnanthes minutissima*	*Navicula cryptocephala*	*Amphora ventricosa*	*Gomphonema augur var. turris*	*Skeletonema costatum*	*Eunotia veneris*	*Nitzschia holsatica*	*Rhabdomena arcuatum*
LC-M-1A	0	0	12	0	0	14	4	0	0	0	0	0	0	5	0	1	0	2	7	0
LC-M-2	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	4	0	0	0	0
LC-M-3A	0	0	18	0	0	9.5	14.5	0	0	0	0	0	3	4	0	5	0	2	4	0
LC-M-4A	0	0	2	0	0	5	6.5	0	0	0	0	0	0	5	0	10	0	8	8	0
LC-M-5A	0	0	8	0	0	5	4.5	0	0	0	0	0	0	7	0	2	0	7	1	0
LC-M-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-7	0	1	0	2	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0
LC-M-8	0	16	0	11	7	0	0	0	0	0	0	0	0	0	3	0	5	0	0	0
LC-M-9	0	2	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-10	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	18
LC-M-11	18	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0
LC-M-12	8	0	0	4	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
LC-M-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-14	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0
LC-M-15	17	0	0	9	0	0	0	33	6	0	0	29	25	0	0	0	0	0	0	0
LC-M-16	0	19.5	0	7	0	0	0	0	0	29.5	0	0	0	1	0	0	0	1	0	0
LC-M-17	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC-M-18	0	0	0	6	0	0	0	0	0	0	0	0	0	0	2	0	16	0	0	0

TABLE A1-2: EIGENVALUES

No.	Eigenvalue	Cumulative % of Sum of Squares
1	3.987257	22.15
2	3.400393	41.04
3	1.581295	49.83
4	1.280356	56.94
5	1.141646	63.28
6	1.054548	69.14
7	0.941771	74.37
8	0.823826	78.95
9	0.723557	82.97
10	0.657737	86.62

species of that factor is *Stephanodiscus carconensis*. This species was actually more abundant in the swash zone sample (LC-M-16), but because practically all of sample 17 was *S. carconensis*, the analysis weighted it as its own factor. Factors 2 and 6 were therefore combined into one. All of the different surf zone plants sampled had epiphytic diatoms on them, and the analysis generated 4 factors to characterize all the species found. This seemed to be too much, and the growth position of these plants did not indicate any correlation between time of exposure and the 4 factors. There were many of the same species in these samples, so total diatoms per sample and weight of Scaled Varimax Factor Scores had to be considered before deciding to revise the results. Factors 3, 4, 5, and 8 showed much similarity in their species members, so they were combine all of these into one factor.

This new scheme with combined factors had 4 factors, and is a much simpler model. Although it deviates slightly from the original analysis, it still explains the variation in the modern samples collected.

TABLE A1-3 FACTORS AND CORRESPONDING TAXA, 8 FACTORS RUN

Factor 1 -- Freshwater Marsh	*Staurosira construens* var. *venter* *Staurosira construens* var. *pumila* *Fragilaria exigua* *Cymbella cuspidata* *Aulacoseira islandica* *Gomphonema parvulum* *Eunotia pectinalis* *Sellaphora pupula* *Eunotia lunaris* *Navicula cryptocephala* *Eunotia veneris* *Nitzschia holsatica*
Factor 2 -- Sand in Swash Zone	*Thalassiosira pacifica* *Thalassionema nitzschoides* *Coscinodiscus marginatus*
Factor 3 -- Surf Zone Epiphytes	*Navicula cryptotenella* *Thalassionema nitzschoides* *Navicula ammophila* *Amphora ventricosa*
Factor 4 -- Wave Water and Surf Zone Epiphytes	*Thalassionema nitzschoides* *Odontella aurita* *Opephora pacifica* *Chaeteroceros fucellatus* *Cocconeis scutellum* var. *parva* *Gomphonema olivaceum* *Amphora ventricosa* *Skeletonema costatum*
Factor 5 -- Surf Zone Epiphytes	*Navicula cryptocephaloides* *Odontella aurita* *Cocconeis scutellum* var. *parva* *Opephora marina* *Rhabdomena arcuatum*
Factor 6 -- Dry Sand on Berm	*Stephanodiscus carconensis*
Factor 7 -- Soil at Spring	*Nitzschia hantszchia* *Nitzschia frustulum var. subsalina* *Achnanthes lanceolata* *Amphora veneta* *Luticola muticoides* *Sellaphora seminulum* *Hantzschia amphioxys* *Achnanthes minutissima*
Factor 8 -- Surf Zone Epiphytes	*Navicula cryptotenella* *Licomphora gracilis* *Thalassionema nitzschoides* *Cocconeis scutellum* var. *parva* *Tryblionella debilis* *Navicula margalithii* *Navicula cryptocephala*

TABLE A1-4 FACTORS AND CORRESPONDING TAXA, 4 FACTOR MODEL

Factor 1 -- Freshwater Marsh	*Staurosira construens* var. *venter* *Staurosira construens* var. *pumila* *Fragilaria exigua* *Cymbella cuspidata* *Aulacoseira islandica* *Gomphonema parvulum* *Eunotia pectinalis* *Sellaphora pupula* *Eunotia lunaris* *Navicula cryptocephala* *Eunotia veneris* *Nitzschia holsatica*
Factor 2 -- Sand in Swash Zone	*Thalassiosira pacifica* *Thalassionema nitzschoides* *Coscinodiscus marginatus* *Stephanodiscus carconensis*
Factor 3 -- Wave Water and Surf Zone Epiphytes	*Navicula cryptocephala* *Navicula cryptotenella* *Odontella aurita* *Gomphonema olivaceum* *Navicula cryptocephaloides* *Opephora marina* *Rhabdomena arcuatum* *Cocconeis scutellum* var. *parva* *Licomphora gracilis* *Navicula ammophila* *Tryblionella debilis* *Opephora pacifica* *Amphora ventricosa* *Navicula margalithii* *Thalassionema nitzschoides* *Skeletonema costatum* *Chaeteroceros fucellatus*
Factor 4 -- Soil at Spring	*Nitzschia hantszchia* *Nitzschia frustulum* var. *subsalina* *Achnanthes lanceolata* *Amphora veneta* *Luticola muticoides* *Sellaphora seminulum* *Hantzschia amphioxys* *Achnanthes minutissima*

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS

		Achnanthes brevipes		Achnanthes lanceolata		Achnanthes minutissima		Amphora ovalis var. attinis		Amphora veneta		Anomoeneis serians var. brachysira		Aulacoseira islandica		Cocconeis diminuta		Cocconeis fasciolata		Cocconeis pediculus	
Sample Number	**Description**	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	water from sediment trap							2						20	2						
LC-M-2	slime -side of sed. trap																				
LC-M-3A	sediments from sed. trap					2	1	2							13						
LC-M-4A	growth on tree stump																				
LC-M-5A	scrapings from lily leaf							2						26	4						
LC-M-6	sand from low swash zone																				
LC-M-7	epiphytes on *Cladophora columbiana*																				
LC-M-8	epiphytes on *Fucus distichus*		4		2								2								1
LC-M-9	epiphytes on *Phyllospadix scouleri*																				
LC-M-10	epiphytes on *Microcladia borealis*																				
LC-M-11	epiphytes on *Priontis australis*																				
LC-M-12	epiphytes on *Cladophora graminea*																				
LC-M-13	epiphytes on *Endocladia muricata*																				
LC-M-14	epiphytes on *Pelvitiopsis limitata*		1																		
LC-M-15	wet soil near spring on slope			60	25		25			30	30										
LC-M-16	sand from high swash zone			2	3												1				
LC-M-17	dry sand-top of berm																		1		
LC-M-18	sea water from waves				2																
total =		0	5	62	32	2	26	6	0	30	30	0	2	46	19	0	1	0	1	0	1

Relative Percentages

Sample Number	**Description**	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	water from sediment trap	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	2.30%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	slime -side of sed. trap	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	sediments from sed. trap	0.00%	0.00%	0.00%	0.00%	0.13%	0.06%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	growth on tree stump	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	scrapings from lily leaf	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	2.07%	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	sand from low swash zone	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	epiphytes on *Cladophora columbiana*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	epiphytes on *Fucus distichus*	0.00%	1.29%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%
LC-M-9	epiphytes on *Phyllospadix scouleri*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	epiphytes on *Microcladia borealis*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	epiphytes on *Priontis australis*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	epiphytes on *Cladophora graminea*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	epiphytes on *Endocladia muricata*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	epiphytes on *Pelvitiopsis limitata*	0.00%	5.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	wet soil near spring on slope	0.00%	0.00%	9.66%	4.03%	0.00%	4.03%	0.00%	0.00%	4.83%	4.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-16	sand from high swash zone	0.00%	0.00%	0.44%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%
LC-M-17	dry sand-top of berm	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	25.00%	0.00%	0.00%
LC-M-18	sea water from waves	0.00%	0.00%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Cocconeis placentula		Cocconeis placentula var. euglypta		Cocconeis placentula var. lineata		Cymbella aspera		Cymbella cuspidata		Cymbella lunata		Cymbella minuta fo. latens		Cymbella prostrata		Cymbella silesiaca		Diatoma vulgare var. producta		Epithemia turgida		Eunotia flexuosa	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A							4		14		2	2											2	
LC-M-2									2															
LC-M-3A								0.5	14	3		0.5			2									
LC-M-4A									16	6.5		4				1.5								
LC-M-5A								2	14	4	2	1			2			1						
LC-M-6																								
LC-M-7																								
LC-M-8		1				2														1				
LC-M-9														1							2			
LC-M-10																								
LC-M-11																								
LC-M-12																								
LC-M-13																								
LC-M-14																								
LC-M-15				1																		4		
LC-M-16		1	2	4																		1		
LC-M-17																								
LC-M-18																								
total =	0	2	2	5	0	2	4	2.5	60	13.5	4	7.5	0	1	4	1.5	0	1	0	1	2	5	2	0

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.46%	0.00%	1.61%	0.00%	0.23%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.89%	0.19%	0.00%	0.03%	0.00%	0.00%	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.22%	0.49%	0.00%	0.30%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	1.12%	0.32%	0.16%	0.08%	0.00%	0.00%	0.16%	0.00%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.32%	0.00%	0.00%	0.00%	0.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.64%	0.00%	0.00%
LC-M-16	0.00%	0.22%	0.44%	0.87%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Eunotia lunaris		Eunotia pectinalis		Eunotia praerupta bidens		Eunotia veneris		Fragilaria exigua		Frustulia vulgaris		Gomphonema affine		Gomphonema angustatum		Gomphonema augur var turris		Gomphonema olivaceum (?)		Gomphonema parvulum		Gomphonema subclavatum	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	4		12		2			2	38	1					2	4		1			12	10		
LC-M-2	4								26								4				2	3		
LC-M-3A	10	4.5	12	6				2	90	83		1				1	2	3			2	12		1
LC-M-4A	4	2.5		2			6	2	38	26		2			4	2	8	2				2		
LC-M-5A	4	0.5	6	2			4	3	144	9	2	1		1			2				4	2	2	
LC-M-6																								
LC-M-7																			2					
LC-M-8																			8	3				
LC-M-9																								
LC-M-10																								
LC-M-11																								
LC-M-12																			2	2				
LC-M-13																								
LC-M-14																								
LC-M-15												2							6	3				
LC-M-16								1								0.5			4	3				
LC-M-17																								
LC-M-18																1			4	2				
total =	26	7.5	30	10	2	0	10	10	336	119	2	6	0	1	6	8.5	16	6	26	13	20	29	2	1

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.46%	0.00%	1.38%	0.00%	0.23%	0.00%	0.00%	0.23%	4.38%	0.12%	0.00%	0.00%	0.00%	0.00%	0.23%	0.46%	0.00%	0.12%	0.00%	0.00%	1.38%	1.15%	0.00%	0.00%
LC-M-2	2.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	14.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.16%	0.00%	0.00%	0.00%	1.08%	1.62%	0.00%	0.00%
LC-M-3A	0.64%	0.29%	0.77%	0.38%	0.00%	0.00%	0.00%	0.13%	5.74%	5.30%	0.00%	0.06%	0.00%	0.00%	0.00%	0.06%	0.13%	0.19%	0.00%	0.00%	0.13%	0.77%	0.00%	0.06%
LC-M-4A	0.30%	0.19%	0.00%	0.15%	0.00%	0.00%	0.46%	0.15%	2.89%	1.97%	0.00%	0.15%	0.00%	0.00%	0.30%	0.15%	0.61%	0.15%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%
LC-M-5A	0.32%	0.04%	0.48%	0.16%	0.00%	0.00%	0.32%	0.24%	11.47%	0.72%	0.16%	0.08%	0.00%	0.08%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.32%	0.16%	0.16%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.57%	0.96%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	1.10%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.97%	0.48%	0.00%	0.00%	0.00%	0.00%
LC-M-16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%	0.87%	0.65%	0.00%	0.00%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%	0.00%	0.00%	1.87%	0.93%	0.00%	0.00%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Luticola muticoides		Mastogloia exigua		Meridion circulare var. constricta		Navicula americana		Navicula ammophila		Navicula cryptocephala		Navicula cuspidata		Navicula simula		Navicula tenella		Neidium productum		Nitzschia frustulum var. subsalina		Nitzschia hantzschia	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A						2					3	2	2	1					2					
LC-M-2																								
LC-M-3A							4				4			1				2		1				
LC-M-4A							4				4	1					4		2					
LC-M-5A							2				5	2		1					2	1				
LC-M-6																								
LC-M-7																								
LC-M-8										7														
LC-M-9									28	2														
LC-M-10																								
LC-M-11																								
LC-M-12											2												20	14
LC-M-13																								
LC-M-14																								
LC-M-15	32	22														2					70	47	68	91
LC-M-16				1								1												
LC-M-17																								
LC-M-18																								
total =	32	22	0	1	0	2	10	0	28	9	18	6	2	3	0	2	4	2	6	2	70	47	88	105

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.35%	0.23%	0.23%	0.12%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.26%	0.00%	0.00%	0.00%	0.26%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.13%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.00%	0.00%	0.30%	0.08%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.40%	0.16%	0.00%	0.08%	0.00%	0.00%	0.00%	0.00%	0.16%	0.08%	0.00%	0.00%	0.00%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.23%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	11.05%	7.73%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	5.15%	3.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%	11.27%	7.57%	10.95%	14.65%
LC-M-16	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Nitzschia holsatica		Nitzschia palacea		Nitzschia scalaris		Nitzschia scapelliformis		Pinnularia abaujensis		Pinnularia appendictulata		Pinnularia braunii var. amphicephala		Pinnularia brevicostata		Pinnularia fasciata		Pinnularia flexuosa		Pinnularia legumen		Pinnularia microstauron	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A		7									2			1	6	2		1						
LC-M-2																								
LC-M-3A	2	2			1	2				1												0.5	2	
LC-M-4A	6	2							2	1														
LC-M-5A		1	1		2				2						2				3		2		2	
LC-M-6																								
LC-M-7								2																
LC-M-8																								
LC-M-9																								
LC-M-10																								
LC-M-11																								
LC-M-12																								
LC-M-13																								
LC-M-14																								
LC-M-15																								
LC-M-16																								
LC-M-17																								
LC-M-18																								
total =	8	12	1	0	3	2	0	2	4	2	2	0	0	1	8	2	0	1	3	0	2	0.5	4	0

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.81%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.23%	0.00%	0.00%	0.12%	0.69%	0.23%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.13%	0.13%	0.00%	0.00%	0.06%	0.13%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.13%	0.00%
LC-M-4A	0.46%	0.15%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.08%	0.08%	0.00%	0.16%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.24%	0.00%	0.16%	0.00%	0.16%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Pinnularia polyonca		Pinnularia viridis		Sellaphora pupula		Sellaphora seminulum		Stauroneis anceps		Stauroneis anceps fo. gracilis		Stauroneis phoenicenteron		Staurosira construens var. pumila		Staurosira construens var. venter		Staurosirella leptostauron var. rhomboides		Surirella amphioxys		Surirella fatuosa	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A		1	2		10	4				1	2				200	13	414	50						
LC-M-2					2	1									50		86	5						
LC-M-3A			2	1	6	3.5							2		208	60	878	104				1		
LC-M-4A					4	1									252	16	828	59						
LC-M-5A			2	0.5	4	1						1			158	18	722	67						
LC-M-6																								
LC-M-7																								
LC-M-8																				1				
LC-M-9																								
LC-M-10																								
LC-M-11																							2	
LC-M-12																								
LC-M-13																								
LC-M-14																								
LC-M-15							15	18																
LC-M-16																								
LC-M-17																								
LC-M-18																								
total =	0	1	6	1.5	26	10.5	15	18	0	1	2	1	2	0	868	107	2928	285	0	1	0	1	2	0

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.12%	0.23%	0.00%	1.15%	0.46%	0.00%	0.00%	0.00%	0.12%	0.23%	0.00%	0.00%	0.00%	23.04%	1.50%	47.70%	5.76%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	1.08%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	27.03%	0.00%	46.49%	2.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.00%	0.13%	0.06%	0.38%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.13%	0.00%	13.27%	3.83%	56.03%	6.64%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.30%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	19.14%	1.22%	62.89%	4.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.00%	0.16%	0.04%	0.32%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.00%	0.00%	12.58%	1.43%	57.51%	5.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.80%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.42%	2.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Surirella robusta		Synedra rumpens		Tabellaria fenestrata		Tabellaria flocculosa		Brackish-Marine Species	Actinocyclus normanii		Actinoptychus senarius		Amphora ventricosa		Biddulphia laevis		Caloneis amphisbaena		Ceratoneis amphioxys		Chaeteroceros fucellatus	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead		Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A		0.5				2.5		1															
LC-M-2																							
LC-M-3A		0.5		1	2	3		5															
LC-M-4A						2																	
LC-M-5A		2			2	3.5		2															
LC-M-6																			1		1		
LC-M-7														16	3								
LC-M-8															3								1
LC-M-9																							
LC-M-10																6	1						
LC-M-11																							
LC-M-12																							
LC-M-13																							
LC-M-14																							
LC-M-15													1										
LC-M-16											3	2	2										
LC-M-17																							
LC-M-18														2								34	24.5
total =	0	3	0	1	4	11	0	8		0	3	2	3	18	6	6	1	0	1	0	1	34	25.5

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead		Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.06%	0.00%	0.00%	0.00%	0.29%	0.00%	0.12%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.03%	0.00%	0.06%	0.13%	0.19%	0.00%	0.32%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.16%	0.00%	0.00%	0.16%	0.28%	0.00%	0.16%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.93%	0.00%	0.93%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	5.83%	1.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.96%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.32%
LC-M-9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.74%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-16	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.65%	0.44%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.89%	11.45%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Cocconeis costata		Cocconeis scutellum var. parva		Coscinodiscus marginatus		Cyclotella stelligera		Dimeregramma minor		Gyrosigma eximium	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A												
LC-M-2												
LC-M-3A												
LC-M-4A												
LC-M-5A												
LC-M-6	2											
LC-M-7			2	2								
LC-M-8			12	13								
LC-M-9			2	1								
LC-M-10				3								
LC-M-11											2	
LC-M-12			14	4								
LC-M-13				1								
LC-M-14		1				0.5						
LC-M-15												
LC-M-16					8	21.5				4		
LC-M-17												
LC-M-18			2	1			4	3				
total =	2	1	32	25	8	22	4	3	0	4	2	0

	Hantzschia amphioxys		Hyalodiscus laevis		Licmophora gracilis		Navicula cryptocephaloides		Navicula cryptotenella		Navicula margalithii	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A												
LC-M-2												
LC-M-3A												
LC-M-4A												
LC-M-5A												
LC-M-6											6	
LC-M-7			2		17	12			114	8	8	3
LC-M-8					8	2			16	6		
LC-M-9					6				360	14		
LC-M-10					55	7	544	41	16	1		
LC-M-11					6				49	9	16	8
LC-M-12					58	8			28	5	2	
LC-M-13									2			
LC-M-14					2				10			
LC-M-15	18	11							12	3	2	4
LC-M-16						2			6	5		
LC-M-17												
LC-M-18									1	4		
total =	18	11	2	0	152	31	544	41	614	55	34	15

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	1.85%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	0.73%	0.73%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	3.86%	4.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.44%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.80%	0.00%
LC-M-12	0.00%	0.00%	7.73%	2.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	0.00%	6.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	5.41%	0.00%	0.00%	0.00%	2.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-16	0.00%	0.00%	0.00%	0.00%	1.74%	4.68%	0.00%	0.00%	0.00%	0.87%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.93%	0.47%	0.00%	0.00%	1.87%	1.40%	0.00%	0.00%	0.00%	0.00%

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.56%	0.00%
LC-M-7	0.00%	0.00%	0.73%	0.00%	6.19%	4.37%	0.00%	0.00%	41.53%	2.91%	2.91%	1.09%
LC-M-8	0.00%	0.00%	0.00%	0.00%	2.57%	0.64%	0.00%	0.00%	5.14%	1.93%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.00%	1.33%	0.00%	0.00%	0.00%	80.09%	3.11%	0.00%	0.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	6.75%	0.86%	66.75%	5.03%	1.96%	0.12%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	5.41%	0.00%	0.00%	0.00%	44.14%	8.11%	14.41%	7.21%
LC-M-12	0.00%	0.00%	0.00%	0.00%	32.04%	4.42%	0.00%	0.00%	15.47%	2.76%	1.10%	0.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.79%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	10.81%	0.00%	0.00%	0.00%	54.05%	0.00%	0.00%	0.00%
LC-M-15	2.90%	1.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.93%	0.48%	0.32%	0.64%
LC-M-16	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.00%	1.31%	1.09%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.47%	1.87%	0.00%	0.00%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Nitzschia subinflata		Odontella aurita		Opephora marina		Opephora pacifica		Paralia sulcata		Rhabdonema arcuatum		Rhaphoneis amphiceros		Rhaphoneis margaritalimbata		Rhaphoneis psammicola		Rhaphoneis surirella		Rhoicosphenia marina		Scoliopleura tumida	
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A																								
LC-M-2																								
LC-M-3A																								
LC-M-4A																								
LC-M-5A																								
LC-M-6				1																				
LC-M-7			12	4.5			10	5										1						
LC-M-8			12	4			24	31	2	1				1		6				8				
LC-M-9				1.5											2									
LC-M-10			70	6	12	18					18										12	2		
LC-M-11																								
LC-M-12																								
LC-M-13			2																					
LC-M-14																								
LC-M-15																		1						
LC-M-16		2	2	1						3						6		1						
LC-M-17																								
LC-M-18			2	1			6	3															2	1
total =	0	2	100	19	12	18	40	39	2	4	18	0	0	1	2	12	0	3	0	8	12	2	2	1

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead
LC-M-1A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-3A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-5A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-6	0.00%	0.00%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-7	0.00%	0.00%	4.37%	1.64%	0.00%	0.00%	3.64%	1.82%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-8	0.00%	0.00%	3.86%	1.29%	0.00%	0.00%	7.72%	9.97%	0.64%	0.32%	0.00%	0.00%	0.00%	0.32%	0.00%	1.93%	0.00%	0.00%	0.00%	2.57%	0.00%	0.00%	0.00%	0.00%
LC-M-9	0.00%	0.00%	0.00%	0.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-10	0.00%	0.00%	8.59%	0.74%	1.47%	2.21%	0.00%	0.00%	0.00%	0.00%	2.21%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.47%	0.25%	0.00%	0.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-13	0.00%	0.00%	13.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-16	0.00%	0.44%	0.44%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	0.00%	0.00%	0.00%	0.00%	0.00%	1.31%	0.00%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-17	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
LC-M-18	0.00%	0.00%	0.93%	0.47%	0.00%	0.00%	2.80%	1.40%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.93%	0.47%

TABLE A2-1 LAGOON CREEK MODERN DIATOM COUNTS, CONTINUED

	Skeletonema costatum		Stephanodiscus carconensis		Synedra fasciculata		Thalassionema nitzschoides		Thalassiosira hendeyi		Thalassiosira pacifica		Trachneis aspera		Trachneis aspera var. Neumeyeri		Triblionella debilis		Triblionella levidensis		SPONGE SPICULE	FORAM	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	Total Diatoms Counted
Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead							
LC-M-1A																											868
LC-M-2																											185
LC-M-3A																											1567
LC-M-4A																									1		1316.5
LC-M-5A																											1255.5
LC-M-6							4	3.5			78	10.5				1									5		108
LC-M-7				1			22	17			8	3													2		274.5
LC-M-8		5		16			6	8			55	39												X	5		311
LC-M-9			2				20	3			2	1	2												2		449.5
LC-M-10												1	2														815
LC-M-11												1					6	12									111
LC-M-12											10		2				8		2								181
LC-M-13											6	3.5															14.5
LC-M-14												4															18.5
LC-M-15										1							4	13							3		621
LC-M-16			4	15.5		2.5	2	28.5	2	5	218	87	2								X			X	2		459.5
LC-M-17				3																	X						4
LC-M-18		16					6	3.5		1	73	15												X	3		214
total =	0	21	6	35.5	0	2.5	60	63.5	2	7	450	165	8	0	0	1	18	25	2	0							8,773.5

Sample Number	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	Live	Dead	
LC-M-1A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-2	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-3A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-4A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-5A	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.70%	3.24%	0.00%	0.00%	72.22%	9.72%	0.00%	0.00%	0.00%	0.93%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-7	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	8.01%	6.19%	0.00%	0.00%	2.91%	1.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-8	0.00%	1.61%	0.00%	5.14%	0.00%	0.00%	1.93%	2.57%	0.00%	0.00%	17.68%	12.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-9	0.00%	0.00%	0.44%	0.00%	0.00%	0.00%	4.45%	0.67%	0.00%	0.00%	0.44%	0.22%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%	0.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-11	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.90%	0.00%	0.00%	0.00%	0.00%	5.41%	10.81%	0.00%	0.00%	100.00%
LC-M-12	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.52%	0.00%	1.10%	0.00%	0.00%	0.00%	4.42%	0.00%	1.10%	0.00%	100.00%
LC-M-13	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	41.38%	24.14%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	21.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-15	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.16%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.64%	2.09%	0.00%	0.00%	100.00%
LC-M-16	0.00%	0.00%	0.87%	3.37%	0.00%	0.54%	0.44%	6.20%	0.44%	1.09%	47.44%	18.93%	0.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-17	0.00%	0.00%	0.00%	75.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
LC-M-18	0.00%	7.48%	0.00%	0.00%	0.00%	0.00%	2.80%	1.64%	0.00%	0.47%	34.11%	7.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

APPENDIX 3 - Fossil Diatom Counts

TABLE A3-1: CORE LC-18 COUNTS

Sample Number	Depth (cm)	Achnanthes lanceolata var. elliptica	Amphora ovalis var. affinis	Amphora subturgida	Anomoeoneis serians var. acuta	Aulacoseira islandica	Aulacoseira italica	Cocconeis placentula	Cocconeis placentula var. euglypta	Cosmioneis pusilla	Craticula accomoda	Cyclotella meneghiniana	Cymbella cuspidata	Cymbella lunata	Cymbella procera	Cymbella silesiaca	Diatoma tenue var. elongatum	Diploneis ovalis	Epithemia turgida	Epithemia turgida westermanii	Eunotia formica	Eunotia lunaris
LCVB18-1	2																					
LCVB18-2	6.5																					
LCVB18-3	10																					
LCVB18-4	13					9	16			2		1		10		6	1	2	1		2	6
LCVB18-5	16																					
LCVB18-6	24																					
LCVB18-7	29				5	28	12		14			2		9	2	1	1		8		9	4
LCVB18-8	32.5																					
LCVB18-9	41																					
LCVB18-10	49.5		3		1	98							2	8	3							4
LCVB18-11	53																					
LCVB18-12	70																					
LCVB18-13	92			9					1		6	8		14	1	1	3	2	2			6
LCVB18-14	103.5																					
LCVB18-15	112		7		13				2			9	1	9		1	5		3			6
LCVB18-16	120																					
LCVB18-17	121.5																					
LCVB18-18	127																					
LCVB18-19	135.5		8	1	1				3		5	5		2			6			1		1
LCVB18-20	140																					
LCVB18-21	153	1	11	2					4	1	103	1					2					
LCVB18-22	156.5		4	19					11		31	28				2	29		3			1
LCVB18-23	162																					
LCVB18-24	180																					
LCVB18-25	193	1		4				4	9		65			1			4		2			
LCVB18-26	204																					
LCVB18-27	214																					
LCVB18-28	225																					
LCVB18-29	240	7		7					16		13					5			7			
LCVB18-30	244			1				3			5								2			
total =		9	33	43	20	135	28	7	60	3	228	54	3	53	6	16	51	4	28	1	11	28

TABLE A3-1: CORE LC-18 COUNTS, CONTINUED

Sample Number	Depth (cm)	Eunotia praerupta bidens	Eunotia tetraodon	Eunotia veneris	Fragilaria exigua	Frustulia vulgaris	Gomphonema affine	Gomphonema angustatum	Gomphonema augur var. turris	Gomphonema constricta var. capitata	Gomphonema parvulum	Luticola mutica	Mastogloia smithii var. lacustris	Melosira varians	Navicula capitata var. hungarica	Navicula cruciculа	Navicula cryptocephala	Navicula peregrina	Navicula pseudocutiformis	Navicula radiosa	Navicula rhynocephala	Neidium iridis var. amphiata
LCVB18-1	2																					
LCVB18-2	6.5																					
LCVB18-3	10																					
LCVB18-4	13	4	3	6	65	1	4	6		1							5		1		1	
LCVB18-5	16																					
LCVB18-6	24																					
LCVB18-7	29	5	4	18	45	4	3	27		3					1		14		1			1
LCVB18-8	32.5																					
LCVB18-9	41																					
LCVB18-10	49.5	1			82	1	2	28	4						1		6		7			
LCVB18-11	53																					
LCVB18-12	70																					
LCVB18-13	92	9	1	35	23	5	6	16		1	1			3	1		2			5		
LCVB18-14	103.5																					
LCVB18-15	112	3		3	12		6	23	1	1	2				10		9		2	12	4	2
LCVB18-16	120																					
LCVB18-17	121.5																					
LCVB18-18	127																					
LCVB18-19	135.5	2		8	56		1	4			3	3			17		9			8	6	
LCVB18-20	140																					
LCVB18-21	153	1			3		2	2				1		1	7	2		1		5	1	
LCVB18-22	156.5	1		1	2		1	1		1	2		9	58	5		1			5	1	
LCVB18-23	162																					
LCVB18-24	180																					
LCVB18-25	193			1			1	10					5	17	7	1						
LCVB18-26	204																					
LCVB18-27	214																					
LCVB18-28	225																					
LCVB18-29	240				5		10	5					10	6	6							
LCVB18-30	244						4	5						6							5	
total =		26	8	72	293	11	40	127	5	7	8	4	24	91	55	3	46	1	11	35	18	3

TABLE A3-1: CORE LC-18 COUNTS, CONTINUED

Sample Number	Depth (cm)	Nitzschia gandershemeneis	Nitzschia palea	Nitzschia scalaris	Opephora parva	Pinnularia braunii var. amphicephala	Pinnularia brevicostata	Pinnularia fasciata	Pinnularia gentilis	Pinnularia lagerstedtii	Pinnularia legumen	Pinnularia nodosa	Pinnularia streptoraphe	Pinnularia viridis	Rhopalodia gibba	Sellaphora pupula	Sellaphora seminulum	Stauroneis kreigeri	Stauroneis phoenicenteron	Staurosira constuens	Staurosira construens var. venter	Stephanodiscus carconensis
LCVB18-1	2																					
LCVB18-2	6.5																					
LCVB18-3	10																					
LCVB18-4	13	24				4	3	2			1		1		1	10	10	3	2	3	365	
LCVB18-5	16																					
LCVB18-6	24																					
LCVB18-7	29	7		1		14									3	12	16	2	1		331	
LCVB18-8	32.5																					
LCVB18-9	41																					
LCVB18-10	49.5	2				2	4		1		1		1			12	25	7	1		643	
LCVB18-11	53																					
LCVB18-12	70																					
LCVB18-13	92	4					3						1	1	1	3	7			2	189	
LCVB18-14	103.5																					
LCVB18-15	112	2				2		1				2	1	1	6	7	31	7	2		557	
LCVB18-16	120																					
LCVB18-17	121.5																					
LCVB18-18	127																					
LCVB18-19	135.5	18			2	1									2	7	23	3			163	
LCVB18-20	140																					
LCVB18-21	153	6	33														5				113	
LCVB18-22	156.5	3	6														1				83	
LCVB18-23	162																					
LCVB18-24	180																					
LCVB18-25	193	1	2														4				28	
LCVB18-26	204																					
LCVB18-27	214																					
LCVB18-28	225																					
LCVB18-29	240	5	8																		6	10
LCVB18-30	244									4												
total =		72	49	1	2	23	10	3	1	4	2	2	4	2	13	51	122	22	6	5	2,478	10

TABLE A3-1: CORE LC-18 COUNTS, CONTINUED

Sample Number	Depth (cm)	Stephanodiscus niagarae	Surirella elegans	Synedra ulna	Tabellaria fenestrata	Tabellaria flocculosa	Thalassiosira lacustris	Brackish-Marine Species	Achnanthes hauckiana	Amphora granulata	Amphora ventricosa	Bacillaria paradoxa	Caloneis westii	Campylodiscus echeneis	Cocconeis scutellum var. parva	Diploneis interrupta	Diploneis smithii var. rhombica	Gyrosigma accuminatum	Gyrosigma balticum	Gyrosigma fasciola	Mastogloia exigua	Navicula cryptotenella
LCVB18-1	2																					
LCVB18-2	6.5																					
LCVB18-3	10																					
LCVB18-4	13			2	4	36																
LCVB18-5	16																					
LCVB18-6	24																					
LCVB18-7	29				14	51								1	1							
LCVB18-8	32.5																					
LCVB18-9	41																					
LCVB18-10	49.5				15	37																
LCVB18-11	53																					
LCVB18-12	70																					
LCVB18-13	92	1		21	2	2			1			7			7			10	12			1
LCVB18-14	103.5																					
LCVB18-15	112			2	3	22			3							2	2					
LCVB18-16	120																					
LCVB18-17	121.5																					
LCVB18-18	127																					
LCVB18-19	135.5			7		2			8			1					3	2				
LCVB18-20	140																					
LCVB18-21	153		1	8		2	4		12			2		1	14			1		5		
LCVB18-22	156.5			73	5	42	1		6			1			43							
LCVB18-23	162																					
LCVB18-24	180																					
LCVB18-25	193			40					1		3	12	1		88	3		2	8		12	
LCVB18-26	204																					
LCVB18-27	214																					
LCVB18-28	225																					
LCVB18-29	240			15					15	36		7		5	128			12			19	48
LCVB18-30	244			8					6	21		4			243							11
total =		1	1	176	43	194	5		52	57	3	34	1	7	524	5	5	27	20	5	31	60

TABLE A3-1: CORE LC-18 COUNTS, CONTINUED

Sample Number	Depth (cm)	Navicula digitoradiata	Navicula margalithii	Navicula salinarum	Nitzschia fasciculata	Nitzschia scapelliformis	Nitzschia sigma	Opephora parva	Rhopalodia musculus	Surirella ovalis	Synedra fasciculata	Synedra rumpens	Tryblionella acuminata	Tryblionella circumsuta	Tryblionella coarctata	Tryblionella levdensis	Tryblionella plana	Tryblionella punctata	Marine "Beach" Species	Coscinodiscus decresens	Coscinodiscus marginatus	Coscinodiscus radiatus
LCVB18-1	2																					
LCVB18-2	6.5																					
LCVB18-3	10																					
LCVB18-4	13																					
LCVB18-5	16																					
LCVB18-6	24																					
LCVB18-7	29																					
LCVB18-8	32.5																					
LCVB18-9	41																					
LCVB18-10	49.5																					
LCVB18-11	53																					
LCVB18-12	70																					
LCVB18-13	92			9			2			1	11		7							1		
LCVB18-14	103.5																					
LCVB18-15	112																				1	
LCVB18-16	120																					
LCVB18-17	121.5																					
LCVB18-18	127																					
LCVB18-19	135.5		5	3		5				1				2		1				1		
LCVB18-20	140																					
LCVB18-21	153			37	1		1				1	2	2			2						1
LCVB18-22	156.5			4		1					15											
LCVB18-23	162																					
LCVB18-24	180																					
LCVB18-25	193		19	11			3		3		29		17		8	9	3	1				
LCVB18-26	204																					
LCVB18-27	214																					
LCVB18-28	225																					
LCVB18-29	240					5	5	6					14		4	5		8			5	
LCVB18-30	244	5	10	7			3				3	7	6			5		5				3
total =		5	34	71	1	11	14	6	3	2	59	9	46	2	12	22	3	14		2	6	4

TABLE A3-1: CORE LC-18 COUNTS, CONTINUED

Sample Number	Depth (cm)	Endictya hendeyi	Paralia sulcata	Rhaphoneis amphiceros	Rhaphoneis psammicola	Stephanodiscus carconensis	Stephanodiscus niagarae	Thalassionema nitzschoides	Thalassiosira eccentrica	Thalassiosira hendeyi	Thalassiosira pacifica	SPONGE SPICULE	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	PRESERVATION	Percent Fresh	Percent Brackish-Marine	*Percent Marine "Beach"	Total Diatoms Counted
LCVB18-1	2																				
LCVB18-2	6.5																				
LCVB18-3	10																				
LCVB18-4	13														4	3	VG	100.00%	0.00%	0.00%	624
LCVB18-5	16																				
LCVB18-6	24																				
LCVB18-7	29														2	2	G	99.70%	0.30%	0.00%	675
LCVB18-8	32.5																				
LCVB18-9	41																				
LCVB18-10	49.5														3	3	VG	100.00%	0.00%	0.00%	1002
LCVB18-11	53																				
LCVB18-12	70																				
LCVB18-13	92										2				2	9	VG	84.86%	14.50%	0.64%	469
LCVB18-14	103.5																				
LCVB18-15	112										1				3	5	VG	98.88%	0.87%	0.25%	801
LCVB18-16	120																				
LCVB18-17	121.5																				
LCVB18-18	127																				
LCVB18-19	135.5		1		1					1	2				3	7	F	91.08%	7.47%	1.45%	415
LCVB18-20	140																				
LCVB18-21	153			3	1				2		7				4	16	VG	77.27%	19.38%	3.35%	418
LCVB18-22	156.5										1				2	2	VG	85.83%	13.97%	0.20%	501
LCVB18-23	162																				
LCVB18-24	180																				
LCVB18-25	193	1						5			4				4	12	G	46.00%	51.78%	2.22%	450
LCVB18-26	204																				
LCVB18-27	214																				
LCVB18-28	225																				
LCVB18-29	240				5						16				5	28	F	29.13%	65.50%	5.37%	484
LCVB18-30	244				3	6	5		4		16				5	33	P	10.34%	80.77%	8.89%	416
total =		1	1	3	10	6	5	5	6	1	49										6,255

*"Beach" species refers to total planktic and epipsammic marine species.

TABLE A3-2. CORE LC-16 COUNTS

Sample Number	Depth (cm)	Achnanthes biasolettiana	Achnanthes exigua	Achnanthes lanceolata var. elliptica	Achnanthes minutissima	Achnanthes rupestoides	Achnanthes saxonica	Amphora ovalis var. affinis	Amphora [illegible]	Anomoeoneis serians var. acuta	Aulacoseira islandica	Aulacoseira italica	Caloneis [illegible] (?)	Cocconeis disculus	Cocconeis placentula	Cocconeis placentula var. euglypta	Cosmioneis pusilla	Craticula accomoda	Cyclotella meneghiniana	Cymbella cuspidata	Cymbella heteropleura var. subrostrata	Cymbella [illegible]	Cymbella [illegible]	Cymbella silesiaca	Diatoma hiemale var. mesodon	Diatoma tenue var. elongatum	Diploneis ovalis	Epithemia turgida	Epithemia turgida westermannii	Eunotia [illegible]	Eunotia formica	Eunotia gracilis	Eunotia lunaris	Eunotia monodon	Eunotia pectinalis	Eunotia praerupta bidens	Eunotia tetraodon	Eunotia veneris	Fragilaria capucina	Fragilaria [illegible]
LCVB16-1	3										54					1			10	1	1	8		5				4			6			14			3	14		
LCVB16-2	19						4				2									1	1	2		4			1	3			1			2				3		
LCVB16-3	34		2		15		1				2	13										12	1	3						3	1	1		3			1	25		
LCVB16-4	42				27		1	2		5	5	4										15				11				3	7			25				24		
LCVB16-5	51.5				5		1			2	38	8										15		1		12		4		3	9			26				18	1	
LCVB16-6	54.5				12		3	2			39	7										13	1	2		2	1	1		7	16			17			3	46		
LCVB16-7	58.5				2		3			1	20											5		3				1						4				7		
LCVB16-8	72.5				6		13			1	135	8							1			8								2	14			16				15		
LCVB16-9	86.5				7		8	1			16	49										1		2														12		
LCVB16-10	100				1		6				8	35										9								1				2				4		
LCVB16-11	109		1		27		1			18	20	6								1		23		1						3				1			1	28		
LCVB16-12	120			1	7		5	1			45					3			2			3	1	2				2			1					4	7.5	4		25
LCVB16-13	131				13		2	2		2	35	3				1			1			7								2				2				2		
LCVB16-14	143.5				5			2	23		11			1		8			6			1		2		40	1		3									3	21	
LCVB16-15	151.5				16		2	3	1	3	28	28				1				1		14	0.5	1						2				1				30	1	
LCVB16-16	153.5				5		1	2			50	2										12												5				9		
LCVB16-17	159				1			7		2	38								3	3		5	1								1							4		56
LCVB16-18	166.5				4		5	2	1	1						2			3			15		3		1		3.5					6			6		23.5		24
LCVB16-19	169.5		4		18		1		2	2						1		2	3	1		2				7		2		2				2			1	4	14	
LCVB16-20	172.5			2	5		2	3	21.5	1						7.5			9.5			1		1		5.5		1.5					1			4		2		39
LCVB16-21	180	2			4			2	17	3						3		69	4							4												1		
LCVB16-22	186				5				5							7		72				3				1														
LCVB16-23	199				8			8	13							3		39	7			2				7	3	2							2	1				
LCVB16-24	201				3		4	1	2							1	3	10	6			2		1		5								2	1					
LCVB16-25	204.5				9		8	4									30	2	12					7		2		1						12		6		1		
LCVB16-26	209.5			2	2	5	1										10		12					1		2.5								1		2				4
LCVB16-27	216.5				1		2	2								1	17	2	3					1		1	2							2		1				
LCVB16-28	223.5					18	1		1								2.5		10					1		4.5	1	1								6				1
LCVB16-29	231						7	1	1									1	9					8										9						
LCVB16-30	237.5				3			1										3								5														
LCVB16-31	244				1		1	2	5							5		7	6					1		12								3						
LCVB16-32	249					5		3	12							2			5							11.5	1	9.5								1				22
LCVB16-33	260			1				8	2							2			5							4.5		3.5								2				19
LCVB16-34	272							1	52							4			3									1												14
LCVB16-35	283							4	3							2			1										13.5							1				2
LCVB16-36	291							1									1											1					0.5							3
LCVB16-37	295																											3.5												7
LCVB16-38	308.5							3	1							6			6			0.5		1		2	1													11
LCVB16-39	317.5								5				1			5			3					1		10.5														20
LCVB16-40	327				2.5	1	5	1	1							2.5			1							1														11.5
LCVB16-41	333.5								4	1						9	1		4									13												
LCVB16-42	338.5							2.5	5							2.5	3		1			2.5		1		17							1			1				5
LCVB16-43	345				6				6	1						4.5			4			24			2.5															
LCVB16-44	351			10	24	22.5			1						1	2	5						1	9		2.5		1			1					25		5		
LCVB16-45	354.5			13.5	15.5	5.5										1	9		1	1		2		5.5		1							28			78		8		
LCVB16-46	362.5			1	15		7	3		1							3		5			2		21		31							19	27		1		3		
LCVB16-47	372			1	11		27	1									4	3						13		18							9	10						
LCVB16-48	380			3	7		25			1						3	5	8	10					2		6.5								1.5					7.5	6
total =		2	7	34.5	293	57	147	73.5	204.5	45	546	163	1	1	1	90	93.5	218	156.5	9	2	209	5.5	103.5	2.5	225	11	56.5	16.5	28	57	1	64.5	207.5	3	139	16.5	287.5	44.5	249.5

TABLE A3-2. CORE LC-16 COUNTS, CONTINUED

Sample Number	Depth (cm)	Frustulia vulgaris	Gomphonema affine	Gomphonema angustatum	Gomphonema augur var. turris	Gomphonema constricta var. capitata	Gomphonema gracile	Gomphonema herculeana	Gomphonema longiceps var. subclavata	Gomphonema parvulum	Gomphonema subclavatum	Gomphonema tenellum	Gomphonema ventricosum	Gyrosigma acuminatum	Gyrosigma attenuatum	Luticola mutica	Luticola muticoides	Martyana martyi	Mastogloia exigua	Mastogloia pumila	Mastogloia pusilla	Mastogloia smithii var. lacustris	Melosira roseana var. epidendron	Melosira varians	Meridion circulare var. constricta	Navicula americana	Navicula capitata var. hungarica	Navicula crucicula	Navicula cryptocephala	Navicula cryptotenella	Navicula elegans	Navicula guatemalensis	Navicula menisculus	Navicula pseudoacutiformis	Navicula pseudolanceolata	Navicula pupula var. mutata	Navicula radiosa	Navicula rhynchocephala	Navicula slesvicensis	Navicula witrockii
LCVB16-1	3	4																								1											4			
LCVB16-2	19	13		5																						1			1				5				6			
LCVB16-3	34		1		1					20																	1										2			
LCVB16-4	42	1								12																1											6			
LCVB16-5	51.5	1	1	2		1			1	11												1					2		2								9	1		
LCVB16-6	54.5	7			1					46															1				2								2			2
LCVB16-7	58.5					1				10															1				5											5
LCVB16-8	72.5	2								8																			3											3
LCVB16-9	86.5	1	1							7																			4					1						
LCVB16-10	100	2								5		1																	2								2			
LCVB16-11	109	2			2					34																			3											3
LCVB16-12	120	8		2		1.5				4	11				1														5									5.5		
LCVB16-13	131	1		1		1				10																	2		6								1			1
LCVB16-14	143.5	1		1						15			1									7		23			6										2			
LCVB16-15	151.5			2	1					22																1			8					1		1	1			1
LCVB16-16	153.5	2		3						18																3			3											7
LCVB16-17	159	2		1	1	1					6				4							2				1	4	1	13			1					8	10.5		
LCVB16-18	166.5			6							19																3		1								5	7		
LCVB16-19	169.5				1	1				7																	5		4								18			1
LCVB16-20	172.5	1				1				2											1	3					4	1	6									3		
LCVB16-21	180		2							9										5	9			19			16	3									9			
LCVB16-22	186									2					7				3	19	2							1									2	1		
LCVB16-23	199									4					1					2	2			31			16										8	12		
LCVB16-24	201									13	12				1									5			11										2	7		
LCVB16-25	204.5	5			4	2				8	38	1												11	1		9				1						13			
LCVB16-26	209.5									6	10.5					4	4							12			7	2.5										4.5		
LCVB16-27	216.5	1			7					7	15													2			15	2									14	13		
LCVB16-28	223.5	2		2		1				5	7			1		6	3							12			7	1	2		2							16.5		
LCVB16-29	231				3					4	11													4			3		1								6	2		
LCVB16-30	237.5				1						3													6			5	1									7	6		
LCVB16-31	244				2						13													8			14										2	8		
LCVB16-32	249			2		1										5								36			18.5	2			1						4.5	12.5		
LCVB16-33	260			4							2					1		1			1			22			25	1	4		2						3	24		
LCVB16-34	272			2							2.5					2								14			29	4									1	3.5		
LCVB16-35	283			2			1														2			8			7	3			2						2	11		
LCVB16-36	291						1													5	30							1		1	1.5						4	11		
LCVB16-37	295						2																	13			6			4	6						13	4		
LCVB16-38	308.5					1	4.5										1							28			37	3			2						5	10		
LCVB16-39	317.5			1			5																	4			8	2			2						5	8		
LCVB16-40	327															4	1							5			10.5	2.5									1	15		
LCVB16-41	335.5		2													4	1							76			1											11.5		
LCVB16-42	338.5				1		9	1								2				4				26			34.5	2.5			1						1.5	16		
LCVB16-43	345									5						1					6			69			15				1						0.5	5		
LCVB16-44	351	3.5	1	1						16	5					20	5							7.5			14											8	2	
LCVB16-45	354.5	1		21						48	9					19							1	5.5			11										0.5	1.5	11	
LCVB16-46	362.5	5		8						94															3		10										2	7		
LCVB16-47	372			11		1				59	2																12.5		2								2	6		
LCVB16-48	380	3		6						28.5																	24.5		1						2		4.5	10		
total =		68.5	8	83	25	13.5	20.5	1	1	545.5	146	2	1	1	14	68	15	1	3	35	53	13	1	447	6	8	389.5	33.5	78	5	24.5	1	5	2	2	1	173.5	239	13	23

TABLE A3-2: CORE LC-16 COUNTS, CONTINUED

Sample Number	Depth (cm)	Neidium iridis var. ampliata	Neidium iridis fo. vernalis	Nitzschia commutata	Nitzschia dissipata	Nitzschia dubia	Nitzschia frustulum var. subsalina	Nitzschia gandersheimensis	Nitzschia holsatica	Nitzschia ignorata	Nitzschia Kutzingiana	Nitzschia palea	Nitzschia pseudofonticola	Nitzschia pusilla	Nitzschia scalaris	Nitzschia sigmoidea	Nitzschia sublinearis	Oestrupia parva	Pinnularia abaujensis	Pinnularia abaujensis var. rostrata	Pinnularia abaujensis var. subundulata	Pinnularia braunii var. amphicephala	Pinnularia brevicostata	Pinnularia divergens	Pinnularia fasciata	Pinnularia gentilis	Pinnularia gracile	Pinnularia lagerstedtii	Pinnularia legumen	Pinnularia mesogongyla	Pinnularia microstauron	Pinnularia nodosa	Pinnularia stomatophora	Pinnularia subcapitata	Pinnularia viridis	Pleurosigma delicatum	Pleurosigma elongatum	Rhopalodia gibba	Sellaphora pupula	Sellaphora seminulum
LCVB16-1	3	1													1				1			2					1				5		1		1				8	
LCVB16-2	19									64												4							1				6						7	
LCVB16-3	34	2													0.5																								6	
LCVB16-4	42																						4						1										2	
LCVB16-5	51.5							2	3	1					1							2	1										2						5	
LCVB16-6	54.5	1						2	1						1							3	3	1					1	2			1						5	
LCVB16-7	58.5	1							2													2	2																3	
LCVB16-8	72.5	1								1													1										1							
LCVB16-9	86.5	1													2							1																		
LCVB16-10	100							1														2																	1	
LCVB16-11	109	1						3	1						1							5											1							
LCVB16-12	120							4.5							2				1			10	1							1		1.5			2				2	
LCVB16-13	131							3	1						1							3	1										1							
LCVB16-14	143.5							3	1														1													1				
LCVB16-15	151.5	2																				7	6										1			1			5	
LCVB16-16	153.5	1																				13	5										2						2	
LCVB16-17	159							2.5															1							1										
LCVB16-18	166.5							1															1															7	2	
LCVB16-19	169.5							3																																
LCVB16-20	172.5																																					5.5	1	
LCVB16-21	180						10		1																															
LCVB16-22	186						4																																	
LCVB16-23	199						2	4	1																															
LCVB16-24	201						2	12										12											2		1		5		1					
LCVB16-25	204.5							21	10									5													9		2		1					
LCVB16-26	209.5											3																2			3									3
LCVB16-27	216.5							17										2													4		3						1	
LCVB16-28	223.5										2									1					1	2		3												
LCVB16-29	231							12																											1				1	
LCVB16-30	237.5							2																											1					
LCVB16-31	244																	1																						
LCVB16-32	249																																				1			
LCVB16-33	260											2																									1			
LCVB16-34	272											2																												
LCVB16-35	283											1				1		1																						
LCVB16-36	291										10							1															1							
LCVB16-37	295										7				2																		2							
LCVB16-38	308.5										2					3										1														
LCVB16-39	317.5				1	4					4		5.5					4																						
LCVB16-40	327					1					9		2.5		1				1							1														
LCVB16-41	335.5																																					3		
LCVB16-42	338.5	2		2.5		1					1								2											1			1							
LCVB16-43	345										1							1	1							1														
LCVB16-44	351	1	6		4			15		6	1		9					2.5	1			1	7.5			1		11		7.5	5	6	4	9	5				2.5	
LCVB16-45	354.5	2	2					11					4						4		8	11	2			2		12		1		4.5	2	1	3.5				1	
LCVB16-46	362.5								2			9		4			3						4.5				2				7				4				1	
LCVB16-47	372								1			20		3																	11		1		1				2	
LCVB16-48	380							3	8			20.5		5			5														8								5	
total =		16	8	2.5	5	6	18	126	32	72	37	57.5	21	12	12.5	4	8	29.5	11	1	8	66	41	1	1	8	3	28	5	13.5	54	12	39	10	22.5	2	4	15.5	63.5	3

TABLE A3-2: CORE LC-16 COUNTS_CONTINUED

Sample Number	Depth (cm)	Stauroneis anceps	Stauroneis kriegeri	Stauroneis muriella	Stauroneis phoenicenteron	Stauroneis sp.	Staurosira construens	Staurosira construens var. venter	Staurosirella leptostauron var. rhomboides	Staurosirella pinnata	Stephanodiscus carconensis	Surirella amphioxys	Surirella angusta	Surirella biseriata var. constricta	Surirella brebissonii	Surirella linearis var. constricta	Surirella linearis var. helvetica	Surirella ovalis	Surirella ovata fo. pinnata	Surirella robusta	Surirella tenera var. nervosa	Surirella tenuis	Synedra acus	Synedra amphicephala	Synedra ulna	Tabellaria fenestrata	Tabellaria flocculosa	Thalassiosira lacustris	Brackish-Marine Species	Achnanthes hauckiana	Amphora ventricosa	Bacillaria paradoxa	Caloneis amphisbaena	Caloneis permagna	Caloneis westii	Campylodiscus clypeus	Campylodiscus echeneis	Cocconeis scutellum	Cocconeis scutellum var. parva	Diploneis smithii
LCVB16-1	5				4		201	252		48							1									18	119													
LCVB16-2	19	7			4		124	172									3									3.5	6													
LCVB16-3	34	3					14	88																		85	127													
LCVB16-4	42						13	206																		12	89													
LCVB16-5	51.5	1					34	83													1					38	84													
LCVB16-6	54.5	3	1		1		36	141													1					12	17													
LCVB16-7	58.5	1					11	286					1								1					7	24													
LCVB16-8	72.5	1			1		12	125																		9	26													
LCVB16-9	86.5						103	264																		5.5	22													
LCVB16-10	100	1					70	247																		11	64													
LCVB16-11	109	1					24	98																		87	24													
LCVB16-12	120				2			281	9	1																5	1													
LCVB16-13	135						52	287																		8	20	2											8	
LCVB16-14	143.5	1					35	56																		2	11			7									35	
LCVB16-15	151.5		2				21	196																		12	12												29	
LCVB16-16	155.5		3				31	263																		8	16													
LCVB16-17	159							411												1					1	7	8	1											7	
LCVB16-18	166.5		1					348																1	2	3	7					2							9	
LCVB16-19	169.5		1				24	240																		12	28												3	
LCVB16-20	172.5							199																	11.5	1	7												32.5	
LCVB16-21	180							21																	90					6		6			2				88	
LCVB16-22	186							1			3														9														209	
LCVB16-23	199		1				4	26	37	17					1								3		62			1		1			1						52	
LCVB16-24	201	2	7	2			20	176																	30					7									13	
LCVB16-25	204.5	1	4	2			85	73																12	72					3									1	
LCVB16-26	209.5		2.5			2		215																	75															
LCVB16-27	216.5		3	2			91	87																8	92			2		7									1	
LCVB16-28	223.5		1					210																	36.5			2						1					1	
LCVB16-29	231	3	1				142	205																21	39					2									2	
LCVB16-30	237.5						125	246																7	12			3		1									1	
LCVB16-31	244		1				107	139																17	41			1.5		4									2	
LCVB16-32	249							133							1										59.5			2		1							0.5		8.5	
LCVB16-33	260							243							1				1						37.5			2		1						1		1	33	
LCVB16-34	272							92																	11.5			2		2									17	
LCVB16-35	283				1			20																	19.5			3		3	2							1	195.5	0.5
LCVB16-36	291																								17					5	16							1	168	
LCVB16-37	295							17																	12			4		9	2								166	
LCVB16-38	308.5				0.5			151							1										37			2		8		2	1	5					7	1
LCVB16-39	317.5							149																	27.5	1				20		3	2	2					7.5	
LCVB16-40	327							197										1							21			2		19.5		1	1	1					9	
LCVB16-41	335.5							8	2									1							24.5					2		5.5							97.5	
LCVB16-42	338.5		1		1			67.5	3			1													17			1		5.5		1.5							72	1
LCVB16-43	345		1		2.5			73	4																9			3		5		14							28.5	
LCVB16-44	351		55		1			17.5				1				1				1					10.5		1										1		18	0.5
LCVB16-45	354.5		10		1			2								1				4.5		1			2														0.5	
LCVB16-46	362.5		37	1	0.5		13	32		2				1											3					2										
LCVB16-47	372	1	11	1			32	32																	27					1										
LCVB16-48	380	1	9.5				18	34.5										1							29.5					8									3	
total =		25	133	8	19.5	2	1,442	6,901	55	68	3	2	1	1	4	2	4	3	1	6.5	3	1	3	66	900	347	713	29.5		134	20	35	5	9	2	1	1.5	3	1,325	3

TABLE A3-2. CORE LC-16 COUNTS, CONTINUED

Sample Number	Depth (cm)	Fallacia cryptolyra	Gyrosigma balticum	Hantzschia amphioxys	Hantzschia virgata	Mastogloia elliptica var. dansei	Melosira moniliformis	Melosira nummuloides	Navicula margalithii	Navicula pseudolanceolata	Navicula pygmaea	Navicula salinarum	Nitzschia angelliformis	Navicula spicula	Nitzschia sigma	Plagiotropis lepidoptera	Plagiotropis vitrea	Pleurosigma salinarum	Rhopalodia brebissonii	Rhopalodia gibberula
LCVB16-1	3																			
LCVB16-2	19																			
LCVB16-3	34																			
LCVB16-4	42																			
LCVB16-5	51.5																			
LCVB16-6	54.5																			
LCVB16-7	58.5																			
LCVB16-8	72.5																			
LCVB16-9	86.5																			
LCVB16-10	100																			
LCVB16-11	109																			
LCVB16-12	120																			
LCVB16-13	131																			
LCVB16-14	143.5								22	4										
LCVB16-15	151.5																			
LCVB16-16	153.5																			
LCVB16-17	159		2						2											
LCVB16-18	166.5		17.5						2											
LCVB16-19	169.5		1																	
LCVB16-20	172.5								29			2			2					
LCVB16-21	180		3						7			7								
LCVB16-22	186		2						13		7	8		1						
LCVB16-23	199				3				8		2	1			4				1	
LCVB16-24	201		2						1			4			19					
LCVB16-25	204.5											1								
LCVB16-26	209.5								2			3	2.5		19					
LCVB16-27	216.5								2			4								
LCVB16-28	223.5								8			3	17.5		4					
LCVB16-29	231											3			2					
LCVB16-30	237.5				1							4			1					
LCVB16-31	244											2			2					
LCVB16-32	249								16			7			3	1		3		
LCVB16-33	260		1				6		25			17			2.5			3		
LCVB16-34	272		2					2	122.5			14	1							
LCVB16-35	283					7			43			2			2					
LCVB16-36	291	1	36			5			14						18.5		1	5		
LCVB16-37	295		26												16.5			9		
LCVB16-38	308.5					2			22			8			1			2		
LCVB16-39	317.5					4			56			12			1.5					
LCVB16-40	327		1						31			18			1			0.5		
LCVB16-41	335.5					4.5		10	60.5			10			4			1		
LCVB16-42	338.5		4			2.5		1	33			3			3			3.5		1
LCVB16-43	345		16.5			1			21.5						3			1		19.5
LCVB16-44	351					1			7.5											
LCVB16-45	354.5			3.5		1			1											
LCVB16-46	362.5						1						31							
LCVB16-47	372											1	23							
LCVB16-48	380						1					3	19.5		2.5					
total =		1	114	3.5	4	28	8	13	549	4	9	137	94.5	1	111.5	1	1	28	1	20.5

Sample Number	Depth (cm)	Rhopalodia musculus	Surirella ovalis	Synedra fasciculata	Synedra pulchella	Tryblionella acuminata	Tryblionella circumsuta	Tryblionella commutata	Tryblionella constricta	Tryblionella debilis	Tryblionella levidensis	Tryblionella plana	Tryblionella punctata	Tryblionella victoriae	Marine "Beach" Species	Actinocyclus curvulatus	Actinoptychus senarius	Chaetoceros cinctus	Coscinodiscus decrescens	Coscinodiscus marginatus	Coscinodiscus radiatus
LCVB16-1	3																				
LCVB16-2	19																				
LCVB16-3	34																				
LCVB16-4	42																				
LCVB16-5	51.5																				
LCVB16-6	54.5																1				
LCVB16-7	58.5																				
LCVB16-8	72.5																				
LCVB16-9	86.5																				
LCVB16-10	100																				
LCVB16-11	109																				
LCVB16-12	120																				
LCVB16-13	131					1															
LCVB16-14	143.5			23		2															
LCVB16-15	151.5					2															
LCVB16-16	153.5																				
LCVB16-17	159			1																	
LCVB16-18	166.5					13															
LCVB16-19	169.5																				
LCVB16-20	172.5			4.5	5	3															
LCVB16-21	180			11		9					5		1								
LCVB16-22	186			2		24					4		1								
LCVB16-23	199			10		2												1	1		
LCVB16-24	201		3	7																	1
LCVB16-25	204.5										1										
LCVB16-26	209.5			16							1										
LCVB16-27	216.5										1										
LCVB16-28	223.5			10			2					1									
LCVB16-29	231																				
LCVB16-30	237.5					1															
LCVB16-31	244					1															
LCVB16-32	249	1		42.5		6		1			1			2							
LCVB16-33	260			29		3		2.5			2			1							
LCVB16-34	272			4		1	1										1				
LCVB16-35	283	12		1.5	2	5.5							8.5								
LCVB16-36	291	6		3.5		43		1			12		4			1	1				
LCVB16-37	295	2		4		36	6				4		10								
LCVB16-38	308.5			11		1	3				6		1								
LCVB16-39	317.5			12.5	3		1				1.5		1								
LCVB16-40	327			10.5	2.5	3	2				2.5										
LCVB16-41	335.5			21.5	5.5	5.5					1.5						1			2	1
LCVB16-42	338.5			21.5		7.5	2				3						1				
LCVB16-43	345			18		7.5	1				1						1				
LCVB16-44	351			2.5	1	1							2.5								
LCVB16-45	354.5												7								
LCVB16-46	362.5			2	8				1												
LCVB16-47	372			4	25	1			2	1											
LCVB16-48	380			3	49	0.5															
total =		21	3	275.5	101	179.5	18	4.5	3	1	46.5	1	36	3		1	6	1	1	2	2

TABLE A3-2: CORE LC-16 COUNTS, CONTINUED

Sample Number	Depth (cm)	Coscinodiscus sp.	Cyclotella striata	Endictya hendeyi	Hyalodiscus laevis	Odontella aurita	Opephora pacifica	Paralia sulcata	Rhaphoneis amphiceros	Rhaphoneis cf. margaritilimbata	Rhaphoneis psammicola	Stephanodiscus carconensis	Stephanodiscus niagarae	Thalassionema nitzschioides	Thalassiosira eccentrica	Thalassiosira pacifica	SPONGE SPICULE	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	PRESERVATION	Percent Fresh	Percent Brackish-Marine	*Percent Marine "Beach"	Total Diatoms Counted
LCVB16-1	3																			8	1	VG	100.00%	0.00%	0.00%	794
LCVB16-2	19																			2	2	VG	100.00%	0.00%	0.00%	454.5
LCVB16-3	34																			5	1	VG	100.00%	0.00%	0.00%	439.5
LCVB16-4	42																			7	5	VG	100.00%	0.00%	0.00%	436
LCVB16-5	51.5																			9	1	VG	100.00%	0.00%	0.00%	433
LCVB16-6	54.5																			4	1	VG	99.79%	0.00%	0.21%	467
LCVB16-7	58.5																			3	1	VG	100.00%	0.00%	0.00%	409
LCVB16-8	72.5																			4	1	VG	100.00%	0.00%	0.00%	415
LCVB16-9	86.5																			3	1	VG	100.00%	0.00%	0.00%	508.5
LCVB16-10	100																			1	1	VG	100.00%	0.00%	0.00%	475
LCVB16-11	109																			4	1	VG	100.00%	0.00%	0.00%	423
LCVB16-12	120																X			4	2	VG	100.00%	0.00%	0.00%	475.5
LCVB16-13	131				2											2				4	1	VG	97.33%	1.85%	0.82%	487
LCVB16-14	143.5			2			1									16				15	1	VG	72.41%	22.91%	4.68%	406
LCVB16-15	151.5				2											1.5				7	1	VG	92.33%	6.89%	0.78%	450
LCVB16-16	153.5																			5	1	VG	100.00%	0.00%	0.00%	466
LCVB16-17	159				5.5												X			6	2	VG	97.13%	1.97%	0.90%	609.5
LCVB16-18	166.5			3	0.5					1						2	X		2	5	2	VG	91.29%	7.58%	1.13%	574
LCVB16-19	169.5																	1		6	2	VG	99.05%	0.95%	0.00%	419
LCVB16-20	172.5			1											4		X			4	2	G	80.99%	17.87%	1.15%	436.5
LCVB16-21	180																			16	1	G	66.12%	33.88%	0.00%	428
LCVB16-22	186							1			1					3				37	1	F	34.75%	64.07%	1.18%	423
LCVB16-23	199															13			1	15	3	G	76.74%	19.77%	3.49%	430
LCVB16-24	201															1				6	1	G	86.32%	13.21%	0.47%	424
LCVB16-25	204.5																			13	1	VG	98.73%	1.27%	0.00%	472
LCVB16-26	209.5															1.5				3	2	VG	89.83%	9.83%	0.34%	442.5
LCVB16-27	216.5																			7	1		96.56%	3.44%	0.00%	436
LCVB16-28	221.5																			1	2	VG	88.73%	11.27%	0.00%	421.5
LCVB16-29	231																			7	1	VG	98.21%	1.79%	0.00%	504
LCVB16-30	237.5																						97.95%	2.05%	0.00%	439
LCVB16-31	244																			6	1	G	97.30%	2.70%	0.00%	407.5
LCVB16-32	249					1										0.5				2	2	VG	78.35%	21.32%	0.33%	448
LCVB16-33	260			1	2															4	4	VG	76.23%	23.24%	0.54%	559.5
LCVB16-34	272															2.5				3		G	58.59%	40.56%	0.85%	410.5
LCVB16-35	283								1	1	1	1								3		F	27.72%	71.29%	1.00%	400.5
LCVB16-36	291									1			1				X					G	20.74%	78.34%	0.92%	434
LCVB16-37	295			2								2	2	2						2	2	G	25.56%	72.44%	2.00%	401
LCVB16-38	308.5																				2	G	79.83%	20.17%	0.00%	401.5
LCVB16-39	317.5														1					3	2	VG	68.20%	31.55%	0.25%	402.5
LCVB16-40	327																			2	3	VG	74.48%	25.52%	0.00%	405.5
LCVB16-41	335.5				1															2	2	VG	41.50%	57.25%	1.25%	400
LCVB16-42	338.5		1.5	2	1									0.5		4			1	2	2	VG	57.63%	39.95%	2.42%	413
LCVB16-43	345	0.5		1							1		0.5	9.5	1	6			7	3	2	VG	60.79%	34.12%	5.09%	403
LCVB16-44	351															1				2	3	VG	91.04%	8.71%	0.25%	402
LCVB16-45	354.5																			2	6	G	96.78%	3.22%	0.00%	404
LCVB16-46	362.5																			10	2	VG	89.51%	10.49%	0.00%	429
LCVB16-47	372															1				7	1	VG	85.77%	13.99%	0.24%	414.5
LCVB16-48	380													3.5		3				12	1	VG	76.90%	21.99%	1.11%	407
total =		0.5	1.5	12	14	1	1	1	1	3	3	3	3.5	15.5	6	56		1	11							21,581

*"Beach" species refers to total planktic and epipsammic marine species.

TABLE A3-3: CORE LC-9 COUNTS

Sample Number	Depth (cm)	Achnanthes lanceolata var. elliptica	Achnanthes minutissima	Achnanthes rupestoides	Achnanthes saxonica	Amphora ovalis var. affinis	Amphora subturgida	Anomoeoneis serians var. brachysira	Aulacoseira islandica	Aulacoseira italica	Cocconeis placentula var. euglypta	Cosmioneis pusilla	Craticula accomoda	Cyclotella meneghiniana	Cymbella aspera	Cymbella cuspidata	Cymbella lunata	Cymbella procera	Cymbella silesiaca	Diatoma hiemale var. mesodon	Diatoma tenue var. elongatum	Epithemia turgida	Eunotia alpina	Eunotia formica
LCVB9-1	21																							
LCVB9-2	36																							
LCVB9-3	43.5	19.5	6	2.5					28.5	6	2.5						15		3.5			2.5		
LCVB9-4	51																							
LCVB9-5	69		1						80	12					1		9	2	5				3	12
LCVB9-6	93																							
LCVB9-7	113																							
LCVB9-8	134																							
LCVB9-9	154																							
LCVB9-10	169	1			3	4			41	28	1					1	9	2	5			1	1	
LCVB9-11	174.5				1	1	1		2	1	2		2	11			1				1	4		
LCVB9-12	178																							
LCVB9-13	184	21		3				11						3			3		3					
LCVB9-14	185.5																							
LCVB9-15	190																							
LCVB9-16	200																							
LCVB9-17	219																							
LCVB9-18	234																							
LCVB9-19	258					2						1							4			5		
LCVB9-20	271																							
LCVB9-21	277	1.5	1.5			5					1.5	3		10					6	1		6		
LCVB9-22	281																							
LCVB9-23	294																							
LCVB9-24	299.5																							
LCVB9-25	304																					0.5		
LCVB9-26	306.5																							
LCVB9-27	315																							
LCVB9-28	320	35				5		40		5	15								10			5		
LCVB9-29	327																							
LCVB9-30	332	36		3				6			3													
total =		114	9	9	4	17	1	57	152	52	25	4	2	24	1	1	37	4	37	1	1	24	4	12

TABLE A3-3: CORE LC-9 COUNTS, CONTINUED

Sample Number	Depth (cm)	Eunotia gracilis	Eunotia lunaris	Eunotia monodon	Eunotia pectinalis var. minor	Eunotia praerupta bidens	Eunotia tetraodon	Eunotia veneris	Fragilaria exigua	Frustulia vulgaris	Gomphonema affine	Gomphonema angustatum	Gomphonema augur var. turris	Gomphonema gracile	Gomphonema parvulum	Gomphonema subclavatum	Luticola mutica	Luticola muticoides	Mastogloia smithii var. lacustris	Melosira roseana var. epidendron	Meridion circulare var. constricta	Navicula americana	Navicula capitata var. hungarica	Navicula crucicula
LCVB9-1	21																							
LCVB9-2	36																							
LCVB9-3	43.5	1	9		17	2.5		22	26	13		3.5			32		16				2.5	1		
LCVB9-4	51																							
LCVB9-5	69	3	9	1	15	1	2	14	21	5	3	5	1		50	1		1						
LCVB9-6	93																							
LCVB9-7	113																							
LCVB9-8	134																							
LCVB9-9	154																							
LCVB9-10	169		1		3			9	24	2		4			21		1	1				2	3	
LCVB9-11	174.5		1		2	1		12	18	1		2			12							1	12	
LCVB9-12	178																							
LCVB9-13	184		1		33			7	18	4		15		5	55		13	5					1	
LCVB9-14	185.5																							
LCVB9-15	190																							
LCVB9-16	200																							
LCVB9-17	219																							
LCVB9-18	234																							
LCVB9-19	258				4				8					1	2				1					1
LCVB9-20	271																							
LCVB9-21	277				9	1.5			29	5		5		2	14		3	1.5					15	
LCVB9-22	281																							
LCVB9-23	294																							
LCVB9-24	299.5																							
LCVB9-25	304																							
LCVB9-26	306.5																							
LCVB9-27	315																							
LCVB9-28	320				30										40		41			1				
LCVB9-29	327																							
LCVB9-30	332				9					4					16		9						12	
total =		4	21	1	122	6	2	64	144	34	3	35	1	8	242	1	83	9	1	1	3	4	43	1

TABLE A3-3 CORE LC-9 COUNTS, CONTINUED

Sample Number	Depth (cm)	Navicula cryptocephala	Navicula cuspidata	Navicula radiosa	Navicula rhynocephala	Neidium iridis var. ampliata	Nitzschia gandersheimensis	Nitzschia holsatica	Nitzschia palea	Nitzschia scalaris	Nitzschia terrestris	Pinnularia abaujensis	Pinnularia biceps	Pinnularia braunii var. amphicephala	Pinnularia brevicostata	Pinnularia gentilis	Pinnularia gracile	Pinnularia lagerstedtii	Pinnularia legumen	Pinnularia mesogongyla	Pinnularia microstauron	Pinnularia nobilis	Pinnularia nodosa	Pinnularia viridis
LCVB9-1	21																							
LCVB9-2	36																							
LCVB9-3	43.5		1	1	2.5	2.5			1	0.5				2.5	5					2.5		1		
LCVB9-4	51																							
LCVB9-5	69	2				2	1					1		5	4		1						1	1
LCVB9-6	93																							
LCVB9-7	113																							
LCVB9-8	134																							
LCVB9-9	154																							
LCVB9-10	169	9		2	1						1			1	4						1	1		2
LCVB9-11	174.5	3		5	11	1								1										1
LCVB9-12	178																							
LCVB9-13	184	9		4	10	5		1	1				3	4	5					1	11	1	4	3
LCVB9-14	185.5																							
LCVB9-15	190																							
LCVB9-16	200																							
LCVB9-17	219																							
LCVB9-18	234																							
LCVB9-19	258	1		34	10											1		1	1	1		1		10
LCVB9-20	271																							
LCVB9-21	277	9		8	45	2																		2
LCVB9-22	281																							
LCVB9-23	294																							
LCVB9-24	299.5																							
LCVB9-25	304																							
LCVB9-26	306.5																							
LCVB9-27	315																							
LCVB9-28	320	15			75																			
LCVB9-29	327																							
LCVB9-30	332				4																			
total =		48	1	54	159	13	1	1	2	1	1	1	3	14	18	1	1	1	1	5	12	4	5	19

TABLE A3-3: CORE LC-9 COUNTS, CONTINUED

Sample Number	Depth (cm)	Rhopalodia gibba	Sellaphora pupula	Stauroneis anceps	Stauroneis kreigeri	Stauroneis phoenicenteron	Staurosira construens var. venter	Staurosirella leptostauron var. rhomboides	Synedra ulna	Tabellaria fenestrata	Tabellaria flocculosa	Brackish-Marine Species	Achnanthes hauckiana	Bacillaria paradoxa	Campylodiscus echeneis	Cocconeis scutellum var. parva	Diploneis interrupta	Diploneis pseudovalis	Hantzschia amphioxys	Hantzschia virgata	Navicula margalithii	Navicula salinarum	Nitzschia obtusa var. scapelliformis	Nitzschia sigma	Pleurosigma salinarum
LCVB9-1	21																								
LCVB9-2	36																								
LCVB9-3	43.5		10	5	9	1	98			17	10								1			1	2.5		
LCVB9-4	51																								
LCVB9-5	69		6	1	11	2	72			45	20														
LCVB9-6	93																								
LCVB9-7	113																								
LCVB9-8	134																								
LCVB9-9	154																								
LCVB9-10	169	1	8		2	1	210	2	1	34	34			2	0.5	5		3			1		3		2
LCVB9-11	174.5		3		1		231		52	4	3		2			14		1			1	2		2	1
LCVB9-12	178																								
LCVB9-13	184		5	22	1		88	3			1					11			3		3				
LCVB9-14	185.5																								
LCVB9-15	190																								
LCVB9-16	200																								
LCVB9-17	219																								
LCVB9-18	234																								
LCVB9-19	258					2	112		17	1	3					72				1					
LCVB9-20	271																								
LCVB9-21	277						148		48	3	4					12		2		5		4			
LCVB9-22	281																								
LCVB9-23	294																								
LCVB9-24	299.5																								
LCVB9-25	304																								
LCVB9-26	306.5																								
LCVB9-27	315																								
LCVB9-28	320						10		6				5			6									
LCVB9-29	327																								
LCVB9-30	332				4	2			16					2			1								
total =		1	32	28	28	8	969	5	140	104	75		7	4	1	120	1	6	4	6	5	7	6	2	3

TABLE A3-3: CORE LC-9 COUNTS, CONTINUED

Sample Number	Depth (cm)	Synedra fasciculata	Tryblionella circumsuta	Tryblionella levdensis	Tryblionella punctata	Marine "Beach" Species	Actinoptychus senarius	Hyalodiscus laevis	SPONGE SPICULE	FORAM	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	PRESERVATION	Percent Fresh	Percent Brackish-Marine	*Percent Marine "Beach"	Total Diatoms Counted
LCVB9-1	21																		
LCVB9-2	36																		
LCVB9-3	43.5								X				3	5	VG	98.89%	1.11%	0.00%	405.5
LCVB9-4	51																		
LCVB9-5	69												2	2	EX	100.00%	0.00%	0.00%	432
LCVB9-6	93																		
LCVB9-7	113																		
LCVB9-8	134																		
LCVB9-9	154																		
LCVB9-10	169						1	1	X				1	3	VG	96.31%	3.29%	0.40%	501.5
LCVB9-11	174.5	11	1	1									3	2	G	91.84%	8.16%	0.00%	441
LCVB9-12	178																		
LCVB9-13	184				1								4	8	VG	95.51%	4.49%	0.00%	401
LCVB9-14	185.5																		
LCVB9-15	190																		
LCVB9-16	200																		
LCVB9-17	219																		
LCVB9-18	234																		
LCVB9-19	258	7												21	F	73.68%	26.32%	0.00%	304
LCVB9-20	271																		
LCVB9-21	277	2		3									2	8	F	93.29%	6.71%	0.00%	417.5
LCVB9-22	281																		
LCVB9-23	294																		
LCVB9-24	299.5																		
LCVB9-25	304														P	100.00%	0.00%	0.00%	0.5
LCVB9-26	306.5																		
LCVB9-27	315																		
LCVB9-28	320	3											1	26	F	95.97%	4.03%	0.00%	347
LCVB9-29	327																		
LCVB9-30	332			2										21	F	96.12%	3.88%	0.00%	129
total =		23	1	6	1		1	1											3,379

*"Beach" species refers to total planktic and epipsammic marine species.

TABLE A3-4: CORE LC-20 COUNTS

Sample Number	Depth (cm)	Achnanthes lanceolata var. elliptica	Achnanthes minutissima	Achnanthes saxonica	Amphora ovalis	Amphora subturgida	Anomoeoneis serians var. acuta	Anomoeoneis serians var. brachysira	Aulacoseira islandica	Aulacoseira italica	Cocconeis placentula var. euglypta	Craticula accomoda	Cyclotella meneghiniana	Cymbella cuspidata	Cymbella lunata	Cymbella procera	Cymbella silesiaca	Diatoma tenue var. elongatum	Epithemia turgida	Epithemia turgida westermanii
LCVB20-1	6																			
LCVB20-2	18																			
LCVB20-3	29				2				18	33					8	1	2	1	1	
LCVB20-4	41																			
LCVB20-5	53																			
LCVB20-6	66																			
LCVB20-7	79																			
LCVB20-8	84	2			5		1		21	13		1	4	2	5	2	3	1	2	
LCVB20-9	88						4		92	6					15	2			1	
LCVB20-10	90																			
LCVB20-11	99																			
LCVB20-12	109																			
LCVB20-13	115																			
LCVB20-14	117.5				10				13	64			3	5	16	2		4		
LCVB20-15	120																			
LCVB20-16	123.5								4	70				2	17	2				
LCVB20-17	134																			
LCVB20-18	147																			
LCVB20-19	162																			
LCVB20-20	173.5				9	2						2	5					9	2	
LCVB20-21	177		2	1	1		3						1		1	1	1	10	2	
LCVB20-22	179.5			7			1							1	8		1	24	2	
LCVB20-23	191																			
LCVB20-24	204.5		5		2						2	10							35	6
LCVB20-25	214					1					22	28	15						4	
LCVB20-26	220																			
LCVB20-27	230																			
LCVB20-28	240	9			14			1			1					1	8			
total =		11	7	8	43	3	9	1	148	186	25	41	28	10	70	11	15	49	49	6

TABLE A3-4: CORE LC-20 COUNTS, CONTINUED

Sample Number	Depth (cm)	Eunotia formica	Eunotia lunaris	Eunotia pectinalis var. minor	Eunotia praerupta bidens	Eunotia tetraodon	Eunotia veneris	Fragilaria exigua	Frustulia vulgaris	Gomphonema affine	Gomphonema angustatum	Gomphonema augur var. turris	Gomphonema constricta var. capitata	Gomphonema gracile	Gomphonema parvulum	Gomphonema subclavatum	Luticola mutica	Mastogloia pumila	Mastogloia smithii var. lacustris	Melosira varians
LCVB20-1	6																			
LCVB20-2	18																			
LCVB20-3	29	1	10		16	1	17	16	1	8	43	1	1		2					
LCVB20-4	41																			
LCVB20-5	53																			
LCVB20-6	66																			
LCVB20-7	79																			
LCVB20-8	84		9		1		15	51	2	2	23									
LCVB20-9	88	1	6		2		13	23	4		15									
LCVB20-10	90																			
LCVB20-11	99																			
LCVB20-12	109																			
LCVB20-13	115																			
LCVB20-14	117.5		19		11		19	22		14	85	2			7	4				
LCVB20-15	120																			
LCVB20-16	123.5		17		7		8	37		3	26				7					
LCVB20-17	134																			
LCVB20-18	147																			
LCVB20-19	162																			
LCVB20-20	173.5		1		1			137			8	1			5					5
LCVB20-21	177			1	2		12	40			13				6		1			4
LCVB20-22	179.5		9	5			26	45			19		5		2					5
LCVB20-23	191																			
LCVB20-24	204.5			6	5						2				7	5			2	
LCVB20-25	214				1			1			1				4	1		4		
LCVB20-26	220																			
LCVB20-27	230																			
LCVB20-28	240		4	17	5		20	2	43		1			1	46		6			
total =		2	75	29	51	1	130	374	50	27	236	4	6	1	86	10	7	4	2	14

TABLE A3-4: CORE LC-20 COUNTS, CONTINUED

Sample Number	Depth (cm)	Navicula americana	Navicula capitata var. hungarica	Navicula crucicula	Navicula cryptocephala	Navicula elegans	Navicula elegensis var. cuneata	Navicula exilis	Navicula pseudocutiformis	Navicula radiosa	Navicula rhyncocephala	Neidium iridis var. ampliata	Nitzschia gandershemeneis	Nitzschia ignorata	Nitzschia palea	Nitzschia scalaris	Opephora parva	Pinnularia braunii var. amphicephala	Pinnularia brevicostata	Pinnularia gentilis
LCVB20-1	6																			
LCVB20-2	18																			
LCVB20-3	29				4						1	1	6					5	1	
LCVB20-4	41																			
LCVB20-5	53																			
LCVB20-6	66																			
LCVB20-7	79																			
LCVB20-8	84		3		8				1				1			1		4		
LCVB20-9	88	2			15				1	1	1	2	3			1			6	
LCVB20-10	90																			
LCVB20-11	99																			
LCVB20-12	109																			
LCVB20-13	115																			
LCVB20-14	117.5	3	1	1	21							3						6	5	
LCVB20-15	120																			
LCVB20-16	123.5	1			5							2						2	3	1
LCVB20-17	134																			
LCVB20-18	147																			
LCVB20-19	162																			
LCVB20-20	173.5		23		16	1		4		4	17								1	
LCVB20-21	177	1	9		5					1	6	1		3	1			1		
LCVB20-22	179.5				2						3			5				1		
LCVB20-23	191																			
LCVB20-24	204.5			2	4					22	84				2				2	
LCVB20-25	214	1		1	1					8	6				6		1			
LCVB20-26	220																			
LCVB20-27	230																			
LCVB20-28	240		21		48		5				84						4	1		
total =		8	57	4	129	1	5	4	2	36	202	9	10	8	9	2	5	20	18	1

TABLE A3-4: CORE LC-20 COUNTS, CONTINUED

Sample Number	Depth (cm)	Pinnularia lagerstedtii	Pinnularia legumen	Pinnularia mesogongyla	Pinnularia nobilis	Pinnularia streptoraphe	Pinnularia viridis	Rhopalodia gibba	Sellaphora pupula	Sellaphora seminulum	Stauroneis anceps	Stauroneis kreigeri	Stauroneis phoenicenteron	Staurosira construens	Staurosira construens var. venter	Surirella amphioxys	Synedra ulna	Tabellaria fenestrata	Tabellaria flocculosa	Thalassiosira lacustris
LCVB20-1	6																			
LCVB20-2	18																			
LCVB20-3	29		1			1			12	3		2	1		201	2		23	77	
LCVB20-4	41																			
LCVB20-5	53																			
LCVB20-6	66																			
LCVB20-7	79																			
LCVB20-8	84							1	7	5		2	1	5	304		1	16	31	
LCVB20-9	88							1	10	7		3		1	143			9	37	
LCVB20-10	90																			
LCVB20-11	99																			
LCVB20-12	109																			
LCVB20-13	115																			
LCVB20-14	117.5					8	1		18	2		3	8		471			10	30	
LCVB20-15	120																			
LCVB20-16	123.5					1			8			2	1		416			24	60	
LCVB20-17	134																			
LCVB20-18	147																			
LCVB20-19	162																			
LCVB20-20	173.5		1					2	2	3					283		38	5	14	1
LCVB20-21	177							3	5			3			357		3	19	54	
LCVB20-22	179.5			2	1	2			5		1	1	1		468			77	53	
LCVB20-23	191																			
LCVB20-24	204.5						1								15		83			3
LCVB20-25	214								1						68		94			
LCVB20-26	220																			
LCVB20-27	230																			
LCVB20-28	240	1					2		1		1		1		2	1				
total =		1	2	2	1	12	4	7	69	20	2	16	13	6	2,728	3	219	183	356	4

TABLE A3-4: CORE LC-20 COUNTS, CONTINUED

Sample Number	Depth (cm)	Brackish-Marine Species	Achnanthes hauckiana	Caloneis amphisbaena	Caloneis bacillaris var. thermalis	Caloneis bacillum	Caloneis silicula	Cocconeis scutellum var. parva	Diploneis smithii	Hantzschia virgata	Mastogloia exigua	Melosira nummuloides	Navicula margalithii	Navicula salinarum	Nitzschia scapelliformis	Nitzschia sigma	Pleurosigma salinarum	Synedra fasciculata	Tryblionella acumminata	Tryblionella circumsuta
LCVB20-1	6																			
LCVB20-2	18																			
LCVB20-3	29																			
LCVB20-4	41																			
LCVB20-5	53																			
LCVB20-6	66																			
LCVB20-7	79																			
LCVB20-8	84							4			1							2		
LCVB20-9	88										1							3		
LCVB20-10	90																			
LCVB20-11	99																			
LCVB20-12	109																			
LCVB20-13	115																			
LCVB20-14	117.5																			
LCVB20-15	120																			
LCVB20-16	123.5																			
LCVB20-17	134																			
LCVB20-18	147																			
LCVB20-19	162																			
LCVB20-20	173.5			3				7				3			1			8	1	5
LCVB20-21	177		3					9				3	4					1		2
LCVB20-22	179.5									1										
LCVB20-23	191																			
LCVB20-24	204.5		5					65	1				24	11		2	5	5	5	
LCVB20-25	214		1					82					15	7				19		
LCVB20-26	220																			
LCVB20-27	230																			
LCVB20-28	240				7	2	1										40			
total =			9	3	7	2	1	167	1	1	2	6	43	18	1	2	45	38	6	7

TABLE A3-4: CORE LC-20 COUNTS, CONTINUED

Sample Number	Depth (cm)	Tryblionella levdensis	Tryblionella punctata	Marine "Beach" Species	Actinoptychus senarius	Endictya hendeyi	Hyalodiscus laevis	Odontella aurita	SPONGE SPICULE	FORAM	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	PRESERVATION	Percent Fresh	Percent Brackish-Marine	*Percent Marine "Beach"	Total Diatoms Counted
LCVB20-1	6																		
LCVB20-2	18																		
LCVB20-3	29					1							4	3	VG	99.81%	0.00%	0.19%	525
LCVB20-4	41																		
LCVB20-5	53																		
LCVB20-6	66																		
LCVB20-7	79																		
LCVB20-8	84	1					1							3	VG	98.41%	1.42%	0.18%	565
LCVB20-9	88												1	5	G	99.07%	0.93%	0.00%	431
LCVB20-10	90																		
LCVB20-11	99																		
LCVB20-12	109																		
LCVB20-13	115																		
LCVB20-14	117.5												2	4	VG	100.00%	0.00%	0.00%	891
LCVB20-15	120																		
LCVB20-16	123.5												2	2	VG	100.00%	0.00%	0.00%	726
LCVB20-17	134																		
LCVB20-18	147																		
LCVB20-19	162																		
LCVB20-20	173.5	3											3	3	G	95.10%	4.90%	0.00%	633
LCVB20-21	177	1											1	2	G	96.15%	3.85%	0.00%	597
LCVB20-22	179.5												1	1	VG	99.87%	0.13%	0.00%	783
LCVB20-23	191																		
LCVB20-24	204.5		2		1			1					1	6	F	70.60%	28.94%	0.46%	432
LCVB20-25	214	1											1	2	F	68.27%	31.73%	0.00%	394
LCVB20-26	220																		
LCVB20-27	230																		
LCVB20-28	240		1										2	7	G	87.31%	12.69%	0.00%	402
total =		6	3		1	1	1	1											6,379

*"Beach" species refers to total planktic and epipsammic marine species.

TABLE A3-5: CORE LC-2 COUNTS

Sample Number	Depth (cm)	Achnanthes lanceolata var. elliptica	Achnanthes minutissima	Achnanthes rupestoides	Achnanthes saxonica	Amphora ovalis var. affinis	Aulacoseira islandica	Aulacoseira italica	Cocconeis placentula	Cocconeis placentula var. euglypta	Cosmioneis pusilla	Craticula accomoda	Cyclotella meneghiniana	Cymbella aspera	Cymbella cuspidata	Cymbella lunata	Cymbella procera	Cymbella silesiaca	Diatoma tenue var. elongatum	Epithemia turgida	Epithemia turgida westermanii	Eunotia formica	Eunotia gracilis	Eunotia lunaris	Eunotia monodon	Eunotia pectinalis var. minor	Eunotia praerupta bidens	Eunotia veneris
LCVB2-1	6																											
LCVB2-2	13																											
LCVB2-3	24																											
LCVB2-4	31																											
LCVB2-5	37.5																											
LCVB2-6	41	8	2.5			1	1		1						6	3.5	2.5	15						14	2.5	73	11.5	12.5
LCVB2-7	43																											
LCVB2-8	47																											
LCVB2-9	52																											
LCVB2-10	54	1	1	6			25	1							1	1		2.5						6	8.5	61	13	8.5
LCVB2-11	55																											
LCVB2-12	63																											
LCVB2-13	73																											
LCVB2-14	73																											
LCVB2-15	92																											
LCVB2-16	96	1	1	1	1		48	11					3		1	8	1	2				1		5				8
LCVB2-17	97.5	1				2	6	13		1			3		2	5		2						8	2	1	1	11
LCVB2-18	99.5																											
LCVB2-19	102																											
LCVB2-20	108																											
LCVB2-21	116																											
LCVB2-22	123																											
LCVB2-23	131																											
LCVB2-24	135																											
LCVB2-25	139	2.5	3.5	1						2.5	2.5	4	10			2.5		12	1	1				1		2.5		
LCVB2-26	141.5	1.5	2			2.5				2	3.5	1	29							40	29			1				2
LCVB2-27	142					3				6	1	11.5	42							24	26					1		
LCVB2-28	145									1			1							4						1	4.5	
LCVB2-29	147																											
LCVB2-30	157																											
LCVB2-31	167																											
LCVB2-32	177																											
LCVB2-33	184																											
LCVB2-34	193																											
LCVB2-35	200					1				1	1												0.5				9	
LCVB2-36	203					5								1		1				36	5		1	2		1	15	4
total =		15	10	8	1	14.5	80	25	1	13.5	8	16.5	88	1	10	21	3.5	33.5	1	105	60	1	1.5	37	13	140.5	54	46

TABLE A3-5: CORE LC-2 COUNTS, CONTINUED

Sample Number	Depth (cm)	Fragilaria rugas	Frustulia vulgaris	Gomphonema angustatum	Gomphonema augur var. turris	Gomphonema constricta var. capitata	Gomphonema gracile	Gomphonema parvulum	Gomphonema subclavatum	Gomphonema tenellum	Gomphonema ventricosum	Luticola mutica	Mastogloia smithii var. lacustris	Melosira varians	Meridion circulare var. constricta	Navicula americana	Navicula capitata var. hungarica	Navicula cruciculа	Navicula cryptocephala	Navicula radiosa	Navicula rhyncocephala	Neidium iridis var. ampliata	Nitzschia Kutzingiana	Nitzschia palea	Nitzschia scalaris	Pinnularia abaujensis	Pinnularia braunii var. amphicephala	Pinnularia brevicostata
LCVB2-1	6																											
LCVB2-2	13																											
LCVB2-3	24																											
LCVB2-4	31																											
LCVB2-5	37.5																											
LCVB2-6	41	11.5	3.5	9	3.5		20.5	44.5						2.5	25		1		1	1	1		1				8	2.5
LCVB2-7	43																											
LCVB2-8	47																											
LCVB2-9	52																											
LCVB2-10	54	5	2.5	7			12	72				6			1		5		1			2.5	3.5			2.5		
LCVB2-11	55																											
LCVB2-12	63																											
LCVB2-13	73																											
LCVB2-14	73																											
LCVB2-15	92																											
LCVB2-16	96	45	1	1			3	14									2		7		4	2			1		1	1
LCVB2-17	97.5	99	1				4	17				1				1	6		3	3	3	1			1.5	1	1	2
LCVB2-18	99.5																											
LCVB2-19	102																											
LCVB2-20	108																											
LCVB2-21	116																											
LCVB2-22	123																											
LCVB2-23	131																											
LCVB2-24	135																											
LCVB2-25	139		1	10		1	5.5	44	1	1		1					10	1		1	14.5					1		
LCVB2-26	141.5			3.5				6			2						2	6		24	32.5							
LCVB2-27	142	5		1				4					1				3	3	3	15.5	30				1			
LCVB2-28	145			2																0.5	2					2		
LCVB2-29	147																											
LCVB2-30	157																											
LCVB2-31	167																											
LCVB2-32	177																											
LCVB2-33	184																											
LCVB2-34	193																											
LCVB2-35	200				1																0.5							
LCVB2-36	203				1			1												14	4			1		2		
total =		165.5	9	33.5	5.5	1	45	202.5	1	1	2	8	1	2.5	26	1	29	10	15	59	91.5	5.5	4.5	1	3.5	8.5	10	5.5

TABLE A3-5: CORE LC-2 COUNTS CONTINUED

Sample Number	Depth (cm)	Pinnularia fasciata	Pinnularia gracilis	Pinnularia mesogongyla	Pinnularia molaris	Pinnularia nobilis	Pinnularia nodosa	Pinnularia viridis	Sellaphora pupula	Sellaphora seminulum	Stauroneis kriegeri	Stauroneis phoenicenteron	Staurosira construens var. venter	Surirella Capronii	Surirella robusta	Synedra ulna	Tabellaria fenestrata	Tabellaria flocculosa	Brackish-Marine Species	Achnanthes hauckiana	Amphora ventricosa	Bacillaria paradoxa	Caloneis amphisbaena	Caloneis bacillum	Cocconeis scutellum var. parva	Diploneis smithii	Melosira moniliformis	Navicula marginata
LCVB2-1	6																											
LCVB2-2	13																											
LCVB2-3	24																											
LCVB2-4	31																											
LCVB2-5	37.5																											
LCVB2-6	41	2.5		7	9		1	4.5	10		6	1	26		1		33	8										1
LCVB2-7	43																											
LCVB2-8	47																											
LCVB2-9	52																											
LCVB2-10	54		2.5	2.5		1	1	14	4		2.5	9.5	64	2.5			33	10										
LCVB2-11	55																											
LCVB2-12	63																											
LCVB2-13	73																											
LCVB2-14	73																											
LCVB2-15	92																											
LCVB2-16	96			1			1		5		2	1	175			1	15	39							2			
LCVB2-17	97.5			3			1	2	3		3	1	189			6	12	33						3	1			
LCVB2-18	99.5																											
LCVB2-19	102																											
LCVB2-20	108																											
LCVB2-21	116																											
LCVB2-22	123																											
LCVB2-23	131																											
LCVB2-24	135																											
LCVB2-25	139				2.5						1		5.5			123				2		2.5				1	41	3
LCVB2-26	141.5				7								3.5			138				3					5.5	2	6	1
LCVB2-27	142				1					1	1		26			128				2	1		1		9.5		1	4
LCVB2-28	145				1		1	1				1	3			3												
LCVB2-29	147																											
LCVB2-30	157																											
LCVB2-31	167																											
LCVB2-32	177																											
LCVB2-33	184																											
LCVB2-34	193																											
LCVB2-35	200															1												
LCVB2-36	203					1		3	2			1				5	1	1						1				
total =		2.5	2.5	13.5	20.5	2	5	24.5	24	1	15.5	14.5	492	2.5	1	405	94	91		7	1	2.5	1	4	18	3	48	9

APPENDIX 3 - Fossil Diatom Counts, Continued

TABLE A3-5: CORE LC-2 COUNTS, CONTINUED

Sample Number	Depth (cm)	Navicula salinarum	Nitzschia scapelliformis	Nitzschia sigma	Pleurosigma salinarum	Synedra fasciculata	Tryblionella acumminata	Tryblionella circumsuta	Tryblionella levdensis	Marine "Beach" Species	Coscinodiscus marginatus	Endictya hendevi	Hyalodiscus laevis	Paralia sulcata	Rhaphoneis amphiceros	SPONGE SPICULE	FORAM	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	PRESERVATION	Percent Fresh	Percent Brackish-Marine	*Percent Marine "Beach"	Total Diatoms Counted
LCVB2-1	6																									
LCVB2-2	13																									
LCVB2-3	24																									
LCVB2-4	31																									
LCVB2-5	37.5																									
LCVB2-6	41												1			X				2	2	VG	99.50%	0.25%	0.25%	400.5
LCVB2-7	43																									
LCVB2-8	47																									
LCVB2-9	52																									
LCVB2-10	54													1						1	4	G	99.75%	0.00%	0.25%	403
LCVB2-11	55																									
LCVB2-12	63																									
LCVB2-13	73																									
LCVB2-14	73																									
LCVB2-15	92																									
LCVB2-16	96											1			1	X				1	2	VG	99.04%	0.48%	0.48%	418
LCVB2-17	97.5		4			1	1				1		2			X	1				2	VG	97.23%	2.13%	0.64%	468.5
LCVB2-18	99.5																									
LCVB2-19	102																									
LCVB2-20	108																									
LCVB2-21	116																									
LCVB2-22	123																									
LCVB2-23	131																									
LCVB2-24	135																									
LCVB2-25	139	6	16.5	2.5		56		2.5	3.5											3	2	VG	66.42%	33.58%	0.00%	406.5
LCVB2-26	141.5	10	1	2	3.5	34		3	3											2	6	VG	82.44%	17.56%	0.00%	410
LCVB2-27	142	14.5	2	1	1	20.5	2	4	1											2	5	VG	83.98%	16.02%	0.00%	402.5
LCVB2-28	145					1															all	F	96.55%	3.45%	0.00%	29
LCVB2-29	147																									
LCVB2-30	157																									
LCVB2-31	167																									
LCVB2-32	177																					P				innum.
LCVB2-33	184																									
LCVB2-34	193																									
LCVB2-35	200								1												all	P	93.75%	6.25%	0.00%	16
LCVB2-36	203	1					1.5	2													all	F	95.15%	4.85%	0.00%	113.5
total =		31.5	23.5	5.5	4.5	112.5	4.5	11.5	6.5		1	1	3	1	1											3,068

*"Beach" species refers to total planktic and epipsammic marine species.

TABLE A3-6: CORE LC-1 COUNTS

Sample Number	Depth (cm)	Achnanthes lanceolata var. elliptica	Achnanthes minutissima	Achnanthes rupestoides	Achnanthes saxonica	Amphora ovalis var. affinis	Aulacoseira islandica	Aulacoseira italica	Cocconeis placentula	Cocconeis placentula var. euglypta	Cosmioneis pusilla	Cyclotella meneghiniana	Cymbella cuspidata	Cymbella lunata	Cymbella prescara	Cymbella silesiaca	Diatoma tenue var. elongatum	Epithemia turgida	Epithemia turgida westermanii	Eunotia formica	Eunotia lunaris	Eunotia pectinalis var. minor	Eunotia praerupta	Eunotia praerupta bidens	Eunotia triodon	Eunotia veneris
LCVB1-1	3.5																									
LCVB1-2	10																									
LCVB1-3	15.5																									
LCVB1-4	20																									
LCVB1-5	23																									
LCVB1-6	25.5																									
LCVB1-7	29.5																									
LCVB1-8	41.5																									
LCVB1-9	51.5																									
LCVB1-10	56.5																									
LCVB1-11	65.5																									
LCVB1-12	68.5					1	23	13	1				2	9	0.5	2				2.5	4		3			20
LCVB1-13	70.3	3	2	2		4	13	18			0.5	3	1	9		7	5			1	13.5		12			12
LCVB1-14	75.5		5		1	1				1			0.5	5		3		2.5	1		1		8.5	2.5	1	43
LCVB1-15	85.5																									
LCVB1-16	89.5																									
LCVB1-17	92	2				7					2	9		4.5		15					6		16			1
LCVB1-18	95	6		1		9.5					7	13		8.5		24		2.5				19		1		
LCVB1-19	101	Samples 19 -35 are innumerable. They all show evidence of dissolution, with only resistant valves remaining																								
LCVB1-20	108.5																									
LCVB1-21	118.5																									
LCVB1-22	128.5																									
LCVB1-23	138.5																									
LCVB1-24	146.5																									
LCVB1-25	150.5																									
LCVB1-26	160																									
LCVB1-27	165.5																									
LCVB1-28	171.5																									
LCVB1-29	182.5																									
LCVB1-30	187.5																									
LCVB1-31	199.5																									
LCVB1-32	209.5																									
LCVB1-33	219.5																									
LCVB1-34	229.5																									
LCVB1-35	239.5																									
total =		11	7	3	1	22.5	36	31	1	1	9.5	25	3.5	36	0.5	51	5	5	1	3.5	24.5	19	39.5	3.5	1	76

TABLE A3-6: CORE LC-1 COUNTS, CONTINUED

Sample Number	Depth (cm)	Fragilaria exigua	Frustulia vulgaris	Gomphonema affine	Gomphonema angustatum	Gomphonema augur var. turris	Gomphonema constricta var. capitata	Gomphonema gracile	Gomphonema parvulum	Gomphonema subclavatum	Luticola mutica	Melosira varians	Navicula americana	Navicula capitata var. hungarica	Navicula cryptocephala	Navicula elegans	Navicula pseudocutiformis	Navicula radiosa	Navicula rhyncocephala	Navicula slevicensis	Neidium iridus var. ampliata	Nitzschia gandersheimiensis	Nitzschia holsatica	Nitzschia scalaris	Opephora parva	Pinnularia abaujensis
LCVB1-1	3.5																									
LCVB1-2	10																									
LCVB1-3	15.5																									
LCVB1-4	20																									
LCVB1-5	23																									
LCVB1-6	25.5																									
LCVB1-7	29.5																									
LCVB1-8	41.5																									
LCVB1-9	51.5																									
LCVB1-10	56.5																									
LCVB1-11	65.5																									
LCVB1-12	68.5	28	1		3		1		12	3	3				3		1	1	0.5			3.5	1			
LCVB1-13	70.3	29		4	8	2			22	8	7	1		2	8			3	2	0.5	1	15.5	1	0.5		1
LCVB1-14	75.5	40	2		6	5	0.5		23	7			0.5	1	2			0.5	1		1	1.5				
LCVB1-15	85.5																									
LCVB1-16	89.5																									
LCVB1-17	92	15	2		14	14.5			47	3.5	3.5		0.5	2	11	1		3.5	7		1	1		0.5		
LCVB1-18	95	11			3.5	1		33.5	37		3.5			18	9.5			8.5	45						2.5	
LCVB1-19	101																									
LCVB1-20	108.5																									
LCVB1-21	118.5																									
LCVB1-22	128.5																									
LCVB1-23	138.5																									
LCVB1-24	146.5																									
LCVB1-25	150.5																									
LCVB1-26	160																									
LCVB1-27	165.5																									
LCVB1-28	171.5																									
LCVB1-29	182.5																									
LCVB1-30	187.5																									
LCVB1-31	199.5																									
LCVB1-32	209.5																									
LCVB1-33	219.5																									
LCVB1-34	229.5																									
LCVB1-35	239.5																									
total =		123	5	4	34.5	22.5	1.5	33.5	141	21.5	17	1	1	23	33.5	1	1	16.5	55.5	0.5	3	21.5	2	1	2.5	1

TABLE A3-6: CORE LC-1 COUNTS, CONTINUED

Sample Number	Depth (cm)	Pinnularia abaujensis var. subundulata	Pinnularia braunii var. amphicephala	Pinnularia brevicostata	Pinnularia fasciata	Pinnularia gentilis	Pinnularia lagerstedtii	Pinnularia mesogongyla	Pinnularia microstauron	Pinnularia nodosa	Pinnularia viridis	Rhopalodia gibba	Sellaphora pupula	Sellaphora seminulum	Stauroneis kreigeri	Stauroneis phoenicenteron	Staurosira construens var. venter	Staurosirella leptostauron var. rhomboides	Synedra ulna	Tabellaria fenestrata	Tabellaria flocculosa	Thalassiosira lacustris	Brackish-Marine Species	Cocconeis scutellum var. parva	Diploneis interrupta	Navicula salinarum
LCVB1-1	3.5																									
LCVB1-2	10																									
LCVB1-3	15.5																									
LCVB1-4	20																									
LCVB1-5	23																									
LCVB1-6	25.5																									
LCVB1-7	29.5																									
LCVB1-8	41.5																									
LCVB1-9	51.5																									
LCVB1-10	56.5																									
LCVB1-11	65.5																									
LCVB1-12	68.5		3	2				1					9		1	1	214	4		13.5	38	1		3		
LCVB1-13	70.3	2	1				1	1	1		2		5		14		192	1	22.5	16.5	32			1		
LCVB1-14	75.5			1						1		0.5	3		1		300		1	11.5	29.5			4	1	
LCVB1-15	85.5																									
LCVB1-16	89.5																									
LCVB1-17	92	2	0.5	1	2	0.5			1		1.5	2	9		11.5	2	9	2	21	4	136					
LCVB1-18	95						1	1			2.5			1	1	1	9.5		91		5			0.5		2.5
LCVB1-19	101																									
LCVB1-20	108.5																									
LCVB1-21	118.5																									
LCVB1-22	128.5																									
LCVB1-23	138.5																									
LCVB1-24	146.5																									
LCVB1-25	150.5																									
LCVB1-26	160																									
LCVB1-27	165.5																									
LCVB1-28	171.5																									
LCVB1-29	182.5																									
LCVB1-30	187.5																									
LCVB1-31	199.5																									
LCVB1-32	209.5																									
LCVB1-33	219.5																									
LCVB1-34	229.5																									
LCVB1-35	239.5																									
total =		4	4.5	4	2	0.5	2	3	2	1	6	2.5	26	1	28.5	4	724.5	7	135.5	45.5	240.5	1		8.5	1	2.5

TABLE A3-6: CORE LC-1 COUNTS, CONTINUED

Sample Number	Depth (cm)	Nitzschia sigma	Rhopalodia gibberula	Synedra fasciculata	Tryblionella acumminata	Tryblionella circumsuta	Tryblionella levdensis	Tryblionella punctata	Marine "Beach" Species	Rhaphoneis psammicola	Thalassionema nitzschoides	SPONGE SPICULE	FORAM	RADIOLARIAN	SILICOFLAGELLATE	INDETERMINATE	LYCOPODIUM	PRESERVATION	Percent Fresh	Percent Brackish-Marine	*Percent Marine "Beach"	Total Diatoms Counted
LCVB1-1	3.5																					
LCVB1-2	10																					
LCVB1-3	15.5																					
LCVB1-4	20																					
LCVB1-5	23																					
LCVB1-6	25.5																					
LCVB1-7	29.5																					
LCVB1-8	41.5																					
LCVB1-9	51.5																					
LCVB1-10	56.5																					
LCVB1-11	65.5																					
LCVB1-12	68.5	1			1		1					X				1	2	G	98.62%	1.38%	0.00%	435.5
LCVB1-13	70.3		1	4.5							0.5	X				1	2	VG	98.65%	1.25%	0.10%	519.5
LCVB1-14	75.5									1						2	2	VG	98.85%	0.96%	0.19%	521.5
LCVB1-15	85.5																					
LCVB1-16	89.5																					
LCVB1-17	92				1		1	3.5		1						1	3	VG	98.38%	1.37%	0.25%	401
LCVB1-18	95	0.5		18		1		1								2	7	F	94.14%	5.86%	0.00%	401
LCVB1-19	101																					innum.
LCVB1-20	108.5																					innum.
LCVB1-21	118.5																					innum.
LCVB1-22	128.5																					innum.
LCVB1-23	138.5																					innum.
LCVB1-24	146.5																					innum.
LCVB1-25	150.5																					innum.
LCVB1-26	160																					innum.
LCVB1-27	165.5																					innum.
LCVB1-28	171.5																					innum.
LCVB1-29	182.5																					innum.
LCVB1-30	187.5																					innum.
LCVB1-31	199.5																					innum.
LCVB1-32	209.5																					innum.
LCVB1-33	219.5																					innum.
LCVB1-34	229.5																					innum.
LCVB1-35	239.5																					innum.
total =		1.5	1	22.5	2	1	2	4.5		2	0.5											2,279

*"Beach" species refers to total planktic and epipsammic marine species.