DR2001107

GSA Data Repository Information

The purpose of this data repository is to provide detailed information concerning analysis of modern and fossil diatoms from Puget Sound coastal marshes. This diatom data forms much of the data used by in Sherrod, 1998.

Diatom Data Analysis

My data analysis and results presentation generally follow procedures described by ter Braak (1987-1992), Pan and Stevenson (1996). I used SPSS version 6.1 (SPSS Incorporated, 1994) for calculations of descriptive statistics of each environmental variable. Shannon values (H'), an index of diversity, were calculated (using natural logarithms) for the samples with PC-ORD (McCune and Mefford, 1995). I used the software package CANOCO version 3.1 to perform CCA (ter Braak, 1987-1992). This technique relates species composition to measured environmental factors. CCA ordinations utilize untransformed environmental variables. Obvious outliers (n=1) were excluded from the analysis.

I used WACALIB ver. 3.1 to calibrate diatom assemblages with salinity and elevation measurements. This technique first calculates the salinity and elevation optimum for each taxon, and then uses those optima to produce transfer functions (Line and Birks, 1990). The transfer functions are used for inferring environmental variables based on the species composition in unknown samples. Coefficients of determination (r^2) between calculated (inferred) environmental variables and observed values of environmental variables allow evaluation of the transfer function's predictive power. Standard deviations were used to describe variation in inference error around a mean value.

Modern Diatom Distributions in Puget Sound Salt Marshes

A total of 234 diatom taxa were identified from 39 surface sediment samples. The assemblages represent both autochthonous and allochthonous diatoms; no attempt was made to separate the two groups. Diatoms in each sample are well preserved. The

presence of members of the genera *Gyrosigma* and *Nitzschia*, suggested minimal mechanical breakage of long, slender taxa. Lightly silicified diatoms (e.g., *Skeletonema costatum*) were also well preserved and showed minimal evidence of breakage or dissolution. Diatoms that produce toxins harmful to humans, primarily members of the genus *Pseudonitzschia*, were also observed.

For the CCA gradient analysis, I used 108 diatom taxa, representing all taxa with relative abundance ~1% in one or more of the 39 samples (Table 2-2). Eigenvalues for the first three ordination axes are $\lambda_1 = 0.509$, $\lambda_2 = 0.251$ and $\lambda_3 = 0.486$; the sum of all canonical eigenvalues is .761. Eigenvalues for CCA Axis 1 and Axis 2 represent 15.5% of the cumulative variance in the species data. Species-environment correlations were high for both axes (Axis 1 = 0.927, Axis 2 = 0.800). Canonical coefficients, t-values, and interset correlations (Table 2-3) represent different statistics for testing the relationship between environmental variables and ordination axes (ter Braak, 1987-1992; Pan and Stevenson, 1996). Canonical coefficients indicate the magnitude of a particular environmental variable's contribution to an ordination axis, with large canonical coefficients (absolute values relative to other coefficient values) being associated with a higher degree of contribution of an environmental variable to a given axis (Pan and Stevenson, 1996). The canonical coefficient of salinity is highest for Axis 1 (-0.80), while the canonical coefficient of elevation is highest for Axis 2 (1.10).

In CCA, computed t-values, interset correlations, and Monte Carlo permutation tests are used to evaluate the relationship between species distributions and environmental variables. Computed t-values are useful for exploratory purposes to determine if a particular environmental variable contributes more to the fit of the species data relative to other environmental variables in the analysis. This is accomplished by comparing the computed t-values from the CCA output to a critical value, which in this case is 2.03. Environmental variables with t-values that exceed the critical t-value are interpreted as having a unique contribution to the fit of the species data (ter Braak, 1987-1992). Interset correlations are the correlation coefficients between the species axes (ordination axes) and the environmental variables (ter Braak, 1987-1992). Based on interset correlations, I infer that the first ordination axis is a salinity gradient (interset correlation = -0.889), while the second axis is an inferred elevation gradient (interset

correlation = 0.554). Monte Carlo permutation tests statistically tested whether the diatom species are related to salinity and elevation. The diatom distributions in coastal Puget Sound marshes are significantly related to both salinity and elevation ($P \leq 0.001$, 999 permutations).

The results of the CCA are summarized in two biplots (Figure 2-6) that provide a graphical means for representing how species and sites are related to environmental variables. The length of the arrows for salinity and elevation in Figure 2-6 are proportional to the importance of the environmental variable in the biplot, with the arrows pointing in the direction of increasing values for each environmental variable. The angle between the arrow and an ordination axis shows how well the environmental variable is correlated with an ordination axis (the smaller the angle, the stronger the correlation). A perpendicular line drawn from an arrow through a site or species point shows the relative location of that site (Figure 2-6A) or species (Figure 2-6B) along an environmental gradient (Palmer, 1993).

The biplots indicate that there is a strong relationship between species distributions and the environmental variables. Because salinity is strongly correlated with CCA Axis 1, species that fall on the left side of the diagram are more abundant in areas of higher salinity, while those on the right side occur more frequently in areas of freshwater. Likewise, because elevation is correlated with CCA Axis 2, species that fall in the lower part of the diagram are indicative of lower elevations, while those in the upper part are characteristic of higher elevations. The sites follow a similar distribution pattern in relation to the environmental variables on the diagram.

The ordination separates the sites into three main groups representing the main marsh subenvironments (Figure 2-6). By contrast, species are generally distributed in a continuum along the environmental gradients, with most species occurring in several marsh subenvironments. For the species biplot, certain associations of species were representative of each main marsh subenvironment. Tideflat sites have the highest salinity and lowest elevation and were best distinguished by *Opephora parva, Achnanthes lemmermanii, Achnanthes delicatula* spp. *hauckiana,* and *Paralia sulcata*. The low marsh sites are not distinguishable in their species patterns from tideflat and lower high marsh sites. Lower high marsh sites had the highest diversity (H') and were

characterized by species of the genus *Navicula*, *Denticula subtilis*, *Luticola mutica*, and others. Upper high marsh sites had the lowest salinity and highest elevation and were characterized by *Pinnularia lagerstedtii, Navicula rhynchocephala, Meridion circulare, Eunotia pectinalis*, *Synedra rumpens*, and several species of the genus *Gomphonema*. Tideflat taxa were distributed in small amounts throughout most marsh environments, generally decreasing in abundance at higher elevations.
Relationship of diatoms to tidal exposure.

Diatom Salinity and Elevation calibration

Diatoms from a training set of 39 surface sediment samples collected at several Puget Sound coastal marshes were related to salinity and elevation using multivariate statistical techniques. Diatom distribution is primarily controlled by salinity, and secondarily by elevation, as shown by correspondence analysis of diatom assemblages from coastal marshes in Puget Sound (Sherrod, 1999). I used WACALIB (Line and Birks, 19XX) to create transfer functions from a two-step weighted averaging regression and calibration technique to infer past changes in elevation and salinity. The first step (regression) calculates the optimum salinity and elevation values for each taxon in the modern samples. A modern taxon's optimum (u_k) is the average of all salinity (or elevation) values for sites at which the taxon occurs, weighted by the taxon's relative abundance at each site.

The regression equation used in WACALIB (Line and Birks, 19XX) for determine the optima of each modern taxon is:

$$\hat{u}_k = \frac{\sum_{i=1}^{n} y_{ik} x_i}{\sum_{i=1}^{n} y_{ik}}$$

where

$\hat{u}_k$ = environmental optima of taxon k

y_{ik} = abundance of taxon k in sample i ($i = 1, ..., n$ samples; $k = 1, ..., m$ taxa)

x = environmental variable being reconstructed (e.g, salinity or elevation)

x_i = value of x for sample i

The second step (calibration) estimates salinity or elevation from a fossil assemblage. This is accomplished by averaging the u_k for each environmental variable of interest, weighted by the relative abundance of each taxon in the fossil assemblage (see Birks, 1995).

The calibration equation used in WACALIB (Line and Birks, 19XX) to determine the value of an environmental variable for a fossil diatom assemblage is:

$$\hat{x}_i = \frac{\sum_{k=1}^{m} y_{ik} \hat{u}_k}{\sum_{k=1}^{m} y_{ik}}$$

where

$\hat{x}_i$ = inferred value of x for fossil sample i

y_{ik} = abundance of taxon k in sample i ($i = 1, ..., n$ samples; $k = 1, ..., m$ taxa)

$\hat{u}_k$ = optima of taxon

SOURCES OF ERROR

The largest source of analytical error in the calibration process is lack of a close modern analog in the training set. I used a similarity measure (squared-chord distance) to determine if modern analogs for each fossil assemblage existed in the modern diatom data set. The squared-chord distance calculation used by Scweitzer (1994) is:

$$d = \sum_{i=0}^{n-1} \left(\sqrt{s_i} - \sqrt{t_i} \right)^2$$

where:

d = squared chord distance

n = number of taxa represented in both samples being compared

s and t = counts or proportions of taxa in the two samples, respectively

I took the extreme upper and lower 5% of the similarities calculated between all modern samples as threshold values to indicate good modern analogs (Birks, 1995).

Diatom Calibration

Bootstrapping analysis allows an error analysis, and this provides a means for evaluating the predictive ability and bias of salinity and elevation transfer functions (Birks et al., 1990). A regression analysis of diatom-inferred salinities against observed values yields an r^2 of 0.82 (Figure 2-7C). Residual salinity is within ±5‰ of the observed values in all but four cases (Figure 2-7D). Five samples fell outside the range of one standard deviation, and three cases fell outside the range of two standard deviations. Slight systematic trends in residual salinity may indicate that the current transfer function does not explain a certain amount of variance (Pan and Stevenson, 1996). A regression analysis of diatom-inferred elevation and observed values (Figure 2-7A) yields a r^2 of 0.78. Residual elevation is within 30 cm (~ one standard deviation) of the observed value in all but 10 cases, and within 50 cm in all but 3 cases (Figure 2-7B). Only one case fell outside the range of two standard deviations. For both environmental variables, the predictive ability of the transfer function is greater for samples in the middle of the environmental gradients than for samples falling at the extremes of the gradients.

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DIATOM DATA FROM PUGET SOUND, WASHINGTON

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MODERN DIATOM SAMPLES

Sample	Elevation (cm relative to MLLW)	Salinity (parts per thousand)	Achnanthes affinis	Achnanthes brevipes	Achnanthes delicatula	Achnanthes delicatula var. hauckiana	Achnanthes exigua	Achnanthes grimmei	Achnanthes lanceolata
950714.0	428.0	1	1						9
950714.100	366.6	13		7	12	11			5
950714.110	366.6	11		5	8	9			
950714.120	373.6	16	3			73			4
950714.130	361.8	18		6	13	15			2
950714.140	369.1	17		6	8	17		2	
950714.150	361.8	19		13		55			1
950714.160	360.9	19		2	7	12		93	
950714.170	362.8	20		6	8	7		95	
950714.180	364.7	22		5	47	20	105		
950714.190	365.6	23		18	48	13		49	2
950714.20	413.7	0							142
950714.200	347.8	24		8		17			
950714.210	365.6	24		22		48			
950714.220	344.7	23		2		18			
950714.230	344.7	28		2		17			
950714.240	268.5	28		2		64			
950714.250	258.3	28		1		70			
950714.260	252.0	28		3		64			5
950714.3	400.3	0	24						115
950714.4	381.3	0	2						224
950714.5	380.0	0	38			2			100
950714.60	374.6	0	4			5			17
950714.7	373.7	0	5	4	4				4
950714.80	368.3	12	11	7	9	7			6
950714.90	365.4	10		4	38	10			
960628.10	371.3	33		3		14			
960628.130	304.3	28		5		29			
960628.50	246.8	26		6		12			
960628.90	238.4	31.5		3		43			
960719.02	325.2	30				6			1
BM-6M	442.3	2			1				
SK-03c	462.7	15							5
SK-06f	421.2	32		9					
SK-08h	463.5	22				8			60
SK-10J	435.2	25		6					
SK-12L	426.2	23		6		1			
TC02 -13m	283.5	27	7		15	44			
TC02 -6m	275.7	27	6		25	22			

Sample	Achnanthes lemmermannii	Achnanthes minutissima	Achnanthes sp.	Actinoptychus senarius	Actinoptychus splendens	Amphiprora decussata	Amphora coffeaeformis	Amphora lineolata	Amphora ovalis
950714.0			4						
950714.100							5		
950714.110		1					6		
950714.120	1						9		2
950714.130		12					7	1	
950714.140	1	3					1		
950714.150		17					2		2
950714.160							13		
950714.170	1						15		
950714.180	1						6		
950714.190							7		
950714.20									
950714.200							4		5
950714.210							3		
950714.220							1		
950714.230	3						4		2
950714.240	8						2		
950714.250	12	1					3		
950714.260			1				5		
950714.3									
950714.4									1
950714.5									
950714.60									1
950714.7							2		
950714.80							2		
950714.90							6		
960628.10		2					6		
960628.130		57					1		
960628.50		5					1		
960628.90		1		1	1	6	5	1	
960719.02	1			1					2
BM-6M									
SK-03c		10							
SK-06f							4		
SK-08h		23					4		
SK-10J		4					2		
SK-12L				2					
TC02 -13m	7						4		
TC02 -6m	2						6		

Sample	Amphora pediculus	Amphora proteus	Amphora sp.	Amphora strigosa	Amphora ventricosa	Aulacoseira islandica	Aulacoseira italica	Aulacoseira sp.	Bacillaria paxillifer
950714.0				3		1			
950714.100	3				1		1		1
950714.110									2
950714.120					9				8
950714.130	2				2		1		1
950714.140	5								1
950714.150					6			1	5
950714.160					1				2
950714.170									2
950714.180	2				1				2
950714.190	4				4		1		7
950714.20									
950714.200					1				6
950714.210					1				
950714.220							1		
950714.230					1				1
950714.240					3				
950714.250					5				
950714.260			2		3				
950714.3									
950714.4									1
950714.5									
950714.60									
950714.7					1				
950714.80	2						1		
950714.90	1				41		2		1
960628.10									
960628.130					3				1
960628.50									
960628.90	2								1
960719.02							2		
BM-6M									
SK-03c							3		
SK-06f		1			84		1		
SK-08h					1		2		
SK-10J									1
SK-12L									
TC02 -13m									
TC02 -6m							2		

Sample	Berkeleya rutilans	Caloneis bacillum	Caloneis liber	Caloneis sp.	Caloneis westii	Campylodiscus bicostatus	Campylodiscus clypeus	Campylodiscus echeneis	Catenula adhaerens
950714.0									
950714.100		2	4						1
950714.110	1					1			1
950714.120									
950714.130		3				2			
950714.140		5				1			
950714.150							2		
950714.160	21								
950714.170	28								
950714.180	5								1
950714.190	4			1					
950714.20									
950714.200							1		2
950714.210								1	
950714.220						2			4
950714.230									1
950714.240									
950714.250								1	
950714.260									1
950714.3									
950714.4									
950714.5									
950714.60									
950714.7									
950714.80		1			1				3
950714.90		1			3				1
960628.10									
960628.130					1				
960628.50		2							
960628.90					1	4			1
960719.02					5		1		
BM-6M		2							1
SK-03c		48			4				
SK-06f									
SK-08h		21			1				
SK-10J					1		1		
SK-12L									
TC02 -13m									
TC02 -6m							1		1

Sample	Cocconeis costata	Cocconeis dirupta	Cocconeis peltoides	Cocconeis placentula	Cocconeis scutellum	Cocconeis sp.	Cosmioneis pusilla	Cyclotella sp.	Cyclotella stelligera
950714.0					7				
950714.100					13		9		
950714.110			9		13		7	2	
950714.120					11		2		
950714.130			2	1	4		11		
950714.140			7		15		13		
950714.150					6		13		
950714.160			11		3		11		1
950714.170			7		19		40		
950714.180			4		5		4		
950714.190			1	1	10		16		
950714.20					2		20		
950714.200	1				18		5		
950714.210					7				
950714.220			4	1	26		7		
950714.230							2	1	
950714.240			2	10	24				
950714.250			5	1	12	3			
950714.260			11	1	11	3			
950714.3					1		3		
950714.4					3		8		
950714.5				1	2		26		
950714.60					1		22		
950714.7					2		12		
950714.80				1	7		7		
950714.90					2		8		
960628.10	1	2			5				
960628.130	1	1			1				
960628.50	1	2	1	1	7				
960628.90	4	29			27				
960719.02									
BM-6M					1		45		
SK-03c							43		
SK-06f									
SK-08h					1		1		
SK-10J	1		1	2					
SK-12L	2				1				
TC02 -13m			16		1				
TC02 -6m			8						

Sample	Cyclotella striata	Cymbella affinis	Cymbella minuta	Cymbella naviculiformis	Cymbella sinuata	Cymbella tumida	Cymbello-nitzschia diluviana	Cymbello-nitzschia sp.	Denticula subtilis
950714.0									
950714.100									2
950714.110									2
950714.120		6					1		3
950714.130									4
950714.140		1							6
950714.150		1							21
950714.160									21
950714.170	2								10
950714.180									17
950714.190									23
950714.20									
950714.200									13
950714.210									21
950714.220									19
950714.230									11
950714.240									
950714.250									
950714.260									
950714.3									
950714.4			1	1					
950714.5									7
950714.60	1								1
950714.7									5
950714.80									4
950714.90					1	1			4
960628.10								1	21
960628.130									4
960628.50									
960628.90									
960719.02									
BM-6M									52
SK-03c	2								11
SK-06f									
SK-08h	1								29
SK-10J			1						1
SK-12L	1								
TC02 -13m									
TC02 -6m									

Sample	Diatoma hyemale	Dimeregramma minor	Diploneis bombus	Diploneis elliptica	Diploneis interrupta	Diploneis ovalis	Diploneis smithii	Diploneis smithii var. pumila	Diploneis sp.
950714.0				1					
950714.100		3	1	4	3		1	2	
950714.110		10	1	1			1	3	
950714.120									
950714.130		9	1	7					
950714.140		8		1			1		
950714.150		6		6	5	1			
950714.160		7		3	3		1	3	
950714.170		13	4	8	2			1	
950714.180				5	5			10	
950714.190		7		4	2			8	
950714.20									
950714.200		21		2				2	
950714.210		14	2	9	2				
950714.220		10	1	4	1				
950714.230		16		6					1
950714.240		14							
950714.250		32			1				
950714.260		14			1				
950714.3				1					
950714.4									
950714.5		2				3			
950714.60		3		1					
950714.7									
950714.80		1		1	6			2	
950714.90		2	3	6				3	
960628.10							5		
960628.130					9	16	6		
960628.50		1			2	8	1		
960628.90		1			14		2		
960719.02					2				
BM-6M									
SK-03c					16		23		
SK-06f					3				
SK-08h					2		25		
SK-10J	2						1		
SK-12L					2				
TC02 -13m									
TC02 -6m					2				

Sample	Entomoneis alata	Epithemia adnata	Epithemia turgida	Eunotia camelus	Eunotia pectinalis	Fragilaria brevistriata	Fragilaria capucina	Fragilaria construens	Fragilaria fasciculata
950714.0					1		1		
950714.100									5
950714.110									4
950714.120						1			
950714.130	2								1
950714.140	4								3
950714.150	3								
950714.160	10								3
950714.170	8						1		10
950714.180	2						2		5
950714.190									3
950714.20		2			3				
950714.200	1								8
950714.210		1					4		
950714.220	1								4
950714.230									
950714.240	1								
950714.250									
950714.260									
950714.3					5				
950714.4					3				5
950714.5									1
950714.60									
950714.7	1						3		2
950714.80								1	1
950714.90	4								3
960628.10									14
960628.130							28		4
960628.50									11
960628.90									19
960719.02	3				1				
BM-6M					11				
SK-03c			2						
SK-06f								40	3
SK-08h								12	
SK-10J								2	
SK-12L									1
TC02 -13m									1
TC02 -6m					1				3

Sample	Fragilaria pinnata	Fragilaria schulzii	Fragilaria sp.	Fragilaria vaucheriae	Fragilaria virescens	Frustulia creuzburgensis	Frustulia rhomboides	Frustulia vulgaris	Gomphonema angustatum
950714.0			3		2				
950714.100					29	20			
950714.110					1				
950714.120					3				
950714.130					34	5			
950714.140									
950714.150	1				1				
950714.160						5			
950714.170					1				
950714.180								2	
950714.190								2	
950714.20					12	4			3
950714.200					1			1	
950714.210					2				
950714.220					1				
950714.230									
950714.240									
950714.250									
950714.260									
950714.3					6				
950714.4					25				5
950714.5					22				1
950714.60									
950714.7					295				
950714.80					112	1		2	
950714.90					60	3			
960628.10									
960628.130								1	
960628.50									
960628.90						1		1	
960719.02							4		
BM-6M									
SK-03c					3		6		
SK-06f					175			1	
SK-08h						7			
SK-10J						11		20	
SK-12L						8			1
TC02 -13m		8							
TC02 -6m		12							

Sample	Gomphonema clevei	Gomphonema dichotomum	Gomphonema parvulum	Gomphonema subclavatum	Gomphonema valentinica	Grammatophora oceanica var. macilenta	Grammatophora oceanica var. subtilissima	Gyrosigma acuminatum	Gyrosigma balticum
950714.0			5						
950714.100									
950714.110									
950714.120									
950714.130						5			
950714.140						1			
950714.150									
950714.160									
950714.170									
950714.180									
950714.190									
950714.20	3			3					
950714.200									
950714.210									
950714.220						1			
950714.230									
950714.240								1	
950714.250									1
950714.260									1
950714.3			3						
950714.4			2						
950714.5			4						
950714.60									
950714.7									
950714.80									
950714.90									
960628.10					20				1
960628.130					6				
960628.50							1		
960628.90					50				
960719.02							2		1
BM-6M							1		
SK-03c									
SK-06f									30
SK-08h									
SK-10J									
SK-12L							2		1
TC02 -13m									
TC02 -6m									1

Sample	Gyrosigma eximium	Gyrosigma sp.	Gyrosigma spencerii	Hantzschia amphioxys	Hantzschia hyalina	Hyalodiscus scoticus	indeterminant	Luticola mutica	Mastogloia elliptica
950714.0							29	1	
950714.100	6	1	5	1		1	13	42	
950714.110	4	4	3	3			25	33	
950714.120		2				2	25	6	
950714.130	3	2				1	25	16	1
950714.140	3	3		4		7	18	16	
950714.150	5					3	37	18	
950714.160	7	2		7		6	17	12	
950714.170	9	1		2			29	29	
950714.180				2			15	6	
950714.190	2			2		2	19	25	
950714.20						1	10	1	
950714.200	4	3		1			33	31	
950714.210	11	2				1	29	14	
950714.220	1	2						27	
950714.230	6	3					19	14	
950714.240		1					15		
950714.250		1				1	10		
950714.260		2					22		
950714.3				1			3		
950714.4							7		
950714.5							13	6	
950714.60		1					11	9	
950714.7							6	12	
950714.80	4		6				36	25	
950714.90	12		2				26	24	4
960628.10							14	6	
960628.130						1	14	21	
960628.50							19	5	
960628.90						20	15	1	
960719.02			1				16		
BM-6M				19	11		13	16	
SK-03c	6		1			1	10	16	
SK-06f						9	14		
SK-08h	3						16	68	
SK-10J	62					1	6	27	
SK-12L	48					1	4	24	
TC02 -13m		2				1	22		
TC02 -6m		1					19	1	

Sample	Mastogloia exigua	Mastogloia pumila	Mastogloia sp.	Melosira moniliformis	Melosira nummuloides	Meridion circulare	Navicula abunda	Navicula agnita	Navicula capitata
950714.0						3			
950714.100				2	15				
950714.110				5	18				
950714.120		3			1			20	
950714.130				4	21				
950714.140				40					
950714.150					21				
950714.160					25				
950714.170				7	39				
950714.180			1	2	12				1
950714.190					23				
950714.20				1		18			
950714.200	1				16				
950714.210					14				
950714.220					1				
950714.230							3		
950714.240									
950714.250									
950714.260								9	
950714.3						7			
950714.4				6		10			
950714.5				1		3			
950714.60									
950714.7				3	5				
950714.80				15	10				
950714.90	4	1		14	10				
960628.10					78			27	
960628.130					18			23	
960628.50					269			10	
960628.90					3			19	
960719.02	1			1	4				
BM-6M									
SK-03c				2	7				
SK-06f	4			11	4				
SK-08h									
SK-10J									
SK-12L					4	1		1	
TC02 -13m									
TC02 -6m								3	

Sample	Navicula cari	Navicula cincta	Navicula cruciculoides	Navicula cryptocephala	Navicula cryptotenella	Navicula delawarensis	Navicula digito-radiata	Navicula dissipata	Navicula distans
950714.0									
950714.100		7		4	4				1
950714.110		9		5	5				
950714.120				3	14				
950714.130		8		5	10		1		
950714.140		6		1	4				
950714.150				16	1				2
950714.160			1	4					
950714.170				1					
950714.180				12	1				1
950714.190				5	1				
950714.20		2							
950714.200				15	2		1		
950714.210				8	16				
950714.220	1			1					
950714.230				7				2	6
950714.240				2	10	1			2
950714.250				2	2				
950714.260					1				7
950714.3		1							
950714.4		2							
950714.5		1		1					
950714.60				7					
950714.7		2		2	1				
950714.80		35		7	13		1		
950714.90	1	2		8	16				
960628.10		25		19	6		2		
960628.130		37		37	14		2		
960628.50		2		6	3		8		
960628.90		39		17			5		
960719.02		3		19					
BM-6M		30		1	16				
SK-03c		64		15	4				
SK-06f				1			2		
SK-08h		14		43	33				
SK-10J		178		4	2				
SK-12L		174		3	5				
TC02 -13m		9		5					
TC02 -6m		9							

Sample	Navicula elegans	Navicula gelida	Navicula gregaria	Navicula halophila	Navicula heufleri	Navicula indifferens	Navicula insociabilis	Navicula lanceolata	Navicula minuscula
950714.0								1	
950714.100			17			1			
950714.110			9			5			
950714.120						13			
950714.130			30			4			
950714.140			22			1			
950714.150			2			37			
950714.160			15			7			
950714.170			23			2			
950714.180			21			9			
950714.190		5	23			3			
950714.20			2			7			
950714.200			28		2				
950714.210			16						
950714.220			3		4				
950714.230			13				3		
950714.240									
950714.250						1			
950714.260					1				
950714.3			12						
950714.4			21			1			
950714.5			61			5			
950714.60					1				
950714.7	1		5			1			
950714.80			10						1
950714.90			13						
960628.10			22						
960628.130			25						
960628.50			17						
960628.90			32			1			
960719.02			1						
BM-6M			4			30			
SK-03c			4						
SK-06f			4						
SK-08h			3			4			
SK-10J			4						
SK-12L			2						
TC02 -13m			13	3					
TC02 -6m			18			1			

Sample	Navicula muticoides	Navicula occuliformis	Navicula palpebralis	Navicula peregrina	Navicula perminuta	Navicula phyllepta	Navicula pseudosicula var. olympica	Navicula pupula var. rectangularis	Navicula pygmaea
950714.0								1	
950714.100				3	2	1			
950714.110		1			6	1			
950714.120		7		1					
950714.130				19	1	3			2
950714.140	1	4		3		5			1
950714.150		3		5					
950714.160	2			1		1			
950714.170	1			1	4	2			
950714.180					3	9			
950714.190					4	11			
950714.20				2					
950714.200				8	8	3			
950714.210				5					
950714.220		1		1	16	1		1	
950714.230		1		1	15	1			
950714.240		8							
950714.250		6							
950714.260		9							
950714.3						1			
950714.4									
950714.5				3		1			
950714.60				5					
950714.7		1		4		2			
950714.80				7					
950714.90		1		5	6	3			
960628.10				2					
960628.130									
960628.50			1						
960628.90		1		1		1	11		
960719.02		1		2					
BM-6M		1		1					
SK-03c				13		2			1
SK-06f				3		1			
SK-08h		2				4			3
SK-10J				1					
SK-12L									
TC02 -13m						2			
TC02 -6m		4				4			

Sample	Navicula radiosa var. radiosa	Navicula radiosa var. tenella	Navicula rhyncocephala	Navicula salinarum	Navicula seminulum	Navicula slesvicensis	Navicula sp.	Navicula subforcipata	Navicula tripunctata
950714.0			4			4	1		
950714.100				26		4			
950714.110				11		3			
950714.120	1			35		5	5		1
950714.130				32		7			
950714.140				4		7			
950714.150			1	43			1		
950714.160	1			4		4			
950714.170			3	7					
950714.180				5				1	
950714.190				5				2	
950714.20									
950714.200	1		1	8					
950714.210				1			17	2	
950714.220				1			1		
950714.230			1	4			1		
950714.240									
950714.250	4								
950714.260							3		
950714.3						1			
950714.4	3		12			3			
950714.5	2		2			28			
950714.60			38	5					
950714.7				2		6			
950714.80				14	2	3			
950714.90		1		10	10				
960628.10									
960628.130									
960628.50									
960628.90									
960719.02									
BM-6M									
SK-03c				1		43			
SK-06f									
SK-08h									
SK-10J	1			3					
SK-12L				4		8			
TC02 -13m									
TC02 -6m			1						

Sample	Navicula veneta	Navicula viridula	Navicula vittata	Neidium sp.	Nitzschia angustatula	Nitzschia bilobata	Nitzschia coarcta	Nitzschia compressa	Nitzschia constricta
950714.0									
950714.100	6				1				3
950714.110	5							2	2
950714.120					1				5
950714.130	28								
950714.140									5
950714.150			1						3
950714.160					1				1
950714.170	9							1	1
950714.180	6								
950714.190								1	1
950714.20		4							
950714.200					1			1	11
950714.210									1
950714.220								2	
950714.230					2			3	
950714.240									2
950714.250								2	1
950714.260							2		
950714.3									
950714.4									
950714.5									
950714.60				1					
950714.7							1		
950714.80	3								6
950714.90	22								1
960628.10									
960628.130									
960628.50									
960628.90									5
960719.02					3				6
BM-6M									
SK-03c						1			
SK-06f									
SK-08h					3	4			1
SK-10J					1	1			3
SK-12L						5			3
TC02 -13m					6				2
TC02 -6m					5				3

Sample	Nitzschia dubia	Nitzschia fasciculata	Nitzschia fonticola	Nitzschia frustulum	Nitzschia granulata	Nitzschia limnicola	Nitzschia littoralis	Nitzschia longa	Nitzschia monochorum
950714.0									1
950714.100		2		1			5		
950714.110		4		8			13		
950714.120				61					
950714.130				11			11		
950714.140		2		22			13		
950714.150			15			2	11		
950714.160		2	5	2			10		
950714.170	2			2			12		
950714.180			14				1		
950714.190			8				19		
950714.20							1		
950714.200	6	1	1		1		6		
950714.210						8			
950714.220				4			12		
950714.230	2			4			14		
950714.240									
950714.250				2			2		
950714.260				1			1		
950714.3						11			
950714.4						25			
950714.5		1		2		6			
950714.60									
950714.7				2			4		
950714.80				6	1		2		
950714.90		1		7			10		
960628.10			12						
960628.130			12						
960628.50	1		10						
960628.90			11					8	
960719.02				125				1	
BM-6M	12	8		26	1		11		
SK-03c				2				1	
SK-06f							1	1	
SK-08h	2	4	15				2		
SK-10J		39	4				3	2	
SK-12L		32		3			2		
TC02 -13m				10			4		
TC02 -6m		2		11	1		8		

Sample	Nitzschia navicularis	Nitzschia obscurum - type	Nitzschia obtusa	Nitzschia palea	Nitzschia punctata	Nitzschia recta	Nitzschia rostellata	Nitzschia sigma	Nitzschia sp.
950714.0				5		8			2
950714.100				6					
950714.110				18					
950714.120				18			1		1
950714.130	1			12			1		
950714.140				10		3			
950714.150				12		1			
950714.160				11					
950714.170				12					
950714.180				4					
950714.190				10					
950714.20				6		17			
950714.200	1			9					1
950714.210		2		14		1		1	4
950714.220	1			10					
950714.230				15		2			
950714.240				9					
950714.250				6		1			
950714.260				9					5
950714.3				12					
950714.4				12					
950714.5				11					
950714.60				2					2
950714.7				10					
950714.80			1	7					
950714.90				9			1		
960628.10				7					
960628.130				1					
960628.50				4					
960628.90				5			2		
960719.02				69					
BM-6M				15	1				
SK-03c				27					
SK-06f				1			1		
SK-08h				24					
SK-10J				92					
SK-12L				105					
TC02 -13m				11					
TC02 -6m				9					

Sample	Nitzschia tenuis	Nitzschia tryblionella	Odontella aurita	Opephora marina	Opephora martyi	Opephora olsenii	Opephora pacifica	Opephora parva	Orthoseira roeseana
950714.0									
950714.100	8							16	
950714.110	9						1	38	
950714.120	12						4	55	
950714.130	14						1	23	
950714.140	1						3	66	
950714.150	12						1	6	
950714.160	3						4	35	
950714.170	3						3	35	
950714.180	4						3	18	
950714.190	7						12	36	
950714.20									
950714.200	10						6	131	
950714.210	7			16			21	66	
950714.220	4							117	
950714.230	1			2		1	1	120	
950714.240				7			9	186	
950714.250				9			9	133	
950714.260					1		61	124	
950714.3									
950714.4									
950714.5								2	
950714.60	1						2	1	
950714.7	3		1					2	
950714.80	21						7	14	
950714.90	9							6	
960628.10							5	162	
960628.130	2	39					1	37	
960628.50	1	15	3				8	124	
960628.90	2	5	1				9	101	
960719.02	2	11						177	
BM-6M	13						2	1	11
SK-03c	4	18							
SK-06f	2							3	
SK-08h	7	52						7	
SK-10J	6	11	2						
SK-12L	4	4						3	
TC02 -13m							116	207	
TC02 -6m							61	245	

Sample	Paralia sulcata var. coronata	Paralia sulcata var. radiata	Paralia sulcata var. sulcata	Pinnularia abaujensis	Pinnularia acrosphaeria	Pinnularia appendiculata	Pinnularia intermedia	Pinnularia lagerstedtii	Pinnularia microstauron
950714.0			1		1				2
950714.100		29	21			59			
950714.110	2	36	14					1	
950714.120		13	8						
950714.130	1	31	14						
950714.140	1	58	24						
950714.150		61	8					1	
950714.160	2	28	19						
950714.170	5	50	35						
950714.180	2	10	3						
950714.190	2	22	8						
950714.20							1		
950714.200	9	52	26						
950714.210	5	50	20						
950714.220	9	50	35						
950714.230	11	41	29						
950714.240	3	38	16						
950714.250	12	59	31						
950714.260	12	59	21						
950714.3									
950714.4									
950714.5			14						
950714.60		32	16					12	
950714.7			23					2	
950714.80	1	18	12			8		3	
950714.90	1	11	10			16			
960628.10			5						
960628.130			4						
960628.50			22					3	
960628.90			32						
960719.02			9						
BM-6M			1					33	
SK-03c			2					49	
SK-06f									
SK-08h								8	
SK-10J			20					1	
SK-12L			6						
TC02 -13m			10						
TC02 -6m			18						

Sample	Pinnularia sp.	Pinnularia subcapitata	Pinnularia viridis	Plagiogramma staurophorum	Plagiotropis vitrea	Pleurosigma angulatum	Pleurosigma salinarum	Pleurosigma sp.	Pseudonitzschia pungens
950714.0	4	2							
950714.100				2					
950714.110							1		1
950714.120							4		
950714.130							2		
950714.140								1	
950714.150							2		
950714.160				1			1	2	
950714.170				2				1	
950714.180				1				1	
950714.190									
950714.20		1							
950714.200				2				1	2
950714.210									
950714.220									2
950714.230									3
950714.240									
950714.250						3			
950714.260								5	
950714.3		2							
950714.4									
950714.5									
950714.60									
950714.7									
950714.80									1
950714.90									
960628.10				3					
960628.130				3					
960628.50				21					
960628.90				5			2		
960719.02					4		2		
BM-6M									1
SK-03c									
SK-06f					6		6		
SK-08h									
SK-10J									
SK-12L									
TC02 -13m				2					
TC02 -6m									

Sample	Rhaphoneis minutissima	Rhoicosphenia curvata	Rhopalodia gibba	Rhopalodia musculus	Rhopalodia musculus var. constricta	Rhopalodia sp.	Scoliopleura tumida	Skeletonema costatum	Stauroneis anceps
950714.0									
950714.100				14				6	
950714.110		1						6	
950714.120				11					
950714.130				10				14	
950714.140								8	
950714.150				20				6	
950714.160				14					
950714.170				3					2
950714.180				10					
950714.190				23					1
950714.20									
950714.200				12					
950714.210			1	9				4	
950714.220				6					
950714.230				8					
950714.240									
950714.250									
950714.260	2					1			
950714.3		3							
950714.4		3							
950714.5				1				8	
950714.60								1	
950714.7				9					
950714.80				15					
950714.90				26	1			4	
960628.10									
960628.130									
960628.50							2	9	
960628.90				1			1		
960719.02				4					
BM-6M									
SK-03c									
SK-06f				89					
SK-08h									
SK-10J									
SK-12L							1		
TC02 -13m				1					
TC02 -6m									1

Sample	Stauroneis kriegeri	Stauroneis phoenicenteron	Stephanodiscus hantzschii	Stephanopyxis turris	Surirella amphioxys	Surirella angusta	Surirella brebisonii	Surirella sp.	Synedra rumpens
950714.0	1	1			1				
950714.100							1		
950714.110							5		
950714.120								1	
950714.130							2		
950714.140									
950714.150									
950714.160							4		
950714.170							9		
950714.180							2		
950714.190							4		
950714.20							1		13
950714.200							2		
950714.210									
950714.220									
950714.230									
950714.240									
950714.250									
950714.260									
950714.3						1			46
950714.4						1			49
950714.5									4
950714.60									1
950714.7							1		
950714.80									
950714.90							2		
960628.10									
960628.130									
960628.50									
960628.90									
960719.02			1				15		
BM-6M	3						1		
SK-03c							2		
SK-06f									
SK-08h							1		1
SK-10J							5		
SK-12L							2		
TC02 -13m				1					
TC02 -6m							1		

Sample	Synedra sp.	Synedra tabulata	Synedra ulna	Tabellaria fenestrata	Thalassiosira baltica	Thalassiosira eccentrica	Thalassiosira simonseni	Thalassiosira tenera	Trachyneis aspera
950714.0			2						
950714.100						3			
950714.110			1			2			
950714.120		4		1					
950714.130									
950714.140						1			
950714.150		3		17		3			
950714.160									
950714.170						3			
950714.180									
950714.190									
950714.20			4						
950714.200			1		1	1			
950714.210		5	1						1
950714.220		2				1			
950714.230									
950714.240									
950714.250		3							
950714.260	2		1						
950714.3									
950714.4			2						
950714.5			1						
950714.60		2							
950714.7						1			
950714.80				1		2			
950714.90						2			
960628.10						1			4
960628.130						1			7
960628.50						3		3	
960628.90						3			6
960719.02							1	1	1
BM-6M									
SK-03c									
SK-06f									
SK-08h									
SK-10J						1	1		
SK-12L						1			
TC02 -13m						1			
TC02 -6m						2			

Sample	Triceratium repletum	Grand Total
950714.0		113
950714.100		484
950714.110		408
950714.120		480
950714.130		524
950714.140		478
950714.150		548
950714.160		494
950714.170		638
950714.180		436
950714.190		521
950714.20		286
950714.200		578
950714.210		510
950714.220		425
950714.230		427
950714.240		440
950714.250		448
950714.260		487
950714.3		259
950714.4		438
950714.5		386
950714.60		206
950714.7		452
950714.80		514
950714.90		520
960628.10		495
960628.130		473
960628.50		631
960628.90	2	585
960719.02		513
BM-6M		396
SK-03c		472
SK-06f		514
SK-08h		522
SK-10J		538
SK-12L		478
TC02 -13m		531
TC02 -6m		520

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RED SALMON CREEK FOSSIL DIATOMS

Sample	Sample Depth (cm)	Achnanthes brevipes	Achnanthes delicatula var. hauckiana	Achnanthes lanceolata	Achnanthes minutissima	Actinoptychus senarius	Actinoptychus splendens	Amphora coffeaeformis	Amphora lineolata
RSC0016D	4.5	20	8			1		1	
RSC0015D	18.5	39	1						1
RSC0014D	36.5	47	3			1		1	
RSC0012D	53.5	125	2			2			1
RSC0011D	63.5	56	2			2			
RSC0010D	79.5	31				2		1	
RSC009D	95.5	4	4				1		
RSC008D	127.5	3	5		4	4	5		
RSC007D	137.5	5	5		2				
RSC006D	153.5	2	2			1			
RSC005D	162.5	4	1					1	
RSC004D	166.5	3		2	1				

Sample	Sample Depth (cm)	Amphora ovalis	Amphora pediculus	Amphora proteus	Amphora ventricosa	Aulacoseira distans	Aulacoseira islandica	Aulacoseira italica	Berkeleya rutilans
RSC0016D	4.5							1	
RSC0015D	18.5	1						2	
RSC0014D	36.5						2	5	
RSC0012D	53.5	3						2	
RSC0011D	63.5			2			11	18	1
RSC0010D	79.5			5				5	
RSC009D	95.5		2	1				12	
RSC008D	127.5	2						7	
RSC007D	137.5			5		4		16	
RSC006D	153.5	1		1	1			1	
RSC005D	162.5				1			1	
RSC004D	166.5	1						1	

Sample	Sample Depth (cm)	Biddulphia alternans	Caloneis bacillum	Caloneis westii	Campylodiscus clypeus	Chaetoceros sp.	Cocconeis costata	Cocconeis pellucida	Cocconeis peltoides
RSC0016D	4.5	1	5	2				3	1
RSC0015D	18.5		17	3					
RSC0014D	36.5		28	11	2				
RSC0012D	53.5		25	7	1				
RSC0011D	63.5		36	30	1		1		
RSC0010D	79.5		15	10	1				
RSC009D	95.5		16	6	3				
RSC008D	127.5		3	12					
RSC007D	137.5			14		1	1		
RSC006D	153.5		4	7	2				
RSC005D	162.5		13	125				2	
RSC004D	166.5		10	107					

Sample	Sample Depth (cm)	Cocconeis placentula	Cocconeis scutellum	Coscinodiscus asteromphalus	Coscinodiscus centralis	Coscinodiscus divisus	Coscinodiscus marginatus	Cosmioneis pusilla	Cyclotella striata
RSC0016D	4.5	3	4		1			4	6
RSC0015D	18.5		5	1					
RSC0014D	36.5	3	7					2	
RSC0012D	53.5	1	3						1
RSC0011D	63.5	5	7						1
RSC0010D	79.5	13	2					1	
RSC009D	95.5	5	2					2	
RSC008D	127.5	2	4					2	4
RSC007D	137.5	7	1			1		1	1
RSC006D	153.5	5	3						1
RSC005D	162.5		1				1		2
RSC004D	166.5	1	3				1	2	5

Sample	Sample Depth (cm)	Cymbella aspera	Cymbella cymbiformis	Cymbella minuta	Cymbello-nitzschia diluviana	Denticula subtilis	Diatoma hyemale	Dimeregramma minor	Diploneis interrupta
RSC0016D	4.5	1	2			1			
RSC0015D	18.5								2
RSC0014D	36.5								
RSC0012D	53.5		1			2			
RSC0011D	63.5			1		1			2
RSC0010D	79.5			1					3
RSC009D	95.5						3		4
RSC008D	127.5						14		
RSC007D	137.5			1	2		1		2
RSC006D	153.5				2			2	2
RSC005D	162.5								155
RSC004D	166.5								156

Sample	Sample Depth (cm)	Diploneis smithii	Diploneis subovalis	Entomoneis alata	Epithemia turgida	Epithemia zebra	Eunotia pectinalis	Eunotia praerupta	Fragilaria brevistriata
RSC0016D	4.5	3		1					
RSC0015D	18.5	2			1				
RSC0014D	36.5				3				
RSC0012D	53.5								
RSC0011D	63.5	2				2	2		
RSC0010D	79.5	1			6				
RSC009D	95.5	1		2					
RSC008D	127.5	2		4	1				
RSC007D	137.5				2				1
RSC006D	153.5	1							
RSC005D	162.5		7		1				
RSC004D	166.5	8	3					1	

Sample	Sample Depth (cm)	Fragilaria construens	Fragilaria fasciculata	Fragilaria virescens	Frustulia creuzburgensis	Frustulia rhomboides	Gomphonema acuminatum	Gomphonema angustatum	Gomphonema angustatum var. sacrophagus
RSC0016D	4.5			10		13			
RSC0015D	18.5		1	2	10				1
RSC0014D	36.5	5	1	1	26		1		
RSC0012D	53.5		2	1	8		2		2
RSC0011D	63.5		3	2	46				
RSC0010D	79.5			2	13	2		2	
RSC009D	95.5		3		14	1	1		
RSC008D	127.5	3	1					1	
RSC007D	137.5	4		1	9			1	
RSC006D	153.5		1	3	3				
RSC005D	162.5				9	3		1	1
RSC004D	166.5				16			1	

Sample	Sample Depth (cm)	Gomphonema gracile	Gomphonema subclavatum	Gyrosigma acuminatum	Gyrosigma balticum	Gyrosigma eximium	Gyrosigma spencerii	Hantzschia amphioxys	Hyalodiscus scoticus
RSC0016D	4.5					10			14
RSC0015D	18.5					4			17
RSC0014D	36.5					14	1	1	1
RSC0012D	53.5			2		11			7
RSC0011D	63.5		2			18	1	1	
RSC0010D	79.5		2			56	7		1
RSC009D	95.5	1			1	36	5		
RSC008D	127.5				3		9		2
RSC007D	137.5				9	1	1		
RSC006D	153.5	2			3				
RSC005D	162.5					4		1	
RSC004D	166.5					5			1

Sample	Sample Depth (cm)	indeterminant	Luticola mutica	Mastogloia exigua	Melosira moniliformis	Melosira nummuloides	Melosira varians	Meridion circulare	Navicula aurora
RSC0016D	4.5	30	5		1	95			
RSC0015D	18.5	22	4		5	84			
RSC0014D	36.5	30	16	2		47		1	
RSC0012D	53.5	16	4	1	1	29			
RSC0011D	63.5	25	3	1		58	5	1	1
RSC0010D	79.5	15	1	3	6	12	3		
RSC009D	95.5		4	9	1	39			
RSC008D	127.5	15	22	2	2	28			
RSC007D	137.5	31		98		14			
RSC006D	153.5	11		5		8			
RSC005D	162.5	8	1						
RSC004D	166.5	11							

Sample	Sample Depth (cm)	Navicula cincta	Navicula cryptocephala	Navicula cryptotenella	Navicula digito-radiata	Navicula exigua	Navicula gregaria	Navicula lanceolata	Navicula muticoides
RSC0016D	4.5	6	2	4	1				
RSC0015D	18.5	6		4	7		4		
RSC0014D	36.5	3		2	7		8		2
RSC0012D	53.5	5		2			1		
RSC0011D	63.5	8			5		6		1
RSC0010D	79.5	21			3	1	5	1	5
RSC009D	95.5	24		2	7		5		2
RSC008D	127.5	27		1	4		4		9
RSC007D	137.5	27	1	1	14			2	2
RSC006D	153.5	2		2	1		1	1	
RSC005D	162.5	4		13					
RSC004D	166.5	7		12	2				

Sample	Sample Depth (cm)	Navicula occuliformis	Navicula palpebralis	Navicula peregrina	Navicula phyllepta	Navicula pupula var. pupula	Navicula radiosa var. radiosa	Navicula rhyncocephala	Navicula salinarum
RSC0016D	4.5							1	
RSC0015D	18.5		5	29	7				2
RSC0014D	36.5	2					2		
RSC0012D	53.5	4		6					1
RSC0011D	63.5			3			1	2	
RSC0010D	79.5				1		2	6	
RSC009D	95.5	1					5	6	2
RSC008D	127.5	2		1	2		3	1	3
RSC007D	137.5	4				1	3	9	
RSC006D	153.5							2	
RSC005D	162.5								
RSC004D	166.5			1					

Sample	Sample Depth (cm)	Navicula slesvicensis	Navicula viridula	Nitzschia angustatula	Nitzschia bilobata	Nitzschia constricta	Nitzschia dubia	Nitzschia fasciculata	Nitzschia fonticola
RSC0016D	4.5				30	6	10	14	
RSC0015D	18.5			1	4	2	3	3	
RSC0014D	36.5	4			18	9	1	3	1
RSC0012D	53.5	5		3	5	5	10		
RSC0011D	63.5	18		3	12	4	3	4	
RSC0010D	79.5	2			10	7	5	3	
RSC009D	95.5	18		2	3	19	2	3	
RSC008D	127.5	43		5		20		3	
RSC007D	137.5	27	1		1	14		1	
RSC006D	153.5	2				8			
RSC005D	162.5						7		
RSC004D	166.5						4		

Sample	Sample Depth (cm)	Nitzschia frustulum	Nitzschia granulata	Nitzschia littoralis	Nitzschia longa	Nitzschia palea	Nitzschia rostellata	Nitzschia tenuis	Nitzschia tryblionella
RSC0016D	4.5	1				28		31	8
RSC0015D	18.5			1				14	7
RSC0014D	36.5				1	9		23	8
RSC0012D	53.5			6	3	2	1	39	17
RSC0011D	63.5			6	7	8		29	24
RSC0010D	79.5			5		2	1	21	10
RSC009D	95.5			13		2	6	21	5
RSC008D	127.5		1	45		15	2	15	5
RSC007D	137.5		3	23	4	20	3	13	16
RSC006D	153.5		1	2	1		2	1	7
RSC005D	162.5		2					37	11
RSC004D	166.5							15	11

Sample	Sample Depth (cm)	Odontella aurita	Opephora parva	Paralia sulcata var. coronata	Paralia sulcata var. radiata	Pinnularia lagerstedtii	Pinnularia mesolepta	Plagiogramma staurophorum	Pleurosigma salinarum
RSC0016D	4.5	5			13				
RSC0015D	18.5		2	2	4				1
RSC0014D	36.5	1		2	1		2		
RSC0012D	53.5	2		1	1				
RSC0011D	63.5	1		4	13	1			
RSC0010D	79.5			3	6	2			
RSC009D	95.5	1		3	3	2	1		2
RSC008D	127.5			11		7			
RSC007D	137.5		4	2	8	1			
RSC006D	153.5				12	3	1	1	
RSC005D	162.5		1	5	7				
RSC004D	166.5		2	6	8				

Sample	Sample Depth (cm)	Rhoicosphenia curvata	Rhopalodia acuminata	Rhopalodia gibba	Rhopalodia gibberula var. vanheurckii	Rhopalodia musculus	Scoliopleura tumida	Skeletonema costatum	Stauroneis anceps
RSC0016D	4.5								1
RSC0015D	18.5					19			
RSC0014D	36.5	2				4			1
RSC0012D	53.5	2				18			1
RSC0011D	63.5	2			1	51			2
RSC0010D	79.5					21			
RSC009D	95.5	2		1		39			
RSC008D	127.5						1	4	1
RSC007D	137.5	6	2	2		5	2		4
RSC006D	153.5	2					9		1
RSC005D	162.5					36			
RSC004D	166.5	1				11			

Sample	Sample Depth (cm)	Stauroneis phoenicenteron	Stephanopyxis turris	Surirella brebisonii	Surirella ovata	Synedra rumpens	Synedra ulna	Tabellaria fenestrata	Thalassiosira eccentrica
RSC0016D	4.5		1				3		2
RSC0015D	18.5			3				1	2
RSC0014D	36.5			5			1		2
RSC0012D	53.5						1		
RSC0011D	63.5			11			1		6
RSC0010D	79.5			1					5
RSC009D	95.5			8		1			2
RSC008D	127.5			4		1	3		
RSC007D	137.5	1		1					
RSC006D	153.5			3	1				4
RSC005D	162.5								
RSC004D	166.5								

Sample	Sample Depth (cm)	Thalassiosira simonseni	Thalassiosira tenera	Thalassiosira weissflogii	Trachyneis aspera	Triceratium repletum	Grand Total
RSC0016D	4.5		1				415
RSC0015D	18.5			1		1	360
RSC0014D	36.5		1				387
RSC0012D	53.5		1				404
RSC0011D	63.5		3		4	2	596
RSC0010D	79.5		1				372
RSC009D	95.5		3		1		400
RSC008D	127.5					9	418
RSC007D	137.5		1		1		472
RSC006D	153.5		2			4	150
RSC005D	162.5				56		522
RSC004D	166.5	2			37		458

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NISQUALLY RIVER FOSSIL DIATOMS

Sample	Sample Depth (cm)	Achnanthes affinis	Achnanthes brevipes	Achnanthes delicatula	Achnanthes delicatula var. hauckiana	Achnanthes lanceolata	Achnanthes minutissima	Actinoptychus senarius	Actinoptychus splendens
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41			1		1			
NISQ11B	173.75	1				3			1
NISQ15B	194		3						
NISQ23B	238.25			5		2	4		
NISQ26B	252		10	38			1	2	
NISQ2b	261.75		10		8			1	
NISQ29B	268.5		4	10				1	
NISQ3b	286		11		4				
NISQ4b	307		8		9			2	
NISQ5b	314.25					4	1		
NISQ6B	323.25		12				2		
NISQ7B	327.75		81						
NISQ8B	333					2	3		

Sample	Sample Depth (cm)	Amphora coffeaeformis	Amphora lineolata	Amphora ovalis	Amphora pediculus	Amphora proteus	Amphora ventricosa	Aulacoseira distans	Aulacoseira italica
NISQ30B	8								1
NISQ31B	16								
NISQ32B	30								
NISQ33B	41							1	11
NISQ11B	173.75								12
NISQ15B	194								4
NISQ23B	238.25								6
NISQ26B	252	2	2	1			10		
NISQ2b	261.75						24		
NISQ29B	268.5	20	2	2	5	1	1		
NISQ3b	286	1					3		
NISQ4b	307	1				2	7		
NISQ5b	314.25	3				2			19
NISQ6B	323.25					2			24
NISQ7B	327.75	2				1			1
NISQ8B	333								

Sample	Sample Depth (cm)	Bacillaria paxillifer	Caloneis amphisbaena	Caloneis bacillum	Caloneis westii	Campylodiscus clypeus	Campylodiscus fastuosus	Catenula adhaerens	Cocconeis costata
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41			1					
NISQ11B	173.75			10					
NISQ15B	194		1	5	21				1
NISQ23B	238.25	3		34	1	1		1	
NISQ26B	252			9	11			1	1
NISQ2b	261.75			7	6				
NISQ29B	268.5			1	11				
NISQ3b	286	1		1	5		1		
NISQ4b	307						1		
NISQ5b	314.25			3					
NISQ6B	323.25			11	2				
NISQ7B	327.75				14				
NISQ8B	333			1					

Sample	Sample Depth (cm)	Cocconeis dirupta	Cocconeis peltoides	Cocconeis placentula	Cocconeis scutellum	Coscinodiscus centralis	Cosmioneis pusilla	Cyclotella meneghiniana	Cyclotella striata
NISQ30B	8								
NISQ31B	16			1					
NISQ32B	30								
NISQ33B	41			4			4		
NISQ11B	173.75			7	1		46	1	
NISQ15B	194				4		5		2
NISQ23B	238.25	1		1			9		
NISQ26B	252		1	1	3		1		2
NISQ2b	261.75				6		1		
NISQ29B	268.5	1			2	1	3		
NISQ3b	286				1				
NISQ4b	307				4		1		
NISQ5b	314.25						64		1
NISQ6B	323.25				4		60		
NISQ7B	327.75						15		
NISQ8B	333						18		

Sample	Sample Depth (cm)	Cymbella aspera	Cymbella cistula	Cymbella minuta	Denticula subtilis	Diatoma hyemale	Diploneis interrupta	Diploneis ovalis	Diploneis pseudovalis
NISQ30B	8								
NISQ31B	16					1			
NISQ32B	30								
NISQ33B	41			1				1	
NISQ11B	173.75							173	
NISQ15B	194						368	1	
NISQ23B	238.25				32		8	28	
NISQ26B	252				36		14	8	1
NISQ2b	261.75				6		2		
NISQ29B	268.5				1		8	1	
NISQ3b	286								
NISQ4b	307	1			37		5		
NISQ5b	314.25								
NISQ6B	323.25		1	1			13		
NISQ7B	327.75						116		
NISQ8B	333								

Sample	Sample Depth (cm)	Diploneis smithii	Entomoneis alata	Epithemia turgida	Eunotia pectinalis	Fragilaria brevistriata	Fragilaria capucina	Fragilaria construens	Fragilaria cyclopum
NISQ30B	8								
NISQ31B	16			1					
NISQ32B	30								
NISQ33B	41				2			5	
NISQ11B	173.75	1		7	1				
NISQ15B	194								
NISQ23B	238.25	10		1					3
NISQ26B	252			1				17	
NISQ2b	261.75	2			1				
NISQ29B	268.5	2		1				30	
NISQ3b	286								
NISQ4b	307								
NISQ5b	314.25	9			9	7	2	6	
NISQ6B	323.25	3			3		2	22	
NISQ7B	327.75	5						13	
NISQ8B	333	1	1		211				

Sample	Sample Depth (cm)	Fragilaria fasciculata	Fragilaria pinnata	Fragilaria virescens	Frustulia creuzburgensis	Frustulia rhomboides	Frustulia vulgaris	Gomphoneis herculeana	Gomphonema angustatum
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41							1	1
NISQ11B	173.75			3		6			2
NISQ15B	194				1				
NISQ23B	238.25				24		7	3	
NISQ26B	252								
NISQ2b	261.75	2							
NISQ29B	268.5	1		41	1				
NISQ3b	286	2		2					
NISQ4b	307	4		3					
NISQ5b	314.25								1
NISQ6B	323.25			1		1			
NISQ7B	327.75		12	13					
NISQ8B	333								

Sample	Sample Depth (cm)	Gomphonema angustatum var. sacrophagus	Gomphonema clevei	Gomphonema gracile	Gomphonema parvulum	Gomphonema subclavatum	Grammatophora oceanica var. subtilissima	Gyrosigma balticum	Gyrosigma eximium
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41		1						
NISQ11B	173.75	1		1					7
NISQ15B	194								
NISQ23B	238.25			1	1		2		29
NISQ26B	252							6	17
NISQ2b	261.75								88
NISQ29B	268.5	1						107	1
NISQ3b	286								8
NISQ4b	307								
NISQ5b	314.25					1			
NISQ6B	323.25								
NISQ7B	327.75					2			1
NISQ8B	333	25							1

Sample	Sample Depth (cm)	Gyrosigma sp.	Gyrosigma spencerii	Hantzschia amphioxys	Hyalodiscus scoticus	indeterminant	Luticola mutica	Mastogloia exigua	Melosira moniliformis
NISQ30B	8			1					
NISQ31B	16			1					
NISQ32B	30			1					
NISQ33B	41			7		6	1		
NISQ11B	173.75					22			2
NISQ15B	194					15	1		
NISQ23B	238.25		6			32	19		1
NISQ26B	252		5		3	14	1	2	
NISQ2b	261.75				3	5	7		
NISQ29B	268.5		1			17	2	1	
NISQ3b	286	4				10	36	2	
NISQ4b	307	1			2	15	9		
NISQ5b	314.25			1		22	4		
NISQ6B	323.25					13	52		
NISQ7B	327.75					19	11	6	
NISQ8B	333			12		22	15		

Sample	Sample Depth (cm)	Melosira nummuloides	Navicula agnita	Navicula cari	Navicula cincta	Navicula crucicula	Navicula cryptocephala	Navicula cryptotenella	Navicula digito-radiata
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41				1				
NISQ11B	173.75	6			19			1	1
NISQ15B	194							1	3
NISQ23B	238.25				67			17	1
NISQ26B	252	65			9		4	12	9
NISQ2b	261.75	3			18				2
NISQ29B	268.5				12		10	21	14
NISQ3b	286	88	11		12		62		2
NISQ4b	307	155	8		4		3		
NISQ5b	314.25	3	1						
NISQ6B	323.25				42		9		
NISQ7B	327.75			7	1	7	12		
NISQ8B	333						1		

Sample	Sample Depth (cm)	Navicula elegans	Navicula elginensis	Navicula exigua	Navicula gregaria	Navicula inconspicua	Navicula muticoides	Navicula occuliformis	Navicula peregrina
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41			1					1
NISQ11B	173.75								
NISQ15B	194								4
NISQ23B	238.25		1				6		5
NISQ26B	252				10				1
NISQ2b	261.75							1	
NISQ29B	268.5				2			2	
NISQ3b	286				2			2	
NISQ4b	307				2	1		1	
NISQ5b	314.25							3	1
NISQ6B	323.25							1	4
NISQ7B	327.75	6							31
NISQ8B	333				1				6

Sample	Sample Depth (cm)	Navicula perminuta	Navicula phyllepta	Navicula pseudosicula var. olympica	Navicula pupula var. pupula	Navicula pygmaea	Navicula rhyncocephala	Navicula salinarum	Navicula seminulum
NISQ30B	8				1				
NISQ31B	16								
NISQ32B	30								
NISQ33B	41								
NISQ11B	173.75								
NISQ15B	194								
NISQ23B	238.25		3		1				
NISQ26B	252			1		1			
NISQ2b	261.75								
NISQ29B	268.5					4			
NISQ3b	286								
NISQ4b	307								
NISQ5b	314.25	19							9
NISQ6B	323.25								
NISQ7B	327.75						1		
NISQ8B	333						3	2	

Sample	Sample Depth (cm)	Navicula sp.	Navicula slesvicensis	Navicula tripunctata	Navicula viridula	Neidium dubium	Nitzschia angustatula	Nitzschia bilobata	Nitzschia constricta
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41								
NISQ11B	173.75				2				
NISQ15B	194								
NISQ23B	238.25				1		14	1	31
NISQ26B	252							1	2
NISQ2b	261.75		48			1			
NISQ29B	268.5	22					1		1
NISQ3b	286		10			3	3		7
NISQ4b	307		64			20	1		12
NISQ5b	314.25			1					
NISQ6B	323.25			4					
NISQ7B	327.75			45					
NISQ8B	333								

Sample	Sample Depth (cm)	Nitzschia dubia	Nitzschia fonticola	Nitzschia frustulum	Nitzschia granulata	Nitzschia longa	Nitzschia palea	Nitzschia recta	Nitzschia scalaris
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41								
NISQ11B	173.75		1						
NISQ15B	194								
NISQ23B	238.25		38				21		1
NISQ26B	252		12						
NISQ2b	261.75				9	3	2		
NISQ29B	268.5								
NISQ3b	286	1		2	7	3	4	5	
NISQ4b	307	1		3	7	5	1	6	
NISQ5b	314.25	2		10			30		
NISQ6B	323.25	2		3		1	21		
NISQ7B	327.75			1					
NISQ8B	333						10		

Sample	Sample Depth (cm)	Nitzschia tenuis	Nitzschia tryblionella	Opephora pacifica	Opephora parva	Orthoseira roeseana	Paralia sulcata var. coronata	Paralia sulcata var. radiata	Paralia sulcata var. sulcata
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41								
NISQ11B	173.75	3	7				1		
NISQ15B	194	6							1
NISQ23B	238.25	6	54		2				1
NISQ26B	252	31	33	1	39			10	
NISQ2b	261.75	25	69		9				3
NISQ29B	268.5	3	3		9				4
NISQ3b	286	5	78						5
NISQ4b	307	18	34	2	5				4
NISQ5b	314.25		7						
NISQ6B	323.25	4	28	2					1
NISQ7B	327.75	23	7		1				
NISQ8B	333	5	3			5			

Sample	Sample Depth (cm)	Pinnularia borealis	Pinnularia intermedia	Pinnularia lagerstedtii	Pinnularia major	Pinnularia mesolepta	Pinnularia microstauron	Pinnularia subcapitata	Pinnularia viridis
NISQ30B	8							2	
NISQ31B	16	1							
NISQ32B	30	4						1	
NISQ33B	41			4					1
NISQ11B	173.75		40	46					1
NISQ15B	194								1
NISQ23B	238.25		25	41					1
NISQ26B	252								
NISQ2b	261.75								
NISQ29B	268.5					1			
NISQ3b	286			1					1
NISQ4b	307			1		1			
NISQ5b	314.25	1		140				1	6
NISQ6B	323.25			57					
NISQ7B	327.75			5					
NISQ8B	333			18	3		4	18	12

Sample	Sample Depth (cm)	Pleurosigma salinarum	Pleurosigma sp.	Pseudonitzschia pungens	Rhoicosphenia curvata	Rhopalodia gibba	Rhopalodia musculus	Scoliopleura tumida	Stauroneis acuta
NISQ30B	8								
NISQ31B	16								
NISQ32B	30								
NISQ33B	41								
NISQ11B	173.75				1	1	2		
NISQ15B	194						1		
NISQ23B	238.25			2	2		4		
NISQ26B	252	1					11	5	1
NISQ2b	261.75						33		
NISQ29B	268.5						50		
NISQ3b	286						4		
NISQ4b	307		1				5		
NISQ5b	314.25						2		
NISQ6B	323.25				3		1		
NISQ7B	327.75						7		
NISQ8B	333						1		

Sample	Sample Depth (cm)	Stauroneis anceps	Stephanodiscus minutulus	Surirella brebisonii	Surirella fastuosa	Synedra ulna	Tabellaria fenestrata	Tetracyclus rupestris	Thalassiosira simonseni
NISQ30B	8	1							
NISQ31B	16	1							
NISQ32B	30								
NISQ33B	41								
NISQ11B	173.75					1	15		
NISQ15B	194								
NISQ23B	238.25								
NISQ26B	252				23				1
NISQ2b	261.75	1		1					
NISQ29B	268.5								1
NISQ3b	286	1							
NISQ4b	307	1		2					
NISQ5b	314.25	12						1	
NISQ6B	323.25			1		2		2	
NISQ7B	327.75			1					
NISQ8B	333	12	1						

Sample	Sample Depth (cm)	Trachyneis aspera	Total Count
NISQ30B	8		6
NISQ31B	16		6
NISQ32B	30		6
NISQ33B	41		57
NISQ11B	173.75		456
NISQ15B	194	13	462
NISQ23B	238.25		621
NISQ26B	252	3	507
NISQ2b	261.75	18	425
NISQ29B	268.5	4	445
NISQ3b	286		411
NISQ4b	307	3	483
NISQ5b	314.25		408
NISQ6B	323.25		417
NISQ7B	327.75		467
NISQ8B	333		417

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MCALLISTER CREEK FOSSIL DIATOM DATA

Sample	Sample Depth (cm)	Achnanthes brevipes	Achnanthes delicatula	Achnanthes delicatula var. hauckiana	Achnanthes lanceolata	Achnanthes minutissima	Actinoptychus senarius	Amphiprora decussata	Amphora coffeaeformis
97ND010	12.5	83	3						
97ND009	32.5	36	2	2					
97ND006	137.5								
97ND004	147.5								
MC02b	180								
MC03b	195.5				3	1	1		
MC04b	213				2	3			
MC05b	231	3	1					1	
MC06b	235.5	38	2						2
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293	22	1						

Sample	Sample Depth (cm)	Amphora ovalis	Amphora pediculus	Amphora ventricosa	Aulacoseira distans	Aulacoseira italica	Aulacoseira sp.	Bacillaria paxillifer	Caloneis bacillum
97ND010	12.5			1		1		5	5
97ND009	32.5					3			62
97ND006	137.5					1			
97ND004	147.5					1			
MC02b	180				3				
MC03b	195.5		1			6		5	
MC04b	213	1				10			
MC05b	231	2				8			
MC06b	235.5					4			1
MC07b	244								
MC08b	249						1		
MC09b	256								
97ND003	293			1		6			9

Sample	Sample Depth (cm)	Caloneis westii	Campylodiscus clypeus	Cocconeis costata	Cocconeis placentula	Cocconeis scutellum	Cosmioneis pusilla	Cyclotella meneghiniana	Cyclotella striata
97ND010	12.5	11	1		2	2	1	1	
97ND009	32.5	31	1	1	2	3			1
97ND006	137.5						1		
97ND004	147.5				1				
MC02b	180					2	5		
MC03b	195.5				4	1	1		
MC04b	213				2	1	1		
MC05b	231	1			5		2		
MC06b	235.5			1	2	1	29		
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293	11					11		1

Sample	Sample Depth (cm)	Cymbella minuta	Cymbella sinuata	Denticula subtilis	Diatoma hyemale	Dimeregramma minor	Diploneis interrupta	Diploneis ovalis	Diploneis pseudovalis
97ND010	12.5	2						6	1
97ND009	32.5					1	3	3	
97ND006	137.5	1					1		
97ND004	147.5							1	
MC02b	180		1						
MC03b	195.5	1	3					1	
MC04b	213			2	1				
MC05b	231						6	2	
MC06b	235.5		1		1		101	4	
MC07b	244						1		
MC08b	249						1		
MC09b	256								
97ND003	293						25	2	

Sample	Sample Depth (cm)	Diploneis smithii	Entomoneis alata	Epithemia turgida	Eunotia pectinalis	Fragilaria brevistriata	Fragilaria construens	Fragilaria cyclopum	Fragilaria fasciculata
97ND010	12.5		1				4	1	2
97ND009	32.5								1
97ND006	137.5			1	1				
97ND004	147.5			1					
MC02b	180								
MC03b	195.5	2		1		1	3		5
MC04b	213	4		9					15
MC05b	231		1				3		2
MC06b	235.5	1			1	6	16		
MC07b	244	1							
MC08b	249								
MC09b	256								
97ND003	293					1			

Sample	Sample Depth (cm)	Fragilaria virescens	Frustulia creuzburgensis	Frustulia rhomboides	Gomphoneis herculeana	Gomphonema angustatum	Gomphonema angustatum var. sacrophagus	Gomphonema gracile	Gomphonema parvulum
97ND010	12.5	4	36						
97ND009	32.5		29			1			
97ND006	137.5								
97ND004	147.5				1				
MC02b	180			1	1				
MC03b	195.5	10		2	1	1			4
MC04b	213			3			3	1	2
MC05b	231	1	6	1					
MC06b	235.5		1						
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293		5				2		

Sample	Sample Depth (cm)	Gomphonema sp.	Gyrosigma balticum	Gyrosigma eximium	Gyrosigma spencerii	Hyalodiscus scoticus	indeterminant	Luticola mutica	Mastogloia elliptica
97ND010	12.5			7			16	16	
97ND009	32.5			28	2		10	6	38
97ND006	137.5			1					
97ND004	147.5								
MC02b	180						8	2	
MC03b	195.5						21	12	
MC04b	213		1				15	3	
MC05b	231	1		2	10	1	14	5	
MC06b	235.5			2				31	
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293				1		11	4	

Sample	Sample Depth (cm)	Mastogloia exigua	Melosira moniliformis	Melosira nummuloides	Meridion circulare	Navicula agnita	Navicula aurora	Navicula cincta	Navicula cryptocephala
97ND010	12.5		14	99				5	
97ND009	32.5	12		41		25		3	
97ND006	137.5								
97ND004	147.5							1	
MC02b	180		1					4	
MC03b	195.5				1			4	
MC04b	213			1			1		
MC05b	231	22	2	181				6	4
MC06b	235.5	1		47				50	
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293	1	5	111				4	

Sample	Sample Depth (cm)	Navicula digito-radiata	Navicula gregaria	Navicula muticoides	Navicula palpebralis	Navicula peregrina	Navicula phyllepta	Navicula radiosa var. radiosa	Navicula slesvicensis
97ND010	12.5	4	7	1		8	1		
97ND009	32.5	1	10						1
97ND006	137.5			1					
97ND004	147.5								
MC02b	180			1		1			
MC03b	195.5	1		3		1			10
MC04b	213								3
MC05b	231	7	3	11		17		3	35
MC06b	235.5	1		1		7	1		
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293			2	1	1			

Sample	Sample Depth (cm)	Navicula viridula	Nitzschia angustatula	Nitzschia bilobata	Nitzschia constricta	Nitzschia dubia	Nitzschia fasciculata	Nitzschia fonticola	Nitzschia granulata
97ND010	12.5	11		3	8	20	3		2
97ND009	32.5	2			10	2	2		
97ND006	137.5								
97ND004	147.5					1		1	
MC02b	180			2	1				
MC03b	195.5	2			15	2		1	
MC04b	213							1	
MC05b	231	5		1	10	3			
MC06b	235.5			5	2	16			
MC07b	244								
MC08b	249			1					
MC09b	256								
97ND003	293	9	2	10	22	5			

Sample	Sample Depth (cm)	Nitzschia palea	Nitzschia rostellata	Nitzschia tenuis	Nitzschia tryblionella	Orthoseira roeseana	Paralia sulcata var. coronata	Paralia sulcata var. radiata	Paralia sulcata var. sulcata
97ND010	12.5	1	3	12	7	1	1	3	
97ND009	32.5			13	2			1	12
97ND006	137.5								1
97ND004	147.5		1						
MC02b	180			1	3				
MC03b	195.5	2	2	6	18				
MC04b	213		1	1	3				
MC05b	231	3		12	16				
MC06b	235.5	7		8	4				
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293	2	1	9	13		2	13	

Sample	Sample Depth (cm)	Pinnularia acrosphaeria	Pinnularia intermedia	Pinnularia lagerstedtii	Pinnularia mesolepta	Plagiogramma staurophorum	Rhoicosphenia curvata	Rhopalodia musculus	Scoliopleura tumida
97ND010	12.5					6		22	1
97ND009	32.5					1		31	
97ND006	137.5		1	1				1	
97ND004	147.5			1					
MC02b	180			3			1	1	
MC03b	195.5		1	2	1		7	8	
MC04b	213	1		3				1	
MC05b	231			2				26	
MC06b	235.5			11				5	
MC07b	244								
MC08b	249								
MC09b	256								
97ND003	293			2				41	

Sample	Sample Depth (cm)	Stauroneis anceps	Surirella brebisonii	Surirella fastuosa	Synedra ulna	Tabellaria fenestrata	Thalassiosira eccentrica	Thalassiosira lineata	Thalassiosira simonseni
97ND010	12.5			5					
97ND009	32.5			2					1
97ND006	137.5								
97ND004	147.5								
MC02b	180				1	12			
MC03b	195.5		2		3	163		1	1
MC04b	213	1				302			1
MC05b	231		3						
MC06b	235.5	1					1		
MC07b	244								
MC08b	249								
MC09b	256					1			
97ND003	293								

Sample	Sample Depth (cm)	Trachyneis aspera	Triceratium repletum	Grand Total
97ND010	12.5		1	461
97ND009	32.5	15		453
97ND006	137.5			12
97ND004	147.5			10
MC02b	180			55
MC03b	195.5			348
MC04b	213			399
MC05b	231			450
MC06b	235.5	1		414
MC07b	244			2
MC08b	249			3
MC09b	256			1
97ND003	293	11		380

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LITTLE SKOOKUM INLET FOSSIL DIATOMS

SampleID	Sample Depth (cm)	Achnanthes brevipes	Achnanthes delicatula var. hauckiana	Achnanthes lanceolata	Achnanthes minutissima	Actinocyclus ehrenbergii	Actinoptychus senarius	Amphora coffeaeformis	Amphora lineolata
LSI0010D	2.5	3	2				1		
LSI011D	9.5	5				1	3		
LSI012D	18.5	11					3	1	5
LSI013D	28.5	1					5		
LSI015D	41.5								
LSI016D	47.5			14					
LSI017D	53.5								
LSI018D	65.5								
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5			1					
LSI002D	108.5			18					
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5			7	4				
LSI007D	189.5			1	1				
LSI008D	194.5			8	1				
LSI009D	201.5			14	5				

SampleID	Sample Depth (cm)	Amphora ovalis	Amphora pediculus	Amphora ventricosa	Aulacoseira distans	Aulacoseira islandica	Aulacoseira italica	Bacillaria paxillifer	Caloneis bacillum
LSI0010D	2.5	1	1	2	2	1	5		6
LSI011D	9.5	2		1	4		21		9
LSI012D	18.5	1			1		12		19
LSI013D	28.5				1		26		11
LSI015D	41.5								
LSI016D	47.5						29		
LSI017D	53.5						1		
LSI018D	65.5				7		310		1
LSI019D	74.5	1					320		
LSI020D	85.5						1		
LSI021D	94.5								
LSI001D	104.5	2					162		3
LSI002D	108.5						236	1	2
LSI003D	116.5						1		
LSI005D	168.5	1							
LSI006D	182.5	9	2		74		8		1
LSI007D	189.5	4		1	55	26			
LSI008D	194.5	8			18		14		1
LSI009D	201.5	11			14	8	1		

SampleID	Sample Depth (cm)	Caloneis ventricosa	Caloneis westii	Campylodiscus clypeus	Cocconeis costata	Cocconeis pellucida	Cocconeis placentula	Cocconeis scutellum	Cocconeis sp.
LSI0010D	2.5		15	1				4	
LSI011D	9.5		19		2	2		2	
LSI012D	18.5		19					1	
LSI013D	28.5		30					2	
LSI015D	41.5								
LSI016D	47.5								2
LSI017D	53.5								
LSI018D	65.5						3		
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5						34		
LSI002D	108.5						7		
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5	1							
LSI007D	189.5						1		
LSI008D	194.5	2					1		
LSI009D	201.5						10		

SampleID	Sample Depth (cm)	Cosmioneis pusilla	Cyclotella meneghiniana	Cyclotella ocellata	Cyclotella striata	Cymatopleura librile	Cymbella aspera	Cymbella cistula	Cymbella cuspidata
LSI0010D	2.5	16			6				
LSI011D	9.5	49		1	4				
LSI012D	18.5	20			8			1	
LSI013D	28.5	14							
LSI015D	41.5								
LSI016D	47.5	1							
LSI017D	53.5								
LSI018D	65.5						2		
LSI019D	74.5								
LSI020D	85.5						1		
LSI021D	94.5								
LSI001D	104.5						3		
LSI002D	108.5						2		
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5								2
LSI007D	189.5					1			3
LSI008D	194.5								1
LSI009D	201.5		1			2	3		1

SampleID	Sample Depth (cm)	Cymbella cymbiformis	Cymbella heteropleura	Cymbella minuta	Denticula subtilis	Diatoma hyemale	Dimeregramma minor	Diploneis interrupta	Diploneis smithii
LSI0010D	2.5				2		1	1	4
LSI011D	9.5						1	6	7
LSI012D	18.5							46	2
LSI013D	28.5					1		76	
LSI015D	41.5								
LSI016D	47.5			2		2			11
LSI017D	53.5								
LSI018D	65.5			4					20
LSI019D	74.5		1						3
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5			5		1			38
LSI002D	108.5								20
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5	4		2					
LSI007D	189.5								
LSI008D	194.5			3					11
LSI009D	201.5			1					7

SampleID	Sample Depth (cm)	Diploneis sp.	Entomoneis alata	Epithemia turgida	Eunotia diodon	Eunotia parallela	Eunotia pectinalis	Eunotia praerupta	Eunotia sp.
LSI0010D	2.5								
LSI011D	9.5		1	3				6	
LSI012D	18.5			1					
LSI013D	28.5			4			1		
LSI015D	41.5	1							
LSI016D	47.5			2			33		
LSI017D	53.5			1					1
LSI018D	65.5			54		1	4		
LSI019D	74.5			92			1		
LSI020D	85.5			1					
LSI021D	94.5			1					
LSI001D	104.5			9			25	69	
LSI002D	108.5					1	26	8	
LSI003D	116.5	1						1	
LSI005D	168.5	1							
LSI006D	182.5	1		1			12		
LSI007D	189.5			1			2		
LSI008D	194.5			15			53		
LSI009D	201.5			8	3		14		

SampleID	Sample Depth (cm)	Fragilaria brevistriata	Fragilaria capucina	Fragilaria construens	Fragilaria fasciculata	Fragilaria virescens	Frustulia rhomboides	Frustulia vulgaris	Gomphonema acuminatum
LSI0010D	2.5			15		3		14	
LSI011D	9.5	1		16	6	2	5		
LSI012D	18.5			11	2	2			2
LSI013D	28.5			6		1			
LSI015D	41.5								
LSI016D	47.5			1		159			
LSI017D	53.5								
LSI018D	65.5			1					
LSI019D	74.5			2		1			
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5			6					1
LSI002D	108.5					1			
LSI003D	116.5								
LSI005D	168.5			1					
LSI006D	182.5			226		35			2
LSI007D	189.5	9		24		89			1
LSI008D	194.5	20	6	131		5	1		3
LSI009D	201.5	107		210		23			1

SampleID	Sample Depth (cm)	Gomphonema angustatum	Gomphonema angustatum var. sacrophagus	Gomphonema sp.	Gomphonema subclavatum	Grammatophora oceanica var. subtilissima	Gyrosigma balticum	Gyrosigma eximium	Gyrosigma sp.
LSI0010D	2.5		2		2			8	3
LSI011D	9.5					14		8	
LSI012D	18.5					4		10	
LSI013D	28.5	1	1					8	
LSI015D	41.5			1					
LSI016D	47.5		55		13				
LSI017D	53.5								
LSI018D	65.5	5	2		1				
LSI019D	74.5				3				
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5	4	26		1				
LSI002D	108.5	11	44						
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5	1	11		5		2		
LSI007D	189.5		4		1				
LSI008D	194.5	39			29		1		
LSI009D	201.5		4		1				

SampleID	Sample Depth (cm)	Hantzschia amphioxys	Hyalodiscus scoticus	indeterminant	Luticola mutica	Mastogloia exigua	Melosira moniliformis	Melosira nummuloides	Melosira varians
LSI0010D	2.5		13	18	16			17	
LSI011D	9.5		6	20	2			4	
LSI012D	18.5			13	3	3		22	
LSI013D	28.5			22	2		1		
LSI015D	41.5								
LSI016D	47.5	3		21					
LSI017D	53.5								
LSI018D	65.5	1		22					
LSI019D	74.5			9					
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5	5		31	1				
LSI002D	108.5	1		16					
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5			15					3
LSI007D	189.5			11					
LSI008D	194.5			24					1
LSI009D	201.5	1		22					

SampleID	Sample Depth (cm)	Meridion circulare	Navicula agnita	Navicula aurora	Navicula cincta	Navicula cryptocephala	Navicula cuspidata	Navicula digito-radiata	Navicula elegans
LSI0010D	2.5	1	4		98				1
LSI011D	9.5				15			4	
LSI012D	18.5				31				
LSI013D	28.5				3			2	
LSI015D	41.5								
LSI016D	47.5	2							
LSI017D	53.5								
LSI018D	65.5			1					
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5	2			1				
LSI002D	108.5	2				3			
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5	6		3					
LSI007D	189.5	1		3			1		
LSI008D	194.5	9		3		1			
LSI009D	201.5	4		2			1		

SampleID	Sample Depth (cm)	Navicula elginensis	Navicula exigua	Navicula gastrum	Navicula gregaria	Navicula lanceolata	Navicula palpebralis	Navicula peregrina	Navicula pseudosicula var. olympica
LSI0010D	2.5				3			5	1
LSI011D	9.5	1					2	4	
LSI012D	18.5				1			3	
LSI013D	28.5								
LSI015D	41.5								
LSI016D	47.5								
LSI017D	53.5								
LSI018D	65.5								
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5								
LSI002D	108.5		2						
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5		2						
LSI007D	189.5					1			
LSI008D	194.5		4						
LSI009D	201.5			3					

SampleID	Sample Depth (cm)	Navicula pupula var. pupula	Navicula radiosa var. radiosa	Navicula rhyncocephala	Navicula salinarum	Navicula slesvicensis	Navicula tripunctata var. schizonemoides	Navicula viridula	Neidium iridis
LSI0010D	2.5	1			1	3			
LSI011D	9.5								
LSI012D	18.5			3		3			
LSI013D	28.5								
LSI015D	41.5								
LSI016D	47.5	3							
LSI017D	53.5								
LSI018D	65.5								
LSI019D	74.5	1							
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5	2							1
LSI002D	108.5	1							
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5	6	5						1
LSI007D	189.5	3	2	2					
LSI008D	194.5	2	7	1				3	1
LSI009D	201.5	4	2	2	4	1	1	1	

SampleID	Sample Depth (cm)	Nitzschia bilobata	Nitzschia constricta	Nitzschia fasciculata	Nitzschia frustulum	Nitzschia granulata	Nitzschia palea	Nitzschia rostellata	Nitzschia tenuis
LSI0010D	2.5	18	9	4			26	4	20
LSI011D	9.5	10					8	4	5
LSI012D	18.5	63		4		2	4		65
LSI013D	28.5	3				1			8
LSI015D	41.5								
LSI016D	47.5								
LSI017D	53.5								
LSI018D	65.5								
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5								
LSI002D	108.5								
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5								
LSI007D	189.5								
LSI008D	194.5				1		4		
LSI009D	201.5				2		1		

SampleID	Sample Depth (cm)	Nitzschia tryblionella	Odontella aurita	Opephora parva	Orthoseira roeseana	Paralia sulcata var. coronata	Paralia sulcata var. radiata	Paralia sulcata var. sulcata	Pinnularia abaujensis
LSI0010D	2.5	16	2	2				21	
LSI011D	9.5	9	2		1	14	21		
LSI012D	18.5	9	2			6	15		
LSI013D	28.5	8	1			2	16		
LSI015D	41.5								
LSI016D	47.5								
LSI017D	53.5								
LSI018D	65.5								
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5				4				
LSI002D	108.5				2				
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5								
LSI007D	189.5								
LSI008D	194.5				2				
LSI009D	201.5								1

SampleID	Sample Depth (cm)	Pinnularia acuminata	Pinnularia alpina	Pinnularia borealis	Pinnularia lagerstedtii	Pinnularia major	Pinnularia mesolepta	Pinnularia sp.	Pinnularia subcapitata
LSI0010D	2.5				2				
LSI011D	9.5				7		1		
LSI012D	18.5				2				
LSI013D	28.5				4				
LSI015D	41.5							1	
LSI016D	47.5		3				1		
LSI017D	53.5							1	
LSI018D	65.5						1		
LSI019D	74.5								
LSI020D	85.5								
LSI021D	94.5								
LSI001D	104.5		4	2		1	6		
LSI002D	108.5		5				6		
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5					2	5		1
LSI007D	189.5						5		
LSI008D	194.5				1		5		
LSI009D	201.5	1					4		

SampleID	Sample Depth (cm)	Pinnularia viridis	Plagiogramma staurophorum	Rhoicosphenia curvata	Rhopalodia gibba	Rhopalodia musculus	Stauroneis anceps	Stauroneis phoenicenteron	Stephanodiscus minutulus
LSI0010D	2.5		1	2			3	1	
LSI011D	9.5					5	1		1
LSI012D	18.5				1	23			
LSI013D	28.5					1			
LSI015D	41.5								
LSI016D	47.5	2						3	
LSI017D	53.5								
LSI018D	65.5							2	
LSI019D	74.5							2	
LSI020D	85.5	1							
LSI021D	94.5								
LSI001D	104.5	18				1	1	2	
LSI002D	108.5	5							
LSI003D	116.5								
LSI005D	168.5								
LSI006D	182.5	4		2			1	4	
LSI007D	189.5	3			2		2		
LSI008D	194.5	5		1	4		1	2	
LSI009D	201.5	3		1	1			1	

SampleID	Sample Depth (cm)	Surirella brebisonii	Synedra rumpens	Synedra tenera	Synedra ulna	Tabellaria fenestrata	Thalassiosira tenera	Trachyneis aspera	Grand Total
LSI0010D	2.5	1				1	1	1	438
LSI011D	9.5							3	351
LSI012D	18.5	1						1	462
LSI013D	28.5	1		1				1	266
LSI015D	41.5								3
LSI016D	47.5								362
LSI017D	53.5								4
LSI018D	65.5				3				445
LSI019D	74.5								436
LSI020D	85.5								4
LSI021D	94.5								1
LSI001D	104.5				4				476
LSI002D	108.5								420
LSI003D	116.5								3
LSI005D	168.5								3
LSI006D	182.5			2					472
LSI007D	189.5								260
LSI008D	194.5			6					459
LSI009D	201.5		1		4				517

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