Title Page

Summary

Acknowledgements

Contents

Chapter One	Introduction	1
Chapter Two	The Thames Estuary	3
2.1	Hydrography	3
2.2	Water chemistry	3
2.3	Bottom sediments	8
2.4	Pollution	14
2.5	Ecology	15
2.6	Previous diatom studies	16
2.7	Archaeology and palaeoecology	17
Chapter Three	Diatom Analysis and Palaeosalinity	
-	Reconstruction	21
3.1	Review of methods	21
3.1.1	Salinity classification	21
3.1.2	Allochthonous valves	26
3.1.3	Quantitative palaeosalinity reconstruction	28
3.1.4	Comparative methods	29
3.2	Factors influencing the composition of estuarine	
	surface sediment diatom assemblages	31
3.2.1	Ecological factors	32
3.2.1.1	Habitat type	32
3.2.1.2	Environmental gradients	32
3.2.1.3	Seasonal variation	34
3.2.2	Physical processes	34
3.2.2.1	Erosion	34
3.2.2.2	Transport	35
3.2.2.3	Deposition and sediment mixing	36
3.3	The transfer function approach	36
3.3.1	Basic method	36
3.3.2	Assumptions of the transfer function approach	37
3.3.2.1	Changes in the ecological system	38
3322	Changes in the hydrological system	30



3.3,2,3	Post hundel alternative	
3.3.3	GISSOIGHOH	40
3.3.3	Rationale of the present study	40
Chapter Four	Methods	41
4.1	Sample site location and sample collection	41
4.1.1	Sample site location	41
4.1.2	Sample collection	43
4.1.2.1	F	43
4.1.2.2		44
4.1.2.3	Archaeological samples	45
4.2	Sample preparation	48
4.3	Identification and counting	49
4.4	Water chemistry	49
4.5	Data presentation and analysis	50
Chapter Five	Pilot Study	52
5.1	Introduction	52
5.2	Methods	53
5.3	Results and discussion	54
5.3.1	Surface sediment diatom assemblages	54
5.3.2	Periphyton	62
5.4	Implications for the sampling programme	67
Chapter Six	Periphyton	70
6.1	Sample classification	70
6.2	Habitat composition	70 91
6.3	Salinity classification	97
Chapter Seven	Surface Sediment Diatom Assemblages	101
7.1	Species classification	101
7.2	Sample classification	116
7.3	Within-site sample variability	123
7.4	Estimates of the allochthonous and autochthonous	140
	components	126
7.5	Provenance of the allochthonous component	120

Chapter Eight	Diatom / Salinity Transfer Function	133
8.1	Theoretical background	133
8.1.1	Species response models	133
8.1.2	Maximum likelihood methods	134
8.1.3	Weighted averaging methods	137
8.1.4	Comparison of methods	140
8.2	The Thames training data set	141
8.2.1	Data screening	141
8.2.2	Choice and scaling of the environmental variable(s)	142
8.3	Estimation of species' optima and tolerances	143
8.4	Comparison of the distribution patterns of	
	taxa in the life and death assemblages	153
8.5	Application of the transfer function to the	
	training and test data sets	161
Chapter Nine	Application of the Transfer Function to the	
-	Archaeological Diatom Assemblages	167
9.1	Introduction	167
9.2	Species composition of the subfossil assemblages	167
9.2.1	Changes in planktonic taxa over the last 2000 years	170
9.2.2	Changes in benthic taxa over the last 2000 years	171
9.3	Palaeosalinity estimates	173
9.4	The changing nature of the Thames in central	
	London over the last 2000 years	177
9.5	Conclusions	180
Chapter Ten	Conclusions	183
10.1	Sampling strategy	183
10.2	Periphyton	183
10.3	Surface sediment assemblages	184
10.4	Transfer function	185
10.5	Palaeosalinity estimates	186
References		188
Appendix	List of taxa with authorities and descriptions	
	of unidentified forms	206