

**Sediment
and
Contaminant
Transport
in
Surface
Waters**

Sediment and Contaminant Transport in Surface Waters

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Contents

Preface.....	xiii
About the Author	xv
Chapter 1 Introduction	1
1.1 Examples of Contaminated Sediment Sites	2
1.1.1 Hudson River	2
1.1.2 Lower Fox River	4
1.1.3 Passaic River/Newark Bay	6
1.1.4 Palos Verdes Shelf	7
1.2 Modeling, Parameterization, and Non-Unique Solutions	9
1.2.1 Modeling	9
1.2.2 Parameterization and Non-Unique Solutions.....	10
1.3 The Importance of Big Events	12
1.4 Overview of Book	17
Chapter 2 General Properties of Sediments.....	21
2.1 Particle Sizes	21
2.1.1 Classification of Sizes	21
2.1.2 Measurements of Particle Size.....	23
2.1.3 Size Distributions.....	23
2.1.4 Variations in Size of Natural Sediments throughout a System.....	26
2.2 Settling Speeds.....	30
2.3 Mineralogy	33
2.4 Flocculation of Suspended Sediments	35
2.5 Bulk Densities of Bottom Sediments	37
2.5.1 Measurements of Bulk Density.....	39
2.5.2 Variations in Bulk Density.....	41
Chapter 3 Sediment Erosion	45
3.1 Devices for Measuring Sediment Resuspension/Erosion	46
3.1.1 Annular Flumes	46
3.1.2 The Shaker	50
3.1.3 Sedflume	51
3.1.4 A Comparison of Devices.....	54
3.2 Results of Field Measurements	56
3.2.1 Detroit River	57
3.2.2 Kalamazoo River	60

3.3	Effects of Bulk Properties on Erosion Rates	67
3.3.1	Bulk Density	68
3.3.2	Particle Size	70
3.3.3	Mineralogy.....	72
3.3.4	Organic Content	75
3.3.5	Salinity	76
3.3.6	Gas	77
3.3.7	Comparison of Erosion Rates	79
3.3.8	Benthic Organisms and Bacteria	80
3.4	Initiation of Motion and a Critical Shear Stress for Erosion.....	81
3.4.1	Theoretical Analysis for Noncohesive Particles	83
3.4.2	Effects of Cohesive Forces.....	85
3.4.3	Effects of Bulk Density.....	87
3.4.4	Effects of Clay Minerals	88
3.5	Approximate Equations for Erosion Rates.....	90
3.5.1	Cohesive Sediments	90
3.5.2	Noncohesive Sediments	91
3.5.3	A Uniformly Valid Equation.....	92
3.5.4	Effects of Clay Minerals	92
3.6	Effects of Surface Slope.....	93
3.6.1	Noncohesive Sediments	93
3.6.2	Critical Stresses for Cohesive Sediments	96
3.6.3	Experimental Results for Cohesive Sediments	97
Chapter 4	Flocculation, Settling, Deposition, and Consolidation.....	103
4.1	Basic Theory of Aggregation.....	104
4.1.1	Collision Frequency	104
4.1.2	Particle Interactions	106
4.2	Results of Flocculation Experiments	108
4.2.1	Flocculation due to Fluid Shear	109
4.2.2	Flocculation due to Differential Settling	116
4.3	Settling Speeds of Flocs.....	120
4.3.1	Flocs Produced in a Couette Flocculator.....	120
4.3.2	Flocs Produced in a Disk Flocculator.....	122
4.3.3	An Approximate and Uniformly Valid Equation for the Settling Speed of a Floc	125
4.4	Models of Flocculation	126
4.4.1	General Formulation and Model.....	126
4.4.2	A Simple Model.....	130
4.4.3	A Very Simple Model	138
4.4.3.1	An Alternate Derivation.....	139
4.4.4	Fractal Theory	140

4.5	Deposition	142
4.5.1	Processes and Parameters That Affect Deposition.....	145
4.5.1.1	Fluid Turbulence.....	145
4.5.1.2	Particle Dynamics	148
4.5.1.3	Particle Size Distribution	148
4.5.1.4	Flocculation	148
4.5.1.5	Bed Armoring/Consolidation.....	149
4.5.1.6	Partial Coverage of Previously Deposited Sediments by Recently Deposited Sediments.....	149
4.5.2	Experimental Results and Analyses	149
4.5.3	Implications for Modeling Deposition.....	154
4.6	Consolidation	155
4.6.1	Experimental Results	156
4.6.2	Basic Theory of Consolidation	165
4.6.3	Consolidation Theory Including Gas.....	169
	Appendix A.....	171
	Appendix B.....	172
Chapter 5	Hydrodynamic Modeling	175
5.1	General Considerations in the Modeling of Currents.....	176
5.1.1	Basic Equations and Boundary Conditions	176
5.1.2	Eddy Coefficients.....	179
5.1.3	Bottom Shear Stress.....	182
5.1.3.1	Effects of Currents	182
5.1.3.2	Effects of Waves and Currents	185
5.1.4	Wind Stress	187
5.1.5	Sigma Coordinates.....	188
5.1.6	Numerical Stability.....	189
5.2	Two-Dimensional, Vertically Integrated, Time-Dependent Models.....	190
5.2.1	Basic Equations and Approximations.....	190
5.2.2	The Lower Fox River	191
5.2.3	Wind-Driven Currents in Lake Erie	194
5.3	Two-Dimensional, Horizontally Integrated, Time-Dependent Models .	195
5.3.1	Basic Equations and Approximations.....	196
5.3.2	Time-Dependent Thermal Stratification in Lake Erie.....	198
5.4	Three-Dimensional, Time-Dependent Models	201
5.4.1	Lower Duwamish Waterway.....	202
5.4.1.1	Numerical Error due to Use of Sigma Coordinates	204
5.4.1.2	Model of Currents and Salinities	205
5.4.2	Flow around Partially Submerged Cylindrical Bridge Piers	206
5.5	Wave Action	210
5.5.1	Wave Generation.....	210

5.5.2	Lake Erie.....	211
5.5.2.1	A Southwest Wind.....	212
5.5.2.2	A North Wind.....	213
5.5.2.3	Relation of Wave Action to Sediment Texture	213
Chapter 6	Modeling Sediment Transport.....	215
6.1	Overview of Models.....	215
6.1.1	Dimensions	215
6.1.2	Quantities That Significantly Affect Sediment Transport.....	216
6.1.2.1	Erosion Rates.....	216
6.1.2.2	Particle/Floc Size Distributions	217
6.1.2.3	Settling Speeds.....	218
6.1.2.4	Deposition Rates.....	219
6.1.2.5	Flocculation of Particles.....	219
6.1.2.6	Consolidation.....	219
6.1.2.7	Erosion into Suspended Load and/or Bedload	220
6.1.2.8	Bed Armoring	220
6.2	Transport as Suspended Load and Bedload	220
6.2.1	Suspended Load.....	220
6.2.2	Bedload	221
6.2.3	Erosion into Suspended Load and/or Bedload.....	223
6.2.4	Bed Armoring	226
6.3	Simple Applications	226
6.3.1	Transport and Coarsening in a Straight Channel	227
6.3.2	Transport in an Expansion Region.....	229
6.3.3	Transport in a Curved Channel.....	235
6.3.4	The Vertical Transport and Distribution of Flocs.....	237
6.4	Rivers	239
6.4.1	Sediment Transport in the Lower Fox River	239
6.4.1.1	Model Parameters.....	240
6.4.1.2	A Time-Varying Flow	242
6.4.2	Upstream Boundary Condition for Sediment Concentration	246
6.4.3	Use of Sedflume Data in Modeling Erosion Rates	249
6.4.4	Effects of Grid Size.....	251
6.4.5	Sediment Transport in the Saginaw River	252
6.4.5.1	Sediment Transport during Spring Runoff	255
6.4.5.2	Long-Term Sediment Transport Predictions	257
6.5	Lakes and Bays	261
6.5.1	Modeling Big Events in Lake Erie.....	261
6.5.1.1	Transport due to Uniform Winds	261
6.5.1.2	The 1940 Armistice Day Storm	263
6.5.1.3	Geochronology	264
6.5.2	Comparison of Sediment Transport Models for Green Bay	266

6.6	Formation of a Turbidity Maximum in an Estuary.....	271
6.6.1	Numerical Model and Transport Parameters.....	272
6.6.2	Numerical Calculations	273
6.6.2.1	A Constant-Depth, Steady-State Flow	273
6.6.2.2	A Variable-Depth, Steady-State Flow	274
6.6.2.3	A Variable-Depth, Time-Dependent Tidal Flow	277
Chapter 7	The Sorption and Partitioning of Hydrophobic Organic Chemicals.....	279
7.1	Experimental Results and Analyses.....	280
7.1.1	Basic Experiments	280
7.1.2	Parameters That Affect Steady-State Sorption and Partitioning	285
7.1.2.1	Colloids from the Sediments.....	285
7.1.2.2	Colloids from the Water	289
7.1.2.3	Organic Content of Sediments	291
7.1.2.4	Sorption to Benthic Organisms and Bacteria.....	292
7.1.3	Nonlinear Isotherms	292
7.2	Modeling the Dynamics of Sorption.....	297
7.2.1	A Diffusion Model.....	298
7.2.2	A Simple and Computationally Efficient Model.....	300
7.2.3	Calculations with the General Model and Comparisons with Experimental Results	303
7.2.3.1	Desorption	305
7.2.3.2	Adsorption.....	308
7.2.3.3	Short-Term Adsorption Followed by Desorption	310
7.2.3.4	Effects of Chemical Properties on Adsorption	311
Chapter 8	Modeling the Transport and Fate of Hydrophobic Chemicals	313
8.1	Effects of Erosion/Deposition and Transport	316
8.1.1	The Saginaw River.....	316
8.1.2	Green Bay, Effects of Finite Sorption Rates.....	319
8.2	The Diffusion Approximation for the Sediment-Water Flux.....	322
8.2.1	Simple, or Fickian, Diffusion.....	322
8.2.2	Sorption Equilibrium	325
8.2.3	A Mass Transfer Approximation	326
8.3	The Sediment-Water Flux due to Molecular Diffusion	327
8.3.1	Hexachlorobenzene (HCB)	328
8.3.1.1	Experiments.....	328
8.3.1.2	Theoretical Models.....	329
8.3.1.3	Diffusion of Tritiated Water	330
8.3.1.4	HCB Diffusion and Sorption.....	331

8.3.2	Additional HOCs	334
8.3.2.1	Experimental Results	334
8.3.2.2	Theoretical Model	336
8.3.2.3	Numerical Calculations	337
8.3.3	Long-Term Sediment-Water Fluxes	338
8.3.4	Related Problems	338
8.3.4.1	Flux from Contaminated Bottom Sediments to Clean Overlying Water	338
8.3.4.2	Flux Due to a Contaminant Spill	341
8.4	The Sediment-Water Flux Due to Bioturbation	342
8.4.1	Physical Mixing of Sediments by Organisms	343
8.4.2	The Flux of an HOC Due to Organisms	344
8.4.2.1	Experimental Procedures	345
8.4.2.2	Theoretical Model	346
8.4.2.3	Experimental and Modeling Results	348
8.4.3	Modeling Bioturbation as a Diffusion with Finite-Rate Sorption Process	353
8.5	The Sediment-Water Flux Due to “Diffusion”	355
8.5.1	The Flux and the Formation of Sediment Layers Due to Erosion/Deposition	355
8.5.2	Comparison of “Diffusive” Fluxes and Decay Times	356
8.5.3	Observations of Well-Mixed Layers	357
8.5.4	The Determination of an Effective h	359
8.6	Environmental Dredging: A Study of Contaminant Release and Transport	360
8.6.1	Transport of Dredged Particles	361
8.6.2	Transport and Desorption of Chemical Initially Sorbed to Dredged Particles	362
8.6.3	Diffusive Release of Contaminant from the Residual Layers	363
8.6.4	Volatilization	365
8.7	Water Quality Modeling, Parameterization, and Non-Unique Solutions	366
8.7.1	Process Models	367
8.7.1.1	Sediment Erosion	367
8.7.1.2	Sediment Deposition	367
8.7.1.3	Bed Armoring	368
8.7.1.4	The Sediment-Water Flux of HOCs Due to “Diffusion”	368
8.7.1.5	Equilibrium Partitioning	368
8.7.1.6	Numerical Grid	369
8.7.2	Parameterization and Non-Unique Solutions	369
8.7.3	Implications for Water Quality Modeling	370
	References	373

Dedication

*To
Jim and Sarah*

Preface

This book began as brief sets of notes prepared for a graduate class of students at the University of California at Santa Barbara (UCSB). The course emphasized the transport of sediments and contaminants in surface waters. The students were mainly from engineering, but there also were students from the departments of environmental sciences and biology. The course was later given twice as a short course (with the same emphasis) in Santa Barbara to professionals in the field, primarily to personnel from the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers but also to personnel from other federal and state agencies, consulting companies, and educational institutions.

Sediment and contaminant transport is an enormously rich and complex field and involves physical, chemical, and biological processes as well as the mathematical modeling of these processes. Many books and articles have been written on the general topic, and much work is currently being done in this area. Rather than review this extremely large set of investigations, the emphasis here is on topics that have been recently investigated and not covered thoroughly elsewhere — for example, the erosion, deposition, flocculation, and transport of fine-grained, cohesive sediments; the effects of finite rates of sorption on the transport and fate of hydrophobic contaminants; and the effects of big events such as floods and storms. Despite this emphasis, the overall goal is to present a general description and understanding of the transport of sediments and contaminants in surface waters as well as procedures to quantitatively predict this transport.

Much of the work described in this book is based on the research done by graduate students and post-doctoral fellows in the author's research group at UCSB and previously at Case Western Reserve University. For their work, inspiration, and input, I am enormously grateful. Because they are quite numerous, it is difficult to list them with their specific contributions here; hopefully, I have thoroughly referenced their contributions in the text itself. I am also grateful to June Finney, who did much of the typing and assisted in many other ways. Several researchers (Lawrence Burkhard, USEPA; Earl Hayter, U.S. Army Corps of Engineers; Doug Endicott, Great Lakes Environmental Center; and Craig Jones, Sea Engineering) have each reviewed two or more chapters of the text. Their comments and suggestions were of great help.

About the Author

Wilbert Lick is currently a research professor in the Department of Mechanical and Environmental Engineering at the University of California at Santa Barbara (UCSB). His main expertise is in the environmental sciences, fluid mechanics, mathematical modeling, and numerical methods. His present interests are in understanding and predicting the transport and fate of sediments and contaminants in surface and ground waters and the effects of these processes on water quality. This work involves laboratory experiments and numerical modeling with some fieldwork for testing devices and data verification. He has researched these problems in the Great Lakes, the Santa Barbara Channel, New York Harbor, Long Beach Harbor, the Venice Lagoon in Italy, and Korea.

Lick is the author of more than 100 peer-reviewed articles and is a consultant to federal and state agencies as well as private companies. Previous to UCSB, he taught at Harvard University and Case Western Reserve University, with visiting appointments at the California Institute of Technology and Imperial College, University of London. His Ph.D. is from Rensselaer Polytechnic Institute.