

Helmut Meuser

# Contaminated Urban Soils

4y Springer

# Contents

<b>1</b>	<b>Introduction...</b>	<b>1</b>
	References.....	2
<b>2</b>	<b>Geographical Basics.....</b>	<b>5</b>
2.1	Definitions.....	5
2.2	Historical Development of Urbanization.....	6
2.3	Present Urbanization Process.....	11
2.4	City Structures and Their Impacts on Contamination.....	17
	References.....	26
<b>3</b>	<b>Causes of Soil Contamination in the Urban Environment.....</b>	<b>29</b>
3.1	Overview.....	29
3.2	Extensive Contamination.....	31
3.2.1	Bedrock and Parent Material Concentration.....	31
3.2.2	Dust Deposition.....	33
3.3	Linear Contamination.....	46
3.3.1	Traffic Routes.....	46
3.3.2	Utility Networks Pipes.....	53
3.3.3	Floods in Alluvial Floodplains.....	54
3.4	Horticultural and Agricultural Influence.....	64
3.4.1	Fertilizing.....	64
3.4.2	Application of Sewage Sludge and Wastewater.....	67
3.4.3	Pesticide Application.....	72
3.5	Urban Influence.....	73
3.5.1	Derelict Land.....	73
3.5.2	Accident Sites.....	83
3.5.3	Deposits and Fills.....	85
3.6	Identification of Soil Contamination.....	89
	References.....	91

<b>4</b>	<b>Man-Made Substrates</b> .....	95
4.1	Origin.....	95
4.1.1	Construction Debris and Construction and Demolition Waste.....	95
4.1.2	Slag and Ashes.....	97
4.1.3	Mining Waste.....	98
4.1.4	Municipal Solid Waste.....	99
4.1.5	Sludges.....	100
4.1.6	Cleaned-up Substrates.....	100
4.2	Characteristics.....	101
4.2.1	Recognition During Field Work.....	101
4.2.2	Chemical Properties.....	101
4.2.3	Physical Properties.....	105
4.2.4	Biological Properties.....	105
4.3	Contamination Potential.....	106
4.3.1	Texture Influence.....	106
4.3.2	Substrate Differences.....	108
4.4	Distribution.....	115
	References.....	118
<b>5</b>	<b>Anthropogenic Soils</b> .....	121
5.1	Definitions.....	121
5.2	Artificial Soils.....	123
5.3	Cultivated Soils (Anthrosols).....	126
5.3.1	Plaggen Soils.....	126
5.3.2	Garden Soils.....	128
5.3.3	Cemetery Soils.....	134
5.4	Deposited Soils (Technosols).....	138
5.4.1	Soils of Urban Built-up Areas.....	138
5.4.2	Landfill Soils.....	145
5.4.3	Soils of Industrial Deposits.....	159
5.4.4	Mining Soils.....	165
5.4.5	Sludge Fields.....	180
	References.....	191
<b>6</b>	<b>Contamination Influencing Soil Properties</b> .....	195
6.1	Physical Properties.....	195
6.1.1	Sealing.....	195
6.1.2	Erosion and Deflation.....	200
6.1.3	Compaction.....	202
6.1.4	Skeleton Enrichment.....	206
6.1.5	Altered Groundwater Table.....	208
6.1.6	Subsidence.....	208

6.2	Chemical Properties.....	211
6.2.1	Total Concentration: Methodological Aspects.....	211
6.2.2	pH Value.....	218
6.2.3	Carbon Content and Biological Activity.....	221
6.2.4	Texture and Binding Compounds.....	224
6.2.5	Nutrients.....	226
6.3	Pedogenesis.....	232
6.3.1	Humus Formation and Pedoturbation.....	234
6.3.2	Physical Weathering.....	235
6.3.3	Chemical Weathering.....	237
6.3.4	Aggregation.....	239
6.3.5	Reductomorphose.....	239
	References.....	240
<b>7</b>	<b>Assessment of Urban Soils.....</b>	<b>243</b>
7.1	Classification.....	243
7.2	Functional Assessment.....	246
7.2.1	Habitat Function.....	247
7.2.2	Function as Component of Ecological Cycles.....	248
7.2.3	Filter, Buffer and Transformation Function for Contaminants.....	253
7.2.4	Archival Functions.....	255
7.2.5	Use Functions.....	256
7.3	Pathway-Oriented Soil Assessment.....	256
7.3.1	Risk Assessment Scheme.....	256
7.3.2	Calculation of the Risk Assessment.....	260
7.3.3	Main Pathways.....	263
7.4	Assessment Based on Quality Standards.....	272
7.4.1	Definitions.....	272
7.4.2	Published Quality Standard Catalogues.....	273
	References.....	289
<b>8</b>	<b>Outlook.....</b>	<b>293</b>
	<b>Appendix.....</b>	<b>299</b>
	<b>Index.....</b>	<b>303</b>