

# Table of Contents

List of Abbreviations	15
Introduction	19
Chapter 1: Sources and consequences of marine litter	28
A. Sources of marine litter	28
I. Landward factors and activities leading to the introduction of waste into the marine environment	29
1. Urban agglomerations	31
2. Sanitary and sewage-related waste	31
3. Pollution from waste disposal	32
4. Tourism and recreational activities	33
II. Uses of the ocean that lead to marine litter	33
1. Shipping	35
a) Operational pollution	35
b) Accidental pollution	36
2. Fisheries	37
B. Classification and types of marine litter	38
I. Spatial appearance of marine litter	40
II. Monitoring of litter in the marine environment	42
C. Consequences and impacts of marine litter	44
I. Ecological impacts	45
1. Entanglement	45
2. Transport vectors for hitch-hiking of non-native species and smothering of marine habitat	47
II. Toxicological influences of marine litter by ingestion	47
1. Chemicals contained in plastic	49
2. Material science of plastic	50
3. Microplastics	52
a) Primary microplastic	53
b) Secondary microplastic	54
4. The uptake of microplastics	55
5. Adsorption of chemicals and metals onto microplastics	56

## *Table of Contents*

6. Trophical transfer of persistent microplastics	59
7. Toxicological considerations	59
III. Socio-economic impacts	63
IV. Preliminary conclusion	64
D. Preliminary conclusion – Uncertainties and knowledge gaps	65
E. Requirements for an effective and integrated protection instrument	67
Chapter 2: Global regulatory framework relating to marine litter	70
A. Principles and their approaches to address marine litter	70
I. Polluter-pays-principle	73
1. The application of the polluter-pays-principle in agreements	74
2. Function of the polluter-pays-principle in marine litter context	75
II. The role of the preventive principle in a marine litter context	76
III. The precautionary principle	80
1. The implementation of the precautionary principle in the context of the introduction of polluting substances in the marine environment	82
2. The precautionary principle in the marine litter context - how to interpret risks and uncertainty?	85
B. Marine litter considerations in the development of environmental law	87
C. UNCLOS	93
I. The UN Convention of the Law of the Sea (UNCLOS) – framing marine environmental protection activities	93
II. The definition of marine pollution in the context of regulatory measures	94
III. The obligation to preserve and protect the marine environment as stipulated by UNCLOS in the context of marine litter regulation	96
IV. Pollution from land-based sources	100
1. Prescriptive jurisdiction	100
2. Enforcement of land-based pollution	102

V. The regulation of ocean-based pollution	105
1. Dumping as a source of marine litter	105
2. Operational pollution from seagoing vessels	106
3. Enforcement measures of ocean-based pollution prevention measures	110
4. Enforcement by coastal States	112
5. Enforcement through port States	114
6. Discussion on scenarios	117
7. Preliminary Conclusion	118
VI. The duty to co-operate as endorsed by UNCLOS and its implication for marine litter regulation	119
VII. Marine litter considerations in semi-enclosed seas under UNCLOS	121
VIII. Preliminary conclusion	122
D. The implementation and substantiation of environmental standards in public international law	124
I. International Convention for the Prevention of Pollution from Ships, as modified by the Protocol of 1978 relating thereto (MARPOL)	124
1. MARPOL Annex V Regulations for the prevention of pollution by garbage from ships	127
a) Role of the distinction between special areas and outside Special Areas under MARPOL Annex V for the regulation of marine litter	128
b) Discharge standards	130
c) Operational requirements under MARPOL	134
d) Port reception facilities	136
e) Port State Control	138
2. Preliminary Conclusion	140
II. The regulation of dumping as a source of marine litter	141
1. Marine litter aspects in the LC	145
2. Aspects of marine litter considerations in the LP	146
3. Boundary issues between the LC/LP and MARPOL Annex V	149
4. The dumping regime in the context of land-based waste management	151
5. Preliminary conclusion	152

III. The regulatory framework of land-based marine litter in the absence of a legally-binding global agreement	153
1. Marine litter issues in the development of global land-based pollution measures	155
2. Implications of marine litter as a priority contaminant in the framework of the GPA	156
3. The role of the GPA to overcome the fragmented approach in addressing marine litter	159
E. Conclusion	160
Chapter 3: The role of the European Regional Seas Conventions to prevent the introduction of marine litter	164
A. UNEP's Marine Litter Initiative and the Regional Seas Conventions	165
B. Marine litter in the regulatory framework of the Baltic Sea	168
I. The institutional framework established by the Helsinki Convention	171
II. Primary and secondary Helsinki Convention provisions regarding pollution	173
1. The land-based pollution approach of the Helsinki Convention	176
2. The prevention of pollution from ships	178
a) Port Reception Facilities	179
b) The no-special-fee-system as a means to reduce vessel-based pollution	181
c) The role of the polluter-pays-principle and cost recovery	183
3. The role of monitoring of marine litter	186
III. Preliminary Conclusion	187
C. Marine litter regulations in the North-East Atlantic	189
I. The regulatory framework of the North-East Atlantic	189
II. Ship-based pollution prevention in the framework of the OSPAR Convention	192
III. Monitoring obligations under the OSPAR Convention	194
IV. The use of ecosystem quality criteria to assess the impact and presence of marine litter	196
V. Marine litter in the framework of OSPARCOM	199
VI. Preliminary Conclusion	202

D. The regulation of marine litter in the Black Sea Region	203
I. The legal framework of the Black Sea Region	204
1. Measures to address riverine inputs and other land-based pollution	210
2. Critical analysis of the dumping regime as established by the Bucharest Convention	216
II. Marine litter in the overall regulatory framework of the Black Sea Commission	218
III. Preliminary Conclusion	221
E. The regulatory scope of the Mediterranean regarding marine litter	222
I. Marine litter in the context of the Barcelona Convention and UNEP/MAP	227
II. Integrated Coastal Zone Management as an instrument to regulate coastal sources of marine litter	232
III. Preliminary Conclusion	236
F. Regional Action Plans	237
G. Conclusion on the scope and regulatory techniques for preventing marine litter contained in the four European Regional Seas Conventions	245
 Chapter 4: Marine litter in the regulatory context of European Union law	 251
A. The distribution of competences of the EU institutions	252
I. EU environmental objectives from a marine litter perspective	254
II. The principles of EU environmental policy	256
1. The polluter-pays-principle	258
2. The source-principle	260
3. The precautionary principle	262
B. Marine litter considerations in secondary EU law	264
I. Setting the background: marine litter in the overall strategic work	265
II. Secondary EU law—legislative procedure	268
III. Categorisation of relevant secondary legal instruments touching on the question of marine litter	270
IV. Selection of most pertinent issues and instruments	274

V. Source-related legislation	275
1. The waste management system established by EU law	276
a) The regulatory system established by the Waste Framework Directive	276
b) Marine litter in the context of the definition of waste under the Waste Framework Directive	279
c) The relevance of the Waste Framework Directive in the marine litter context	281
2. Addressing identified point sources of marine litter: the role of the Landfill Directive	282
a) Plastic in the context of the definition of non-hazardous waste under the Landfill Directive	283
b) Evaluation of the regulatory approach of the Landfill Directive with a view to marine litter considerations	285
c) Issues of implementation: the Zakynthos-case	288
d) The interlink between waste management law and biodiversity protection	291
e) Role of reporting and information	292
f) Excursus: Measures reducing the impacts of plastic from landfills	294
g) Preliminary Conclusion	297
3. The adoption of more stringent national measures: the classification of a ban of plastic bags in EU law	298
a) The applicability of the Packaging and Waste Packaging Directive	300
b) Essential requirements under the Waste Packaging Directive	302
c) The derogation clause under Art. 114 TFEU	305
d) Preliminary conclusion	308
4. The Green Paper on a European Strategy on Plastic Waste in the Environment and the proposal for amending waste legislation	311
5. Preliminary Conclusion	314
6. Port Reception Facilities Directive—a mechanism to address operational vessel-based pollution	315
a) General framework	315

b) Critical evaluation of the elements of the PRF	
Directive	318
aa) Notification	318
bb) The fee and cost-recovery system of the PRF	
Directive	320
cc) Inspections	324
dd) Waste Handling Plans	325
c) Proposal for a Port Reception Facility Directive	325
d) Preliminary Conclusion	327
7. Preliminary Conclusion	327
VI. Impact related legislation	328
1. The Water Framework Directive	329
a) The management units of the WFD– the river basin districts	330
b) The regulatory approach to protect surface waters under the WFD	332
aa) Determining GECS	333
bb) Good chemical status	334
c) Marine litter considerations despite a clear reference in the WFD?	335
aa) The use of quality elements for GECS for the classification of marine litter	335
bb) Marine litter in the context of chemical pollution of surface waters	336
d) The combined approach to control point and diffuse sources– addressing microplastics	340
e) Preliminary remarks	343
f) The transboundary co-operation obligations of the WFD in light of marine litter considerations	344
g) Preliminary Conclusion	349
2. The Marine Strategy Framework Directive in the context of the marine litter discourse	350
a) The geographical scope of the MSFD	351
b) The aim to achieve a Good Environmental Status by 2020 and the context of “polluting effects”	352
c) Cyclical assessment of the marine environment	353
aa) Assessment of marine waters	355
bb) The challenge to determine the GES for marine litter	357

cc) Descriptor 10 on marine litter: legal challenges	358
(1) Interpretation of the wording of the provision	359
(2) Legislative historical interpretation	360
(3) The effet utile interpretation of descriptor 10 MSFD	362
(4) The challenge to determine “harm” in the context of descriptor 10 MSFD	364
(5) Establishing criteria and indicators for descriptor 10: the Commission Decision on criteria for good environmental status of marine waters	366
dd) Determination of targets for marine litter	368
ee) Monitoring programmes	372
d) Marine Strategies: Programme of measures	374
e) The reference to a public international law instrument by EU law	377
aa) EU as an actor in international public law	378
bb) Regional Seas Conventions as an instrument to implement the MSFD	379
cc) Aspects of institutionalised co-operation by means of the integration of marine litter related MSFD issues in the work and programs of the Regional Seas Conventions	381
f) Marine litter in the context of the GES by 2020	383
g) Preliminary conclusion	384
C. Conclusion concerning EU law	386
Conclusion and Summary	391
Bibliography	407
I. International instruments and cases	407
II. European Union	420
III. The Group of 7 (G7)	428
IV. Literature	428
V. Internet sources	452
VI. Presentations	453