CHAPTER 2: THEORETICAL FRAMEWORK PERTAINING TO THE REGULATION OF LBMP

This Chapter provides an in-depth legal analysis of the theoretical framework pertaining to LBMP regulation.[104] As stated in Chapter 1,[105] in order to adequately appraise the regulatory challenges related to LBMP and to be able to conduct a critical assessment of the South African and French regulatory frameworks pertaining to LBMP, it is essential to understand and analyse the definition(s), scope, nature, extent and impacts related to LBMP in South Africa and France. This section therefore commences with a discussion of some of the most relevant definitions of LBMP provided by international and national law.[106] The Chapter then provides a legal analysis of the nature and extent of LBMP, describing the main sources of pollution, types of substances/pollutants, associated impacts and their associated potential legal implications. The Chapter continues by providing a detailed legal analysis of current international best practice pertaining to LBMP regulation. Through this analysis, this Chapter identifies and analyses the main features which should be considered in the development, implementation and/or assessment of such a regulatory framework. These features include the law principles, regulatory scope, regulatory objectives/purposes, regulatory instruments, institutional structure and regulatory priorities. These features have been used to develop a methodological framework to conduct the legal and comparative analysis required for this research.

---

104 Considering the limited number of authorities and publications that have been written on the national regulatory framework pertaining to LBMP, it was necessary to use different sources of information and literature including international and regional conventions, reports developed by international groups of experts and specialised entities (as detailed in Appendix 1) to distil the theoretical framework as set out in this Chapter. This Chapter is based mainly on the author's analysis of the documents reviewed (as detailed in Appendix 1) and the author's own interpretation of such information.

105 Refer to 2.2.

106 Considering that there is currently no internationally agreed definition for LBMP, 2.1 of this Chapter attempts, by distilling the most useful characteristics identified in the legal analysis of the definitions of LBMP, to develop the most relevant definition for LBMP in the South Africa context.

2.1 Key definitions pertaining to LBMP

The definition of LBMP will have direct implications on the regulatory scope and the overall regulatory framework applicable to LBMP. For example, the definition of LBMP will determine if dumping at sea from vessels is characterised as LBMP and should be regulated as such.[107] Such a definition will also determine which sources of pollution are regarded as LBMP in a legal context, taking into consideration their geographical location and their nature/materiality. Such aspects will also have implications to determine the most relevant regulatory instruments to address LBMP generally and from specific sources.[108] In this context, this section analyses some of the existing key definitions of LBMP (in terms of international and national law) in order to distil the most important characteristics and to propose the most suitable definition for LBMP in the South African context.[109] It is envisaged that the analysis of these definitions should also facilitate the appraisal of the most adequate regulatory scope pertaining to the regulation of LBMP, taking into consideration the associated legal and practical implications.[110]

2.1.1 Key definitions in terms of international and regional conventions

As previously stated,[111] LBMP is commonly referred to as a category of marine pollution. "Marine pollution" is defined in the *United Nations Convention of the Law of the Sea* 1982, (UNCLOS) as:[112]

> ... the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

---

107 Refer to 2.3.2.2 and 2.3.2.3 for further information on the regulatory scope and the specific issue of dumping at sea.

108 Refer to 2.3.4 for further information.

109 Such a definition is proposed in 2.1 and 2.5.

110 Also refer to 2.3.2 for further information on the question of the regulatory scope pertaining to LBMP.

111 Chapter 1.

112 Art 1(1)(4) UNCLOS. Also see Hassan *Protecting the marine environment* 56; Churchill and Lowe *The law of the sea* 254-267; Meng *Land-based marine pollution* 13-27; Bowman and Boyle *Environmental Damage* 199. Also see Tanaka 2006 *ZaöRV* 542-543.

The first element qualifying marine pollution in terms of this definition is "the direct or indirect introduction by man of substances or energy into the marine environment". One of the defining elements (and limiting factor) of this definition relates to the fact that it includes only pollution induced by human action through active "introduction" of substances and/or energy "into the marine environment". Consequently, in terms of this definition climate change (the release of greenhouse gases into the atmosphere due to human activities) or coastal development (involving the degradation/alteration of the coastal environment) might not be regarded as marine pollution, including LBMP, as they do not encompass the introduction of substances into the marine environment.[113] However, due to the vagueness of the term "substances", this definition can be broadly interpreted, thus enabling a wider and more adaptable regulatory scope for the regulation of LBMP. For example, substances to be included in such a definition will not be limited by the general characterisation of "pollutant".[114] Any substances of any nature can be included including gaseous, liquid and solid substances, chemical or biological substances and any other substances which create a wide regulatory scope. Another defining element is the legal qualification of the potential impact: "deleterious effects". The

---

113 Climate change has specific impacts on the marine and coastal environment and in this context can be regarded as a source of LBMP. However, it could be argued that climate change cannot be legally qualified as LBMP and/or marine pollution in terms of the definition of marine pollution provided by UNCLOS, as it does not involve *per se* "the direct or indirect introduction by man of substances or energy into the marine environment". Refer to 2.3.2 for further information on the question of climate change in relation to LBMP. Coastal development, which involves land-use and development of the coastal zone, also does not always involve the "direct or indirect introduction of substances or energy into the marine environment". However, it has negative impacts on the marine and coastal environment, and therefore should be regarded as a source and/or contributing factor of LBMP. Refer to 2.3.2 for further information on this matter.

114 This flexibility is very relevant, especially in the context of a substance on land which is not regarded or legally qualified as a pollutant, but which when introduced in marine waters will become a pollutant for the coastal and marine environment. For example, foodstuffs (like rice, cereal, and fruits) occasionally find their way into the marine environment "If discharged in large quantities, the fish are generally far too few to consume such a sudden and plentiful source of food, even over a period of several months. As a result, foodstuffs are carried away by currents and evolve depending on their nature (emulsification, rotting, polymerisation, fermentation), not to mention the bacterial proliferation and generation of gas they cause, thereby polluting the marine environment". CEDRE 2006 http://www.cedre.fr/en/spill/fenes/fenes.php. Refer to 2.2.2 and 2.3.2.2 for further information on this matter.

terminology used, especially the word "deleterious",[115] is also rather vague. This could present some interpretation issues, especially in the South African context, where such terminology is not commonly used.[116] The definition takes a rather holistic approach considering "harm to living resources and marine life" as such without requiring that there be direct harm to human interests. Such an approach is regarded as rather progressive and especially relevant in the context of LBMP, where the marine and coastal resources need to be protected for their intrinsic ecological value, without direct relevance to human interests and/or the human use of such ecological resources.[117] In this context, the reference to "hindrance to legitimate uses of the sea" is also important as the "management and determination of the uses of the marine and coastal environment" concept is essential for the regulation of LBMP.[118] However, UNCLOS does not provide a definition *per se* of LBMP. It only sets out a generic obligation on parties in article 207.1 to "adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources, including rivers, estuaries, pipelines and outfall structures".

Marine- and coastal-related regional conventions to which France and/or South Africa are a party provide further guidance about the potential content of the definition of LBMP.[119] The *Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region* (Abidjan Convention)[120] and the *Amended Nairobi Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and*

---

115 In terms of Chambers *Concise Dictionary and Thesaurus* 2003, deleterious means "causing harm or destruction".

116 In the South African context, the following terms are more commonly used: alteration, harmful, impacts, changes, and adverse effect.

117 Refer to 1.1 for further information on the importance and value of the marine and coastal environment, and its related ecological services, products and associated economic value.

118 One of the main regulatory instruments involved in LBMP regulation relates to the determination and management of uses of the marine and coastal environment. Refer to 2.3.4.1 (e) for further information on the importance of uses of the marine and coastal environment (determination and management) for the regulation of LBMP.

119 In this context, all of the conventions mentioned in Appendix 1 have been critically reviewed and analysed and only the most relevant findings are presented in this section.

120 *Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region* 1985. South Africa signed the Convention on 16 May 2002.

Central African Region (Nairobi Convention)[121] provide further details on LBMP, prescribing parties' obligations in this context:[122]

> The Contracting Parties shall endeavour to take all appropriate measures to prevent, reduce and combat pollution of the Convention area caused by coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures or any other land-based sources and activities within their territories.

This definition specifies some of the different pathways (rivers, estuaries, coastal establishments, and outfall structures) from which LBMP can reach the coastal and marine environment, and which will have to be regulated. The reference to "any other sources within their territory" is a catch-all phrase in a definition, creating a rather wide regulatory scope. Coastal disposal is not defined and can therefore be interpreted widely as including direct disposal in the marine/coastal environment from the coast, through an outfall structure connected to the coast, and/or disposal from vessels in the coastal/marine environment.[123] For the entities which will have to comply with such an obligation, a clearer definition might be required to ensure legal transparency and certainty, facilitating practical implementation. The Protocol *for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources, 1980*[124] to the *Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean* (Barcelona Convention)[125] characterises LBMP, as:[126]

---

121 *Convention for Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region* 1981, as amended during the 6th Conference of Parties Meeting for the Nairobi Convention and the Conference of Plenipotentiaries for the Nairobi Convention 29th March to 1st April 2010, Nairobi, Kenya. France (Reunion), South Africa signed the Convention on 22 June 1985.

122 Also see Hassan *Protecting the marine environment* 103-147 and Meng *Land-based marine pollution* 114-150.

123 See 2.3.2 for further information explaining why disposal at sea from vessels, also referred to as dumping at sea, is not regarded as a source of LBMP *per se* and is therefore excluded from the scope of this study.

124 Signed in Athens on 17 May 1980, in force 17 June 1983 (amended in Syracusa, Italy, 6-7 March 1996).

125 *Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean* 1976. France signed the Convention on 16 February 1976 and the *Protocol on Land-Based Marine Pollution* (protocol on LBMP) on 17 May 1980.

126 Also see Hassan *Protecting the marine environment* 103-147 and Meng *Land-based marine pollution* 114-150.

(a) Polluting discharges reaching the Protocol Area from land-based sources within the territories of the Parties, in particular: directly, from outfalls discharging into the sea or through coastal disposal, indirectly, through rivers, canals or other watercourses, including underground watercourses, or through run-off,

(b) Pollution from land-based sources transported by the atmosphere.

This definition provides further details on the direct and indirect pathways through which LBMP can reach the sea, referring to rivers,[127] canals, underground water, watercourses, run-off and the atmosphere. The definition is noteworthy as it refers to underground watercourses, run-off and the atmosphere, expanding the regulatory scope in comparison with the two previous definitions. The *Convention for the Protection of the Marine Environment of the North-East Atlantic* (OSPAR Convention)[128] elaborates on land-based sources and defines them as:[129]

> Point or diffuse sources on land from which substances or energy reach the maritime area by water, through the air, or directly from the coast. It includes sources associated with any deliberate disposal under the sea-bed made accessible from land by tunnel, pipeline or other means and sources associated with man-made structures placed in the maritime area under the jurisdiction of a contracting party, other than for the purpose of offshore activities.

This definition introduces a clear distinction between point and non-point (diffuse) sources.[130] It also introduces a new category of LBMP sources associated with "any deliberate disposal under the sea-bed made accessible from land by tunnel, pipeline or other means". However, this new category might be interpreted as including

---

127 "Considering that rivers are a major contributor to marine pollution, the co-ordination between a marine pollution regime and environmental regulation of international watercourses becomes particularly important with a view to preventing land-based marine pollution". Tanaka 2006 *ZaöRV* 544-545.

128 *Convention for the Protection of the Marine Environment of the North-East Atlantic* 1992. The OSPAR Convention is the mechanism by which fifteen governments of the western coasts and catchments of Europe (including France), together with the European Community, cooperate to protect the marine environment of the north-east Atlantic. It started in 1972 with the Oslo Convention against dumping. It was broadened to cover land-based sources and the offshore industry by the Paris Convention of 1974. These two conventions were unified, up-dated and extended by the 1992 OSPAR Convention.

129 Also see Hassan *Protecting the marine environment* 103-147 and Meng *Land-based marine pollution* 114-150.

130 Refer to 2.2 for further information on point and non-point sources of LBMP.

dumping at sea from vessels, due to the reference to "other means".[131] The reference to "sources associated with man-made structures placed in the maritime area ... other than for the purpose of offshore activities" also raises the question of whether or not man-made structures at sea can be regarded as sources of LBMP.[132] The *Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-Based Sources* (Montreal Guidelines)[133] defines land-based sources of marine pollution as meaning:[134]

> Municipal, industrial or agricultural sources, both fixed and mobile, on land, discharges from which reach the marine environment, in particular:
>
> - from the coast, including from outfalls discharging directly into the marine environment and through run-off;
> - through rivers, canals of other watercourses, including underground watercourses; and
> - via the atmosphere.
>
> Sources of marine pollution from activities conducted on offshore fixed or mobile facilities within the limits of national jurisdiction save to the extent that these sources are governed by appropriate international agreements.

This definition provides useful information about different categories of LBMP, namely municipal, industrial and agricultural. It also refers to mobile and fixed sources, a new type of categorisation. As previously noted, the reference to underground water and run-off as pathways is also very relevant. This definition eventually refers to offshore facilities, but such facilities are not included in the scope of this research as such activities take place at sea and not on land, and therefore they are not regarded as sources of LBMP in the context of this study.[135] The definition provided by the Montreal Guidelines is detailed and practical, but can also

---

131 See 2.3.3 for further information explaining why disposal at sea from vessels, also referred as dumping at sea, is not regarded as a source of LBMP *per se* and is excluded from the scope of this research.

132 See 2.3.3 for further information explaining why man-made structures at sea are not regarded as a source of LBMP *per se* and are therefore excluded from the scope of this study.

133 UNEP *Montreal Guidelines for the Protection of the Marine Environment against Pollution from Land-Based Sources Decision* 13/18/II, 1985.

134 Also see Hassan *Protecting the marine environment* 103-147 and Meng *Land-based marine pollution* 114-150. Also see Tanaka 2006 *ZaöRV* 544-545 for further information about the Montreal Guidelines.

135 See 2.3.2 for further information explaining why offshore structures/facilities at sea are not regarded as a source of LBMP *per se* and are therefore excluded from the scope of this study.

be regarded as restrictive due to its level of details which might limit flexibility in its interpretation. The latest definition occurs in the *Protocol for the Protection of the Marine and Coastal Environment of the Western Indian Ocean from Land-Based Sources and Activities*, to the Nairobi Convention (LBMP Protocol to the Nairobi Convention):[136]

> Land-based activities and sources mean activities and sources directly or indirectly causing or contributing to the pollution or degradation of the coastal and marine and coastal environment from the landward side as opposed to activities and sources from the seaward side.

This definition adopts a more pragmatic and descriptive approach which could facilitate and simplify the regulation of LBMP. The rationale of the definition seems to be to ensure legal practicability and convenience by the use of simple terminology and simple concepts like "landward and seaward" or "causing/contributing". The definition is not limited to the direct sources of pollution but also includes activities and sources which (directly or indirectly) "cause or contribute" to the pollution of the marine environment. The concept of "contributing" is interesting in this context as it suggests, from a legal perspective, that an activity and/or substance might not have to be a source of LBMP *per se* and therefore might not have to cause LBMP *per se* to be included in the regulatory scope associated with this definition. An activity and/or substance could be included as long as its relationship with other activities and/or substances contributes towards LBMP, in the sense that it facilitates, increases and/or enables LBMP. The definition also refers to the coastal and marine environment, thus suggesting that they are two different legal concepts, one closer to the land (coastal) and one further at sea (marine), which might be impacted differently by LBMP, due to the dilution effects, and might have different ecological needs.[137] This definition seems to be the most appropriate to facilitate the comprehensive regulation of LBMP.

---

136 Also see Hassan *Protecting the marine environment* 103 and Meng *Land-based marine pollution* 114-150.

137 Other definitions refer to the marine environment, the sea or the maritime area. See 2.3.2.1 for further information on the geographical scope of the environment to be protected from LBMP and further legal discussions concerning associated matters.

The foregoing analysis seemingly suggests that there is not a uniform and common internationally agreed definition of LBMP. Most of the definitions are rather vague. However, most of these state that the sources of LBMP are on land and that they reach the marine area either directly (including through coastal disposal or marine outfalls) or indirectly (including through the atmosphere or run-off). The "vagueness" of the above definitions might reflect a desire to ensure that the definitions have a wide scope. Their regulatory scope would be restricted if they were too specific in the legal qualification of LBMP. However, such vagueness might make it difficult to enforce the obligations they place on governments due to their lack of clarity.[138]

2.1.2 Key national definitions

There is no definition of LBMP in South African or French legislation. There is no legal definition of pollution in French environmental law.[139] In the South Africa context, "pollution" is defined (in the NEMA) as:[140]

> Any change in the environment caused by substances; radioactive or other waves; or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

Such a definition is rather wide and could include LBMP in its associated regulatory scope under the legal qualification of "any change in the environment caused by substances". But it is also not limited by the "human introduction of such substances" as in the UNCLOS definition discussed above. However, this definition is rather anthropocentric, focusing on environmental impacts affecting human-related

---

138 This study strives to distil the most important features of the definitions identified as being most relevant in the South African context, taking into consideration the legal implications related to the existing relevant national legal definitions as analysed in the next section.

139 However, in terms of EU law, "pollution" means "the direct or indirect introduction as a result of human activity, of substances, vibrations, heat or noise into the air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment", IPPC Directive.

140 The definition section of NEMA. For a discussion of the definition of pollution, see also Strydom and King *Environmental management* 2 and Glazweski *Environmental law* 9.

interests "on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people".[141] It is also limited to changes which "have an adverse effect".[142] One question in this context, is to determine if the regulatory scope of the NEMA includes the coastal and marine environment.[143] However, the NWA prescribes a different definition of "pollution" in the specific context of water resources management:[144]

> Pollution means the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it -
>
> (a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or
>
> (b) harmful or potentially harmful:
>
> (i) to the welfare, health or safety of human beings;
> (ii) to any aquatic or non-aquatic organisms;
> (iii) to the resource quality; or
> (iv) to property.

The definition is not limited to "adverse effects" as it encompasses "any alteration" to the water resources' properties, without qualifying "alteration". The reference to resource quality and "less fit for any beneficial purposes" is relevant in the context of LBMP regulation.[145] This definition takes into consideration the issues and particularities of the environmental medium (water) to be managed, making it more ecocentric.[146] However, the definition prescribed by the NWA is not directly

---

141 Refer to 2.3.1 for further discussion of this matter.

142 NEMA does not provide a definition of adverse effects. However, NEM:ICMA provides such a definition which creates some legal challenges. See 2.1.2 for further information on this issue.

143 Refer to 5.2 for further information on this question.

144 Definition section of NEMA.

145 Some of the main regulatory instruments involved in LBMP regulation are instruments based on the "resource-directed approach" which encompass the use of water quality objectives (especially ambient quality standards). The reference to "beneficial purposes" is in relation to uses of the marine and coastal environment. One of the main regulatory instruments involved in LBMP regulation relates to the determination and management of marine and coastal environment uses. Refer to 2.3.4.1 (e) for further information on the importance of uses of marine and coastal environmental (determination and management) for the regulation of LBMP.

146 The ecocentric approach is important in terms of fresh or marine water management, and LBMP regulation, as water needs to be protected for its ecological value and not only for its value and use in respect of humans. Coastal and marine waters as previously mentioned in Chapter 1 have an intrinsic value in terms of their essential role for others ecosystems and natural resources. For example, the determination of "environmental quality standard", meaning the concentration of a particular substance or group of substances in water, sediment or biota which should not be exceeded, will be determine in order to protect human

applicable to LBMP, as marine (and most coastal) waters are not included in the definition of "waters resources" provided by the NEMA.[147] However, it is an important statute in the context of LBMP as water resources are often the "pathways" for LBMP to reach the marine environment.[148]

It is difficult to assess the potential practical implications of both definitions (the NWA and the NEMA) in terms of LBMP regulation. The definition provided by NWA might in theory be more appropriate in terms of LBMP regulation, as it has a specific focus on water resources protection and is more focused on water pollution. However, to avoid having discrepancies between the two definitions and the related legal interpretation and practical issues, there should be only one definition of pollution in a regulatory framework. However, it would be possible to accommodate a definition of "pollution" (under the NEMA) and a different definition of "water pollution" or the "pollution of water resources". Such an approach would be relevant if "water resources" in terms of NWA also included coastal and marine waters.[149]

The NEM:ICMA adopts the definition of "pollution" as prescribed under the NEMA. However, it is relevant to note that the NEM:ICMA also introduces the concept of "adverse effects" in relation to pollution, as follows:

> Any actual or potential impact on the environment that impairs, or may impair, the environment or any aspect of it to an extent that is more than trivial or insignificant and without limiting the term, includes any actual or potential impact on the environment that results in -
>
> (a) a detrimental effect on the health or well-being of a person;
>
> (b) an impairment of the ability of any person or community to provide for their health, safety or social and economic needs; or
>
> (c) a detrimental effect on the environment due to a significant impact or cumulative effect of that impact taken together with other impacts.

---

health but also the environment, therefore they might differ depending on their ultimate protection objective, ecocentric or anthropocentric. But the approach cannot only be anthropocentric as the marine environment has to be protected and standards set accordingly for its intrinsic value and needs/requirement without any relation to human related interests.

147 At the exception of coastal wetlands and estuaries. See 5.2 of this research for further information on this matter.

148 See 5.2.3 of this research for further information on this matter.

149 See 2.1.2 for a further discussion of the definition of pollution in the South African environmental legal framework.

In terms of this definition, the concept of "adverse effects" seems broader and possibly more holistic than that of "pollution".[150] It has therefore the potential to enable broader regulation of LBMP.[151] The concept of "adverse effects" is relevant to the regulation of LBMP.[152] However, as previously noted the definition of "pollution" in terms of the NEMA makes a direct reference to "adverse effect". The exact nature of the legal interrelationship between these two laws and associated definitions is currently unclear.[153] No definition of pollution or LBMP could be found in the French context, maybe due to the difficulties attached to legal definitions, which do not always allow flexibility in interpretations and in practice. A definition of LBMP is proposed at the end of this Chapter.

2.2 Nature and extent of LBMP

This section provides a practical overview of the main sources, pollutants and impacts pertaining to LBMP.[154] The scope and nature of LBMP have direct implications for the regulation of LBMP especially in terms of the regulatory scope and the selection of the most appropriate regulatory instruments. It is therefore important to have an understanding of the nature and extent of LBMP and the related legal implications or issues.

2.2.1 Main sources of LBMP

As already said in Chapter 1,[155] a distinction should be made between "point sources" of LBMP, which should be understood as single identifiable and demarcated sources of pollution from which pollutants are discharged[156] and "non-

---

150 See 5.2.4 for further information on the legal implications of such a definition in terms of LBMP regulation.

151 For further information on the potential implications of the NEM:ICMA regarding LBMP, refer to 5.2.4 of this research.

152 However, the "vagueness" of the terms used, such as "trivial" and "insignificant", could jeopardise the effective implementation and enforcement of the Act, creating legal arguments regarding the exact meaning and practical implications of this definition. For further information refer to 5.2.4

153 See 5.2 for further information.

154 As already stated in Chapter 1.

155 See 2.2.1.

156 Another definition of "point sources" (provided in the LBMP Protocol to the Nairobi Convention): "sources of pollution where discharges and releases are introduced into the

point sources" of LBMP that are more diffused and difficult to identify and which normally reach the marine environment through rivers, canals, storm-water, run-off, seepage, and the atmosphere.[157] The type/category of LBMP pollution source will influence the selection of the most appropriate regulatory instruments.[158] For example, regulatory instruments based on the sources-directed approach[159] commonly strive to regulate pollution directly at source and are therefore more suitable and efficient in regulating point sources of LBMP. Most common sources of LBMP include, *inter alia,* the following:[160]

- Point sources (coastal and upstream), including waste-water treatment facilities, industrial facilities, power plants, military installations, recreational/tourism facilities, construction works (e.g. dams, coastal structures, harbour works and urban expansion), coastal mining (e.g. sand and gravel), research centres, aquaculture, coastal/estuary dredging, draining of wetlands or clearing of mangrove areas.[161]

- Non-point (diffuse) sources (coastal and upstream), including urban run-off, agricultural and horticultural run-off, forestry run-off, mining waste run-off, construction run-off, land and hazardous waste sites, physical modification/alterations,[162] dams and irrigation up-stream, deforestation, climate change (e.g. sea level rise, change in sea temperature, synergetic effects with others pollution sources and pollutants), transport, deforestation,

---

environment from any clearly discernable confined and discrete conveyance including but not limited to a pipe, outfall, channel, ditch, tunnel, conduit or well from which pollutants are or may be discharged".

157 Another definition of "non-point sources" or "diffuse sources" (provided in the LBMP Protocol to the Nairobi Convention) is as follows: "sources of pollution other than point sources, from which substances enter the marine and coastal environment as a result of land or surface run-off, precipitation, atmospheric deposition, drainage seepage or by hydrologic modifications or destruction of habitats".

158 See 2.3.4.3 for further information on this matter.

159 Refer to 2.3.4.1 for further information on such regulatory instruments.

160 GESAMP/UNEP *Protecting the oceans from land-based activities* 16-17.

161 GESAMP/UNEP *Protecting the oceans from land-based activities* 16-17.

162 "Physical alterations of the coastal foreshore include beach development, tourist developments (construction of hotels, marinas, etc), and the construction of industrial plants such as power stations, pulp mills, trans-shipment facilities, wharves and jetties, fish processing plants, shipbuilding plants, shore reception facilities, sewage treatment plants and a variety of outfalls". GESAMP/UNEP *Protecting the oceans from land-based activities* 16-17.

agricultural activities, intensive coastal urbanisation, atmospheric deposition (caused by transportation, power plants and industrial facilities, incinerators and agricultural operations).[163]

LBMP sources might be located in coastal areas but might also be located far inland.[164] These sources would include, for example, atmospheric pollutants emitted by mining activities and coal-fired power plants located in the Gauteng Province of South Africa, which might reach the marine environment through the atmosphere. This might also include in the French context, nuclear pollution from nuclear plants located in the Rhone-Alpes Region which could reach the marine environment through rivers. Most pollutants entering storm-water systems will find their way into the marine environment,[165] even if the direct introduction of such pollutants into the storm-water system takes place far from the coast, as in Gauteng Province.

The categories of sources (point and non-point sources) are important for determining the most appropriate regulatory framework for LBMP. As previously stated, there are specific regulatory instruments for point sources and specific instruments for non-point sources.[166] Understanding the nature of LBMP sources is also essential to identify and regulate activities and/or operations identified as sources or contributing factors of LBMP. Knowing the main sources of LBMP will also enable the identification of the applicable legislation and of the responsible and relevant regulatory agency/department(s) with the appropriate mandate to regulate specific activities and/or operations which are sources of LBMP.[167] However, understanding the nature of the sources is insufficient. There is a need to identify the main substances/pollutants and products involved in LBMP. This is necessary to establish efficient regulatory instruments in terms of LBMP. For example, specific regulatory instruments will have to be developed and implemented to control the import, manufacture, transport, use and disposal of priority products/substances in

---

163 GESAMP/UNEP *Protecting the oceans from land-based activities* 16-17.
164 Sinha *Marine pollution* 71.
165 GESAMP/UNEP *Protecting the oceans from land-based activities* 16-17.
166 Refer to 2.3.4.3 for further information on regulatory instruments for point and non-point sources.
167 Refer to 2.3.5 for further information.

terms of LBMP.[168] Also specific monitoring programmes will have to be designed in respect of such priority substances.[169]

2.2.2 Main substances associated with LBMP

As stated in a Global Forum on Oceans, Coasts, and Islands (GESAMP) Report:[170]

> A pollutant is a resource "out of place", it should be noted that any substance - even a regular constituent of the environment - can cause pollution in abnormal concentrations arising from anthropogenic activities. There are some unique and surprising contaminants in some areas.

GESAMP and the GPA[171] have identified the following main priority substances in terms of LBMP: sewage, persistent toxic substances and persistent organic pollutants (POPs),[172] radioactive substances,[173] heavy metals, oils (hydrocarbons), nutrients,[174] sediment mobilisation[175] and litter. The following substances have been

---

168 See 2.3.4.1 for further information.

169 Priority substances are substances which have been identified are key pollutant involved in LBMP (source of LBMP), therefore they required specific and urgent regulatory intervention to prevent and reduce their release. For example nitrates, in France and the EU. See 3.5.1 and 4.3.2.1 for further information on such monitoring programmes. Refer to 2.3.6.2 below for further information on priorities substances.

170 GESAMP/UNEP *Protecting the oceans from land-based activities* 20-26.

171 UNEP *Protecting the coastal and marine environment.*

172 "Substances in this category are diverse. They include substances that are persistent in the sense of being long-lived and relatively slow to break down into other less persistent chemicals. They also include less persistent chemicals that, because of the amounts in widespread and continuing use, occur in significant equilibrium concentrations in the environment and are of concern due to possible adverse effects". GESAMP/UNEP *Protecting the oceans from land- based activities* 20.

173 "A variety of practices and activities routinely introduce radioactivity into the marine environment. These include military activities, nuclear fuel cycle operations (mining, milling, conversion, fuel enrichment and fabrication, fuel reprocessing, waste storage, decommissioning) and the use of radioisotopes by research centres, hospitals and industry. Nuclear weapon tests carried out in the atmosphere (mainly before 1964) and fuel reprocessing plants are the main contributors to radioactive contamination of the marine environment by a wide range of man-made nuclides. Atmospheric nuclear weapon tests represent a source of global contamination, whereas releases from spent fuel reprocessing plants lead to contamination on local and regional scales". GESAMP/UNEP *Protecting the oceans from land-based activities* 22.

174 "Nutrients and particulate material are arguably the most important classes of contaminants at national and regional levels". GESAMP/UNEP *Protecting the oceans from land-based activities* 24.

175 "The increasing mobilisation of sediments from development activities is clearly an issue of primary concern at local and even regional levels. In temperate areas, such increased introduction of sediment gives rise to benthic community blanketing with associated changes in community structure and an increased need to undertake dredging of navigation channels.

identified as the main contributors to LBMP:[176] pesticides, industrial chemicals and unintended by-products.[177] It is also important to note that the introduction of POPs and heavy metals into the marine environment may take place through the atmosphere.[178] The spray of fertilisers and agricultural chemicals is a source of LBMP by POPs. When POPs are released into the atmosphere and transported by wind they can reach the marine environment. The substances can also be categorised in terms of their impacts.[179] It is important to note that a substance that is not regarded as a pollutant on land can actually be a contaminant for the marine environment due to its physical and/or chemical reaction with water (e.g. change of PH, salinity, oxygen demand). This must be considered when implementing a regulatory framework pertaining to LBMP. While introducing the main substances and sources involved in LBMP, it has to be emphasised that broad socio-economic phenomena might increase the negative impact of LBMP on the marine environment or increase the generation of LBMP, such as overpopulation or poverty.[180]

The rate of deforestation in developing areas is a major cause of increased sediment run-off. Reduced sediment supply in run-off also poses an existing or potential problem. It gives rise to reductions in the natural inflow of chemicals, including nutrients, and to under-nourishment of beaches and fine shelf sediments. There are more than 36,000 large dams in the world; as a result, very few rivers run entirely free of man-made obstructions". GESAMP/UNEP *Protecting the oceans from land-based activities* 24.

176 GESAMP/UNEP *Protecting the oceans from land-based activities* 17.

177 Pesticides (Aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, and toxaphene); industrial chemicals (hexachlorobenzene and polychlorinated biphenyls (PCBs)); unintended by-products (polychlorinated dibenzo-p-dioxins (PCDDs) and heptachlor – polychlorinated dibenso – furans (PCDFs)).

178 UNEP *Protecting the coastal and marine environment* 20.

179 "There are substances causing mechanical impacts that damage the respiratory organs, digestive system, and receptive ability; substances provoking eutrophic effects (e.g. mineral compounds of nitrogen and phosphorus, and organic substances) that cause mass rapid growth of phytoplankton and disturbances of the balance, structure, and functions of the water ecosystems; substances with saprogenic properties (sewage with a high content of easily decomposing organic matter) that cause oxygen deficiency followed by mass mortality of water organisms, and the appearance of specific microphlora; substances causing toxic effects (e.g. heavy metals, chlorinated hydrocarbons, dioxins, and furans) that damage the physiological processes and functions of reproduction, feeding, and respiration; substances with mutagenic properties (e.g. benzo(a)pyrene and other polycyclic aromatic compounds, biphenyls, radionuclides) that cause carcinogenic, mutagenic, and teratogenic effects". Taljaard *Baseline assessment of sources and management of LBMP* 1-13.

180 As noted in Chapter 1, also see 3.1.1 and UNEP *Protecting the coastal and marine environment* 53.

2.2.3 Main impacts associated with LBMP

The main impacts associated with LBMP are commonly divided into three categories, namely social, economic and ecological impacts.[181] The main ecological impacts include marine eco-systems disturbance or degradation,[182] erosion, disturbance of the marine resources population and the reproduction process, physical and biological degradation of marine resources, habitat degradation or destruction, euthrophication,[183] change in sediment flows and algae bloom. Economic impacts include *inter alia*[184] the reduction of income for local communities, impacts on tourism and on fishing-related business, property devaluation, impacts on the GDP, and economic impacts on activities related to the commercial use of marine resources (e.g. marine aquaculture). Social impacts include public health-related issues, limited access to natural resources, lifestyle deterioration, food security issues, and limiting the state's ability to alleviate poverty.[185] There is also the potential for LBMP to have an impact on future generations. Table 1 provides an overview of the different sources of LBMP and priority contaminants in terms of LBMP and their associated socio-economic and environmental impacts. In terms of this table, physical alteration and the discharge of sewage and nutrients are regarded as the sources of LBMP with the overall highest impacts.

---

181 As discussed in Chapter 1.

182 "The most widespread, frequently irreversible, human impact on the coastal zone". GESAMP/UNEP *Protecting the oceans from land-based activities* 1.

183 Resulting from excess inputs of nutrients into the marine environment (nitrogen and phosphates substances).

184 GESAMP/UNEP *Protecting the oceans from land-based activities* 118-119.

185 GESAMP/UNEP *Protecting the oceans from land-based activities* 118-119.

Source category	Food security	Public health	Coastal and marine resources	Ecosystem health	Overall impact
Physical alteration	−+	+−	−−−	−−+	−+−
Sewage	−−	−−−	− −	−−+	−− −
Nutrients					
Sediment mobilisation	−	+			
POPs	−		−	−−	−
Hydrocarbons (oil)	−+		−	−	−
Heavy metals	−	+	−	n	−
Litter	n		−	n	−
Radionuclides			n	n	n

Key: − − = high; −− = moderate; n = negligible impact

Table 1. Impacts Matrix[186]

2.3 International best practice pertaining to the regulation of LBMP

A review and analysis of current international best practice in terms of LBMP regulation is regarded as an essential preliminary stage in the critical assessment of the regulatory framework pertaining to LBMP in France and South Africa.[187] Firstly, the review of current international best practice provides the necessary information

186 GESAMP/UNEP *Protecting the oceans from land-based activities* 118-119.

187 In order to distil international best practice relevant to LBMP regulation, various source documents dealing generally with LBMP and LBMP management have been reviewed and analysed to extract the most relevant information. Various specialised institutions, agencies and expert groups have been established to address the specific issue of LBMP and have developed detailed reports, analysis and guidance documents which have been reviewed in this context. International and regional conventions dealing specifically with the issue of LBMP have also provided useful guidance on the regulatory instruments involved in LBMP regulation. The latest policy developments in the EU and the United states have also been analysed to identify the latest regulatory structures, objectives, and regulatory instruments to address LBMP. Appendix 1 sets out the various sources of international best practice reviewed and analysed in the context of this research.

and guidance to be able to conduct an informed and scientific legal appraisal of the French and South African regulatory framework related to LBMP. Secondly, such a review and analysis provides a baseline/benchmark to assess critically and compare the French and South African regulatory frameworks. Such a benchmark should enable an objective comparative legal assessment. Thirdly, the review of international best practice has enabled the development of a methodological framework to conduct the comparative legal analysis, based on the main features of a regulatory framework pertaining to LBMP as identified and analysed in this section. The key regulatory features/characteristics[188] include law principles, the regulatory scope, the regulatory objective(s)/purpose(s), the regulatory instruments, the institutional structure, and the areas of priority. This section provides a detailed legal analysis of each of these regulatory features. Using this methodological framework should ensure that the legal appraisals of the French and South African regulatory frameworks are easily comparable.

In the context of this section and study, various sources of international best practice in terms of LBMP have been identified and analysed.[189] Different specialised institutions, agencies and expert groups have been established to address the specific issue of LBMP[190] and have developed detailed reports, analyses and guideline documents[191] which have been reviewed for this study. International and regional conventions dealing specifically with the issue of LBMP have also been used.[192] The latest policy development in the European Union (EU) and the United

188 As identified during a review of international best practice conducted in the context of this research, and of which an overview is provided in Appendix 1.

189 Refer to Appendix 1 for the full list of sources of international best practice related to LBMP regulation consulted in the context of this study. Also see Hassan 2003 *Australian international law journal* 2003 61-94.

190 I.e. Global Programme of Action (GPA), Mediterranean Action Plan (MAP), Global Forum on Oceans, Coasts, and Islands (GESAMP). Refer to Appendix 1 for further information on such institutions, agencies and expert groups and the associated reports, analyses and guidance documents.

191 Refer to Appendix 1 for a full list of the documents analysed in this context.

192 Refer to Appendix 1 for a full list of the conventions analysed in this context, international and regional. "It is important to note that legal techniques and approaches to enhance the regulation of LBMP are developing particularly in regional conventions. It would seem that those regional treaties may provide a useful insight to consider legal techniques and institutions reconciling the protection of the marine environment from land-based sources and the economic development". Tanaka 2006 *ZaöRV* 537.

States (US) have also been reviewed to analyse the latest trends in terms of LBMP regulation. Appendix 1 provides an overview and analysis of the main origins and sources of international best practice in terms of LBMP and sets out a comprehensive list of all the documents reviewed and analysed in the context of this study. These sources have been reviewed and analysed to extract the most relevant elements and guidance in terms of LBMP regulation.[193]

2.3.1 Law principles

In the context of this study, the terminology "law principles" refer to environmental principles, notions and concepts which have been incorporated in a policy and/or legal framework. It is important to recall the general nature, objective(s) and status of law principles, especially environmental law principles in this context, demonstrating their importance in an overall legal framework.[194] Nevill[195] states that "environmental principles are the essential concepts which, explicit or implicit, underlie all environmental legislation, policies, and programmes". He also indicates that the "explicit statement of principles is important and should be considered for the development and implementation of environmental legislation or policy". According to this author, environmental principles should assist in understanding the intent of a statute or policy. The author also recognises the important role of environmental principles in interpreting laws and policies. The legal value of environmental principles differs between countries (depending on whether or not they have been incorporated in national policy and/or legislation) and between regulatory frameworks

---

193 It is important to note that most of the sources of international best practice consulted in the context of this study deal more broadly with the management of LBMP generally, and therefore a focused review was necessary to extract the relevant information in terms of LBMP regulation.

194 However, it is not the intention of this study to provide an analysis of the application of law principles in international and national law. For further information see Glazewski *Environmental Law* 12-2; Sadeleer *Environmental principles* and Sands *Principles of international environmental law*.

195 He also indicates that the term is sometimes "misinterpreted, and used to include modes of action, or mechanisms chosen to assist in the achievement of objectives. According to him, this misconception is not merely a matter of semantics, and should be avoided wherever possible". Nevill and Nichols *Improving the legislative basis for river management* 21. Sadeleer argues that environmental principles have become "directing principles" which translate political imperatives into legal rules. Sadeleer *Environmental principles* 23.

(international, regional and national).[196] However, it seems correct to state that environmental principles should always (and at least) be regarded as law principles for the development, implementation and enforcement of environmental policy and/or legislation, and possibly non-environmental policy and legislation.

International best practice in the context of LBMP[197] provide guidance on the relevant environmental law principles which are regarded as being conducive to the effective regulation and management of LBMP and which should be incorporated in the regulatory framework pertaining to LBMP. These principles are outlined in Table 2.[198] All of the principles mentioned in Table 2 are identified by one or more sources of international best practice as being important for the regulation and management of LBMP. However, the following principles are identified as being the most important:[199] the precautionary principle,[200] principles related to integrated coastal

---

196 For example, in relation to EU law some researchers argue that "several principles of community environmental law are already recognised and ... can nevertheless be a source of principled and meaningful community environmental law". Engle *General Principles of European Environmental Law* 43. Also see Macrory *Principles of European Environmental Law*.

197 Such principles have been identified through a review of documents identified in terms of international best practice, as specified in Appendix 1.

198 The following main sources of international best practice have been analysed to develop this table: Global Programme of Action (referred to as GPA in the table), Mediterranean Action Plan (referred to as MAP in the table), Global Forum on Oceans, Coasts, and Islands (referred to as GESAMP in the table), the Barcelona Convention (referred to as BARCELONA in the table), the OSPAR Convention (referred to as OSPAR in the table), the Nairobi Convention (referred to as NAIROBI in the table), the Abidjan Convention (referred to as ABIDJAN in the table), MAP, the EU Marine Strategy Framework Directive, 2008 (referred to as EU in the table) and the US Ocean Policy 2004 (referred to as US in the table). For further information see Appendix 1. The purpose of this study is not to give a critical discussion of these principles as this has been done by various authors. For further information refer to Glazewski *Environmental Law* 12-2; Sadeleer *Environmental principles* and Sands *Principles of international environmental law*.

199 The principles are listed in order of "appearance" in international best practice. The first one listed is the principle which was the most often mentioned in international best practice. However, this does not mean that it is the most important for the regulation of LBMP.

200 The precautionary principle has its origins in the German principle of *Vorsorge*, or foresight. At "the core of early conceptions of this principle was the belief that society should seek to avoid environmental damage by careful forward planning, blocking the flow of potentially harmful activities" Glazewski *Environmental Law* 18. The *Vorsorgeprinzip* developed in the early 1970s into a fundamental principle of German environmental law. The precautionary principle is defined in the *Rio Declaration* (principle 15) as follows: "in order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". "The precautionary principle or precautionary approach is a response to

area/zone, management,[201] integrated river basin/watershed management,[202] integrated management,[203] the polluter pays principle,[204] sustainable development,[205]

---

uncertainty, in the face of risks to health or the environment. In general, it involves acting to avoid serious or irreversible potential harm, despite lack of scientific certainty as to the likelihood, magnitude, or causation of that harm. It is now an established principle of environmental governance, prominent in law, policy and management instruments at international, regional and domestic level, across such diverse areas as pollution, toxic chemicals, food and phytosanitary standards, fisheries management, species introductions and wildlife trade". IUCN TRAFFIC FFI and ResourceAfrica 2003 http://www.pprinciple.net/theprecautionaryprinciple.html. For further information on the precautionary principle, see Tickner, Raffensperger and Myers *The precautionary principle in action* and Glazewski *Environmental Law* 18. Also see Tanaka 2006 *ZaöRV* 545.

201 Integrated coastal management (ICM) is the general concept which encompasses integrated coastal zone management (ICZM) and integrated coastal areas management (ICAM) and which can be defined as "a continuous and dynamic process by which decisions are made for the sustainable use, development, and protection of coastal and marine areas resources. First and foremost the process is designed to overcome the fragmentation inherent in both the sectoral management approach and the splits of jurisdiction among levels of government at the land-water interface". Cicin-Sain and Knecht *Integrated Coastal and Ocean Management* 39. The ICZM concept was born in 1992 during the Earth Summit of Rio de Janeiro. The policy regarding ICZM is set out in the proceedings of the summit within Agenda 21, Chapter 17. The EU defines the ICZM as follows: "ICZM is a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning (in its broadest sense), decision making, management and monitoring of implementation. ICZM uses the informed participation and co-operation of all stakeholders to assess the societal goals in a given coastal area, and to take actions towards meeting these objectives. ICZM seeks, over the long term, to balance environmental, economic, social, cultural and recreational objectives, all within the limits set by natural dynamics. 'Integrated' in ICZM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space". *Communication from the Commission to the Council and the European Parliament on Integrated Coastal Zone Management: a Strategy for Europe, (COM/2000/547),* 27 September 2000, and *Commission Communication on the evaluation of Integrated Coastal Zone Management (ICZM) in Europe,* COM 308 7 June 2007. ICAM is a similar concept to ICZM. Integrated marine and coastal area management (IMCAM) is also a similar concept and it defines "a participatory process for decision making to prevent, control, or mitigate adverse impacts from human activities in the marine and coastal environment, and to contribute to the restoration of degraded coastal areas". AIDEnvironment, National Institute for Coastal and Marine management/Rijksinstituut voor Kust en Zee (RIKZ) *Integrated Marine and Coastal Area Management (IMCAM)* iii. For further information about ICM, ICZM and ICAM see Cicin-Sain and Knecht *Integrated Coastal and Ocean Management*; Cullinan *Integrated coastal management law*; UNIDO *Integrated Coastal Area Management*; Krishnamurthy *et al Integrated Coastal Zone Management* 24-35.

202 Integrated River Basin Management (IRBM) can be defined as "the process of coordinating conservation, management and development of water, land and related resources across sectors within a given river basin, in order to maximise the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems", definition adapted from Global Water Partnership *Integrated Water Resources Management* Technical Advisory Committee Background Papers, No. 4, 2000. The main objective of IRBM is to establish a balance between the existing natural functions of the river system and the developed aspects of the system. "The

adaptative management,[206] flexibility,[207] integrated ecosystem-based approach,[208] predictability,[209] the rational-equitable-efficient-sustainable use of natural

---

management actions should fulfil the expectations of the society for industrial use, recreation, nature management, and agricultural purposes" Watersketch http://toolbox.watersketch.net/page_view.php?page=132&open=0. Integrated watershed management (IWM) is a similar concept to IRBM. A watershed is the boundary of a drainage basin and it also refers to the drainage basin itself or catchment, an area of land within which all waters flow to a single river system, regarded as the most appropriate unit for water management, IWM aims to manage this "unit" in an integrated way. Heathcote *Integrated Watershed Management* 5. For further information on IRBM see Global Water Partnership *Integrated Water Resources Management* Technical Advisory Committee Background Papers, No. 4, 2000. For further information on IWM, see Heathcote *Integrated Watershed Management*.

203 Integrated management in the environmental context refers to the concept that "all elements of the environment are linked and management must therefore take account of the connections between them. The integration of environmental concerns into every area of human activity is central to the achievement of sustainable development. Priority areas for environmental governance include the integration of environmental, social and economic considerations in development and land use planning processes and structures. This requires the assessment of environmental impacts at policy, planning, programme and project levels; an integrated approach to environmental management addressing all environmental media, all social, cultural and natural resources, pollution control and waste management; and an integrated approach to government's environmental functions including organisational and institutional arrangements, legislation, and all policies in all spheres of government", DEAT *White Paper on Environmental Management Policy* 1997. NEMA (s 2) prescribes that "environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option". For further information on integrated management or integrated environmental management (IEM), see Cairns and Crawford *Introduction* and Glazewski *Environmental Law* 231.

204 The first major reference to the Polluter Pays Principle (PPP) appeared in 1972 in the OECD *Guiding Principles Concerning International Economic Aspects of Environmental Policies.* This principle was first mentioned at the international level in Principle 16 of the *Rio Declaration*, 1992, where it was described as "the internalisation of environmental costs where the polluter should bear the costs of pollution, with due regard to the public interests, and without distorting international trade and investment. It can be defined as meaning that "those responsible for environmental damage must pay the repair costs both to the environment and human health, and the costs of preventive measures to reduce or prevent further pollution and environmental damage" DEAT *White Paper on Environmental Management Policy* 1997. "The PPP is essentially an economic policy for allocating the costs of pollution or environmental damages borne by public authorities" Birnie and Boyle *International Law* 92.

205 In 1987, the United Nations released the World Commission on Environment and Development report *Our Common Future* (Brundtland Report), which defines sustainable development as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs".

206 "Adaptive management acknowledges a continuous process of action based on doing, learning, sharing and improving, while sustainability is not absolute: the responses of ecosystems, agencies and people depend on changing circumstances, whether these are the climate, the population pressure or economic factors". In terms of coastal management, "the main problem lies with the temporal mismatches between the cycles of coastal ecosystem change and cycles of coastal governance. It is therefore fundamentally important to allow for

resources,[210] measurable,[211] participatory/participative approach,[212] integrated territorial approach,[213] equity,[214] and accountability.[215] The following law principles,

---

adaptive management and locate coastal governance initiatives within the longer-term cycles of ecosystem change". AIDEnvironment, National Institute for Coastal and Marine management/Rijksinstituut voor Kust en Zee (RIKZ) *Integrated Marine and Coastal Area Management* 9.

207 The concept is similar to adaptative management.

208 The "Ecosystem Approach" was mentioned in the early 1980s, but found a formal presence in the *Rio Declaration* in 1992, where it became an underpinning concept of the *Convention on Biological Diversity*, 1993. It was later described as: "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way". In terms of the Convention, an "ecosystem" is a "dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit". (Art 2 of the Convention). According to the Convention, the ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. "It is based on the application of appropriate scientific methodologies focused on levels of biological organisation which encompass the essential processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of ecosystems". Secretariat of the Convention on Biological Diversity 2009 http://www.cbd. int/programmes/cross-cutting/ecosystem/. Within the context of LBMP regulation, the "ecosystem approach" can be defined as the "comprehensive integrated management of human activities based on best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity". Ocean Blue 2009 http://www.oblue.utvinternet. com/ob ecosystem1.html. For the purpose of the OSPAR Convention, the ecosystem approach is defined as "the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity". The application of the ecosystem approach "integrates conservation and management approaches, such as marine protected areas or measures targeted on single species and habitats, as well as other approaches carried out under existing national and international policy and legal frameworks and helps to adapt the management of human activities to the complex and dynamic nature of marine ecosystems". OSPAR Commission 2009 http://www.ospar.org/content/content.asp?menu= 00430109150000 000000 000000.

209 This principle refers mainly to environmental policy and regulatory provisions which must be predictable and clear for the subjects affected by them. In terms of the *Chambers Dictionary*, 2007, predictability means easily foreseeable.

210 The rational-equitable-efficient-sustainable use of resources generally refers to the need to use resources in harmony with natural ecological cycles of renewal which will ensure sustainable development. NEMA (s 2) states that "equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination".

211 This principle refers to the need to ensure that the effectiveness of policy and regulatory interventions can be measured and assessed.

212 Participative (or participatory) management, also known as participative decision making, encourages the involvement of stakeholders (especially affected communities/sectors) at all levels in the analysis of problems, the development of strategies, and the implementation of policies and regulatory interventions. In this context, NEMA (s 2) prescribes that "the

referred to by many sources of international best practice, are also regarded as important for LBMP regulation: community-based natural resources management,[216] cost-integrated water resources management,[217] large marine ecosystem approach,[218] multi-use management,[219] ocean-land-atmosphere connections,[220]

---

participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation and participation by vulnerable and disadvantaged persons must be ensured. Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge". Such an approach should be open and transparent to ensure that all of the necessary information is related to relevant stakeholders in order that they may make informed decisions.

213 This principle refers to the need to ensure territorial cohesion in environmental management and regulation. In this context, the concept of territorial cohesion should be understood as the need to adapt to the particular needs and characteristics of specific geographical areas, challenges and opportunities, taking into consideration history, culture, the economy, the institutional situation, the local environment and the local use of natural resources.

214 This principle refers to the need to grant equitable access to environmental resources, benefits and services to meet basic needs and ensure human wellbeing. Each generation has a duty to avoid impairing the ability of future generations to ensure its wellbeing. DEAT *White Paper on Environmental Management Policy* 1997.

215 This principle refers mainly to the need for government to be accountable for policy formulation, monitoring and enforcement.

216 In line with the participative approach, community-based natural resource management (CBNRM) focuses on "the collective management of ecosystems to promote human well-being and aims to devolve authority for ecosystem management to the local (community) level. CBNRM therefore requires strong investments in capacity development of local institutions and governance structures". Fabricius and Collins *Water Policy* 83.

217 This principle refers to the Full Cost Accounting principle which advocates that decisions must be based on an assessment of the full social and environmental costs and benefits of policies, plans, programmes, projects and activities that impact on the environment. It also refers to the principle of cost-effectiveness, which is that what would be the most cost-effective investment must be established and policy decisions in terms of the results of that investigation, especially in terms of prevention and mitigations measures.

218 "The Large Marine Ecosystem (LME) approach is being endorsed and supported by 110 governments world-wide, five UN agencies, as well as financial institutions including the Global Environment Facility and the World Bank, and a broad constituency in the scientific community. In 2005, Large Marine Ecosystems were recognised in a scientific consensus statement by over 200 marine scientists, academics and policy experts as important global areas for practising ecosystem-based research, assessment and management of ocean goods and services. The LMEs are natural regions of coastal ocean space encompassing waters from river basins and estuaries to the seaward boundaries of continental shelves and seaward margins of coastal currents and water masses. They are relatively large regions characterised by distinct bathymetry, hydrography, productivity, and trophically dependent populations. It is within the boundaries of 64 LMEs that 80 per cent of annual marine fisheries' yields are produced; overfishing is most severe, marine pollution is concentrated, and eutrophication and anoxia are increasing. A five-module indicator approach to assessment and management of LMEs has proven useful in ecosystem-based projects in the USA and elsewhere. The five modules are focused on measuring changes in LME (i) productivity, (ii) fish and fisheries, (iii) pollution and ecosystem health, (iv) socioeconomics, and (v) governance. Each of the five modules applies suites of indicators to assess spatial and temporal changes in the LMEs and determine whether conditions are improving or

prevention,[221] and proportionality.[222] In addition, Nevill[223] sets out further relevant principles dealing with ocean management which would also be relevant in the context of LBMP regulation. He distinguishes between ecological protection principles,[224] good governance principles,[225] and resource management principles.[226]

---

deteriorating. For example, the productivity module lists as indicators photosynthetic activity, zooplankton biodiversity, oceanographic variability, zooplankton biomass, and ichthyoplankton biodiversity". Secretariat of the convention on biological diversity http://www.cbd.int/ecosystems/newsletters/ea-2009-10.htm. For further information on LME see UNEP *LME Report: A Perspective on Changing Conditions of the World's Regional Seas* 2008.

219 This principle refers to promoting the rational-equitable-efficient-sustainable use of natural resources. However, it focuses of the management of concurrent uses of similar resources and promotes the integrated and sustainable management of such uses, ensuring that the resource used is adequately protected.

220 This principle refers to the need to ensure that environmental management and regulations take into consideration the economic, social and environmental interrelationship between ocean, land and the atmosphere, emphasising the necessity to manage and regulate them in an integrated way. Also see Tanaka 2006 *ZaöRV* 547. "The 2001 *Montreal Declaration* highlights the need to support the new integrated management model for oceans and coastal governance as an important new element of international environmental governance".

221 This principle refers to the need to anticipate problems and prevent negative impacts on the environment and on people's environmental rights.

222 This principle refers mainly to policy and regulatory interventions and their associated impacts/requirements (especially financial), which need to be proportional to their respective ultimate objectives and risks. It also refers to environmental crimes and fines, which need to be proportional. For further information on these principles, and more broadly on environmental law principles, the following further readings are suggested: UNEP *Protecting coastal and marine environments;* Nevill 2005 http://www.ids.org.au/~cnevill/marineHobart Principles.htm; UNEP/Stockholm Environmental Institute *Mainstreaming of marine and coastal issues;* Ringbom *Competing norms in the law of marine environmental protection;* Sadeleer *Environmental principles.*

223 He also indicates that the term is sometimes misinterpreted and used as if it included modes of action, or mechanisms chosen to assist in the achievement of objectives.

224 Such principles include *inter alia* protected areas and sympathetic management (biodiversity should be protected by the establishment of a comprehensive, adequate and representative system of ecologically viable protected areas, integrated with the sympathetic management of all other areas); special ecological value (ecosystems and species of special value or vulnerability need special protection); economic progress within ecological limits (sustainable economic progress works on the basis of no net loss of ecological assets. Short-term gains must be weighed up from a long-term perspective); ecological scale (arrangements for the management of ecosystems and for managing the human impacts on ecosystems need to recognise, understand and accommodate the important ecological processes and linkages in operation, and the scales and time-frames to which they apply); integrated and cohesive management should be applied across jurisdictional boundaries within the commons, recognising that the integrity of cross-boundary ecosystems needs to be understood and protected); market externalities and ecological incentives (economic incentives should be applied to markets so as to ensure that economic progress in the long term goes to those who compete best while maintaining or improving ecological assets and integrity). For further information see Nevill and Nichols *Improving the legislative basis for river management.*

225 Such principles include participation; transparency (decisions regarding resource management should follow a defined and established process); reliability; accountability;

According to international best practice, the principles listed above have the potential to assist and facilitate effective LBMP regulation and should therefore be incorporated in the regulatory frameworks. The comparative assessment to be conducted on the French and South African regulatory frameworks pertaining to LBMP will assess the extent to which these principles have indeed been incorporated.

---

enforceability (while governance arrangements should be designed to minimise the costs and need for enforcement, such enforcement must be achievable in practice, adequately resourced, and undertaken when necessary); integrity (decisions need to be based on the best available science, and all relevant factors need to be taken into account by decision-makers); cost-effectiveness; flexibility (flexibility is desirable in terms of the form of assessment and management processes, issues to be addressed, process time-frames, and degree of public participation); and practicality (activity approval processes and ongoing management arrangements should recognise community concerns, commercial realities, best practice technology, and scientific knowledge and uncertainties). Nevill and Nichols *Improving the legislative basis for river management*.

226 Such principles include full cost allocation (all costs and benefits concerning the use of natural resources should be identified and allocated and economic markets should reflect these costs and benefits); cumulative impacts (the cumulative impacts of incremental developments should be recognised, assessed and managed by imposing strategic limits well ahead of ecosystems approaching a crisis situation); taking precautions; responsibility (rights to resource use entail responsibilities to use resources efficiently, without waste as far as possible. Those using both renewable and non-renewable resources must also accept responsibilities to predict, prevent or minimise environmental effects which may be the unintended results of actions); adaptive management (management arrangements should include explicit cyclic phases designed to set, measure and achieve objectives in a complex and changing environment); and continuous improvement (management arrangements should explicitly seek to increase both efficiency and effectiveness over time). Nevill and Nichols *Improving the legislative basis for river management* 2.

	GESAMP	GPA	OSPAR	NAIROBI	ABIDJAN	BARCELONA	MAP	EU	US
Acceptability	√								
Accountability		√							√
Adaptive management	√	√							√
Cohesive management								√	
Collaborative management								√	
Community based natural resources management		√							
Conflict resolution		√							
Cost effectiveness	√								
Cross sectoral approach	√								
Driver-pressures- states- impact		√							
Ocean governance									√
Equity	√							√	
Flexibility	√	√						√	
Holistic approach	√								
Incorporation	√								
Integrated coastal area/zone and/or river basin/watershed management	√	√			√	√	√	√	√
Integrated ecosystem based approach			√					√	√
Integrated management		√	√		√	√		√	√
Integrated pollution control							√		
Integrated territorial approach		√						√	
Integrated water resources management		√							
Large marine ecosystem approach									√
Multi-use management									√
Ocean-land-atmosphere connection									√
Participative/participatory management								√	√
Phased approach		√							
Polluter pays principle			√	√	√		√	√	
Practicality	√								
Precautionary approach	√		√	√	√	√	√	√	√
Predictability	√						√		√
Prevention								√	
Proportionality	√								
Quantifiable and measurable		√							√
Rational, equitable, efficient and sustainable use of natural resources	√				√				
Realistic		√							
Reversibility	√								
Simplicity	√								
Stewardship									√
Sustainable development			√	√	√	√			√
Time-bounded		√							
Transparency		√							

Table 2. Law principles relevant for LBMP regulation as promoted by international best practice

2.3.2 *Regulatory scope*

Generally, the regulatory scope is an essential characteristic of any regulatory regime/framework. In terms of LBMP, the review of international best practice[227] in this context has enabled the identification of two key legal questions which need to be answered when determining the regulatory scope pertaining to the regulation of LBMP, namely:[228]

- To which geographical areas will the framework apply (the geographical scope)? and
- What will be regulated? In other words, what is LBMP and which sources/ activities/substances/contributing factors will be regulated (the material scope)?

The determination of the regulatory scope will have important legal implications for the selection and implementation of the most adequate regulatory instruments, institutional structure(s) and identification of regulatory priorities related to LBMP regulation.[229] For example, the geographical regulatory scope will determine which laws are applicable and which authorities need to be involved in the regulation of LBMP. The determination of the environment to be protected in the geographical scope will also inform the type of regulatory instruments which can be used.[230] As previously stated,[231] understanding the nature of LBMP sources is essential to identifying and regulating the activities and/or operations identified as the main sources of LBMP.[232]

---

227 Refer to Appendix 1 for the full list of references consulted in this context.

228 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

229 Also refer to 2.3.6 for further information on this matter.

230 In particular the types of planning-management-based regulatory instruments. See 2.3.2 for further information.

231 See 2.2.

232 "Due to its nature, the regulation of land-based pollution is more complex than that of pollution from other sources. In the case of the vessel-source pollution, for instance, sources and substances to be regulated – which are mainly oil and oily mixtures – can be clearly identified. Yet the regulation of land-based pollution involves more substances than oil and oily mixtures. Furthermore, land-based sources are variable in their nature over time. Some may be chronic sources causing a low-level but steady pressure on the marine environment, while others may be episodic, such as the pulse of pollutants flushed into the ocean after heavy rain. Each

2.3.2.1 Geographical scope

In order to determine the geographical scope of a regulatory framework pertaining to LBMP the following matters need to be determined:[233] the geographical scope of the (marine/coastal) environment to be protected and its geographical delimitation, and the geographical scope of the sources of LBMP pollution to be regulated.

a. Geographical scope of the (marine/coastal) environment to be protected

Most regulatory frameworks pertaining to LBMP generically refer to the marine environment and/or the coastal zone (or coastal environment), also referred to as coastal and marine waters. However, the geographical scope of the marine and/or coastal environment might differ between countries according to their respective national regulatory frameworks.[234] In this context, the OSPAR Convention provides guidance by referring to the following components of the marine/coastal environment to be protected:

> The Maritime Area including the internal waters and the territorial seas, the sea beyond and adjacent to the territorial sea under the jurisdiction of the coastal state to the extent recognised by international law, and the high seas, including the bed of all those waters and its sub-soil, situated within the limits defined in the Convention.

The Protocol to the Barcelona Convention[235] provides further details by making reference to the hydrologic basin,[236] waters on the landward side of the baselines

---

source requires different measures to prevent environmental damage, and this requirement makes regulatory measures complex. Moreover, in the case of vessel-source pollution, ships are the only actor, and the shipping industry is the major economic sector to be regulated. By contrast, many actors and activities, such as pollution-generating industrial, agricultural and municipal activities, are involved in pollution from land-based activities. It follows that the regulation of land-based pollution concerns various economic sectors in the state". Tanaka 2006 *ZaöRV* 548.

233 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

234 For example, each national regulatory framework might prescribe a different legal definition of the "coastal zone" and associated geographical delimitation, as is the case with France and South Africa. Refer to 3.4.3.1 (France) and 5.3.3.2(d) (South Africa) for further information. They might also determine different geographical boundaries for their particular maritime zones.

235 *Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean* 1976. France signed the Convention on 16 February 1976, and signed the *Protocol on land-Based Marine Pollution* on 17 May 1980.

from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit,[237] brackish waters, coastal salt waters including marshes and coastal lagoons, and ground waters communicating with the sea.

The LBMP Protocol to the Nairobi Convention includes the riparian and internal waters constituting part of the natural river basin draining into the specified area, and the marine and coastal environment including the watershed of that part of the specified area. The Protocol specifies that this geographical scope also includes the seabed and its sub-soil, the waters, seabed and its sub-soil on the landward side of the baseline from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the natural catchments or riparian limits upstream, and the terrestrial coastal areas designated by each of the parties, including wetlands.

When considering the foregoing, it seems that the marine and coastal environment to be protected should include as a minimum the seashore,[238] internal waters,[239] relevant coastal watershed/catchments/river basins including watercourses (up to the freshwater limit),[240] territorial seas,[241] the Exclusive Economic Zone (EEZ),[242] estuaries, coastal lagoons, coastal wetlands, the sea bed, the sub-soil of the

---

236 In terms of the Protocol, "hydrologic basin" means the entire watershed area within the territories of the contracting parties draining into the Mediterranean Sea area as defined in Art 1 of the Convention.

237 The Protocol defines "freshwater limit" as the place in watercourses where, at low tides and in a periods of low freshwater flow, there is an appreciable increase in salinity due to the presence of sea water.

238 The seashore generally refers to the area between the low-water line/mark (the lowest line to which coastal waters recede during spring tides) and the high-water mark/line.

239 The internal waters commonly comprise all waters landward of the low-water mark, generally including all harbours.

240 It commonly refers to the place in the watercourse where, at low tide and in a period of low freshwater flow, there is an appreciable increase in salinity due to the presence of sea water.

241 The sea within a distance of twelve nautical miles from the baselines (the normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast, as marked on large-scale charts officially recognised by the coastal state).

242 In terms of UNCLOS, it is an area beyond and adjacent to the territorial sea, under which the rights and jurisdiction of the coastal state and the rights and freedoms of other states are governed by the relevant provisions of UNCLOS. Commonly, it refers to the sea beyond the territorial waters but within a distance of two hundred nautical miles from the baselines.

abovementioned waters, and the environment (such as living resources and ecosystems) associated with these marine and coastal areas.

The question of the inclusion of the high seas[243] in this scope is a contentious issue. It needs to be understood that states lack direct jurisdiction over the high seas, and it might therefore be difficult to include the high sea in the regulatory scope in terms of LBMP.[244] Moreover, LBMP has in some instances a more critical impact on the marine/coastal environment closer to the coast.[245] However, in terms of the integrated and ecosystem-based management of the marine/coastal environment it might be appropriate to include the high seas in the regulatory scope of LBMP regulation.[246]

The reference to hydrologic basins, river basins, watersheds and ground water (which communicates with the marine environment) is also significant and needs to be analysed. A regulatory regime in terms of LBMP might not naturally include the protection of freshwaters in its scope, as it is not regarded as part of the marine/coastal environment *per se*. However, due to the interconnection of and interdependency between fresh and marine waters[247] and the fact that most LBMP will be transported to the marine environment through freshwater pathways like

---

243 In terms of UNCLOS, it refers to all parts of the sea that are not included in the EEZ zone, in the territorial sea, in the internal waters of a state, or in the archipelagic waters of an archipelagic state.

244 In terms of UNCLOS "all states enjoy the traditional freedoms of navigation, overflight, scientific research, and fishing on the high seas". However, coastal states assume additional obligations. UNCLOS provides that there is a duty on states to control and protect the high seas and that they are obliged to adopt domestic mechanisms that must be of the same standard as international regulatory measures. However, national jurisdiction is limited in the high seas. "National jurisdiction over resources has recently been extended to 200 nautical miles in the sea, leaving about 60 per cent of the ocean as 'high seas' and deep seabed beyond national jurisdiction. Beyond national jurisdiction, many human activities remain unregulated, ecosystem considerations are seldom taken into account and scientific information is often ignored". IUCN 2008 http://cmsdata.iucn.org/downloads/10_principles_for_high_seas_governance_final.pdf. For further information on the legal status of the high seas also refer to Rayfuse 2004 http://www.defyingoceansend.org/; Global Forum on Oceans, Coasts and Islands 2008 http://www.globaloceans.org/highseas/pdf/HighSeas_ProjectLeaflet.pdf; UNCLOS; Birnie and Boyle *International Law* 347-353.

245 Mainly as a result of the limited assimilative, dilution and absorption capacity of the marine waters and environment close to the coast (especially wetlands, bays, estuaries and the sea-shore) associated with the accumulation of pollution in coastal waters. Kennish *Estuarine and Marine Pollution* 26; Tuncer *et al Land-based sources of pollution*.

246 As suggested previously in the OSPAR convention.

247 Refer to Chapter 1.

rivers, storm water, run-off and groundwater,[248] it is essential to ensure a cohesive and integrated regulatory approach in this regard.[249] The geographic scope of the LBMP regulatory regime should therefore include the relevant hydrologic/river basins and watersheds. Consequently relevant freshwater resources (including watercourses and watersheds at least up to the freshwater limits) should be associated with the regulatory regime of LBMP, giving "legal effect" to the foregoing "interdependency". The United Sates Ocean Policy[250] confirms this position by stating that there is a need for a large geographical scope in terms of the regulation of LBMP, which should include the relevant watersheds of the coastal zone.

b. Geographical scope of the sources of LBMP to be regulated

In terms of the geographical scope of the sources of LBMP which need to be regulated, most international best practice includes all land-based sources, activities and contributing factors within the terrestrial territory over which the country has jurisdiction. It is also internationally recognised that sources to be regulated should not be limited to "coastal sources" but that inland sources far removed from the coast must also be regulated.[251] As previously said, some activities at sea (i.e. dumping at sea from vessels or offshore facilities) have sometimes been included in the regulatory scope related to LBMP regulation. However, the scope of LBMP regulation should be limited to activities on land only or with a direct connection to the land (i.e. outfall and pipelines). Activities at sea related to maritime transport, such as dumping at sea from vessels, and offshore activities should not be included within the scope of LBMP regulation as they are not land-based activities and they are commonly qualified as maritime activities which are generally subject to specific national[252] and international[253] legal regimes often referred to as maritime law. When

---

248 Refer to 2.2.

249 Based on the analysis of UNEP *Protecting coastal and marine environments* and the Montreal Guidelines.

250 US Commission on Ocean Policy *An Ocean Blueprint* 6.

251 The Montreal Guidelines and the GPA. Also see 2.2.1.

252 For example, in South Africa there are the *Merchant Shipping Act* 57 of 1951 as amended, the *Maritime Pollution (Intervention) Act* 64 of 1987, the *Marine Pollution (Control and Civil Liability) Act* 2 of 1986, the *Marine Pollution (Prevention of Pollution from Ships) Act* 2 of 1986, and the *Marine Traffic Act 2 of 1981*, which are aimed at regulating such maritime activities and related pollution.

referring to coastal disposal, only disposal from land using sea outfalls or effluents pipes, or direct disposal from the coast should be regarded as LBMP. In this context, it is important to make reference to the definition of dumping at sea provided by the NEM:ICMA which means:

> (a) any deliberate disposal into the sea of any waste or material other than operational waste from a vessel, aircraft, platform or other man-made structure at sea;
>
> (b) any deliberate disposal into the sea of a vessel, aircraft, platform or other man-made structure at sea;
>
> (c) any storage of any waste or other material on or in the seabed, its subsoil or substrata: or
>
> (d) any abandonment or toppling at site of a platform or other structure at sea, for the sole purpose of deliberate disposal,
>
> but "dumping at sea" does not include:
>
> (i) the lawful disposal at sea through sea out-fall pipelines of any waste or other material generated on land;
>
> (ii) the lawful depositing of any substance or placing or abandoning of anything in the sea for a purpose other than mere disposal of it; or
>
> (iii) disposing of or storing in the sea any tailings or other material from the bed or subsoil of coastal waters generated by the lawful exploration, exploitation and associated off-shore processing of mineral resources from the bed. subsoil or substrata of the sea.

An "other man-made structure at sea" could potentially include pipelines from land into the sea, however it seems that it is referring more to offshore structures due to the reference "at sea". Moreover there is a clear exclusion of sea-out fall pipelines into the scope of "dumping at sea". Despite the lack of clarity in this definition, it is argued that dumping at sea from vessels and offshore installations should not be included in the regulatory scope of LBMP regulation for the reason mentioned above.

---

253 Including all instruments developed by the International Maritime Organisation (IMO).

The next question regarding the regulatory scope is to determine the exact nature of the LBMP sources to be regulated.[254]

2.3.2.2 Material scope

There are various definitions of and concepts related to LBMP,[255] it is important to clarify the exact nature and extent of the LBMP sources which need to be regulated, especially with regard to the implications for the mandate and functions of governmental agencies and the applicable legislation.[256] Generally direct and indirect sources, point and diffuse sources need to be regulated.[257] According to the above analysis of the definition of LBMP, it seems that the different types of sources should include activities, products, substances, emissions/discharges, installations, and other contributing factors (i.e. land-use) which pollute, or might contribute to the pollution and/or degradation of the marine environment.[258] It seems as if the pathways for LBMP also need to be included in the regulation, including air (atmospheric pollution), water (watercourses, groundwater, and stormwater) and man-made installations.[259] For example, in setting ambient quality standards and objectives for rivers and air, their relationship with the coastal and marine environment should also be considered, including the ecological requirements of the marine and coastal environment. And finally the "contributing factors" also need to be regulated as they have the potential to increase LBMP.[260] For example, the regulation of existing coastal waste water treatment facilities will not be effective if there is inefficient management of coastal urban development and coastal population in general, as such phenomena will ultimately create new sources of LBMP or will

---

254 Refer to 2.2 of this research for further information on this matter.
255 As already stated in Chapter 1 and 2.1.
256 Refer to 2.3.5.
257 Based on the analysis of UNEP *Protecting coastal and marine environments* and the Montreal Guidelines.
258 Based on the analysis of UNEP *Protecting coastal and marine environments* and the Montreal Guidelines.
259 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.
260 Based on the analysis of UNEP *Protecting coastal and marine environments* and the Montreal Guidelines.

increase current ones (i.e. the discharge of sewage). Another example which might increase LBMP is the lack of regulation of seasonal coastal tourism.

2.3.2.3 Additional issues related to the regulatory scope

Other specific issues have been discussed at the international level regarding the regulatory scope of LBMP.[261] Among the most relevant issues in the context of this study is the question of whether or not "dumping at sea" and "climate change" should be included in the regulatory scope pertaining to LBMP regulation.[262]

"Dumping at sea from vessels" of waste or substances generated on land has sometimes been identified as LBMP.[263] Such an inclusion seems to be supported by the argument that most of the materials/substances dumped at sea from vessels have been generated on land.[264] In the context of this research, dumping at sea from a vessel is regarded as a marine activity and it is therefore not regarded as a source of LBMP.[265] The main argument in this context is that dumping at sea is an activity which takes place in the marine environment (and is therefore not land-based) and

---

261 See 2.3.3 for further information on this matter.

262 This question was raised during the Conference of Contracting Parties decision CP 5/4 on the Revision of the Nairobi Convention and the related protocols as adopted during the fifth Conference of the Contracting Parties to the Nairobi Convention (COP-5), held in Johannesburg, South Africa in November 2007 and the First formal Legal and Technical Review Meeting on the Draft Protocol on Land-based Sources and Activities (LBSA Protocol) of the Nairobi Convention, as well as a Regional Stakeholder workshop regarding the *Strategic Action Programme on Land-based Sources and Activities* (SAP) in Cape Town 18-21 November 2008.

263 For example DWAF *Operational Policy for the Disposal of Land-Derived Water*, makes a reference to coastal dumping without specifying land-based coastal dumping.

264 Based on a discussion with South African representatives of the Council for Scientific and Industrial Research (CSIR).

265 Based on a discussion with South African representatives of the Council for Scientific and Industrial Research (CSIR). "Chemicals enter the sea through deliberate dumping. For centuries, the oceans have been a convenient dumping ground for waste generated on land. This continued until the 1970s, with dumping at sea the accepted practice for disposal of nearly everything, including toxic material such as pesticides, chemical weapons, and radioactive waste. Dumping of the most toxic materials was banned by the *London Dumping Convention* in 1972, and an amended treaty in 1996 (the London Convention) further restricted what could be dumped at sea. However, there are still the problems of already-dumped toxic material, and even the disposal of permitted substances at sea can be a substantial environmental hazard". WWF 2010 http://wwf.panda.org/about_our_earth/blue_planet/problems/pollution/.

that it is regulated by specific maritime legislation[266] which categorises dumping at sea as a "marine source" of marine pollution resulting from a marine activity. In the context of this research, it has become clear[267] that the regulatory framework for LBMP should include only sources, activities and contributing factors located on land. In support of this argument, it has to be noted that there is already a sophisticated maritime legal regime in place addressing dumping at sea from vessels.[268]

The second question is whether or not climate change should be included in the scope of LBMP. Such a question was debated at the Conference of the Parties of the Nairobi and Abidjan[269] Conventions in November 2007. One of the propositions was to make a reference to climate change in the Third Draft Protocol additional to the Nairobi Convention concerning land-based sources and activities of marine pollution. The position was founded on the fact that climate change is a direct result of land-based activities emitting greenhouse gas emissions in the atmosphere, and has negative impacts on the marine environment.[270] However, some opposed this approach[271] arguing that climate change could not be included in the definition of LBMP as it could not be legally defined as "pollution" or as "contributing to marine pollution".[272] However, the interrelationship between climate change and the marine environment is now internationally recognised.[273] Moreover, various experts also

---

266 The main international legal instrument regulating this matter is the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* 1972.

267 See 2.1, 2.2 and 2.3.2.

268 The *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* 1972, the "London Convention", and its associated protocols. However, it is noted that in order to have a holistic approach to LBMP, especially in terms of impact assessment, dumping at sea from vessels of substances or energy generated on land should always be considered. See 2.1.1 and 2.2 for further information on this matter. For further information refer to IMO, *Dumping at sea: the evolution of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LC)* 1997, IMO, *London Convention and Protocol* 2009 *Edition: Guidance for the Development of Action Lists and Action Levels for Dredged Material* 2009 and www.imo.org.

269 Fifth Conference of the Parties of the Abidjan Convention and Seventh Conference of the Parties of the Nairobi Convention, Johannesburg, South Africa, 2007.

270 Based on a discussion with South African representatives of the Council for Scientific and Industrial Research (CSIR).

271 Based on a discussion with South African representatives of the CSIR.

272 Also see 2.1 and 2.2.

273 The Intergovernmental Panel on Climate Change (IPCC) recognises this interrelationship. IUCN has recently published, *The Ocean and climate change - tools and guidelines for action,*

recognise the potential impacts of climate change or the contribution of climate change to LBMP impacts.[274] It is therefore suggested that climate change could be characterised as a diffuse[275] source of LBMP or as a factor contributing to LBMP.[276]

In terms of South African law, the definition of pollution provided by the NEMA refers expressly to "any change in the environment", which could include climate change as a source of LBMP. Climate change could also be characterised as an "adverse effect" in terms of the NEM:ICMA. In this context, the latest development in South Africa regarding LBMP is the publication of "South Africa's National Programme of Action for Protection of the Marine Environment from LBMP"[277] (NPA), which identifies climate change and the introduction of alien vegetation as sources of LBMP.[278]

2.3.3 Regulatory objectives

A regulatory regime in terms of LBMP traditionally has four main types of objectives relating to pollution management, environmental protection, human health protection and the management of marine and coastal natural resources uses.[279] In terms of pollution management, it is suggested that the objectives of the regulatory regime can be divided into pro-active objectives (i.e. preventing, reducing and minimising

---

which provides an authoritative review of the role of the ocean within the climate debate as well as a holistic view in terms of mitigation and adaptation strategies, while outlining a clear set of action recommendations for policy decision-makers. The publication is available at http://cmsdata.iucn.org/downloads/the_ocean_and_climate_change.pdf, and finally the WWF http://www.panda.org/what_we_do/how_we_work/conservation/marine/our_solutions/climate_change/. "There is already an accumulating body of evidence to suggest that many marine ecosystems are responding both physically and biologically to changes in regional climate. This is caused predominately by the warming of air, the increase in sea surface temperature (SST) and to a lesser extent by the modification of currents, precipitation regimes and wind patterns". SAHFOS 2008 http://www.sahfos.ac.uk/climate_per cent20encyclopae dia/index2.html.

274 For example, Hassan *Protecting the marine environment* 38.

275 For example, Hassan *Protecting the marine environment* 38

276 Due to the extent of this thesis, the relationship between climate change and LBMP cannot be addressed extensively. For further information sea IUCN *The ocean and climate change - tools and guidelines for action*

277 Department of Environmental Affairs and Tourism (DEAT) *South Africa's National Programme of Action for Protection of the Marine Environment from Land-based Activities* First Edition 2008 (NPA).

278 Refer to 2.3.2 for further information on the introduction of alien species and LBMP.

279 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

pollution, including transboundary pollution) and reactive objectives, once the pollution has occurred (i.e. eliminating, combating and mitigating pollution - and rehabilitation).[280] LBMP regulatory frameworks normally strive to protect and conserve the environment, to ensure sound environmental management of natural resources and, when possible, to restore or rehabilitate the environment damaged as a result of LBMP.[281] Another objective relates to human protection and in particular the need to ensure that LBMP is reduced and managed to avoid any substantial risk to human health.[282] Finally, in terms of the management of uses, the regulatory regime normally aims at managing, planning and rationalising the uses of the marine and coastal environment and related natural resources in the broader framework of sustainable development.[283] The overall regulatory objective/goal can be summarised as follows:[284]

> The goal is to protect the marine ecosystem by maintaining its quality within acceptable levels as determined on the basis of scientific, institutional, social and economic factors. It should be recognised that there are many activities competing to derive benefits from the marine environment. None of these activities, save the perpetuation of a marine ecosystem as a vital component of global life support, should be regarded as having guaranteed rights.

According to the above, no specific human-related use(s) of the coastal and marine environment should be regarded as more important than and superior to other uses of the same environment. All uses should originally be regarded as equal and the management approach should strive to allocate rights to such users. The management of uses should be conducted in the broader context of sustainable development and the ultimate goal should be to maintain the ecological role of the marine and coastal ecosystem as a vital component of global life support.

---

280 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

281 According to the review of international best practice-related documents as identified in Appendix 1.

282 According to the review of international best practice-related documents as identified in Appendix 1.

283 According to the review of international best practice-related documents as identified in Appendix 1.

284 Annex 1, Montreal Guidelines, 1985.

2.3.4 Regulatory instruments

In terms of the review and legal analysis of international best practice pertaining to LBMP regulation,[285] the regulatory instruments commonly used to regulate LBMP can be categorised as direct or indirect instruments.[286] Direct instruments refer to the instruments and measures which are primarily aimed at the control and management of LBMP. Indirect measures can be regarded as instruments and measures in support of direct instruments, to facilitate the regulation and management of LBMP. Such a classification will also be used to conduct the critical assessment of the French and South African regulatory instruments used for LBMP regulation.[287]

2.3.4.1 Direct regulatory instruments

In accordance with the guidance provided by the Montreal Guidelines, three categories of direct instruments can be identified, namely instruments based on the "resource-directed approach", instruments based on the "sources-directed approach", and instruments based on planning management.

a. Overview

Designing instruments based on the "resource-directed approach" entails using a regulatory approach based on marine environmental quality objectives[288] and standards.[289] Such an approach is primarily focused on "the quality of water, biota or sediments that must be maintained for a desired level of quality and intended use".[290] Such regulatory instruments might involve the determination of "quality objectives"

---

285 According to the review of international best practice-related documents as identified in Appendix 1.

286 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

287 Refer to 3.4, 3.5 and 3.6 for France and 5.3, 5.4 and 5.5 for South Africa.

288 The phrase "environmental quality objectives" means a set of clearly identified objectives or goals for purposes of environmental quality, whether in specific or general application to relevant environmental resources, activities or programmes. LBMP Protocol to the Nairobi Convention, art 1.

289 "Environmental quality standard" are the concentration of a particular substance or group of substances in water, sediment or biota which should not be exceeded in order to protect human health and the environment. LBMP Protocol to the Nairobi Convention, art 1.

290 Annex 1 Montreal Guidelines 1985.

(setting the maximum allowable pollution inputs that will ensure that the desired levels of environmental quality are attained),[291] or standards based on "current ambient quality" (when standards are set based on existing levels which must not be exceeded).[292] Such an approach might also involve the setting of standards based on the "dilution capacity/rate" (when the dynamic characteristics of the receiving environment are used to determine the rate and level of dilution and consequently when standards are derived from measured parameters taken at given distances from the discharging source).[293] It might also include the setting of "loading allocation" (when allowable discharges are measured in terms of the total allowable for an entire receiving environment, taken regardless of specific site quality)[294] or

---

291 "Technical assessments are conducted to determine the maximum allowable inputs that will ensure that the desired levels of environmental quality are met. The assessments consider the fate and effects of various contaminants, amounts of input, and the existing natural characteristics of the relevant marine ecosystem. Numerical standards are then established, to which concentrations measured in the receiving environment may be compared. They are usually more restrictive than numbers derived from the technical assessment to allow for monitoring and enforcement capabilities and safety requirements. They may apply to water, sediment, fish or the tissues, health or community composition of organisms in the marine ecosystem. Monitoring is required to detect changes and compliance with the standards. Changes in the items monitored, after adjustment for natural fluctuation, may signal a need to reduce inputs further and vary existing standards and controls". Montreal Guidelines Annex I.

292 "Standards are set based on existing levels which must not be exceeded. This strategy is employed in situations where the aim is to prevent any increase in prevailing specific contaminant levels. It is an interim strategy to allow time to develop a solid scientific base on which more precise quality criteria may be employed for a specific use. It does not imply that an existing state of the environment is satisfactory, nor does it eliminate the need for its improvement". Montreal Guidelines Annex I.

293 "Some contaminants discharged at the source are assumed to attenuate as they spread from that source. Dynamic characteristics of the receiving environment are employed to determine the rate and level of dilution. Standards are derived from measured parameters taken at given distances from the discharging source. This strategy may accept short-term or local excess of a potential pollutant at the source of discharge. Application is generally used with effluent that is considered biodegradable, and avoided where scientific evidence suggests that the effluent may accumulate in a given receiving environment". Montreal Guidelines Annex I.

294 These impose the priority of control on the larger sources in consideration of the most cost-effective solutions. "Allowable discharges are measured in terms of the total allowable for an entire receiving environment, regardless of specific site quality. Application is suited to relatively self-contained receiving environments, such as lagoons and semi-enclosed bodies of water. It allows flexibility of contaminant output, in that certain sources may emit more than adjacent ones as long as loading limits are not exceeded. All these strategies may employ criteria for water, air or sediment quality, as well as criteria related to specific marine life. Receiving environment quality standards are most present for uses – e.g. swimming, direct harvesting of fish for human consumption – where sound scientific criteria exist to determine levels of harm. Emissions of potential pollutants are usually controlled to ensure that the desired quality is achieved. If the quality needs to be upgraded, additional controls are placed on allowable emissions". Montreal Guidelines Annex I.

"ambient quality objectives". Such measures might also involve the determination of a "classification system" and/or a reserve for relevant water resources.[295]

Instruments based on the "sources-directed approach" commonly strive to directly regulate pollution at source, and are especially relevant for point sources. Such an approach is generally based on the "emissions control" concept.[296] Regulatory instruments based on the "sources-directed approach" might involve the development of technology-based standards, which might involve the "best practicable technology",[297] the "best available technology" (BAT),[298] the "as low as reasonably achievable"[299] approach, or the "zero discharge approach".[300] The regulatory approach based on emissions controls might also include the development of regional emissions standards.[301] Some other regulatory instruments might include discharge authorisation and associated standards/conditions, guidelines, code of practices, permits, equipments standards, general and specific standards, certification, product controls (phasing out, regulated specification, use requirements), market-based instruments, emissions control of point sources, Best

---

295 Based on the South African regulatory framework. Refer to 5.3.1 further information.

296 "Emission controls" means controls requiring a specific emission limitation, or otherwise specifying limits or conditions on the effects, nature or other characteristics of an emission or operating conditions which affect emissions. Nairobi Convention draft LBS/A protocol, art 1.

297 In terms of the Montreal Guidelines Annex I, this reflects the application of demonstrable and sound treatment technology or a spectrum of technologies which is affordable by the sector concerned. Also see 2.3.4.1(c) for further information.

298 In terms of the Montreal Guidelines Annex I, this reflects state-of-the-art technology in use in contaminant control. In general, the standards set would reflect a more stringent level of control than best practicable technology. Application is generally for the control of emissions of the most noxious substances or to protect a sensitive environmental use. Also see 2.3.4.1(c).

299 In terms of the Montreal Guidelines Annex I, this is applied mainly to radio-nuclides, and is based on the principle of "optimisation". This, as defined by the International Commission on Radiological Protection, requires radiation doses to be kept to levels that are "reasonably achievable" by technological improvements and by a suitable choice among alternative options. "Reasonably achievable" takes into account both the ease with which the technology can be applied and the balance between the benefits, in terms of dose reduction, and the social and economic costs of its application.

300 In terms of the Montreal Guidelines Annex I, it is used in a situation where stringent protection of a sensitive marine environment is deemed appropriate. Consideration may be given to the denial of any release of a contaminant to the environment.

301 In terms of the Montreal Guidelines Annex I, such standards are usually applied in situations where there are existing pollution problems of a similar nature and there is an urgent need to reduce pollution. They do not give primary consideration to the nature of sources, their economic base, or the receiving environment.

Environmental Practice (BEP),[302] emission limits and the creation of a list of priority substances and activities.[303]

Finally, regulatory instruments based on planning management encompass specific planning tools which are aimed at regulating developments, activities and uses of the environment (especially the coastal and marine environment) in order to regulate LBMP proactively. Such regulatory instruments enable an approach to the management of particular land use, developments and protection of particular environments which may involve "restrictions on, or modification of, activities and sites as well as discharges".[304] Such an approach can be divided into two distinct sub-categories: (a) activity management, which includes use designation[305] and the environmental assessment of activities, and (b) areas planning, which involves the implementation of coastal zone management,[306] watershed or drainage basin planning,[307] and the delimitation of specifically protected areas.[308] The main regulatory instruments based on planning management include[309] EIA,[310] strategic

302 For further information see 2.3.4.1(c).

303 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1, especially the Montreal Guidelines Annex I.

304 Montreal Guidelines Annex I.

305 In terms of the Montreal Guidelines Annex I, use of the receiving environment is the determining factor for pollution control standards as well as the basis for regulations or guidelines affecting other activities.

306 In terms of the Montreal Guidelines Annex I, such an approach employs planning capabilities to make the best use of the coastal zone. It is not use-specific or source-specific but area-specific. Potential activities are assessed as components of a coastal zone. Planning is based on regional socio-economic and ecological considerations. Zoning and other land use restrictions or modifications are major regulatory tools.

307 In terms of the Montreal Guidelines Annex I, this approach acknowledges that a large proportion of pollution enters the marine environment via watercourses. It does not necessarily account for inputs via the atmosphere, though air management areas have also been employed for control purposes. Through consideration of socio-economic and environmental factors, taking the area of a drainage system as the planning unit, the desired uses and level of quality that can be attained for any given marine water body are determined. Pollution via watercourses is controlled through regulation of point and diffused sources of such pollution within the given watershed.

308 In terms of the Montreal Guidelines Annex I, this approach involves the identification of unique or pristine areas, rare or fragile ecosystems, critical habitats and the habitats of depleted, threatened or endangered species and other forms of marine life. Those areas to be protected or preserved from pollution, including from land-based sources, are selected on the basis of a comprehensive evaluation of factors, including conservational, ecological, recreational, aesthetic and scientific values. States should notify an appropriate international organisation of the establishment of any modification to such areas, with a view to the inclusion of such information in an inventory of specially protected areas.

309 Further analysis of such instruments is provided in 2.3.4.1(f).

environmental assessment (SEA),[311] development and land-use authorisations,[312] planning restrictions,[313] the determination and management of waters uses (water uses planning),[314] risk management strategies including risk assessments, authorisations and regulation of activities,[315] and the determination of protected areas and/or other sensitive areas.[316]

International best practice provides specific guidance on the nature, functions and specificities of some of the main direct regulatory instruments which can effectively be used to regulate LBMP, including *inter alia* guidelines and standards, BEP, BAT, EIA, marine and coastal environment uses determination and management, and planning regulations.[317]

b. Guidelines and standards[318]

As previously stated, guidelines and standards in this context are direct regulatory instruments based on the "sources-directed approach". In this context, the Nairobi Convention and its LBMP Protocol provide relevant information on the scope of some of the guidelines and standards to be developed, which can be regarded as current international best practice with regard to LBMP regulation, including:[319]

- the length, depth and position of pipelines for coastal outfalls, taking into account in particular the methods used for the pre-treatment of effluents;
- special criteria for effluents necessitating separate treatment;
- the quality of the sea water used for specific purposes necessary for the protection of human health, living resources and ecosystems;

---

310 Refer to 2.3.4.1(d) for further information.
311 See 2.3.4.1(d) for further information on EIA and SEA.
312 Refer to 2.3.4.1(f) for further information.
313 Refer to 2.3.4.1(f) for further information.
314 Refer to 2.3.4.1(f) for further information.
315 Refer to 2.3.4.1(f) for further information.
316 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.
317 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1. Also see 2.3.4.2 for further information on some of the main indirect regulatory instruments.
318 In terms of source-directed measures and instruments, such guidelines, standards and criteria are regarded as useful for LBMP regulation.
319 LBMP Protocol to the Nairobi Convention Art 11.

- the control and progressive replacement of products, installations and industrial and other processes causing significant pollution of the marine environment; and
- specific requirements concerning the quantities of the substances discharged, their concentration in effluents, and the methods of discharging them.

The Protocol also states that guidelines and criteria shall take into account "local ecological, geographical and physical characteristics, the capacity to adapt and the 'retrofitting' of existing installations, the economic capacity of the state and its need for development, the level of existing pollution and the real absorptive capacity of the marine environment".[320]

c. BEP and BAT[321]

Appendix I of the OSPAR Convention and the Protocol to the Barcelona Convention[322] provides useful information on BEP and BAT. The term BAT can be defined as follows:[323]

---

320 France and South Africa have developed and implemented different standards and/or guidelines, relevant for LBMP regulation. Refer to 5.3.2 information about the standards and/or guidelines relevant for LBMP regulation in South Africa and 3.4.2 for France.

321 Based on the review of international best practice-related documents as identified in Appendix 1.

322 Protocol LBMP on 17 May 1980. Also see Tanaka 2006 *ZaöRV* 563-566 regarding issues related to BAT and BEP related to LBMP regulation. Also see Kotzé 2007 *SA Public Law* 43-44 and ICES *Journal of Marine Science* 65 1492–1497.

323 In terms of the *Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control*, as amended (IPPC Directive), BAT shall mean "the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole. 'Techniques' shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned; 'available' techniques shall mean those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member state in question, as long as they are reasonably accessible to the operator. 'Best' shall mean most effective in achieving a high general level of protection of the environment as a whole". In terms of the IPPC Directive, considerations to be taken into account generally or in specific cases when determining BAT, bearing in mind the likely costs and benefits of a measure and the principles of precaution and prevention, include the use of low-waste technology; the use of less hazardous substances; the furthering of the recovery and recycling of substances generated and used in the process and of waste, where appropriate; comparable processes, facilities or methods of operation which have been tried with success on an industrial scale; technological advances and changes in scientific knowledge and understanding; the nature, effects and volume of the emissions concerned; the commissioning dates for new or existing

> The latest stage of development (state of the art) of processes of facilities or of methods of operation which indicates the practical suitability of a particular measure for limiting discharges, emissions and waste. In determining whether a set of processes, facilities and methods of operation constitute the best available techniques in general or individual cases.

It also specifies that "techniques" include both the technology used and the way in which the installation is designed, built, maintained, operated and dismantled. In terms of Appendix I of the OSPAR Convention, BEP can be defined as "the application of the most appropriate combination of environmental control measures and strategies".[324] International best practice also identifies criteria which should be considered in the identification and assessment of BEP.[325] It is important to note that BEP and BAT might change over time in consideration of technological progress, economic and social development, and the progress of scientific knowledge and understanding.[326]

---

installations; the length of time needed to introduce the best available technique; the consumption and nature of raw materials (including water) used in the process and their energy efficiency; the need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it; and the need to prevent accidents and to minimise the consequences for the environment. "The concept of BAT is not aimed at the prescription of any specific technique or technology, but at taking into account the technical characteristics of the installation concerned, its geographical location and the local environmental conditions. Appropriate control techniques to reduce releases of the chemicals listed in Part I are in general the same. In determining best available techniques, special consideration should be given, generally or in specific cases, to the following factors, bearing in mind the likely costs and benefits of a measure and consideration of precaution and prevention". Stockholm Convention Secretariat, *Guidelines on best available techniques and provisional guidance on best environmental practices* 12-14.

324 Appendix I of the OSPAR Convention also specifies that in terms of BEP the following range of measures should at least be considered: the provision of information and education to the public and to users about the environmental consequences of choice of particular activities and choice of products, their use and ultimate disposal; the development and application of codes of good environmental practice which covers all aspect of the activity in the product's life; the mandatory application of labels informing users of environmental risks related to a product, its use and ultimate disposal; saving resources, including energy; making collection and disposal systems available to the public; avoiding the use of hazardous substances or products and the generation of hazardous waste; recycling, recovery and re-use; the application of economic instruments to activities, products or groups of products; establishing a system of licensing, involving a range of restrictions or a ban.

325 Including the environmental hazard of the product and its production, use and ultimate disposal; its replacement by less polluting activities or substances; the scale of use; the potential environmental benefit or penalty of substitute materials or activities; advances and changes in scientific knowledge and understanding; time limits for implementation; and social and economic implications.

326 International best practice also provides guidance for the successful implementation of BEP and BAT, promoting the following supportive actions: to support access to clean production technologies; to stimulate research, development and transfer of clean production

BEP and BAT[327] are regarded as essential direct instruments based on the "sources-directed approach" for the regulation of LBMP.[328] BAT is especially relevant for the regulation of point sources of LBMP, as it mainly relates to specific equipments, facilities, or processes for specific activities/products which are individually identifiable, as BEP is regarded as more appropriate for the regulation of non-point sources, as it relates more to practices which will apply generally to all activities/products/practices and reduce generally pollution.[329]

d. EIA

In terms of international best practice,[330] an EIA[331] (a planning regulatory instrument) should be used to assess systematically for planned developments, activities,

---

technologies, often through strategic partnerships; to promote cooperative interaction with private-sector groups and non-governmental organisations to introduce cost-effective and environmentally sound practices; to strengthen existing national institutions to assess, develop, manage and apply new environmentally sound technologies; to facilitate access to sources (public or private, national or multilateral) of technical advice and assistance with respect to particular source-categories and sectors; to promote cleaner production techniques and practices for production processes, for products and for services through the training of industry personnel; to support the codes of good environmental practice which cover all aspects of activity in the product's life; to promote a voluntary scheme/plan for the award of the eco-label to products with reduced environmental impacts; and to prepare programmes giving priority to energy efficiency and renewable sources of energy. MAP 2009 http://www.unepmap.org/index.php?module =content2&catid=001001002.

327 Based on the review of international best practice-related documents as identified in Appendix 1, especially Appendix I of OSPAR; the Barcelona Convention and its Protocol on LBMP and the MAP.

328 Based on the review of international best practice-related documents as identified in Appendix 1.

329 Based on the review of international best practice-related documents as identified in Appendix 1, especially Appendix I of OSPAR; the Barcelona Convention and its Protocol on LBMP and the MAP.

330 In terms of the Nairobi Convention LBMP Protocol (art 13), the Barcelona Convention and others. Also see Tanaka 2006 *ZaöRV* 566-569.

331 Based on the review of international best practice-related documents as identified in Appendix 1, the two main tools internationally recognised for impact assessment in terms of LBMP are EIAs and environmental audits. SEAs are also regarded as an important tool, linking environmental impact assessment and planning management. Principle 17 of the *Rio Declaration on Environment and Development* (1992) refers to an EIA as a national instrument which "shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment". For example, in terms of Art 13 of the Abidjan Convention, parties shall develop technical and other guidelines to assist the planning of their development projects in such way as to minimise their harmful impacts on the Convention area. They shall endeavour to include an assessment of the potential environmental effects in any planning activities entailing projects within their territory, particularly in a coastal area, that may cause substantial pollution of or significant and harmful changes to the area. "Environmental Impact Assessment can be defined as the process of identifying, predicting,

programmes, and processes in order to determine their actual or potential impacts on the coastal and marine environment.[332] In terms of the nature, scope and objectives of an EIA, it is internationally recognised that it should at least assess the possible direct or indirect, immediate and long-term environmental impacts on the coastal and marine environment, including the cumulative and transboundary

evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made". IAIA and IEA *Principles of Environmental impact assessment* 2. "The role of an EIA is to ensure that environmental considerations are explicitly addressed and incorporated into the development decision-making process; to anticipate and avoid, minimise or offset the adverse significant biophysical, social and other relevant effects of development proposals; to protect the productivity and capacity of natural systems and the ecological processes which maintain their functions; and to promote development that is sustainable and optimises resource use and management opportunities". IAIA and IEA *Principles of Environmental impact assessment* 2. In terms of EU law, an environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect effects of a project on the following factors: human beings, fauna and flora; soil, water, air, climate and the landscape; material assets and the cultural heritage; and the interaction between the abovementioned factors. *Council Directive of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment* (85/337/EEC), EIA Directive. For further information on EIAs refer to UNEP *EIA and SEA*. Also see Strydom and King *Environmental Management* 971-1045 and Glazewski *Environmental Law* 227-254. "EIA/SEA are structured approaches for obtaining and evaluating environmental information prior to its use in decision making in the development process. This information consists basically of predictions of how the environment is expected to change if certain alternative actions are implemented and advice on how best to manage environmental changes if one alternative is selected and implemented. EIA focuses on proposed physical developments such as highways, power stations, water resource projects and large-scale industrial facilities. SEA focuses on proposed actions at a higher level such as new or amended laws, policies, programmes and plans. Often, physical developments and projects are the result of implementation of a policy or plan, for example an extended highway network may be an outcome of a new transport policy". UNEP *EIA and SEA* 6. EIA has been in existence since 1970 (when it was introduced into the United States of America) and has spread rapidly since then to all parts of the world. "EIA is still relatively new in some countries, but virtually all countries have it as a legal or administrative requirement. SEA is a more recent tool. It emerged in the middle to late 1980s as it became clear that the EIA procedures in many countries did not require the application of EIA to policies, programmes and plans. However, it was realised that the implementation of such actions could have significant environmental consequences. Thus, informally at first, SEAs were implemented for such actions. Over time, various moves have been initiated to introduce administrative requirements for use of SEA and then to amend existing EIA laws or to introduce new ones focusing on SEA". UNEP *EIA and SEA* 7. For further information on SEA refer to Dalal-Clayton and Sadler *Strategic Environmental Assessment*, and UNEP *EIA and SEA*.

332 The main advantages and benefits of EIA are improved project design/siting; more informed decision making (with improved opportunities for public involvement in decision making); more environmentally sensitive decisions; increased accountability and transparency during the development process; improved integration of projects into their environmental and social settings; reduced environmental damage, more effective projects in terms of meeting their financial and/or socio-economic objectives; and making a positive contribution towards achieving sustainability. UNEP *EIA and SEA* 8.

impacts of developments, activities, programmes and processes being planned.[333] The environmental impacts on the coastal and marine environment to be assessed should include potential or actual environmental impacts during the planning, implementation and decommissioning stages of relevant developments, activities, programmes and processes.[334] An EIA should also identify, assess and determine appropriate measures to be taken to prevent, reduce, control, mitigate or eliminate to the maximum extent possible such environmental impacts. In addition, an EIA should outline the possible process and pollution abatement alternatives, including restorative measures which are feasible, and indicate the measures to be taken for the restoration of the coastal and marine environment from pollution and degradation during and, as appropriate, at the end of the development activities, programmes and processes. An EIA should also provide a description of the geographical location of the proposed activities, project, programmes and processes,[335] including a description of the initial ecological state of the marine environment and the coastal area which may be affected. In terms of the proposed activities, an EIA should provide a description of the methods, installations, processes and other means to be used or being used. International best practice also advocates that an EIA should contain a definition of commitments to ongoing environmental management and monitoring and a cost-benefit analysis.[336]

e. Determination and management of use of the marine and coastal environment

International best practice[337] commonly recognises three designated marine/coastal water uses (by humans), namely marine aquaculture, recreational use, and industrial

---

333 In terms of the LBMP Protocol to the Nairobi Convention, the Barcelona Convention and others. For further information also see Kennish *Estuarine and Marine Pollution* 70.

334 In terms of the LBMP Draft Protocol to the Nairobi Convention, the Barcelona Convention and others.

335 Based on the review of international best practice-related documents as identified in Appendix 1.

336 In terms of the LBMP Protocol to the Nairobi Convention, the Barcelona Convention and others. For further information also see Kennish *Estuarine and Marine Pollution* 70.

337 Based on the review of international best practice-related documents as identified in Appendix 1. Also refer to Miles 1999 *Coastal Management* 27-30.

use.[338] According to DWEA, "the characterisation of water uses involves determining and describing those characteristics which will help determine its significance as well as those which dictate its water quality requirements".[339] The water quality requirements of a water use are further determined by considering specific elements, including common water quality problems associated with a particular water use or the role that water quality has in sustaining the water uses, the nature of the effects of poor water quality on the water uses, the norms which are commonly used as benchmarks to measure the effect of water quality on a particular water use, the water quality constituents which are generally of concern, and any other site or specific characteristics of the water use which may influence its water quality requirements.[340] It is recognised that for each water use, some of the following instruments should be developed and implemented, namely:[341] management goals, quality objectives,[342] critical limits for developments and activities, design criteria and construction considerations, and long-term monitoring programmes. The designation

---

338 In the South African context, it has been proposed that three designated uses of the coastal marine environment be recognised, namely marine aquaculture (including the collection of seafood for human consumption), recreational use, and industrial use. Taljaard *Baseline assessment of sources and management of LBMP* 2-12.

339 "The significance of each water use is determined by considering issues such as the volume of water used, the socio-economic benefits and costs associated with the use; and the nature of the use, i.e. whether it is consumptive or not, or whether it is abstractive or not", DWAF *South African Water Quality Guidelines Recreational* 3.

340 Based on DWAF *South African Water Quality Guidelines Recreational* 3.

341 Based on the review of international best practice-related documents as identified in Appendix 1. France and South Africa have implemented different regulatory instruments to manage the use of the marine/coastal environment. Refer to 5.3.3.2 for further information about marine/coastal use determination and management in South Africa and 3.4.3 for France.

342 "The water quality requirements of the different user groups are not necessarily the same. In some instances, they may even conflict. These differences imply that water which would be adequately fit for use for one specific user may not be suitable for another. In addition, water seldom becomes totally unfit for use when the quality deteriorates. Quality is thus not an intrinsic property of water, but is linked to the use made of the water. A definition of what constitutes fitness for use is thus a key issue in the evaluation and management of the quality of water resources". DWAF *South African water quality guidelines for coastal marine waters volume 3 industrial use* viii. In the South African context, industrial uses include seafood processing, salt production, desalination, aquariums and oceanariums, harbours and ports, cooling water, ballast water, coastal mining, water for marine outfalls, exploratory drilling, scrubbing and scaling. "The aim of water quality guidelines is to provide scientific yardsticks against which the fitness for use of a particular water body for a designated use may be evaluated. However, the quality of a water body can be described in many different ways. It is therefore important to select specific norms upon which water quality properties/constituents relevant to describing the fitness of use could be selected. These norms are usually based on types or 'boxes' of problems associated with a particular use of sea water". DWAF *South African Water Quality Guidelines for Coastal Marine Wafers Volume 2 Recreational Uses.*

of water uses is regarded as a necessary step in the development of most of the other regulatory instruments and measures identified above.[343] The "fitness for use of water" is a judgement of "how suitable the quality of water is for its intended use or for protecting the health of aquatic ecosystems", the issue of quantity should is also important.[344] The ultimate goal of use management (a planning regulatory instrument) is to ensure the long-term sustainability of water uses.

f. Other regulatory instruments based on planning management

International best practice identifies various planning regulatory interventions as potential planning instruments to regulate LBMP in a proactive way. It makes reference to regulations to prevent "continuous and linear urbanisation of coastal areas".[345] It also indicates that regulations to prevent "the construction of new roads parallel to and alongside the coast" would be useful instruments to reduce coastal land degradation, coastal environment degradation and coastal erosion.[346] Regulations "to maintain agricultural and green belts and establish ecological corridors" are also regarded as very useful in this context.[347] The "prohibition of

---

343 Based on the review of international best practice-related documents as identified in Appendix 1. France and South Africa have implemented different regulatory instruments to manage the use of the marine/coastal environment. Refer to 5.3.3.2 for further information about marine/coastal uses determination and management in South Africa and 3.4.3 for France.

344 To be able to make judgements about fitness for use one needs to characterise the water uses and/or particular aquatic ecosystems from a water quality perspective; determine the quality requirements of the intended uses and/or those of aquatic ecosystems; obtain information on the key constituents which determine the fitness of water for its intended uses and/or that affect the health of aquatic ecosystems; establish how, and how much, the intended use of an aquatic ecosystem will be affected by the prevailing water quality; determine whether the undesirable effects of water quality on a particular use can be mitigated. Based on DWAF *South African Water Quality Guidelines Recreational* 3.

345 Based on the review of international best practice related documents as identified in Appendix 1.

346 Based on the review of international best practice related documents as identified in Appendix 1.

347 For example the 1985 Montreal Guidelines "introduced the concept of specially protected areas with a view to protecting fragile ecosystems from LBMP. In this respect, Annex I to the Guidelines states that the strategy on specially protected areas involves the identification of unique or pristine areas, rare or fragile ecosystems, critical habitats and the habitat of depleted, threatened or endangered species and other forms of marine life. Those areas to be protected or preserved from pollution, including that from land-based sources, are selected on the basis of a comprehensive evaluation of factors, including conservational, ecological, recreational, aesthetic and scientific values. To this end, states are required to notify an appropriate international organisation of the establishment of any modification to such areas, with a view to the inclusion of such information in an inventory of specially protected areas.

construction in high-risk areas" is regarded as relevant to protect the coastal environment from development activities and related LBMP. It also promotes the development and implementation of regulations "to ensure that EIAs are carried out for projects and SEAs for plans and programmes" affecting the sea or coastal zones. From a risk management perspective, international best practice recommends the development and implementation of the following planning instruments:

- Vulnerability assessments of coastal zones;[348]
- Technological risk assessments[349] for activities in the coastal zone;
- Risk prevention plans included in urban development plans and other planning instruments; and
- The development and implementation of contingency plans for all vulnerable coastal spaces.[350]

Finally, legislation to enhance the heritage value of coastal areas, including traditional productive activities, is also regarded as a useful instrument.[351]

Considering that the conservation of the marine ecosystem is becoming an important issue in the international community, it is worth noting that the regulation of land-based pollution is linked to the conservation of the marine ecosystem in the Montreal Guidelines". Tanaka 2006 *ZaoRV* 545.

348 This tool is aimed at managing risks related to LBMP and the associated impacts. Vulnerability assessment commonly focuses on the risks and impacts of natural hazards, taking into account the exposure and sensitivity, as well as the adaptive capacity of the environment. However, in this context it will also include the assessment of risks and impacts associated with LBMP. It involves the evaluation of the expected performance of the environment, structures, infrastructure, communities and institutions under the pressures related to natural hazards and LBMP. This tool is extremely important in the context of the impact of climate change, including sea-level rise and tsunamis. The Intergovernmental Panel of Climate Change has actually developed an internationally recognised methodology to conduct the assessment of vulnerability to climate change and especially sea-level rise in coastal zones. "Predictions of morphological changes in the coastal zone in response to both direct and indirect human interference and projected climatic change is an increasingly important issue in coastal management". Capobianco, Devriend, Nicholls and Stive 1999 *Journal on Coastal Research* 701-716. Such a tool is aimed at providing decision makers with the relevant information to manage the priority vulnerability area (hot spots) and higher risks and to facilitate hazard mitigation.

349 This instrument is aimed at identifying such technological risks, especially in terms of their impacts on the marine environment (i.e. nuclear activities in the coastal zone, specific chemical industries, or petrochemical plants). It is aimed at providing as much information as possible to be able to identify, prevent, reduce and manage such technological risks. For further information see *Leroy, Gould et al, Perceptions of technological risks and benefits;* Committee on Risk Assessment of Hazardous Air Pollutants, National Research Council (U.S). *Science and judgment in risk assessment;* and *Technological risk assessment*, NATO ASI series, Volume 1981, Issue 81.

350 For example, an oil contingency plan for a petrochemical plant located in a port.

2.3.4.2 *Indirect regulatory instruments*

In terms of current international best practice and the abovementioned regulatory approaches, the following indirect instruments are regarded as essential to support the effective regulation of LBMP and need to be provided for in national, and when relevant, regional/international regulatory frameworks pertaining to LBMP: ecological status assessment,[352] monitoring programmes,[353] data/information management (including research, reporting and notification),[354] the management of pollution incidents/emergencies, performance/effectiveness assessment,[355] capacity building,[356] enforcement and compliance,[357] public participation,[358] and financial management.[359] All of these instruments are regarded as essential in international best practice to support regulation, most commonly by providing the information necessary to facilitate informed decision making, and the development and implementation of the most suitable direct regulatory instruments. International best practice provides specific guidance on the nature, functions and specificities of the key indirect regulatory instruments which can be effectively used to assist LBMP regulation, including *inter alia* the assessment of ecological status, effectiveness assessment, financial management instruments, information management, public participation, compliance and enforcement, and capacity building.[360]

---

351 France and South Africa have undertaken different planning regulatory interventions to facilitate coastal zone management, including LBMP regulation. Refer to 5.3.3.2(d) for information about planning regulatory interventions to facilitate coastal zone management, including LBMP regulation in South Africa and 3.4.3.1 for France.

352 Refer to 2.3.4.2 (a) for further information.

353 Refer to 2.3.4.2 (a) and (d) for further information.

354 Refer to 2.3.4.2 (d) for further information.

355 Refer to 2.3.4.2 (b) for further information.

356 Refer to 2.3.4.2 (f) for further information.

357 Refer to 2.3.4.2 (g) for further information.

358 Refer to 2.3.4.2 (c) for further information.

359 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

360 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

a. Assessment of ecological status[361]

International best practice recognises the need to conduct an initial assessment of the ecological status of the coastal and marine environment to evaluate the conditions and features of the coastal and marine environment (the physical, biological and chemical characteristics).[362] This assessment should also provide an assessment of the state of LBMP, including an inventory of inputs of substances and activities from land-based activities and sources, information on the distribution of activities and sources, and the quantities of such substances introduced into the coastal and marine environment.[363] Such an assessment should be conducted on a regular basis, and should be assisted with programmes to assess and monitor the evolution of the ecological status and progress of any measures implemented. This assessment is essential to identify the areas of priority in terms of LBMP which need to be regulated as a matter of urgency,[364] vulnerable, sensitive and damaged environments which need to be protected as a priority,[365] main sources of LBMP, and other contributory factors. The assessment could also facilitate the identification of cross-media pollution. Such an identification will be essential to develop and implement the most adequate and effective regulatory instruments in terms of the specific problems related to LBMP in a particular country.

---

361 France and South Africa have developed and implemented different instruments related to the assessment of ecological status in the context of pollution management. Refer to 5.4.1 for South Africa and 3.5.1 for France.

362 Based on the review of international best practice-related documents as identified in Appendix 1.

363 This assessment should also evaluate and monitor transboundary pollution; should systematically assess the levels of pollution or other degradation within their internal and territorial waters, in particular with regard to the substances that may have a potential significant impact on the coastal and marine environment and should result in the production of periodic reports in this respect; should systematically assess the state of the coastal and marine environment; and should systematically assess, as far as possible, the levels of pollution along the coast, in particular with regard to sectors of activity and categories of substances. This opinion is based on the review of international best practice as per Appendix 1.

364 See 2.3.6 for further information.

365 See 2.3.6 for further information.

b. Effectiveness assessment[366]

International best practice[367] provides guidance on the criteria to evaluate the effectiveness of instruments and measures implemented to regulate LBMP. The effectiveness assessment should inform[368] environmental effectiveness, economic costs and benefits, equity (are the costs and benefits of the strategy or programme being shared fairly), flexibility in administration (can the strategy or programme adapt to changes in circumstances), effectiveness in administration (is the management of the strategy or programme cost-effective and accountable), timing (the timetable needed to put the strategy or programme in place and to begin producing results), and inter-media effects (will the achievement of the objectives of the strategy or programme create a net environmental benefit).[369] The aim of an effectiveness assessment of regulatory instruments and measures is to determine whether or not the regulatory framework meets its management and regulatory objectives.The assessment criteria should be developed and customised by each state. Such assessment should be conducted on a regular basis, the frequency should be determined by the state. Such assessments are important to ensure that the regulatory interventions and instruments are adequate and effective and to facilitate continual improvement of the regulatory framework pertaining to LBMP.

c. Financial management[370]

The access and allocation of appropriate finance/investment (public and private) for the implementation of a regulatory framework pertaining to LBMP is critical.[371] In this

---

366 To some extent, both France and South Africa have developed and implemented instruments to conduct effectiveness assessment of programmes and measures related to LBMP. Refer to 5.4.2 information about these instruments in South Africa and 3.5.3 for France. Also see Tanaka 2006 *ZaöRV* 568-571.

367 Based on the review of international best practice-related documents as identified in Appendix 1.

368 Based on the review of international best practice-related documents as identified in Appendix 1.

369 GPA.

370 To some extent, both France and South Africa have provided, different, instruments for financial management related to LBMP regulation. Refer to 5.4.3 for information about instruments for financial management related to LBMP regulation in South Africa and 3.5.2 for France.

context, it is useful to identify the internationally advocated best practice regarding financial planning, financial mobilisation and financial instruments, mainly from the public (government) sector perspective.[372]

In the context of financial planning, the Mediterranean Action Plan (MAP) advocates the development and implementation of an "investment portfolio" for LBMP-related activities. According to the MAP, an investment portfolio is a "framework for guiding investment choices and decisions, usually within changing environmental and socio-economic conditions". It sets out "the economic implications of environmental actions". The MAP states that an investment portfolio "should be used as a guide to develop deeper environmental-economic analysis in the light of funding and justification requirements at the regional and national levels". Such an instrument could be used to assess the most cost-effective regulatory instruments, and proactively to assess the finances needed to implement the various regulatory instruments and to prioritise the financing decisions pertaining to the regulatory framework according to the regulatory priorities. This refers to the budgeting exercise necessary for the development and implementation of a regulatory framework pertaining to LBMP. Such an instrument should integrate the principle of cost-effectiveness, cost-integrated water resources management, and proportionality.[373] The MAP states that "the mobilisation of resources is essential for the development and implementation of programmes, measures and action plans". It also indicates that most of the financial resources should be national and that they should be mobilised by polluters, consumers, users and governments. In this context, the polluter pays principle must be considered.[374] International co-operation is also regarded as an important source of financial assistance. The MAP recognises the pivotal role of international co-operation in facilitating and promoting capacity-building, technology transfer and co-operation and financial support. In this context, the MAP highlights the financial role of international agencies, i.e. UNEP, the World

---

371 Based on the review of international best practice related documents as identified in Appendix 1.

372 Based on the review of international best practice related documents as identified in Appendix 1.

373 See 2.3.1.

374 See 2.3.1.

Bank or the Global Environmental Fund (GEF). In terms of the financial instruments (including market-based instruments) or approaches which are regarded as useful for the regulation of LBMP, international best practice advocates the following approach/principles:

- Adjust prices for the users of water in line with their economic and environmental costs;
- Establish and apply a tax for the treatment of waste water which gradually covers the costs of treatment and disposal;
- Establish, where appropriate, an industrial waste management fee at rates that reflect the cost of providing the service, and ensure that those who generate the wastes pay the full cost of disposal in an environmentally safe way;
- Introduce economic and financial incentives to encourage the use of cleaner production techniques; and
- Introduce pollution fees and fines to reduce the environmentally harmful impacts of certain activities. Pollution fees and fines can also be used as a source of funds for environmental activities.[375]

375 In connection with the financial instruments or approaches, international best practice also advocates the following: encourage (through financial incentives) more efficient water use, and mobilise the funds needed for operation, maintenance and new investment; and establish a fee for the discharge of waste water which complies with the regulations adopted for its discharge into public channels, rivers and the sea. This fee should take into account the volume of water discharged and its quality, and its ultimate aim should be to help maintain and monitor the quality of the receiving water. Establish an annual tax applied to vehicles for their harmful emissions into the atmosphere and use of carburants. Users should, where appropriate, pay for the costs of the collection and disposal of urban solid waste. Establish a tax for air emissions from industrial installations. This tax would be higher in the case of industrial installations located in "hot spots" and areas of concern. Both the public and the private sector should set up a fund from which advances can be made to support the recycling of waste and introduce economic and financial incentives to encourage the use of goods with less potential to pollute, for example, by encouraging the use of unleaded petrol. Efforts to mobilise local and national resources for environmental protection through user fees or pollution charges are expected to yield results very gradually, according to information from MAP.

d. Information management[376]

Information management (including research, reporting and notification) is regarded as an essential component of the regulatory framework to manage LBMP.[377] The main international best practice in this context relates to the types of information to be collected, the format, accessibility and communication of such information and the reporting obligation.[378] International best practice provides valuable guidance on the type of information to be collected, including data/information on the resources to be protected (i.e. an assessment of their ecological status) and the quantities of priority substances discharged (inputs), on the authorisations, permissions and EIAs and environmental audits applicable, on legal and regulatory measures, action plans, programmes and other steps taken for the regulation of LBMP, and on the results achieved in the prevention, control, reduction or elimination as appropriate of any hot spots in the territory.[379] The MAP sets out specific information management instruments available which could be used, including public tracking and reporting systems of pollutants, known generically as Pollutant Release and Transfer Register (PRTRs),[380] general and specific monitoring programmes (national and regional), and, the establishment of a clearing house mechanism.[381]

---

376 To some extent, both France and South Africa have developed different instruments for information management related to LBMP regulation. Refer to 5.4.1 for further information about instruments for information management related to LBMP regulation in South Africa, and to 3.5.1 France. Also see Tanaka 2006 *ZaöRV* 568-571.

377 Based on the review of international best practice-related documents as identified in Appendix 1.

378 Based on the review of international best practice-related documents as identified in Appendix 1.

379 Also information/data on baseline concentrations; on priority activities or substances altering or destroying the coastline, habitats within coastal and marine areas, and related watersheds; on the general results achieved and, if the case arises, on the difficulties encountered. It should include data from monitoring natural resources (ambient monitoring); from monitoring sources of pollution (source monitoring); and from monitoring activities and programmes (effectiveness monitoring). These statements are based on the review of international best practice-related documents as identified in Appendix 1.

380 "A PRTR is an environmental database or inventory of potentially harmful releases to air, water and soil. Also included in the database are wastes transferred for treatment and disposal from the site of their production. In addition to collecting data for PRTRs from stationary (or point) sources such as factories and waste facilities, some PRTRs are designed to include estimates of releases from diffuse sources; these include agricultural and transport activities based on other data elements (e.g. number of automobiles). Data concerning releases and transfers are provided by the facility, the type, quantity and affected environmental media must be included in the reporting. Data are then made available to the

International best practice also provides guidance regarding the limitation in the data and the extent to which they can be tolerated, inter-comparability requirements,

public. One considerable benefit of a PRTR to governments, the public and industry is its ability to provide in one concise place, a set of data critical to governments for pollution prevention and control and for chemicals management. It answers the following questions: Who is generating potentially harmful releases or transfers to various environmental media - What pollutants are being released or transferred - How much is being released or transferred over time - What is the geographic distribution of the releases and transfers - With this information, government authorities can set priorities for reducing or even eliminating the most potentially damaging releases. In those countries with systems in place, this information has stimulated potentially affected and interested parties to ask questions of firms whose performance is significantly below normal for their sectors, and to demand improvements". OECD 2010 http://www.oecd.org/document/58/0,3343,fr_2649_344111913466_1_1_1_1,00.html. Also refer to PRTR.net, a website which provides a global portal to Pollutant Release and Transfer Register (PRTR) information and activities from countries and organisations around the world. The website aims to assist countries in the development, implementation and improvement of PRTR programmes. It has been developed and is maintained by the Task Force on Pollutant Release and Transfer Registers (PRTRs) of the Organisation for Economic Co-operation and Development (OECD), in co-operation with the United Nations Economic Commission for Europe (UNECE) and the United Nations Environment Programme/GRID-Arendal, http://www.prtr.net/. The development and implementation of a PRTR system adapted to national needs represent an effective way for governments to track the generation, release and fate of various pollutants over time.

381 In this context, the MAP prescribes that the functions of the clearing-house should include:

- To collect, treat and disseminate information as well as data on available technologies, their sources, their environmental risks and the broad terms under which they may be acquired.
- To disseminate information on concrete cases where environmentally sound technologies were successfully developed and implemented.
- To advise, assist and suggest guidelines, for instance for policy integration, capacity building, technology transfer, etc.
- To facilitate other services, as for instance to be the source of advice, training, technology and technology assessment.
- To allow decision makers to have ready access to data and obtain direct contact with the sources of information, practical experience and technical expertise identified therein (including the relevant organisations, institutions, firms and/or individuals).
- To assess and manage LBMP-related incidents/accidents.

For further information also see SAEON http://www.saeonocean.co.za/geonetwork/srv/en/main.home which sets out the clearing-house mechanism for South Africa under the Nairobi Convention. "The South Africa Clearinghouse and information sharing system is designed to provide a one-stop mechanism that promotes the advertising, discovery, access, dissemination and use of the increasingly diverse and comprehensive data using the decentralized capabilities of the Internet. Through a clearinghouse and a Web interface, the system provides integration of information held by numerous departments, institutions and organisations to deal with the vast array of policy, management, scientific and other practical issues of the coastal and marine environment in South Africa. The South Africa Clearinghouse mechanism constitutes the national platform for the Nairobi Convention Clearinghouse and information sharing system. In essence, the goal of the Nairobi Convention Clearinghouse is to improve the coordination and participation of South Africa in implementing the Convention for the protection, management and development of the marine and coastal environment of Eastern Africa Region. This is in accordance with Decision 4/8 of the contracting parties to the Convention. The other contracting states are Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia and Tanzania".

requirements for analytical quality control, and requirements for data storage, retrieval and exchange.[382]

e. Public participation[383]

International best practice emphasises the importance of ensuring that all relevant stakeholder groups are part of the decision-making process.[384] Generally speaking, three significant stakeholder groups can be identified: the authorities,[385] the users,[386] and the supporters.[387] This also refers to the participative management principle.[388] In this context, international best practice does not provide specific guidance regarding the measures, tools or specific instruments to be used, but it refers to international guidance related to public participation in environmental management generally.[389]

---

382 Guidance is provided mainly by the Montreal Guidelines 1985 Annex III.

383 To some extent, both the French and the South African environmental regulatory frameworks relevant in the context of LBMP provide for public participation. Refer to 5.4.4 for further information about South Africa and to 3.5.5 for France.

384 Based on the review of international best practice-related documents as identified in Appendix 1.

385 These are authorities at national, regional and local level, who have the overall responsibility to manage the public interests, including politicians and parliamentarians, relevant ministries (national development, finance, planning, environment, water, agriculture, health, public works, transport, energy), and the judiciary, legislators and regulators.

386 These are users mainly at regional and local level, who extract personal benefits from the resources. This group will include the private sector (business and industry, services and financial sectors), agriculturalists, tourism associations, local and indigenous communities, and women's groups.

387 These are supporters mainly at regional and local level, who assist both the authorities and the users in specific tasks. Such a group will include NGOs such as conservation and youth groups, researchers, scientists, financial institutions and potential investment partners, both domestic and international, and the media.

388 See 2.3.1.

389 In terms of Principle 10 of the *Rio Declaration on Environment and Development* (1992), "Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided. Principle 23.2 of Agenda 21, 1992, notes that one of the fundamental prerequisites for the achievement of sustainable development is broad public participation in decision-making. Furthermore, in the more specific context of environment and development, the need for new forms of participation has emerged. This includes the need of individuals, groups and organisations to participate in environmental impact assessment procedures and to know about and participate in decisions, particularly those which potentially affect the communities in which they live and work. Individuals, groups and organisations should have access to information relevant to environment and development held by national authorities, including information

However, international best practice supports the need for focused public involvement and participation at the coastal zone and river basin level.[390]

f. Capacity building

Capacity building (for the public and private sector) is regarded as a pivotal tool, especially in developing countries like South Africa, to implement an effective regulatory framework for LBMP.[391] According to the sources of best practice in countering LBMP, capacity building should be aimed at addressing the specific matters and objectives relevant to the efficient regulation of LBMP.[392] The financing of such capacity training will also have to be ensured from national or international sources. International best practice is not specific on the way to achieve effective

---

on products and activities that have or are likely to have a significant impact on the environment, and information on environmental protection measures". "Public participation is an open, accountable process through which individuals and groups within selected communities can exchange views and influence decision-making and public participation is a democratic process of engaging people in thinking, deciding, planning, and playing an active part in the development and operation of services that affect their lives". Calouste Gulbenkian Foundation 1973 http://devplan.kzntl.gov.za/ASALGP/Resources/Documents/ASALGPhandbooks/1-what-is-public-participation.htm. For further information see Kurukulasuriya and Robinson *Training manual on international environmental law*; Koontz *Collaborative Environmental Management*; Ewing *Public participation in environmental decision making*; Beierle and Cayford *Democracy in Practice*; Bowman and Roberts *Public Participation in Environmental Decisionmaking*; Depoe, Delicath and Elsenbeer *Communication and Public Participation*.

390 For further information about public participation see Cicin-Sain and Knecht *Integrated Coastal and Ocean Management* 237-239.

391 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

392 Including institutional capacity building in the field of environmental matters: improving access to and the availability of technological and scientific information at all levels; EIA; environmental auditing and management; environmental education; academic and excellence research centre training and focus in terms of LBMP; organising sufficient training and educational programmes for local administration to operate and maintain sewage treatment facilities adequately; facilitating the identification of opportunities for projects contributing to sustainable development in the private sector; the integrated management of coastal areas; the management of water demand; eco-tourism (to promote initiatives that are compatible with the environment and the social and cultural background); rural development; the development of effective policies on waste reduction and on the environmentally sound management of urban solid waste; the environmentally sound treatment of municipal sewage discharged to rivers, estuaries and the sea, or other solutions appropriate to specific sites; pollution and ambient quality monitoring; air pollution monitoring; effluent discharges, emission monitoring and inspection; ecological agriculture; and the development and implementation of monitoring and performance indicators.

capacity building. Guidance from international best practice related to capacity building is rather general.[393]

g. Compliance and enforcement

Effective enforcement of and compliance with the regulatory framework pertaining to LBMP is essential to ensuring the effective reduction of LBMP.[394] In this context, international best practice advocates the following: effective integration of the polluter pays principle in the legal system, comprehensive inspections of development and activities, strict sanctions, fines and penalties, the creation of environmental crimes in terms of LBMP, the development of a comprehensive compensation regime, the implementation (by the private sector and the relevant authorities) of relevant monitoring programmes, and the effective reporting of

---

393 "Agreements made at the regional level have to be implemented on national and local levels. While the national government has the overall legal responsibility, the capability to oversee and enforce environmental legislation primarily lies within the realm of local governments. To fulfil laws, rules, and regulations the implementing and supporting institutions and organizations must be strengthened. Capacity building, enhancing the competence and capacity of the relevant institutions, is therefore an important activity". Daoji and Daler *Ocean pollution from Land-based sources east China sea* Several Regional Seas Programmes have been involved in capacity building activities in 2009. This includes capacity building for government and researchers in ecosystem-based management, the socio-economic evaluation of ecosystem services, the evaluation of conservation activities, the cumulative effects of human activities, climate change adaptation and marine spatial planning. Some of the training also aims at addressing the challenge of improving the link between science and policy. One example of this is the project "Addressing land-based activities in the Western Indian Ocean (WIO-LaB)" which seeks to tackle some of the major environmental problems and issues related to the degradation of the marine and coastal environment resulting from land-based activities (LBA) in the Western Indian Ocean (WIO) region. It is funded by the countries of the WIO Region, the Norwegian government, UNEP, and the GEF, and runs from 2005-2010. The project's objectives are to improve the knowledge base and establish regional guidelines for the reduction of stress to the marine and coastal ecosystem by improving water and sediment quality; to strengthen the regional legal basis for preventing land-based sources of pollution; and to develop regional capacity and strengthen institutions for sustainable, less polluting development. A lack of adequate technical capacity has been recognised as a restricting factor for many of the region's governments, in particular in relation to marine science; for example in the implementation of the water and sediment quality monitoring programmes. Developing national capacity is therefore a key focus of the project. UNEP *Contribution to capacity building for division of ocean affairs and law of the sea report* 2009 http://www.un.org/Depts/los/generalassembly/contributions_2010/UNEP.pdf.

394 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA. Also refer to Weiss 1997 *Environmental Policy and Law* 297-303.

contraventions.[395] In this context, it is regarded as essential for the government to have adequate capacity and skills to ensure effective enforcement.[396]

2.3.4.3 Proposed sectoral combination of regulatory instruments[397]

Direct and indirect regulatory instruments are interdependent and should be combined in a regulatory framework pertaining to LBMP. In this context, international best practice advocates that the regulatory framework should implement the most efficient combination of direct and indirect regulatory instruments.[398] The Montreal Guidelines provide specific guidance on the factors which may influence the policy choices, the selection and the combination of regulatory instruments, which are categorised as follows:[399]

- Economic: including general economic conditions and trends (i.e. deficit, balance of trade, inflation), the availability of public financing, the availability of external funding, unemployment, the economic viability of various sectors, the "polluter pays" principle, the availability of institutions and infrastructure.

- Scientific/technical: including the availability/accessibility of scientific data, the availability/accessibility of technology and the availability of expertise, the capability for monitoring, existing engineering infrastructure, experience with the implementation of strategies or instruments elsewhere, the sensitivity of the ecosystems to be affected, climatic considerations, knowledge of the current level of pollution of the receiving environment and of identified trends in municipal, agricultural and industrial waste releases.

---

395 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

396 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

397 South Africa and France have implemented their respected strategic combination of instruments in terms of LBMP. This research provides a detail critical appraisal of the policy and regulatory mix selected by each country. Refer to 5.3, 5.4 and 5.5 for an assessment of the strategic "cocktail of instruments" implemented in South Africa and 3.4, 3.5 and 3.6 France.

398 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

399 Montreal Guidelines.

- Social/culture/political: including infrastructure, the existing and proposed uses of the marine environment and the political realities, social/cultural awareness of the population, and the perception of environmental, social and cultural values.

Direct and indirect regulatory instruments should be optimally combined to increase the efficiency and effectiveness of the LBMP regulatory framework.[400] The MAP provides guidance on the combination of instruments which can be implemented on a sectoral basis to address specific sources of LBMP. For example, in terms of LBMP from municipal sewage, the MAP advocates the following combination of regulatory instruments: a national authorisation/licence/permit system for waste water disposal,[401] development and implementation of agreed environmental quality criteria/standards,[402] criteria and/or standards for waste water treatment requirements,[403] guidelines for operation and maintenance of waste water facilities,[404] a comprehensive inventory[405] and monitoring of points of discharge regarding waste water,[406] the regulation of the reuse of waste water (the conservation of water resources),[407] the regulation of use and disposal of sewage sludge,[408] and the regulation of the separation of rain waters and municipal waste water.[409] The US

---

400 Osborn and Datta 2006 *Ocean & Coastal Management* 576-596. "To ensure an effective and efficient environmental enforcement regime, a series of tools need to be selected, adopted and used in order to harness the synergies offered by both their differential performance and failure potentialities...there is no universal cocktail or broad spectrum portfolio of tools that guarantee successful environmental enforcement for all situations. Selection, adoption and use of the correct or optimum mix of enforcement tools that suit specific conditions and requirements, is essential to ensure an efficient and effective enforcement regime. Knowledge of the potential performance and failure modes as well as the strengths and weaknesses of all the types of environmental enforcement tools is imperative to design an efficient and effective portfolio of environmental enforcement tools that offer an improved capability to drive sustained and reliable environmental enforcement". Nel and Wessels 2009 *PER* and Nel and Du Plessis 2004 *SA Public Law* 181-190.

401 A direct regulatory instrument based on the "sources directed approach".

402 A direct regulatory instrument based on the "resource-directed approach".

403 Direct regulatory instruments based on the "sources-directed approach".

404 A direct regulatory instrument based on the "sources-directed approach".

405 An indirect regulatory instrument.

406 An indirect regulatory instrument.

407 A combined direct regulatory instrument based on the "sources directed approach" and planning management.

408 A direct regulatory instrument based on the "sources directed approach".

409 A direct regulatory instrument based on the "sources directed approach". With regard to LBMP from urban solid waste, the implementation of the following instruments is advocated

Ocean Policy also provides details on specific programmes, measures and action plans which combine direct and indirect regulatory instruments, to facilitate the regulation of LBMP from point and non-point sources. In terms of point sources regulation the policy suggests the following mix of instruments and measures: a national pollutant discharge system[410] (a permit system associated with water quality standards), the determination of a total maximum daily load for priority pollutants[411] (which also assists in the management of non-point sources), a "clean water state revolving fund",[412] a water pollutant trading policy for priority pollutants,[413] the

---

by the MAP: the reduction at source and environmentally sound management of urban solid waste; insisting on producers' responsibility for the disposal of certain goods (paper, packaging, pneumatic goods): recycling; regeneration; and reusing. In terms of LBMP from air pollution, the MAP advises the authorities to regulate traffic management; to regulate fuel use and incentivise the use of less polluting fuels; to regulate air quality objectives; and to develop economic incentives for the maintenance of vehicles and the renovation of old vehicles. In terms of LBMP from industrial development, the following instruments are advocated: the compiling of an inventory of point source discharges and emissions of pollutants and emissions of pollutants in hot spots and areas of concern (in industrial areas); the control of point source discharges of industrial waste water; the development of guidelines, criteria and standards; and the promotion of the joint handling of waste waters. For LBMP from toxic, persistent substances and those which are liable to bioaccumulate, the following regulatory mix is advocated by the MAP: the compiling of an inventory of quantity and use; the phasing out of use and the prohibition of manufacturing, trade and new use; the regulation of disposal; environmental audits; the development of environmental voluntary agreements between authorities, producers and users on the basis of a reduction plan; incentivising the use of environmentally friendly products; developing pollution control measures; BAT, BEP; regulating integrated pest management; regulating the sustainable use of toxic substances; the regulation of good agricultural practices; regulating the use of fertilisers and other toxic substances.

410 A direct regulatory instrument based on the "sources based approach", associated with a direct regulatory instrument based on the "resource based approach". The programme regulates polluters by issuing permits that reflect federal standards for discharges (the sources based approach). If the regulatory agency determines that a particular water body is not meeting water quality standards (the resource based approach), the permit holders discharging to those waters may be required to implement more stringent controls (the sources based approach). US Commission *An ocean blueprint* 207.

411 A direct instrument based on the "resource based approach". The programme establishes the maximum amount of a pollutant that can be present in a water body while still meeting the water quality standards. US Commission *An ocean blueprint* 207.

412 An indirect regulatory instrument (related to financial management). States decide which projects have the highest priority for funding, the borrowers repay the loans, and the programme lends the money again to other borrowers. The states provide below-market interest rates and other financial incentives to towns, counties, non-profit organisations, farmers and homeowners for water quality improvement projects. The funds finance capital construction costs - not operations and maintenance - and are used mostly to build or improve wastewater treatment plants and related sewer systems. This programme is widely considered a cost-effective, long-term mechanism for meeting infrastructure demands. US Commission, *An ocean blueprint* 207.

development of enforceable best management practices for priority activities and sectors,[414] and the implementation of market-based incentives and disincentives especially regarding the use and discharge of certain priority substances.[415] In terms of non-point sources, the policy refers to the following mix of instruments and measures: a non-point sources pollution programme,[416] an agricultural conservation programme,[417] and the improvement of watershed, coastal management and planning processes.[418]

---

413 An indirect instrument based on financial management. This instrument is a market-based instrument (MBI). In terms of the National Treasury Tax Policy Chief Directorate *Draft policy paper. a framework for considering market-based instruments to support environmental fiscal reform in South Africa* 2006. Market-based instruments (MBIs) are "a package of policy instruments that seek to correct environmentally-related market failures through the price mechanism. By seeking to alter the relative prices that individuals and firms face, market-based instruments could be a more efficient way of addressing certain environmental concerns. In some instances, such instruments could be used to replace command-and-control measures, but in most cases they have a complementary role". "Unlike the command-and-control approach, MBIs use price or other economic variables to provide incentives for polluters to reduce harmful emissions. MBIs include charges, subsidies, marketable (or tradable) permits and other MBIs including deposit/refund systems, eco-labelling, licenses, and property rights". ESCAP 2003 http://www.unescap.org/DRPAD/VC/orientation/M5_3.htm. Refer to 3.5.2 and 5.4.3 for further information on MBIs. Under the US policy, a source can be reduced beyond the required levels, creating a credit that can then be sold to another source discharging the same pollutant to the same body of water. The Environmental Protection Agency (EPA) has had a water pollutant trading policy in place since the 1990s, primarily for use among wastewater treatment plants. US Commission *An ocean blueprint* 212.

414 A direct regulatory instrument based on the "sources directed approach".

415 An indirect instrument based on financial management.

416 Such a programme will probably be a mix of direct and indirect regulatory instruments. It relies on the implementation of best management practice (the sources directed approach) compiled by EPA. US Commission on Ocean policy *An ocean blueprint* 214.

417 The programmes encompass a mix of indirect and direct instruments based on planning management and the "sources directed approach". The agricultural conservation programmes generally involve cash payments to farmers to implement conservation and best management practice on productive farm and ranch lands, the retirement of land through permanent or long-term easements, and the conservation and restoration of wetlands and grasslands. "These programmes present an opportunity to decrease nonpoint source pollution and improve aquatic habitats and natural resources". US Commission *An ocean blueprint* 214.

418 Direct instruments based on planning management. The policy also includes the following in this mix of instruments and measures: re-address planning and zoning schemes in terms of their impact on water quality; develop enforceable best practice for priority activities and sectors; develop specific insurance programmes; develop a storm-water pollution prevention plan for municipalities, proposed urban and industrial developments; implement a storm-water permit systems; develop an air-water interface work plan; compile an inventory of air emissions and their potential impact on marine water resources (including an analysis of trans-boundary pollution); and conduct technological research and development especially in terms of waste-water treatment facilities.

Osborn and Datta[419] promote "incremental experimentation with a variety of instruments and combination thereof", emphasising that policy instruments should be regarded as complementary rather than alternatives. Osborn and Datta[420] advocate a strategic "cocktail" of instruments. The concept of a mix of instruments is not new,[421] but it is an essential concept/approach which will affect the overall effectiveness of the policy and regulatory framework of a country in terms of LBMP. It is therefore important for a country to assess and implement a regulatory mix best suited to its own environmental, cultural, constitutional and economic circumstances.[422]

Due to the cross-sectoral and multi-disciplinary character of LBMP regulation, a wide range of regulatory instruments and integrated tools must be incorporated in a legal framework.[423] International best practice suggests that such incorporation should be conducted taking into consideration the current legal system in the country.[424] In this context, a legal review and assessment of the current national environmental legal framework to assess its implications for the regulation of LBMP should be conducted, and it should assess how to incorporate the necessary regulatory instruments and measures. The laws related to the following sectors are regarded as the most relevant in terms of LBMP regulation: coastal and marine waters, fresh waters, agriculture, forest management (including mangroves), biodiversity, tourism, mining, pollution and health.[425] Osborn and Datta[426] advocate that the regulatory framework should provide for the best combination of instruments and measures and assess the best mix of command-control, voluntary and economic-based instruments, taking into consideration the social, economic, legal, institutional, environmental and cultural specificities of the country and its regulatory priorities and objectives in terms of LBMP. It is internationally recognised that it is not the lack of

---

419 Osborn and Datta 2006 *Ocean & Coastal Management* 576-596.
420 Osborn and Datta 2006 *Ocean & Coastal Management* 576-596.
421 Buergenmeier 1999 *FEEM Working Paperction* 42-99; Persson *Choosing environmental policy instruments*; OECD *Environmental outlook to 2030.*
422 Osborn and Datta 2006 *Ocean & Coastal Management* 576-596.
423 Osborn and Datta 2006 *Ocean & Coastal Management* 576-596.
424 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.
425 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.
426 Osborn and Datta 2006 *Ocean & Coastal Management* 576-596.

legislation which might impair the effective regulation of LBMP, but rather the fragmentation of the legal and institutional framework (especially in terms of mandates).[427]

2.3.5 National institutional structure

Considering the cross-sectoral nature of LBMP,[428] the institutional structure has to be effectively integrated and vertical[429] and horizontal[430] co-operation are regarded as essential.[431] It can be difficult from an international point of view to advocate a specific national institutional structure, considering that such a structure is dependent on the existing governmental and administrative structure and local circumstances of a state. International best practice does not provide detailed guidance on this matter, but suggests[432] that a "national focal institution" would be preferable to undertake the overall responsibility in terms of LBMP management and regulation. The need for efficient integrated and co-operative governance is also internationally recognised, especially at the watershed level.[433] The same is true of the need for the decentralisation of the operational functions in terms of LBMP to the municipal and/or local level (in a specific area like a bay).[434] International best practice[435] advocates delegated/shared responsibilities and partnerships among government, civil society, the private sector and other key stakeholders to facilitate the regulation of LBMP.

---

427 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

428 As outlined in Chapter 1, the sources of LBMP are various and complex. There are numerous state agencies involved in the regulation of LBMP, which makes LBMP a cross-sectoral issue.

429 Between different governmental spheres/levels, for example between national, regional/provincial and local governmental levels/spheres.

430 Between different line/sectoral departments/governmental agencies, i.e. water, coastal management and energy.

431 Own interpretation, based on the review of international best practice-related documents as identified in Appendix 1.

432 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

433 Based on the review of international best practice-related documents as identified in Appendix 1.

434 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

435 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

Specific factors are recognised as also having an influence on the most appropriate institutional structure, including financial constraints (affordability), institutional capacity constraints, a lack of institutional technical capacity, the need for clear agency mandates, the lack of agreed responsibility for the implementation of activities, the rationalisation/harmonisation of relevant legislation, the identification of jurisdictional overlaps, the resolution of statutory ambiguities, and compliance and enforcement capabilities.[436]

Due to the potential of the transboundary impact of LBMP and the existence of "international" watersheds, international best practice also advocates regional co-operation, especially between neighbouring states sharing river basins and/or coastal zones.[437] Regional co-operation should facilitate the uniform and harmonious development and implementation of relevant regulatory instruments, programmes of action and measures.[438] Regional co-operation is also considered a cost-effective mechanism for the regulation of LBMP especially regarding the development and implementation of the following instruments: EIAs, monitoring, scientific and technological research and development, scientific research, BEP and BAT.[439]

2.3.6 Determination of regulatory priorities

International best practice for the regulation of LBMP provides guidance on the possible regulatory priorities for action, by identifying some of the priority substances and activities which are the most relevant in terms of LBMP and which need to be

---

436 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA. "It should be noted that the application of those approaches and legal techniques are qualified by economic, political and social elements. For instance, as discussed earlier, the application of the precautionary approach is qualified by economic, political and social factors. Furthermore, the use of the BAT as well as the BEP must be balanced with the 'economic feasibility' of technology". Tanaka 2006 *ZaöRV* 573.

437 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

438 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA.

439 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA. However, as previously stated, this research focuses on the national regulatory framework pertaining to LBM. Regional considerations will therefore not be addressed. However, some European Union Directives will be assessed due to their implications for the French regulatory framework.

regulated using instruments based on the "sources based approach".[440] It also provides guidance on the most sensitive/vulnerable environments which require urgent and focused protection from LBMP, mostly using regulatory instruments based on planning management, i.e. the declaration of sensitive or protected coastal/marine areas.[441]

2.3.6.1 The need for regulatory priorities

In terms of the development of regulatory instruments, action plans, programmes and measures (regulatory interventions), it is internationally recognised that there is a need to identify and determine which regulatory intervention(s) should be prioritised. In terms of LBMP regulation, Annex II of the OSPAR Convention provides guidance on the criteria which should be used for setting regulatory priorities and assessing the nature and extent of the regulatory interventions needed (programmes and measures) and associated time scales.[442]

International best practice indicates that instruments, programmes, action plans and measures (most of them being regulatory interventions) need to be customised to the regulatory priorities of the state or region in terms of LBMP. The social, political, legal, economic and cultural characteristics and capacities of the state should be considered in the identification of the priority areas for regulatory interventions. An ecological status assessment[443] will be very useful in this context as it will enable the

---

440 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA. Also refer to 2.3.4.1 for further information.

441 Based on the review of international best practice-related documents as identified in Appendix 1, especially in terms of the GPA. Also refer to 2.3.4.1 of this study for further information.

442 Annex II of the OSPAR Convention sets out the following criteria to be taken in consideration to set the priority of regulatory intervention: persistence, toxicity or other noxious properties of pollutants and substances involved in LBMP; the tendency to bioaccumulation; radioactivity, the ratio between observed or (where the results of observations are not yet available) predicted concentrations of LBMP pollutants and concentrations with no observed effect; the anthropogenically caused risk of eutrophication; transboundary significance; the risk of undesirable changes in the marine ecosystem and the irreversibility or durability of effects; interference with the harvesting of sea-foods or with other legitimate uses of the sea; effects on the taste and/or smell of products for human consumption from the sea, or effects on the smell, colour, transparency or other characteristics of the water in the marine environment; the distribution pattern (i.e. the quantities involved, the use pattern and the possibility of reaching the marine environment); and the non-fulfilment of environmental quality objectives.

443 See 2.3.4.2(a) for further information.

identification of specific substances, activities and environments (to be protected) as regulatory priorities and specific regulatory instruments will then have to be developed and/or implemented to address such regulatory priorities. Monitoring programmes[444] and effectiveness assessments[445] may provide necessary information regarding the progress realised on such regulatory priorities (and the appearance of new ones) including the effectiveness of the regulatory interventions in this context, enabling continuous improvement.

In 2006, the UNEP/GPA Coordination Office highlighted six emerging challenges related to LBMP, including coastal dead zones, depleted freshwater (downstream rivers and near-coast freshwater wetlands), new chemicals in the environment, the lack of healthy and resilient coastal habitats, and the impact of the sea level rise.[446]

2.3.6.2 Priority substances, activities and environments

As previously indicated,[447] some substances are internationally regarded as the most troubling in terms of LBMP.[448] The Montreal Guidelines Annex II[449] also provides useful guidance on the classification of substances to determine those which should be regulated as a priority in order to reduce and avoid LBMP. The Montreal Guidelines specify that substances may be classified into a "black list", meaning that these substances need to be eliminated and a "grey list", which consists of substances which should be strictly limited and reduced.[450] The basic criteria to be considered in assessing substances include their persistence, their toxicity or other noxious properties, and their tendency to bioaccumulate. Other factors also need to be taken into consideration, including the location and quantities of the discharge.[451]

---

444 See 2.3.4.2(a) and (d) for further information.
445 See 2.3.4.2(b) for further information.
446 UNEP *Protecting the coastal and marine environment*, 43.
447 Refer to 2.2.2 for further information.
448 *Inter alia*, heavy metals and their compounds; organohalogen compounds, nitrates; organic compounds of phosphorus and silicon; biocides such as pesticides, fungicides, herbicides and insecticides; oils and hydrocarbons of petroleum origin; nitrogen and phosphorus compounds; radioactive substances, including wastes; and persistent synthetic materials.
449 The Montreal Guidelines.
450 For further information, see Tanaka 2006 *ZaöRV* 553-556.
451 In terms of the substances which cannot be discharged into the marine environment, they might include substances which are not readily degradable or rendered harmless by natural

In consideration of the ecological assessment to be conducted by states,[452] substances can be identified and regulated as priority substances[453] and can be classified as black or grey substances. Recent conventions tend to replace the black/grey lists approach by the "uniform approach", which seeks to regulate harmful substances causing LBMP without any differentiation of obligations in accordance with the degree of its harmfulness.[454]

International best practice recognises certain activities as the most common sources of LBMP.[455] According to international best practice, each country should identify the main activities which are sources of or contribute to LBMP, through ecological assessments, and should regulate them as priority sectors in terms of LBMP using planning management or "sources based" regulatory instruments.[456]

---

processes; and may give rise to the dangerous accumulation of harmful material in the food chain; or may endanger the welfare of living organisms causing undesirable changes in the marine ecosystems; or interfere seriously with the harvesting of sea-foods or with other legitimate uses of the sea.

452 See 2.3.4.2(a) above for further information on ecological assessment.

453 See 2.3.6.1 above for further information about setting the priority of action, especially regarding the regulation of substances identified as the main pollutants in LBMP. Both France and South Africa have identified specific substances as the main sources of LBMP and in some instances have developed specific programmes/measures to address LBMP from such substances, like the "nitrates programme" in France, or the "marine litter programme" (including the "plastic bag campaign") in South Africa. For further information refer to 3.4 for France and Chapter 6 for South Africa.

454 "It appears that the uniform approach reflects this paradigm shift in the marine environmental protection. In this sense, it could be said that the replacement of the black/grey lists approach by the uniform approach is an important development in this field". Tanaka 2006 *ZaöRV* 556.

455 Including diffuse sources from agricultural areas; energy production; fertiliser production; the production and formulation of biocides; the pharmaceutical industry; petroleum refining; the paper and paper-pulp industry; cement production; the tanning industry; the metal industry; mining; the shipbuilding and repairing industry; harbour operations; the textile industry; the electronic industry; the recycling industry; other sectors of the organic chemical industry; tourism; agriculture: animal husbandry; food processing; aquaculture; the treatment and disposal of hazardous wastes; the treatment and disposal of domestic waste water; municipal solid waste; the disposal of sewage sludge; the waste management industry; the incineration of waste and the management of its residues; works which cause physical alteration of the natural state of the coastline; and transport. The Nairobi Convention (art 1 and 3 of Protocol on LBMP) also makes reference to coastal erosion resulting from man's activities, such as land reclamation and coastal engineering as well as the destruction of marine and coastal ecosystems caused by engineering activities such as land reclamation and dredging. Based on the review of international best practice-related documents as identified in Appendix 1. They have developed specific programmes, measures and/or instrument to regulate LBMP from such activities.

456 Based on the review of international best practice-related documents as identified in Appendix 1. Both France and South Africa have respectively identified activities which are regarded nationally as main sources of LBMP, agricultural activities being one of them for France and

Certain areas of the marine and coastal environment are regarded as more vulnerable to LBMP and require specific protection through the regulatory framework.[457] The most affected or vulnerable areas to LBMP commonly include critical habitats such as coral reefs, wetlands, sea-grass beds, coastal lagoons and mangrove forests, habitats of endangered species, ecosystem components such as spawning areas, nursery areas, and feeding grounds, shorelines, coastal watersheds, estuaries and their drainage basins, specially protected marine and coastal areas, and small islands.[458]

2.4 The importance of the socio-economic assessment in this study

The concept of sustainable development, which is most commonly defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs",[459] demonstrates the intrinsic

---

port development being one for South Africa. For further information refer to 3.4 for France and Chapter 6 for South Africa.

457 Including: the coastal zone, coastal wetlands, estuaries, enclosed seas and bays, mangroves, corals reefs, and others sensitive areas due to specific local factors (i.e. very polluted areas, pristine coastal zone, areas identified as reproductive zone for marine life, heritage sites). "The degree of marine pollution varies in each coastal region. It is observed that usually land-based pollutants are not transported far from their sources of discharge, and, thus, the land-based marine pollution is regionalised. Furthermore, it is conceivable that affects of land-based pollution are more serious in shallow enclosed or semi-enclosed coastal sea areas than open oceanic areas. In such areas, more stringent regulation of land-based pollution than in other marine areas will be needed. In fact, almost all regional agreements governing this issue are essentially concerned with enclosed or semi-enclosed seas", Tanaka 2006 *ZaöRV* 548-549.

458 UNEP *Protecting the coastal and marine environment.*

459 The term was formally established by the Brundtland Commission in 1983. The Commission was created to address growing concern "about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development". In establishing the commission, the United Nations (UN) General Assembly recognised that environmental problems were global in nature and determined that it was in the common interest of all nations to establish policies for sustainable development. It is not the purpose of this research to discuss sustainable development but it is important to note the current debate regarding the relationship between sustainable development, sustainability and environmental governance. Kotzé *Integrated Environmental Governance 10-14* states that sustainable development is typically a regulatory function, which may be facilitated by way *inter alia* of environmental governance. He supports the view that sustainable development should be regarded as a mechanism that may be utilised to achieve sustainability. He states that whilst sustainable development requires a long-term approach for the establishment of an equilibrium between development and the environment, sustainability refers to activities or conditions that can be maintained in future without constant external inputs. In his terms, sustainability is the ability to maintain a desired condition over time without eroding natural, social and financial resource bases, though a process of continual improvement in the form of sustainable development. Sustainability also relates to

interconnection and interdependency between the environment and social and economic processes.[460] The interconnection of these factors may have implications for assessment of the adequacy, efficiency and effectiveness of a country's environmental regulatory framework.[461] National economic and social considerations and characteristics have to be carefully considered in the environmental regulatory and institutional design process,[462] especially in the selection (and development) of the regulatory objectives and scope, and the regulatory instruments and institutional structure to be incorporated in the country's environmental law. For example, the level of literacy and education of the majority of the population in a country will influence the level of sophistication of the regulatory instruments and measures to be implemented.[463] The overall macro-economic objectives of a country will also have implications for the scope and objectives of environmental legislation.[464] The economic and fiscal development of a country will influence the introduction of market-based instruments for environmental purposes.[465] The capacity level of the national administration should also be considered in the design and development of environmental institutional and regulatory instruments.[466] It has to be emphasised that broad socio-economic phenomena might increase the negative impact of LBMP

---

the integration of various considerations including the environment, the economy, social factors, environmental governance and management efforts, and public and industry involvement. He also supports the position that sustainability is more comprehensive in nature than sustainable development.

460 In terms of CISDL *Strengthening environmental governance and law for global sustainable development* 12, "sustainable development was never meant to replace the environment as a priority. Neither was environmental law and policy meant to provide the only answer for problems which reach far beyond this field. Rather, environmental protection and restoration is necessary in its own right, and sustainable development can help other areas of law (trade, investment, social development) to address environmental challenges. Integrated instruments provide valuable legal guidance at the intersections".

461 UNEP Montreal Guidelines, and as explained in 3.1.1 Also see for the South African context, *Fuel Retailers Association of Southern Africa v Director-General Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province, and Others* 2007 6 SA 4 (CC) and *Fuel Retailers Association of SA (Pty) Ltd v Director-General, Environmental Management, Mpumalanga* 2007 2 SA 163 (SCA) 168A-171A. For further information on such cases, refer to Hayward and O' Neill Justice 1997 Property and the Environment 1; Britz 2007 *SALJ* 263, 275; Kotzé and Retief 2009 *SAJELP* 139-155; Kidd 1999 *SAJELP* 85-102; Du Plessis and Feris 2008 *SAJELP* 157.

462 La Viña and Ateneo The future of environmental law and governance 3.

463 La Viña and Ateneo The future of environmental law and governance 3.

464 UNEP *Protecting the coastal and marine environment* 24.

465 National Treasury Draft policy paper a framework for considering market-based instruments to support environmental fiscal reform in South Africa 2006.

466 UNEP *Protecting the coastal and marine environment* 18.

on the marine environment or increase the generation of LBMP.[467] Such phenomena include population pressures, poverty, energy consumption, the extensive urbanisation of coastal areas, consumption patterns (including the use of water and other natural resources), globalisation, tourism, increased demand for space and natural resources, climate change, and extensive industrialisation.[468] The main sources of LBMP are related to economic activities and social pressures.[469] Considering that this research encompasses a comparison of the French and South African regulatory frameworks in the context of LBMP, it is necessary first to provide an overview of the main socio-economic features of both countries.[470] Such an overview will provide the necessary information to improve the relevance and adequacy of the legal assessment undertaken in this research. The socio-economic situation of South Africa will have to be taken into consideration in the determination of the most adequate, efficient and cost-effective environmental regulatory framework for LBMP regulation, especially as regards the regulatory instruments. Some of the socio-economic differences between France and South Africa will have to be considered in the development of recommendations on the possibility of using some elements (if applicable) of the French environmental regulatory and institutional framework to assist South Africa in improving LBMP regulation and management.[471]

---

467 GESAMP/UNEP *Protecting the oceans from land- based activities* 24.

468 GESAMP/UNEP *Protecting the oceans from land- based activities* 20. Also see 2.2 for further information.

469 Such economic and social activities/pressures/factors contributing to LBMP include the following: transport, mining, agriculture, forestry, land-based fishing activities, tourism, industries, construction activities, port/harbour-related activities, recreational activities on the coast. DEAT *White paper towards sustainable coastal development in South Africa*. Also see 2.2.

470 See 5.1 for the South African overview.

471 See 7.4.

2.5 Conclusion

2.5.1 Definition of LBMP

The LBMP Protocol to the Nairobi Convention currently provides the most comprehensive definition of LBMP available.[472] As previously stated,[473] the most relevant elements of such a definition include the references to "land-based activities, sources and factors", "causing or contributing", "coastal and marine environment" and "direct and indirect causes" of marine pollution. The definition is regarded as being comprehensive in the context of LBMP regulation. However, this definition applies to land-based activities and sources of marine pollution and not to LBMP *per se*, a fact which might create some challenges for legal interpretation. Moreover, it does not provide clarity in terms of the inclusion in LBMP of climate change and dumping at sea.[474] It also does not make reference to "legitimate uses of the sea".[475] It follows that the definition has to be adapted for the purpose of this study in the context of the definition of "pollution" in the NEMA. The amended definition would then be relevant in South Africa, as it would maintain legal consistency between the two different definitions related to pollution. For the purpose of this study LBMP is therefore defined as:

(1) Any change in the marine and/or coastal environment directly or indirectly caused by any:
   a. substances;
   b. radioactive or other waves;
   c. noise, odours;
   d. heat;
   e. energy; or
   f. any other factors (including contributing factors),

   generated by land-based activities

472 See 2.1.1.
473 See 2.1.
474 See 2.3.2.
475 See 2.3.4.1(e).

(2) and where that change has or is likely to have adverse effects on the coastal and/or marine environment, associated living resources and marine life, human health, marine and coastal activities, including fishing; other legitimate uses of the coastal and marine environment; related amenities; and the suitability for use of sea water.

Such a definition provides a wide and comprehensive scope for LBMP regulation. It should also clarify the situation regarding the inclusion of climate change as LBMP, as the causes of climate change are covered by this definition. "Any other factors" can refer to land-use, coastal urbanisation, habitat destruction, or dune degradation. "Any changes" can include erosion. Under such a definition, offshore activities and dumping at sea are purposefully excluded from the scope of LBMP as they are not land-based activities. Dumping at sea from vessels often involves the dumping of waste generated on land. However, dumping at sea, as previously mentioned,[476] has a dedicated international and national regulatory regime which encompasses a very specific regulatory approach which is not applicable and relevant to LBMP in general and is therefore excluded from this study.

The current definition of "pollution" in terms of the NEMA[477] provides the necessary legal foundation to enable possibly effective regulation of LBMP in South Africa. It might therefore not be necessary to create a new definition for LBMP. But one may ask if the regulatory scope of the NEMA includes the coastal and marine environment.[478] The discrepancy between the NEMA and the NWA regarding the definition of "pollution", might be problematic in terms of LBMP regulation.[479] It would

476 See 2.3.2.

477 In terms of the NEMA, pollution is "any change in the environment caused by substances; radioactive or other waves; or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future".

478 Refer to 5.2 for further information on this question.

479 See 5.2 for further information.

therefore be preferable to have only one national definition for pollution.[480] In this context, the introduction by the NEM:ICMA of the concept of "adverse effects"[481] might also be problematic for the regulation of LBMP.[482] It might currently be too sophisticated a concept in the context of pollution management in South Africa. The concept of "adverse effects" is relevant and important for coastal zone management, and it seems that it should be regarded as a law principle in terms of administrative decision making in coastal zone management. Other definitions will also have to complement that of "LBMP", such as definitions of "marine and coastal environment", "coastal zone", and "maritime area".[483]

2.5.2 Understanding the nature and scope of LBMP

As demonstrated above, a thorough understanding and knowledge of the priority pollutants involved in LBMP, the main activities/sources/factors relating to LBMP, the main impacts of LBMP and the coastal and marine environments in a country and/or region most vulnerable to LBMP is essential for the design and implementation of an efficient and cost-effective regulatory regime. Such knowledge will enable the relevant authorities to understand the priorities areas for regulatory interventions, including from a time and cost perspective. Moreover, such information will ensure informed decision-making processes for the selection of the most adequate regulatory instruments, measures and institutional structures. LBMP is a complex phenomenon which is influenced by different factors. The regulation of LBMP will have to consider the following "elements" in the design and implementation of a regulatory regime:

---

480 See 5.2 for further information.

481 An adverse effect in terms of the NEM:ICMA is "any actual or potential impact on the environment that impairs, or may impair, the environment or any aspect of it to an extent that is more than trivial or insignificant and without limiting the term, includes any actual or potential impact on the environment that results in -
(a) a detrimental effect on the health or well-being of a person
(b) an impairment of the ability of any person or community to provide for their health, safety or social and economic needs: or
(c) a detrimental effect on the environment due to a significant impact or cumulative effect of that impact taken together with other impacts".

482 See 5.2 for further information.

483 Refer to 5.2 and 7.4 for further information on the matter.

- Point sources and non-point sources;
- The production, handling, use and disposal of substances identified as pollutants;
- The transmission of pollution from one medium to another, e.g.: from fresh water or the atmosphere to marine water;
- LBMP "pathways";
- The prioritisation of actions in terms of the main pollutants, sources, and impacts;
- the factors that contribute to LBMP; and
- the identification and protection of particularly vulnerable marine ecosystems.

The nature of LBMP implies a high level of complexity in the regulatory regime. A customised and appropriate regulatory approach and instrument(s) for each specific "element" of LBMP, as outlined above, will have to be developed and implemented. It will also be necessary for each country to select, identify and address its specific regulatory priorities in terms of LBMP.[484]

2.5.3 International best practice in terms of LBMP regulation

The international best practice analysed above provides guidance for the critical assessment of the regulatory framework pertaining to LBMP in France and South Africa. The following main regulatory features have been extracted from international best practice and will form the methodological framework in conducting the legal assessment:

- Law principles: In the context of this study, law principles are environmental principles which are incorporated in policy and/or the regulatory framework in the context of LBMP. "Environmental principles are the essential concepts which, explicit or implicit, underlie all environmental legislation, policies, and programs".

---

484 Refer to 2.3.6

- Regulatory scope: in the context of LBMP it refers to the determination of two main matters: Where will the regulatory framework apply (the geographical scope), and, what will be regulated? In other words, what is LBMP and which sources/activities/substances/contributing factors will/should be regulated (the material scope)?
- Regulatory objective(s)/purpose(s): which refer to the ultimate objectives of a regulatory framework, its legal intentions and what it is trying to achieve?
- Regulatory instruments: are the instruments developed and implemented in the context of a regulatory framework. In the context of LBMP regulation, a distinction can be made between direct and indirect regulatory instruments. In the context of this study, regulatory instruments are defined as instruments which are provided and/or prescribed by a regulatory framework. They can be command-and-control, voluntary, or market-based instruments.
- Institutional structure: which refers to the various governmental/state institutions, national and sub-national, involved in the regulation of specific matters, including their interrelationships, taking into consideration their respective mandates, powers and functions. In the context of this study, institutional structures are the governmental/state entities involved in the regulation of LBMP.
- Regulatory priorities: which are also called priority areas. They are the identified national and/or local priorities for regulatory intervention, the substances and activities which are most relevant in causing LBMP, and the environments which most need protection from LBMP.

2.5.3.1 Law principles

The following law principles seem to be the most important for LBMP regulation:

- General environmental law principles: the precautionary principle, integrated management, the polluter pays principle, sustainable development, adaptative management, flexibility, measurability, the participative approach, equity, predictability, prevention, proportionality and accountability.

- Environmental law principles related to sustainable resources management: community based natural resources management, the rational-equitable-efficient-sustainable use of natural resources, integrated river basin/watershed management, the integrated ecosystem-based approach, cost-integrated water resources management, multi-use management, the integrated territorial approach.
- Specific environment law principles related to coastal and marine management: integrated coastal area/zone management, the large marine ecosystem approach, and ocean-land-atmosphere connections.[485]

2.5.3.2 Regulatory scope

The determination of the regulatory scope is also essential, and in terms of best practice it is advisable that the marine and coastal environment to be protected should include as a minimum the following components: the seashore,[486] internal waters,[487] relevant coastal watershed/catchments/river basins including watercourses (up to the freshwater limit),[488] territorial seas,[489] the Exclusive Economic Zone (EEZ),[490] estuaries, coastal lagoons, coastal wetlands, the sea-bed and sub-soil of these waters, the environment (the living resources, ecosystems and such) associated with these marine and coastal areas, and if possible the high seas. In terms of the land-based sources of marine pollution which should be regulated, all direct and indirect sources on the territory should be included, even the sources or potential sources far inland.

---

485 For a definition of each of them refer to 2.3.1.

486 The seashore is the area between the low-water mark (the lowest level to which coastal waters recede during spring tides) and the high-water mark.

487 The internal waters commonly comprise all waters landward of the low-water mark generally, including all harbours.

488 The freshwater limit is the place in the watercourse where, there is an appreciable increase in salinity due to the presence of seawater at low tide and in a period of low freshwater flow.

489 The sea within a distance of twelve nautical miles from the base-lines. The normal baseline for measuring the breadth of the territorial sea is the low-water mark along the coast, as marked on large-scale charts officially recognised by the coastal state.

490 In terms of UNCLOS, it is an area beyond and adjacent to the territorial sea, under which the rights and jurisdiction of the coastal state and the rights and freedoms of other states are governed by the relevant provisions of UNCLOS. Commonly, it refers to the sea beyond the territorial waters but within a distance of two hundred nautical miles from the baselines.

2.5.3.3 *Regulatory objectives*

The regulatory objectives should include pollution management, environmental protection, human health protection and the management of marine and coastal natural resource uses. The ultimate goal of LBMP regulation may be regarded as the "reconciliation of development pressures with protection objectives".[491] Therefore management and regulation of the "legitimate and designated uses" of the marine coastal and marine environment will be paramount to the effective regulation of LBMP.

2.5.3.4 *Regulatory instruments*

In terms of the regulatory instruments and measures recognised as the most appropriate in the context of LBMP, a combination of direct[492] and indirect instruments[493] should be integrated in the regulatory framework, taking into consideration the economic, social, environmental, cultural, institutional and political characteristics and constraints of the country. For each of the abovementioned instruments, guidance from international best practice should be taken into consideration, and a review of the effectiveness and adequacy of the chosen instruments should be conducted on a regular basis.

---

491 UNEP/SEI *Mainstreaming of Marine and Coastal Issues into National Planning and Budgetary Processes* 3.

492 In terms of the specific direct instruments, the following are recognised as the most efficient and relevant in the context of LBMP: environment quality objectives and standards, EIA, SEA, regulations, guidelines, code of practices, permits, equipment standards certification, product controls (phasing out, regulated specifications, bans, use requirements), planning restrictions, determination and management of water uses, emissions control of point sources, BAT and BEP, emission limits, requirements for the discharge of effluent, risk management strategies and risk assessment, the development of a list of priority substances and activities, authorisations and regulation of activities, the development of programmes, measures and plans of action.

493 The following indirect measures and instruments are regarded as essential to support the effective control and management of LBMP, and need to be provided for in the national and when relevant the regional/international regulatory framework: ecological assessment, monitoring, data management, reporting, notification, management of pollution incidents/ emergencies, effectiveness assessment, research, capacity building, enforcement and compliance, public participation, and financial management.

2.5.3.5 *National institutional structure*

The institutional structure should be integrated and provide for co-operation. Vertical and horizontal integration should be facilitated. The designation of a focal point or managing authority is also regarded as an essential component of the institutional structure. The need for integration and rationalisation also applies to the environmental regulatory framework applicable to LBMP.[494] International best practice emphasises the need for national action to be customised to the uniquely specific circumstances and priorities of each country.

2.5.3.6 *Regulatory priorities*

The country must select the approach that best suits its geographic characteristics, its political, institutional and regulatory frameworks, the best available science and technology, and its current assessment, inventories and data. Therefore, no two national approaches to protecting the marine environment from land-based activities will have quite the same appearance, design, scope or focus.[495] The identification of national priorities is regarded as an essential element of the regulation of LBMP. In this context the implementation of a phased implementation of the priorities identified is advocated.[496] Current international best practice provides guidance only. The development of a National Plan of Action, and especially the steps advocated for such a process, as advocated by the GPA, can be regarded as a very valuable preliminary tool to facilitate the development and implementation of an effective regulatory and governance system. Table 3 summarises international best practice for the regulation of LBMP.

---

494 The legal framework should ensure the implementation of the most appropriate regulatory instruments and measures, through the most adequate combination of command-control, voluntary and economic instruments and measures. The legal framework should be supported by effective compliance and enforcement systems and tools, including: effective integration of the polluter pays principle; inspections; strict sanctions, fines and penalties; creation of environmental crimes in terms of LBMP; comprehensive compensation regime; monitoring programmes; and effective reporting of contraventions.

495 UNEP *Handbook on the Development and Implementation of NPA* 47.

496 Based on the review of international best practice-related documents as identified in Appendix 1.

Table 3 provides an overview of the different elements which have to be taken into account in the regulation of LBMP.

OVERVIEW OF INTERNATIONAL BEST PRACTICE FOR LBMP REGULATION

	Specialised international agencies, institutions and expert groups	**International conventions, protocol, programmes and projects**	**EU**	**US**
MANDATORIES OF INTERNATIONAL BEST PRACTICE	GPA; Global Forum on Oceans, Coasts and Islands; and GESAMP.	The Regional Seas Programme: OSPAR, Barcelona, Abidjan and Nairobi Conventions; BCLME Programme; Wio-Lab project; and the MAP.	Thematic Strategy on the Protection and Conservation of the Marine Environment	Ocean Policy
	- General environmental law principles: precautionary principle, integrated management, polluter pays principle, sustainable development, adaptative management, flexibility, measurable, participatory/participative approach, equity, predictability, prevention, proportionality and accountability. - Environmental law principles related to sustainable resources management: community based natural resources management, rational-equitable-efficient-sustainable use of natural resources, integrated river basin/watershed management, integrated ecosystem-based approach, cost-integrated water resources management, multi-use management, integrated territorial approach. - Specific environmental law principles related to coastal and marine management: integrated coastal area/zone management, large marine ecosystem approach, and ocean-land-atmosphere connections.			
	What should be regulated? All LBMP on the territory, including direct and indirect sources, point and diffuse sources, activities, substances, emissions/discharges, installations and other factors which might pollute or contribute to the LBMP and/or degradation of the coastal and marine environment. The pathways (natural or manmade) of LBMP also need to be regulated in this context.		**Where should the regulatory regime apply?** • Marine side (protection): as a minimum the following components: the seashore; internal waters; relevant coastal watershed/catchments/river basins including watercourses (up to the freshwater limit) ; territorial seas; Exclusive Economic Zone (EEZ); estuaries; coastal lagoons; coastal wetlands; sea-bed and sub-soil of these waters; the environment (living resources, ecosystems and others) associated with these marine and coastal areas, and if possible the high seas • Land side (control of sources):land-based territory under the jurisdiction of a state	

REGULATORY INSTRUMENTS FOR LBMP REGULATION

Pollution management (proactive or reactive)	Environmental protection	Human health protection	Uses management of marine, coastal and land-based natural resources
	Environmental quality objectives and standards; quality objectives; standards based on current ambient quality or based on the dilution capacity/rate; setting of loading allocation or ambient quality objectives; determination of a classification system and/or a reserve for relevant water resources; environmental quality objectives and standards (ambient); loading allocation.		
	Discharge authorisation and standards; guidelines; code of practice; permits; equipment; standards; certification; product controls (phasing out, regulated specification, use requirements); market-based instruments; emissions control of point sources; BAT; BEP; emission limits; substance bans and phasing out; guidelines for specific activities in terms of pollution and waste management; standards and criteria; requirements for discharge of effluent; and list of priority substances and activities.		
	Activity management: EIA, uses designation, SEA. ***Areas planning:*** coastal zone and watershed management, risk management, protected areas, and special zoning.		
INDIRECT Instruments in support of direct instruments and measure, facilitating the control and management of LBMP. **GENERAL**	• Ecological assessment • Monitoring • Data management • Reporting and notification • Performance assessment of measures • Research • Capacity building • Public participation • Financial planning • Enforcement		
	• Integrated • Cooperative • National focal point • Decentralised: river basin/watershed level • Delegation/shared responsibilities • Partnership • Clear agency mandates • Regional governance		

SUBSTANCES	Each country should identify the main substances and sources of pollution and should regard them as priority sectors for LBMP regulation. The basic criteria to be considered to assess substances include persistence; toxicity or other noxious properties; and the tendency of the substance to bioaccumulate. Other factors also need to taken into consideration, including the location and quantities of the discharge.
ACTIVITIES	Each country should identify the main activities and sources of pollution and should regard them as priority sectors for LBMP regulation.
AREAS	Certain areas of the marine environment are regarded as more vulnerable to LBMP and require specific protection through the regulatory framework. Each country should identify such areas.
ECONOMIC	General economic conditions and trends, unemployment, the availability of external funding, economic viability, the polluter pays principle, the availability of infrastructure and institutions.
SCIENTIFIC / TECHNICAL	Availability/accessibility of scientific data, availability/accessibility of technology, availability of expertise, capability for monitoring, existing engineering infrastructure, experience with implementation of strategies or instruments elsewhere, sensitivity of ecosystems to be affected, climate considerations, current levels of pollution, waste discharge trends
SOCIAL / CULTURAL / POLITICAL	Infrastructure, existing and proposed uses of the marine environment, political context, social/cultural awareness, perception of environmental, social and cultural values.

Table 3. Overview of international best practice in terms of LBMP regulation.