



Guidelines for the location of new offshore dumping sites

"Application of ecosystem principles for the location and management of offshore dumping sites in SE Baltic Region (ECODUMP)"

Nerijus Blažauskas², Helena Boniecka¹, Grazyna Dembska¹, Marta Staniszewska¹, Grazyna Sapota¹, Sergej Suzdalev²,

¹Maritime Institute in Gdańsk, Poland

²Klaipėda University Marine Science and Technology Centre, Lithuania

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1. Introduction

Maintenance of the navigable depths in ports and entrance waterways is one of the key activities of successful operation. This is especially important for the ports located at the sandy coasts of South Eastern Baltic region. Further development of ports is and will imply extensive dredging of sediments in coming years. This will result in huge amount of material that has to be removed and handled. Handling of the dredged material has several options available. The process of sustainable management requires the application of Best Environmental Practice as described in the HELCOM Guidelines for the Disposal of Dredged Material at Sea. Unconfined open water disposal of dredged sediments deemed not appropriate for contaminated material. The most attractive and widely promoted is beneficial use of dredged material in different applications. Beach nourishment and coastal protection; port construction/extension; land improvement; habitat creation are among those. In order to allow this, dredged material has to be recognized as valuable resource and not a waste. Although different handling methods of dredged materials are available, the disposal at sea is the commonly accepted and legally grounded activity in different countries of the Baltic Sea region. In many cases, the dredged material is clean or contain small fraction of contaminants.

Disposal of non-contaminated dredged material at sea was and is considered as unwelcome and non-beneficial activity still. Guidelines aims to promote the “eco-dumping” approach, i.e. considering the selection of the sites for disposal of clean sandy material to sustain the sediment balance in the near shore. This allows minimizing the costs of disposal operations as well as serves as additional source of sandy matter contributing to maintenance of good status of the sandy beaches. Study promotes the integration of findings of scientific research, modelling of hydrodynamic conditions and behaviour of disposed mater. Additionally the principles of marine spatial planning while finding the suitable places for beneficial disposal at sea have been applied.

2. International Legal Aspects

The disposal of dredged material is regulated by international and regional conventions. Contracting parties are obliged to ensure that main principles are adopted and introduced in the national legislation. There are three main international conventions regulating a dredged sediment management in Europe - the LONDON CONVENTION (1972); the OSPAR CONVENTION (1992) and the HELSINKI CONVENTION (1992). The "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972" (London Convention) is one of the first global conventions addressing the protection of the marine environment and human activities at the sea. The main objective of the Convention is to establish effective control and prevention measures under any kind of marine pollution including dredged material disposal at the sea operations. The Convention was revised in 1996, when “London Protocol” has come into force. The 1996 Protocol is more restrictive. It states (in Article 4) that Contracting Parties "shall prohibit the dumping of any wastes or other matter with the exception of those listed" (in Annex 1 to the Protocol) and dredged material is in this list. Parties of the Convention agreed to control dumping by implementing regulatory programmes to assess the need for and potential impact of dumping. Implementation has also resulted in the development of “Specific Guidelines” for particular types of wastes, containing step-by-step procedures for the evaluation of wastes being considered for sea disposal and including also the assessment of potential adverse environmental effects of dumping and selection of the disposal site.

Both the London Convention and Protocol provide the global rules and standards on dumping as called for in Article 210.6 of the UN Convention on the Law of the Sea (1982).

The Convention for the Protection of the marine Environment of the North-East Atlantic (OSPAR CONVENTION) regulates international cooperation on environmental protection in the North-East Atlantic and North Sea and is open to countries, which border these sea areas. The provisions of the Convention, obliges all Contracting Parties to take all possible steps to prevent and eliminate pollution and shall take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected. According to the Article 4 of the Convention “The Contracting Parties shall take, individually and jointly, all possible steps to prevent and eliminate pollution by dumping or incineration of wastes or other matter in accordance with the provisions of the Convention”.

Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELSINKI CONVENTION) sets the framework for disposal of the dredged material for the Baltic countries. In accordance with the Article 11 of the Convention Contracting Parties should ensure that disposal of the dredged material is not allowed before the permission is issued by appropriate responsible authority. Furthermore, Commission has adopted the HELCOM Recommendation 13/1, which recommends following the prepared and adopted by the Commission “Guidelines for the disposal of dredged spoils”.

3. Existing Guidelines

Each of above-mentioned conventions has set into force dredged material guidelines for an environmentally sound disposal of dredged material into the sea. Those are:

- Specific Guidelines for Dredged Material Assessment Framework - DMAF (adopted in 2000) and Waste Assessment Guidance (WAG) of the London Convention;
- OSPAR Guidelines for the Management of Dredged Material (adopted in April 2009);
- HELCOM Guidelines for the Disposal of Dredged Material at Sea (adopted in June 2007).

Existing guidelines cover several stages of the disposal related process including evaluation of disposal options, assessment of potential effects, management of the disposal operations and monitoring of the effects. As it is stated in both – HELCOM and OSPAR guidelines, the results of the physical/chemical/biological characterisation (evaluation stage) will indicate whether the dredged material, in principle, is suitable for disposal at sea. Where sea disposal is identified as an acceptable option, it is nonetheless important, recognising the potential value of dredged material as a resource, to consider the availability of beneficial uses. London guidelines also addresses issue of prevention of potential contamination to the environment due to the dispersion and dilution of the wastes disposed. Furthermore, HELCOM and OSPAR guidelines require an issue of concise statement of the expected consequences of the disposal option (*i.e.* the Impact Hypothesis) before the permission for the disposal is granted. The statement in the London guidelines requires that compliance and field monitoring is used to verify that permit conditions are met, and that the assumptions made during the permit review and site selection process were correct and sufficient to protect the environment and human health. The same objective – to monitor the compliance with permit requirements and of

the condition and changes in condition – is embedded in the HELCOM and OSPAR guidelines along with requirement of yearly reporting on nature and quantities of material that has been dumped.

HELCOM Guidelines for the disposal of dredged material at sea are the only document providing legally-binding obligations for Baltic Sea countries with regard to authorisation or regulation procedures for dredged material. The guidelines were adopted by the 21st Meeting of the Heads of Delegation (June 2007) as authorized by the 28th Meeting of the Helsinki Commission (March 2007). The guidelines in particular address the disposal of dredged material by dumping in the maritime area and the relocation of sediments, due to hydrodynamic and side cast dredging as well as its subsequent deposition. Document was designed to assist Contracting Parties in the management of dredged material in ways that will prevent and eliminate pollution in accordance with Article 3 to the 1992 Helsinki Convention, and protect marine species and habitats in the Baltic Sea Area in accordance with Article 15. Countries are encouraged to apply Best Environmental Practice (BEP) in order to control both dredging and dumping operations.

There are some shortcomings to be mentioned. HELCOM guidelines mainly focuses on what should be investigated when selecting the disposal site, however lacks detailed guiding principles of dumping site location and its further management (monitoring approaches). HELCOM guidelines mainly address dumping impact on marine environment, but do not cover sediment transport patterns, which is especially sensitive issue for the south-eastern part of the Baltic Sea, currently suffering from the lack of sediments participating in natural sediment exchange processes.

The guidelines also cover, in some extent, the selection of disposal site at the sea. However, the guidelines focus on the characterization of the site (physical, chemical and biological), identification of adjacent activities and assets (according to the list provided), and size of the disposal site. London Convention Specific guidelines points to the assessment of economic and operational feasibility while selecting the site, but none of the planning principles while selecting are introduced in any of mentioned three documents.

4. Existing permitting and disposal regulations in the South-Eastern Baltics

4.1. Lithuania

According to the Law of Marine environment protection (No. VIII-512, 1997-11-13) the special permit to dispose dredged material in territorial and internal waters is issued by Lithuanian Ministry of Environment. The Order No. 54 of the Minister of Environment approved the first provisional regulation on dredged sediments disposal in Lithuanian territorial waters of the Baltic Sea in 1994. Further obligations were implemented by developing new procedures for dredging of sediments from the sea and harbour areas including further management. The procedures were presented in the environmental normative document LAND 46-2002: Regulations on sediments dredging in sea and harbour areas and management of dredged sediments, approved by the Order No. 77 of the Minister of Environment. Current edition of the regulations was approved In April, 2011 by the Order. No. D1-286 of the Lithuanian Minister of Environment. New edition specified management procedures by introducing new restrictions for sea disposal based on the strict levels of contamination of dredged sediments. Thus, disposal of dredged material at sea became stronger limited and, at the same time, demand for new management alternatives increased considerably.

The observation of the environmental conditions at the existing deep-water disposal is also introduced in the same LAND 46A-2002 normative document. The monitoring of the main dumping site is carried out according to the two official programmes - National monitoring of marine environment and special monitoring programme prepared by Klaipėda State Seaport Authority.

4.2. Poland

Dredged material is still recognized as a waste in Poland. There are exclusions defined for the sediments to be used for management of waterways, prevention or mitigating the effects of floods and droughts or land reclamation. Those sediments do not fall under the definition of wastes (act on waste dated 14th of December 2012 (Journal of Laws of 2013, item 21)).

The offshore disposal of dredged material is regulated by the special regulation "On the procedures for issuing permits for discharge into the sea of dredged material and dumping at sea of wastes or other substances" approved on 26th of January, 2006 and signed by the Minister of Transport and Maritime Economy of Poland (Journal of Laws No. 22, item 166). The regulation defines permit issuing procedures and regulates process and functions of national authorities involved. According to the regulation, application for disposal has to be approved by the Regional Directorate for Environmental Protection and, if conclusions are positive, Maritime Office issues the permission for sea disposal of dredged material.

Systematic observations of the state of existing disposal sites and adjacent marine environment is not carried out in Poland. Nevertheless, Maritime Institute in Gdańsk is conducting periodic scientific investigations of disposal sites near Gdańsk and Gdynia as well as Szczecin. Investigations include physical, chemical and biological components.

4.3. Russia

Disposal of dredged material in the exclusive economic zone of the Russian Federation Baltic Sea is carried out in accordance with national legislation and requirements of regional documents (London Convention and Protocol, HELCOM Convention). The main legislative documents of the Russian Federation, regulating the process of sediment dredging and further dumping at sea, including the procedure of authorization, are:

- Federal Law "On Environmental Protection", 10.01.2002, № 7-F3;
- Federal Law "On the continental shelf of the Russian Federation", 25.10.1995, № 187-F3 (amended on 09.05.2005);
- Federal Law "Waste production and consumption", 24.06.1998, № 89-F3;
- Federal Law "On the inland waters, territorial sea and contiguous zone of the Russian Federation", 31.07.1998, № 155-F3 (last amended on 07.05.2013);
- Federal Law "On the exclusive economic zone of the Russian Federation", 17.12.1998, № 191-F3;
- Federal Law "On the Ecological Expertise", 23.11.1995, № 174-F3.

State monitoring is carried out by federal executive bodies authorized by the Government of Russian Federation with the participation of executive bodies in accordance with the laws of Russian Federation. Regular observations of the marine environment at the dumping sites are carried out

during the dredging works only. Monitoring of the disposal sites is part of state ecological monitoring (according the Federal Law "On the inland waters, territorial sea and contiguous zone of the Russian Federation")

5. Selection of new sites for disposal

In practice, the selection of a disposal site is integral part of the complete application for the dredging and further utilization of dredge material. If no beneficial use is applicable, dredge material has to be first be evaluated to ensure suitability for sea disposal. Following has to be considered prior to the looking for the place for sea disposal:

- Amount and composition of the material;
- State, physical properties and lithological type of the material (especially grain size distribution and degree of consolidation);
- Chemical and biochemical properties;
- Radioactivity and toxicity level.

Existing legislation in South-Eastern Baltic does not address the establishment of disposal sites at the sea. Although there are no officially approved planning procedures, countries have clearly identified general principles of selection the disposal sites and also have an obligation to full fill the national procedures of environmental impact assessment before the permission is granted. The main principles address both – environmental and economic concerns. The main economic driver is the distance between site of dredging and disposal. Maximum allowed contamination level, maintenance of sea floor integrity, avoidance of sensitive and valuable natural assets were amongst the main environmental preconditions to ensure the ecological balance and prove the economic viability. Currently, selection of new sites for offshore disposal of dredged material has to pass appropriate planning procedure in order to avoid potential conflicting with other sea users.

5.1. Application of Planning Principles

The main principles of the planning of maritime activities are embedded in the international strategic documents. Among those are EU Integrated Maritime Policy; HELCOM Baltic Sea Action Plan (Recommendation 28E/9 on the “Development of Broad-scale Maritime Spatial Planning Principles in the Baltic Sea Area”); VASAB Long Term Perspective for the Territorial Development of the Baltic Sea Region and recently endorsed by European Parliament the new Framework Directive for Maritime Spatial Planning (Directive 2014/89/EU, adopted in July, 2014). The Directive sets the deadline for the Member States to establish the Maritime Spatial Plans (MSP) by 31st of March 2021.

When successfully established, MSP is the first document to consider while looking for the most sustainable alternative for new disposal site. This would save the time for planning and permitting efforts.

If MSP is not in place, identification of new site for disposal has to follow the main principles and steps of MSP:

- I. Identification of the relevant maritime stakeholders interested in using the same marine area and/or the resources.

II. Analysis of existing ecological and socio-economic conditions – state of the art report on existing natural, cultural and social assets.

- What are the natural resources available?
- What are the most valuable areas of marine environment?
- What are the pressures on the coast?
- How local coastal communities contribute, influence and benefit from the marine related services?
- What are the cultural and social assets of coastal communities?

III. Mapping of spatial distribution of current uses.

- How much space and where is occupied by current activities (including buffer zones), such as:
 - Areas of special importance for conservation and scientific purpose;
 - Fishing and shell-fishing grounds;
 - Spawning, feeding and nursery grounds and migration routes of commercially important fisheries;
 - Migration routes of marine mammals;
 - Aquaculture sites;
 - Renewable energy sites;
 - Engineering infrastructure (cables and pipelines);
 - Seabed mineral and aggregate extraction areas
 - Military exclusion zones;
 - Shipping lanes;
 - Marine heritage sites;
- What are the plans for future development of existing uses, are there any additional space required and where?

IV. Screening of existing regulations and legal frameworks of different sea uses in order to identify the existing and potential conflicts.

- What are the existing regulations in those areas?
- Do those regulations set the limitations to other marine resource users?
- Are the possibilities to combine several sea uses in the same – already “occupied” areas?

V. Evaluation of economic viability. The distance of the proposed dumping site from the dredging site is a major factor to be considered. A considerable distance between dumping and dredging sites is not beneficial from the point of view of environmental protection and safety, since it increases marine traffic, which, in turn, causes an increase in exhaust and noise emissions and difficulties for shipping.

VI. The size of the disposal area(s):

- It should be large enough, unless it is an approved dispersion site, to have the bulk of the material remain either within the site limits or within a permissible area of impact after disposal;
- It should be large enough in relation to anticipated volumes for disposal so that it would serve to function for many years; and
- In order to assess the capacity of a site(s), the anticipated loading rates per day/week/month/year has to be taken into account;

VII. Location of the disposal area(s):

- The proposed dumping sites should be at a safe distance from the shipping lanes. Furthermore, the proposed locations should not be an obstacle to recreational boating, practicing sports and recreation in the coastal zone;
- Areas of military and defence importance should be considered with special attention and selection of disposal sites near or at those zones has to be consulted at the early stage of the planning.
- Dumping sites cannot be established in the areas particularly valuable for fishing. Moreover, from the point of view of ichthiofauna protection, the potential sites of breeding and habitats of protected species should be excluded from consideration.
- Any physical obstacles on the seabed, which would make the disposal difficult, should be considered. Wrecks can have cultural value or pose a threat to the environment (military wrecks).
- Dumping sites cannot be established in the area of existing or planned underwater infrastructure, such as telecommunication and power cables, power lines, gas pipelines, wastewater discharge pipelines.

VIII. Develop the alternative spatial solutions and ensure that consultations with involved stakeholders are in place;

5.2. Ecosystem based principles

The ecosystem approach is ...*“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”*. (Joint HELCOM/OSPAR Ministerial Meeting, Bremen 2003). In general, ecosystem based approach is already “embedded” in the principles of maritime spatial planning. This approach is closely linked to concepts such as ecosystem function and integrity, which in turn is linked to the idea of environmental quality. The main objective of this approach is to ensure that the marine environment is of good or improving status, duly protected from human induced harm, e.g. pressures are minimized. The location of new disposal sites has to be based on several key principles:

- Environmental conditions and state of the key ecological parameters are maintained (“good environmental status” concept);
- Ensure the connectivity (“blue corridor” concept) between most valuable ecological areas is maintained. “Blue corridor” concept aims to ensure the connectivity and coherence between marine habitats, making sure that nursery areas, feeding areas or spawning grounds are linked to one another and that degraded habitats can easier recover. The relations to the neighbouring areas should be maintained, not blocked by human activities, not interrupted by the disposal operations and related physical effects on the sea floor and marine habitats.
- The placement of valuable sandy sediments is based on the hydrodynamic conditions of the area and contributes maintaining the sediment balance at the nearshore (“eco-dumping” concept). Clean sandy material should be used to sustain the sediment balance in the near

shore. This allows minimizing the costs of disposal operations as well as serves as additional source of sandy matter.

5.3. Descriptors of Good Environmental Status

The status of the environment and further pressures due to the new disposal place are assessed against the key environmental parameters and relevant Marine Strategy Framework Directive (2008/56/EC) descriptors of Good Environmental Status (GES) during the Environmental Impact Assessment (EIA) procedure. There are several descriptors that correspond to the disposal induced threats and have to be considered during the EIA procedure:

Descriptor 1. Biodiversity is maintained. The key pressure on marine biodiversity in relevance with disposal operations is the physical impact to the sea floor. Disposal operations might create disturbances in the structure and composition of seabed habitats and in the species composition of the communities associated with these habitats and therefore, if affected, sea floor has implications for the food web.

Descriptor 6. The sea floor integrity ensures functioning of the ecosystem. The sea-floor integrity reflects the physical, chemical and biological characteristics of the sea bottom. These characteristics delineate the structure and functioning of marine ecosystems, especially for species and communities living on the sea floor. Disposal of the dredged material mainly impacts the physical conditions of the sea floor – i.e. might change the lithological type and fragmentation of the area due to the different type of sediment introduced into the natural pattern of the sea floor. Therefore, maximum possible matching of the lithological composition of the original substrate and the material to be disposed is the key factor while minimizing the impact on sea floor integrity.

Descriptor 7. Permanent alteration of hydrographical conditions does not adversely affect the ecosystem. The physical parameters of seawater are essential because they structure the water masses and determine the various habitats that provide the environmental conditions required for marine life. Temperature, salinity, depth (sea floor morphology), currents, waves, turbulence, turbidity (related to the load of suspended particulate matter) play a crucial role in the dynamics of marine ecosystems and can be altered by disposal operations. Therefore, physical modelling of behaviour of sediments disposed to the sea can give a better understanding of possible adverse effect.

Descriptor 8. Concentrations of contaminants give no effects. Human activities may affect the marine environment through the release of chemical contaminants, which degrade the state of marine waters and can cause serious damage to its functioning. Although disposal of contaminated sediments at sea is not allowed, contamination and toxicity level of the dredged material has to be monitored carefully prior to disposal, and also proper monitoring of contamination level at the disposal site and also surroundings has to be foreseen.

5.4. Environmental Impact Assessment

Pre-selected alternatives have to follow the detailed environmental assessment against the planned economic activity before the permission is granted. The assessment is much easier if the comprehensive maritime spatial plan is in place and suitable for disposal areas are defined on a strategic level. If such a plan is not in place yet, following the above-mentioned MSP principles will

have to be applied while proposing the alternatives. Sites with unacceptable impacts can be eliminated already in the early stage and this is a big advantage of the overall project – saving time and efforts for in-depth study. If two or more candidate sites have been identified as acceptable then a comparison needs to be carried out to evaluate the differences between the sites (i.e. size, physical characteristics, dispersive qualities etc.) in order to determine the relative potential adverse effects of dredge material disposal at each of the sites. These should include quantitative and qualitative evaluations of the perceived risks of disposal at each site.

The evaluation of the proposed alternatives must consider both spatial and temporal effects of the impact. Therefore, analysis will require basic information on the scale and scope of the activity:

- Bathymetry, current speed and direction at different levels of the water column, waves;
- Sediment type; geochemical and geological characteristics;
- Water temperature, salinity, dissolved oxygen and chemical compounds, suspended matter.
- Benthic fauna and flora ;
- Fisheries resources including spawning, feeding and nursery grounds;
- Migration routes of important fisheries , birds and mammals;
- Proximity to other uses (see chapter 5.1).

Whereas the oceanographic data are typically used to develop a hydrodynamic model of the area of disposal, physical information such as type of material, quantities and the disposal frequency is used to determine the further behaviour of the dredged material in the disposal site and also adjacent environment. The modelling of above-mentioned should give an impression of how hydrodynamic conditions will influence the further migration of deposited sediments, reveals the area and scale of the impact.

6. Conclusions

If no beneficial use of the dredged material is possible, using of maritime spatial principles while selecting the new disposal sites might create favourable conditions for economically and environmentally sound operations. On one hand dumping of non-contaminated sediments might be considered as secondary resource for recovery of sediment balance in the nearshore zone, on the other hand proper selection of the site might have positive economic effects, which also contributes to the less environmental impact. Ecosystem based concept if human activities are considered to be equally important is an proper mechanism to ensure the sustainable development, maintenance of good environmental status and therefore contributes to the intelligent use of the sea as a common resource (for humans and the wild life). Introduction of so called “eco-dumping” concept, among mentioned above, goes along with modelling exercises and therefore ensures that disposed sediments are in balance with geological, hydrodynamic and ecological conditions on and adjacent to the disposal site. This makes dumping activity to be, in some extent, recognized to be beneficial too.