DAIMON
(Decision Aids for Marine Munitions)

Legal Aspects of Marine Munitions Management: Decision Making in the Face of Uncertainty and Risk

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Executive Summary

Legal Review and Process:

The aim of understanding the legal aspects to implement management strategies of underwater munitions is to compel sponsorship (funding, authority for project etc.). Understanding the legal aspects is to identify the sponsorship (nation) who will need to be accountable for the implementation of underwater munition site management strategies within their jurisdiction. The sponsor may be easily identified by the location of the underwater munition site. In this case, the problem for making that nation an accountable sponsor towards implementing a management strategy involves what present legal mechanisms exist to compel the sponsor to act. There may not be one single legal aspect to compel sponsorship; rather, there could be several at various political levels. The problem then becomes if the identified sponsor is beholding to any of these legal aspects due to flaws in the legal language, definitions or purposeful omissions of old dumped underwater munitions.

The organization trying to compel the sponsor needs to perform a hierarchal legal test of the nation's internal environmental laws and if not able to identify applicable legal recourse, then successively continue to regional to international agreements and treaties. If the sponsor agrees with commencing a management plan/strategy, then the problem is solved. If they do not agree that the underwater munition site is their responsibility due to many factors in legal interpretation, then it would be prudent during this review stage to consult international lawyers to verify responsibility and draft appropriate legal action. If legal review deems such responsibility is being vacated by the sponsor, then much diplomatic and political actions would likely be required to pursue. If the legal review determines that the sponsor identified really has no legal obligation for management strategy actions, then other means of funding will be required for the strategic management of the underwater munition site or other more specific treaties will need to be developed. However, even though different funding may be acquired, permission from the non-compliant sponsor nation would have to be acquired in order for work and activity to be carried out in their territorial waters.

This legal test described above becomes increasingly complex for multi-national sponsors or for those sponsors who had no action in dumping those munitions in the first place. In addition, other national laws that inhibit economic or navigational activities due to underwater munition management strategies by others, may also be violated. So, before any action is taken on sites, verification and concurrence with such nations would be required.

Nonetheless, history on the dumping site complete with compelling environmental data would be required to compel sponsor action. Pressure in the form of legal, political, social (environment, health and safety of humans, flora and fauna) all may play a synergistic role in developing a motivated sponsor for required funding.

There would be three different types of legal process dependent on the type of underwater munition issue. Legal aspects are different for:

- Immediate emergency scenarios like reacting to a munition on the beach or caught in a fishing net;
  - i.e. the need to follow existing emergency procedures and employ territorial emergency services, following national regulations on transport and disposal.
- Medium term like identifying and compelling sponsorship with well documented underwater munition sites
  - i.e. as identified above by legal compel for sponsorship; and
- Longer term like the actual implementation of various strategic management strategies
  - i.e. the need to respect the many various jurisdictional laws of health and safety, environment, transportation, navigation).

This document identifies the major national, regional and multi-national laws and treaties to associate various nations with applicable legal aspects in identifying and compelling sponsorship to underwater munition sites.
The issue of complex environmental threats and relevant jurisdictions for the identification and remediation of underwater munitions previously inappropriately discarded in the world's oceans is becoming increasingly problematic and requires serious attention. The remediation of underwater munitions has many obstacles in both technical and jurisdictional realms and actions are required to be taken on national and international levels.

This paper is not a substitute for legal advice however it researches the realm of potential legal aspects of underwater munitions management and identifies an inconsistent holistic framework to identify appropriate remedial stakeholders and sponsors. The various national and international laws on underwater munitions management are fragmented and uneven with relatively no consistency in legislation, any common language, regulations, or mandates. The benefits of the research findings have resulted in creation of the roadmap for IDUM and all DAIMON partners to navigate current legal national and international frameworks, propose future legal regulations and treaties and communicate recommendations for ultimate national and international remedial action to effect appropriate solutions.

IDUM has researched different levels of Law in relation to the underwater munitions' management around the world, from national to the international perspective. The existing legal framework in remediating previously dumped munitions has no common existing treaty, protocol, or Convention and the overall approach to the Law of the Sea is not harmonized and is fragmented at best. Unfortunately, there exists no current domestic and international laws that specifically cover the underwater munitions common approach.

While looking into the perspectives of National Law of the countries surrounding the Baltic Sea, one of the examples is Finland that constitutionally features responsibility for the environment and has a "Chemical Act" that covers "safe handling and storage of dangerous chemicals and explosives (390/2005)," but it does not specific management of underwater munitions. Finland is

just one of the examples of National Law which one could extrapolate upon legal aspects of underwater munitions management but only on general level.

Some states have specific programs to work on the underwater munitions' programs for commercial, or economic purposes. It seems that only when there is a concern or impediment to current activities such as in construction, that underwater munitions are addressed in a small localized fashion and specific to the ongoing project. For instance, as underwater munitions are found due to such construction activities they are dealt with at that singular level. Enough remediation is only done to solve the immediate problem of construction. The problem of "happenstance" remediation could be that underwater munition areas of exploration are localized, and most areas are still unclassified which suggests that a detailed map of the locations of the munitions is needed for the creation of the international law of dumped munitions management.

Currently, there are many treaties that are relevant to the issue of underwater munitions, but there is no joint one. Existing Treaties that are relevant to the issue of underwater munitions include Chemical Weapons Convention (CWC), 1958 Convention on the High Seas and the 1974 Convention on the Protection of the Marine Environment of the Baltic Sea Area. In addition, the CWC has another approach of handling sea-dumped weapons which is the "1985 exemption" of CWC states all marine munitions prior to 1 January 1985 are not covered by the Convention.

With the appropriate actions taken, there are different ways on how to approach the fragmented law that exists today such as a UN Treaty Amendment to the CWC, development of a New Treaty, or No Treaty. Each of the solutions poses its uncertainty with the dependence on legal process and multi-jurisdictional collaboration.

As for the possibility of a future more applicable underwater munition treaty, International Dialogue on Underwater Munitions (IDUM), has made a UNEP Voluntary Commitment under SDG14 # 21356 on underwater munitions (UWM's), to become the global focal point for: Policy, Science, Technology and Responses whose mission is to develop an international treaty on all underwater munitions for a goal to address the issues past and present that will facilitate compliance and any necessary remediation of the environmental harm of underwater munitions.

In conclusion, Because of the participation of many states in the dumping of chemical weapons and the associated widespread environmental and human health effects, the existence of sea dumped chemical weapons is clearly an international issue. The above legal development and collaboration required to promote and ensure underwater munition remediation and thereby enabling States to act (sponsorship) will require much resources; however, legal framework development is paramount in order to identify jurisdictions and sponsor responsibilities to effectively employ the required management strategies for the reduction of environmental impacts from underwater munitions. While many international agreements touch on certain aspects of the issues (environmental protection, hazardous materials and/or explosives handling) surrounding the dumping of chemical munitions, none address it specifically nor provide mechanisms for international cooperation or enforcement. As such, there is a need for a comprehensive international agreement specifically for underwater munitions management.

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1. Prologue

> [M]ilitary, environmental, and political security issues are closely interwoven. The ecological aspect of this problem has reached a critical point, growing into a political problem of international importance." During the decades of the Cold War, all attempts of its appropriate solution remained practically blocked. Now such a possibility exists, but it can be realized on the basis of a wide international cooperation only.
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> *- Mikhail Gorbachev,* 1995 *NATO Advanced Research Workshop on Sea Dumped Chemical Munitions.*[1]

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Potential environmental and human health effects resulting from the dumping of World War I and World War II-era conventional and chemical weapons in the Baltic Sea are of continuing concern. It has been estimated that 30–40 thousand tonnes of chemical weapons have been dumped in the Baltic Sea, while perhaps conventional munitions make up five times of this amount. The final quantities cannot be ascertained with precision. Areas with large amounts of dumped munitions in the Baltic Sea include the Skagerrak straits and the Bornholm Basin.

Smaller quantities of munitions can, in principle, be uncovered anywhere, including in and around harbours and near military facilities. Knowledge of possible dumping by the former Soviet Union in the Baltic Sea is less well-known than dumping by other states. The progressive corrosion of the munitions has prompted concern that unstable munitions pose a growing and significant threat, which will result in clear, measurable effects in the near future. There is concern, for example, that the level of arsenic in the food chain will increase through the leakage of chemical warfare agents. The dumping of munitions has also received attention as a consequence of the laying (actual and planned) of sea cables and pipelines, as well as the inadvertent raising of munitions in fishing nets. Fishermen in the Baltic Sea generally recover munitions with their catches in the Baltic Sea every year and these incidents are tracked by the Helsinki Commission (HELCOM).

There is no common understanding on whether dumped munitions should be handled primarily within the environmental context or the arms control and disarmament context. For example, Nord Stream AG, a German–Russian business consortium, a 1200-kilometre gas pipeline, worth an estimated €5 billion, which links Viborg, Russia, and Greifswald, Germany, with the originally proposed route running down the middle of the Baltic Sea and passing off the southeast side of

[1] Mikhail Gorbachev, Proceedings of the NATO Advanced Research Workshop on Sea Dumped Chemical Munitions, (Kaliningrad Russia, January 12-15), in ALEXANDER V. KAFFKA (ed.), SEA DUMPED CHEMICAL WEAPONS: ASPECTS, PROBLEMS AND SOLUTIONS 3 (2010).

Gotland raised a concern that the detonation of a single munition may be sufficient to rupture the pipeline.

Table 1: Areas identified by the Helsinki Commission where fishing vessels should not anchor or use bottom tackle

Areas A,B,C,D,E on Map[2]	Parallels	Meridians
A	55° 50' north and 55° 40' north	18° 30' east and 20° 00' east
B	54° 50' north and 55° 30' north	14° 30' east and 16° 30' east
C	54° 45' north and 54° 52' north	10° 00' east and 10° 20' east
D	58° 10' north and 58° 25' north	09° 10' east and 09° 50'east
E	58° 07' north	10° 47' east

In 2008, the Modelling of Ecological Risks Related to Sea-dumped Chemical Weapons (MERCW), worth €2 250 000, funded under the European Commission Framework Programme 6, was scheduled to be completed. The purpose of this project has been to study chemical weapon munition dump sites in the Baltic Sea and Skagerrak area in order to assess the environmental risks posed to humans and the environment. The project developed an integrated geophysical, geo- and hydro-chemical, hydrographical and hydro-biological site investigation. It aimed to model the release, migration and degradation of toxic compounds and their degradation products.

In September 2008, the European Network on Coastal Research (ENCORA) initiative, launched in 2006 and co-funded by the European Commission Framework Programme 6, issued a European Action Plan to address the issue of fragmentation in European approaches to coastal and marine management. It is estimated that there are over 300 institutes and 10 000 scientists in the EU who deal with marine and coastal research. The action plan addresses four major areas in which knowledge and technology currently hinder sustainable coastal marine management. More generally, the initiative has considered pollution risks, including those posed by dumped munitions.

Finally, an extensive recreational and professional diving community exists in the Baltic Sea region, and its members may be familiar with the nature and type of ships and degree of accessibility which may become very problematic without management strategies such as Limitations of Activities at Sea to protect recreational divers or fishermen from those dangerous areas.

[2] *Source*: 'Final report of the ad hoc Working Group on Dumped Chemical Munition (HELCOM CHEMU) to the 16th meeting of the Helsinki Commission', Mar. 1995, p. 13.

The paramount point is that areas of dumped munitions must be made known and States to put forth management strategies to illuminate potential environmental and heath to human threats.

2. Introduction

2.1. Overview of the Underwater Munitions Issue

In the global arms race, the world's oceans, rivers and lakes have become a junkyard for discarded military munitions. Through the greater part of the 20th century, warring states disposed of excess, obsolete, and unserviceable munitions of all types at sea.[3] Sea dumping of munitions has been carried out in every ocean, as well as many terrestrial watercourses.[4] In a 2001 report, the United States Army identified seventy-four chemical weapon disposal sites from 1917-1970 across the globe - from the Atlantic Ocean, Pacific Ocean, Mediterranean Sea, Indian Ocean - to US rivers and lakes.[5] Other states have also carried out sea disposal. After the Second World War, France, the Soviet Union, the United Kingdom and the United States largely relied on sea dumping to dispose of confiscated German weapons.[6] Japan also dumped material off its coasts.[7] Cold war accidents demonstrate that not all dumping was intentional, and that the scope of the issue may be much larger than anticipated. Similarly, dumping may have been carried out secretly, and accidents may not have been reported.

In 1994, the Helsinki Commission ("HELCOM") concluded that around 40,000 tons of chemical weapons, containing 13,000 tons of chemical warfare agents were dumped in the Helsinki Convention Area.[8] In 2009, the OSPAR Commission identified 148 known dumping locations throughout the maritime area from Iceland to Gibraltar.[9] Identified sites included conventional munitions such as bombs, grenades, torpedoes, mines, and incendiary devices such as chemical munitions.") Of these munitions dumped in the OSPAR area, 78% percent were identified as conventional weapons, and 20% were chemical munitions.[10]

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[3] OSPAR Commission, *Overview of Past Dumping at Sea of Chemical Weapons and Munitions in the OSPAR Maritime Area* 5 (2005).

[4] Caroline Ong, Tamara Chapman, Raymond Zilinskas, Benjamin Brodsky, and Joshua Newman, *Chemical Weapon Munitions Dumped at Sea, an Interactive Map*, JAMES MARTIN CENTER FOR NONPROLIFERATION STUDIES, 6 August 2009, http://cns.miis.edu/stories/090806_cw_dumping.htm#citel, (last visited 2 July 2014) ("SDW Interactive Map").

[5] US Department of Defense, US Army Research, Development and Engineering Command, Historical Research and Response Team, *Offshore Disposal of Chemical Agents and Weapons Conducted by the United States*, Historical Database No. 26 (2001).

[6] Joshua Newman & Dawn Verdugo, *Building Awareness of Sea-Dumped Chemical Munitions in* KERSTEN VIGNARD, JANE LINEKAR (eds.), MARITIME SECURITY 45-46 (2010); Tine Missiaen & Jean-Pierre Henriet (eds.), *Chemical Munition Dump Sites in Coastal Environments: a border-transgressing problem*, Belgian Federal Office for Scientific, Technical and Cultural Affairs (OSTC) (2002).

[7] *Id. at* 46.

[8] HELCOM is responsible for implementing the 1992 Helsinki Convention. Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea, 1507 UNTS 167 (Helsinki, 1992) ("Helsinki Convention"); HELCOM, Report on Chemical Munitions Dumped in the Baltic Sea, Baltic Sea Environment Proceedings No. 142 (2013) ("2013 HELCOM Report"), at 5.

[9] The OSPAR Commission is responsible for implementing the OSPAR Convention. Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, 1992) ("OSPAR Convention"); OSPAR Commission, *Assessment of the Impact of Dumped Conventional and Chemical Munitions* (updated 2009) ("2009 OSPAR Report"), at 3,

[10] 2009 OSPAR Report at 3.

Until the 1970s, sea dumping was believed to be one of the safest and most cost effective ways to dispose of munitions.[11] In the 1960s, atmospheric testing of nuclear weapons drastically increased public concern and awareness of the environment, leading to a larger discourse of the environmental impacts of military activity.[12] This movement led the U.S. National Academy of Science to recommend the discontinuation of sea disposal in 1969.[13] In 1972, the US Congress enacted the Marine Protection Act recognizing that "unrelated dumping of material into ocean waters endangers human health, welfare, and amenities, and the marine environment, ecological system, and economic potentialities.[14] That same year, a multilateral Convention was signed in London prohibiting the sea dumping of biological and chemical weapons.[15] The Convention prohibits only the dumping at sea of certain "blacklisted" substances. It did not create a duty to remove these agents, nor prohibit the dumping of conventional weapons.

The end of the Cold War made it possible to address the global stockpile of chemical weapons.[16] However, the 1993 Chemical Weapons Convention did not require States to declare chemical weapons it dumped at sea before 1 January 1985.[17] One participant in the 1995 NATO Advanced Research Workshop on Sea Dumped Chemical Munitions remarked that any recovery of any munitions as was not seen as adding to the security of states parties, the primary purpose of the Convention.[18] This exemption from declaration duties under Article III of the Chemical Weapons Convention was unexplained. A likely explanation is that it would have been difficult to declare sea dumped weapons, as dumping was often carried out haphazardly.[19] Similarly, there is no obligation to destroy munitions dumped at sea under Article IV of the Chemical Weapons Convention. As for the cut-off date, it was likely that some states would be implicated by an earlier date. Although the practice of sea-dumping largely stopped in the 1970s, US Navy and US Marine Corps' inventory found that some munitions sites were used as recently as the 1990s.[20]

2.2. Risks

2.2.1. Known Risks

[11] US NATIONAL ACADEMY OF SCIENCES, DISPOSAL HAZARDS OF CERTAIN CHEMICAL WARFARE AGENTS AND MUNITIONS 20 (1984).

[12] J. Samuel Walker, *The Controversy over Radiation Safety, a Historical Overview, 262* J. AMERICAN MEDICAL ASSOCIATION 664, 665-67 (1989).

[13] US NATIONAL ACADEMY OF SCIENCES, DISPOSAL HAZARDS OF CERTAIN CHEMICAL WARFARE AGENTS AND MUNITIONS (1969); David M. Bearden, *U.S. Disposal of Chemical Weapons in the Ocean: background and Issues for Congress*, CONGRESSIONAL RESEARCH SERVICE, 3 January 2007. ("2007 CRS Report").

[14] 33 U.S.C. §1401 et seq.

[15] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 26 UST 2403 (1972) ("London Convention").

[16] Ian Kenyon and Teresa Dunsworth, *Conflict Management and the Chemical Weapons Convention, 1* LJIL 81, 81 (1997).

[17] Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction 1974 UNTS 45 (1993) ("Chemical Weapons Convention"), Arts. III, IV.

[18] Dr. Thomas Stock, *Sea Dumped Chemical Weapons and the Chemical Weapons Convention,* in Kaffka, *supra* note 1 at 62.

[19] SDW Interactive Map.

[20] Strategic Environmental Research and Development Program, White Paper, *Munitions in the Underwater Environment: State of Science and Knowledge Gaps 1* (2010). ("SERDP White Paper").

In 1948, nine fishermen were brought to a hospital in Liepaja, Latvian SSR with signs of mustard gas poisoning.[21] An investigation revealed that the fisherman fished out a box with German inscription. The box contained a chemical weapon. The USSR Ministry of Internal Affairs reported that in 1945, Soviet troops captured 35,000 tons of chemical weapons dumped by different groups between the USSR and Swedish coasts.[22] Incidents like this have continued into modern times. In January 1997, a polish fishing crew accidently recovered a lump of mustard gas. The next day, all of the crew members experienced adverse reactions including skin lesions and reddening.[23] More recently in 2013, authorities in Puerto Rico reported that a young tourist was burned after picking up a shell containing white phosphorous.[24] In the past 20 years, a total of 115 incidents of accidental contact with sea-dumped munitions were reported to CHEMSEA, a cooperative research project for monitoring hazardous substances in the Baltic Sea.[25] Although CHEMSEA reported that the number of incidents were declining, it remarked that only Danish statistics were deemed reliable considering the discrepancies in the injury compensation systems.[26]

Reported instances have demonstrated the serious effect munitions can have on human beings. The consequences of contact with chemical agents may include burns, sores, vomiting, respiratory dysfunction, mental impairment, damage to the immune and nervous systems, infertility, and death.[27] Available historical information indicates that sulfur mustard is the most common chemical warfare agent in dumped munitions. The harm from a chemical munition may be triggered in many ways including: (1) functioning as intended, releasing toxic elements after detonation; and (2) indirect contact through vapors, leaked liquid, or solid agents that have become attached to an object, such as fish, or contaminated sediment.[28] Similarly, unexploded conventional munitions may eventually release, harming humans, structures, and the environment around it.[33] The magnitude of the harm depends on the class and type of munition.

Human activity on the sea increases the risk of contact with these contaminants. One study at the University of Bari in Italy reported that 232 male residents were exposed to mustard gas recovery in fishing nets.[29] The highest risk of coming into contact with dangerous materials was demonstrated to be highest when fishing inside or near former dumping areas. There has been a decrease in incidents in recent years. However, HELCOM suggests this may be associated with changes in local abundance of fish, fewer fishing hours, more efficient fishing gear, and

[21] Dr. Lev Fedorov, *Pre-Convention liquidation of Soviet Chemical Weapons,* in Kaffka, *supra* note 1 at 17.
[22] *Id.*
[23] CHEMSEA, *Results from the CHEMSEA Project - Chemical Munitions Search and Assessment 19* (2014). ("CHEMSEA Findings").
[24] Danica Coto, *Tourist in Puerto Rico Injured by Live Munition,* ASSOCIATED PRESS, 33 March 2013, *available at* http://bigstory.ap.org/article/tourist-puerto-rico-injured-live- munition.
[25] CHEMSEA Findings, §1.4.
[26] *Id. at* **21.**
[27] 2007 CRS Report at 8.
[28] 2013 HELCOM Report at 6.
[29] Emily Baine & Margaret Simmons, *Mitigating the Possible Damage Effects of Twentieth-Century Ocean Dumping of Chemical Munitions*, Huntsville, AL, US Army Engineering & Support Center 6 (2005).

discrepancies in national reports.[30] Other development projects and economic activities, such as offshore construction or seabed resource extraction, increases the probability of encounters with underwater munitions. Offshore construction and maintenance workers run the risk of encountering munitions buried in the sediment and contact with contaminated equipment. Accidental detonations from such activities may also result in injury to marine life from the shock waves produced by exploding munitions.[31] Marine leisure and recreational activities may also place humans at risk of contact with munitions. HELCOM identified recreational divers as a special risk group.[32] Although the likelihood of beach visitors coming into contact with munitions has been assessed as negligible, there is a high likelihood of confusing incendiary agents such as white phosphorus with collectible amber when washed ashore. Liepaja in Lithuania and the beaches of Usedom between Poland and Germany were identified as risk areas in light of various incidents.[33]

2.2.2. Unknown Risks

Munitions may also cause harm to human health and the environment over time. However, the probability and magnitude of the threat is largely unknown. It is estimated that over time, chemical constituents will leak from munitions in the underwater environment, resulting in slow discharge into the surrounding water and sediment. While there is no present evidence of widespread negative effect on the food chain, corroding metal casings may breach and lead to impacts in the future. Breached munitions casings release chemical compounds which can be absorbed or dissolved in marine waters, bind to particles, or remain in suspension in overlying waters. Some munitions constituent compounds have been already reported in low concentrations in marine sediment.[34] As these munitions are in various stages of corrosion, some may leak immediately, and others may not be released for a long time. Similarly, agents react differently in sea water. Some agents may rapidly mix with seawater and be diluted, only having a short-term effect, while others are insoluble and persistent polluters. The latter of these agents have a potential to bioaccumulate, and bio magnify in living organisms through the food chain.[35] Fish, marine mammals, and sea birds may come into direct contact with chemical warfare materials themselves or through contaminated food. CHEMSEA's findings indicated a higher prevalence of bacterial skin ulcers, gill parasites, and toxic effects in fish caught off dump sites compared to control areas.[36] Similarly, measurable quantities of explosive residues were detected in fish near dump sites off Vieques Island, Puerto Rico. Chronic toxic effects in marine life may result in

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[30] 2013 HELCOM Report at 75.

[31] Kim Detloff, Petra Deimer, Ingo Ludwichowski, Hans-Jurgen Schutte, Ulrich Karlowski and Sven Koschinski, *Environmental Nongovernmental Organizations' Perspective on Underwater Munitions*, 20th ASCOBANS Advisory Committee Meeting, AC2o/Doc.3.5(S) 11 (Warsaw, 27-29 August 2013).

[32] 2013 HELCOM Report at 79.

[33] *Id.* at 8o; TBT Staff, *Tourists hunting "false amber" suffer phosphate burns*, BALTIC TIMES, 4 June 2006 *available at* http://www.baltictimes.cominews/articles/157770.U7VJBvmSylU.

[34] SEDRP White Paper at 7.

[35] 2013 HELCOM Report at 58.

[36] CHEMSEA Findings at 43-49.

behavioral changes or injuries. Similarly, humans and larger forms of marine life suffer from chronic diseases when exposed to low doses of toxins over a long period.[37] The chronic effects of munition compounds may not be readily apparent inside a population, and it is difficult to diagnose and correlate a cause-and-effect relationship. Likewise, the effect of munitions on natural resources may adversely affect the commercial fishing industry, which could have dire effects on local and international economies. Canada's Maritime Provinces are laden with munitions dumping sites, and with a highly valuable fishing industry, the economic risks related to underwater munitions remain uncertain.

The extent of marine life exposure to munition constituents is largely unknown. Given the numerous pathways of exposure and mix of contaminants, it is almost impossible to link adverse ecological effects to certain substances. While toxicology reports have been conducted, they have not addressed the cumulative effects of agents, and what is not well characterized is the levels of munition constituents that may be encountered in the real world. While no major impacts on the marine environment have been witnessed, there is no clear picture of the long-term effects of munitions contaminants. Current studies on underwater munitions have all indicated that further study of the underwater environment is required. Put quite aptly by HELCOM: "The legacy from the past is still resting on the bottom of the sea and is inextricably linked to the fish of today, and it may be that its effects will only be discernible on the consumer of tomorrow."[38]

2.3. Knowledge Gaps

There are a number of remaining uncertainties in assessing the potential risk. Records on munitions disposal are generally incomplete. Although sea dumping has been traced to the early twentieth century, the United States did not keep records of disposal locations until the 1940s.[39] Other states provided hardly any records of chemical dumping activities. Even with available records, historical dump site information often provides only general locations, and may not be entirely accurate. Munitions may shift position in the underwater environment through natural or human activity.[40] Similarly, when fishing trawls are drawn over contaminated areas, sediments may be re-suspended, and the contamination may spread locally. Munitions caught in nets may also travel long distances before being released. Similarly, very little data exists on the state of corrosion of munitions in underwater environment. There is also little known on toxicity of degradation products of CWAs or their metabolites and more basic research is needed. This adds another element of uncertainty. As casings breach, chemical, biological, and physical processes change chemical and toxicity properties in the ecosystem. The

[37] 2013 HELCOM Report at 84.
[38] *Id.* at 86.
[39] US Defense Environmental Programs Annual Report to Congress, *Sea Disposal of Military Munitions*, Fiscal Year 2009 at 86.
[40] 2013 HELCOM Report at 67.

Belgian Federal Study on underwater munitions remarked that "any risk assessment will be uncertain as long as it is based on an incomplete inventory of the site."[41]

[41] Missiaen et al., *supra* note 5 at 143.

2.4. Development and Momentum

2.4.1. National Responses

At the national level, some states have implemented measures to continue assessment and mitigation of the potential threats of underwater munitions. For example, in the United States, the Clean Water Act authorizes the President to ensure effective and immediate removal of a discharge, and mitigation or prevention of a substantial threat of discharge, of oil or a hazardous substance "into navigable waters, or into the US Exclusive Economic Zone ("EEZ"). The John Walker National Defense Authorization Act for Fiscal Year 2007 authorized funding historical identification of munitions sites, cooperation between military and environmental agencies, annual reporting, and identification of navigational and safety hazards.[42] The Defense Environmental Restoration Program ("DERP") authorizes the US Department of Defense to take response to address releases of hazardous substances and pollutants within the meaning of the Clean Water Act. Part of DERP, the Military Munitions Response Program focuses on challenges presented at munitions response sites including investigations, removal, and remedial measures to address human health and environmental risks.[43] However, DERP only applies to locations within the US EEZ.

German studies on underwater munitions have been underway since 1993. Poland and Lithuania have also been very active on addressing underwater munitions. In 2010, an International Scientific Advisory Board ("ISAB") on Dumped Chemical Weapons was established on Lithuania's initiative, with scientists, researchers and experts from around the world.[44] Both Poland and Lithuania have been actively engaged with the work of International Dialogue on Underwater Munitions ("IDUM"), a non-governmental organization that collaborates with governments, international organizations, and stakeholders to provide a better understanding of the impact of decaying munitions on both human health and the environment.

2.4.2. International Responses

International efforts sponsored by the Government of Lithuania led the UN General Assembly to pass Resolution 65/149 titled "cooperative measures to assess and increase awareness of environmental effects related to waste originating from chemical munitions dumped at sea." [45] The Resolution socio-economic impact and overview of implementing the Resolution was presented at United Nations Second Committee on Sustainable Development by Terrance P. Long, Chairman of International Dialogue on Underwater Munitions (IDUM) in 2010 and 2013. This resolution noted the importance of raising awareness of the environmental effects of munitions dumped at sea, suggested that states and organizations continue monitoring, and invited the Secretary-General to seek the views of member states.[46] At the Third Review Conference of State Parties at the Organization for the Prohibition of Chemical Weapons (OPCW) in April 2013, Poland, Lithuania, Bulgaria, and

[42] US Public Law 109-364, 10 STAT. 2137 (2006), § 316.
[43] US Department of Defense Manual, Defense Environmental Response Program, DoDM 4715.20, 9 March 2012.
[44] 2013 HELCOM Report at 14.
[45] UN Doc. A/65/149 (2011).
[46] *Id.*

Luxembourg proposed that the OPCW become a venue for voluntary cooperation on sea dumped chemical munitions. These efforts grabbed the OPCW's attention, inviting states parties to support voluntary sharing of information, awareness and cooperation.[47] In July 2013, following direction from Resolution 65/149, the UN Secretary General drew on information submitted by states, relevant regional and international organizations, NGOs, and produced a report summarizing these views.[48] The Secretary General reported that many states indicated that there was an environmental risk to their states or region. from wastes originating from munitions dumped at sea. States widely agreed that international cooperation would be required to assess and increase awareness of underwater munitions. However, proposals for further examination and lending financial and technical support were less popular.

2.5 Underwater Munitions are an International Issue

Due to the widespread participation of many states in the dumping of munitions and chemical weapons and the associated widespread environmental and human health effects, underwater munitions are clearly an international issue. Various venues for international cooperation such as the OPCW and International Maritime Organization ("IMO") were assessed. However, each of these organizations reaches only part of the problem. Some have doubted the applicability of international law at all to this issue.[49] Others have analyzed solely from a technical application of conventional duties in isolation. However, a legal analysis that ends at the London Convention or Chemical Weapons Convention is simply shortsighted and fails to consider customary international law, emerging legal doctrine, and the interaction between different legal frameworks.

Although states have collectively expressed the opinion that munitions pose a threat to human health and the natural environment, some states and international organizations have recommended that munitions should stay in the ocean. Others, including the NGO community, have pressed for removal of these sources of pollution, and that "*leaving things as they are* is not an option at all."[50] The key to proceeding on this issue is finding an appropriate way to deal with uncertainty. Traditional risk management assumes that science can sufficiently foresee the environmental impacts of human activity. However, in today's legal and political environment, there is a growing consensus that states should not only treat the natural environment with care, but they should take effective measures to prevent environmental harm in circumstances in

[47] Report of the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention, RC-3/3, 19 April 2013, para. 9.147.

[48] Report of the Secretary General, Cooperative Measures to Assess and Increases Awareness of Environmental Effects Related to Waste Originating from Chemical Munitions Dumped at Sea, A/68/258, 24 June 2013. ("2013 Secretary General's Report on Underwater Munitions").

[49] Baine et al., *supra* note 34 at 13. This report was produced by Counsel acting in their own capacity and does not reflect the views of the US Army.

[50] International Dialogue on Underwater Munitions, http://www.underwatermunitions.org/index.php, Detloff et al., *supra* note 38 at 14.

scientific uncertainty.[51] This concept has its origins in the German legal principle *Vorsorgeprinzip,* which introduces environmental ethics into policy decision making. Known in English as the "precautionary principle," it has been used to justify a wide range of measures in relation to climate change, environmental degradation, and food safety. Since the 1980s, the precautionary principle has taken on a number of definitions. The 1984 Ministerial Declaration of the International Conference on the Protection of the North Sea reflected the consensus that states "must not wait for proof of harmful before taking action."[52] A popular definition is citied in the 1992 Rio Declaration, which purports that "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." [53] Since the Rio Declaration, many multilateral treaties have incorporated the principle in various formulations. Some of these documents mention a "precautionary approach," while others a "precautionary principle" or "precautionary measures."[54]

3. Exclusive Economic Zone (EEZ)

Exclusive Economic Zone (EEZ) – is a sea zone prescribed by the United Nations Convention on the Law of the Sea over which a state has special rights regarding the exploration and use of marine resources, including energy production from water and wind. It stretches from the baseline out to 200 nautical miles (nm.) from its coast. In colloquial usage, the term may include the continental shelf. The term does not include either the territorial sea or the continental shelf beyond the 200 nm limit. The difference between the territorial sea and the exclusive economic zone is that the first confers full sovereignty over the waters, whereas the second is merely a "sovereign right" which refers to the coastal state's rights below the surface of the sea. The surface waters, as can be seen in the map, are international waters.

51 NIco SCHRIIVER, THE EVOLUTION OF SUSTAINABLE DEVELOPMENT IN INTERNATIONAL LAW: INCEPTION, MEANING AND STATUS 184 (2008).

52 Rio Declaration on the Environment and Development, UN Doc. A/CONF.151/26 (1992).

53 *Id.*

54 *Compare* Rio Declaration, Principle 15 *with* OSPAR Convention, Art. 2(2).

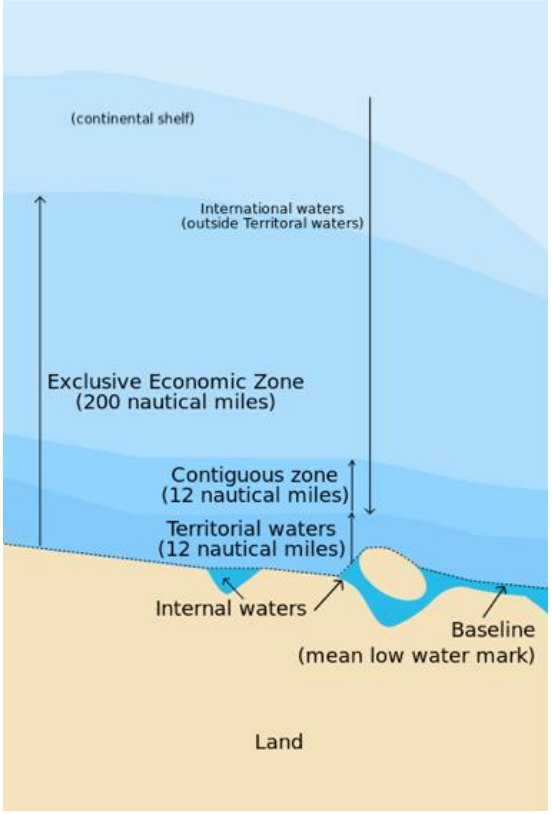

Figure 1: Sea Areas in International Rights

Source: 'Final report of the ad hoc Working Group on Dumped Chemical Munition (HELCOM CHEMU) to the 16th meeting of the Helsinki Commission', Mar. 1995.

Origin:

The idea of allotting nations EEZs to give them more control of maritime affairs outside territorial limits gained acceptance in the late 20th century.

Initially, a country's sovereign territorial waters extended 3 nautical miles or 6 km (range of cannon shot) beyond the shore. In modern times, a country's sovereign territorial waters extend to 12 nautical miles (~22 km) beyond the shore. One of the first assertions of exclusive jurisdiction beyond the traditional territorial seas was made by the United States in the Truman Proclamation of September 28, 1945. However, it was Chile and Peru respectively that first claimed maritime zones of 200 nautical miles with the Presidential Declaration Concerning Continental Shelf of 23 June 1947 (El Mercurio, Santiago de Chile, 29 June 1947) and Presidential Decree No. 781 of 1 August 1947 (El Peruano: Diario Official. Vol. 107, No. 1983, 11 August 1947).

It was not until 1982 with the UN Convention of the Law of the Seas the 200 nautical mile exclusive economic zone was formally adopted as:

Part V, Article 55 of the Convention states:

> Specific legal regime of the exclusive economic zone

> The exclusive economic zone is an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, 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 this Convention.

Disputes:

The exact extent of exclusive economic zones is a common source of conflicts between states over marine waters.

- One well-known example of such dispute was the Cod Wars between the United Kingdom and Iceland.
- Norway and Russia dispute both territorial sea and EEZ regarding the Svalbard archipelago as it affects Russia's EEZ due to its unique treaty status. A treaty was agreed in principle in April 2010 between the two states and subsequently ratified, resolving this demarcation dispute.
- The South China Sea (and the Spratly Islands) is the site of an ongoing dispute between several neighbouring nations.
- Croatia's ZERP (Ecological and Fisheries Protection Zone) in the Adriatic Sea caused friction with Italy and Slovenia and caused problems during Croatia's accession to the European Union.
- A wedge-shaped section of the Beaufort Sea is disputed between Canada and the United States, as the area reportedly contains substantial oil reserves.
- France claims a portion of Canada's EEZ for Saint-Pierre-et-Miquelon based on a new definition of the continental shelf and EEZ between the two countries. Saint-Pierre-et-Miquelon is surrounded by Canada's EEZ.
- Mauritius claims EEZ for Tromelin from France and EEZ for British Indian Ocean Territory from the UK.
- Northern Cyprus claims a portion of Cyprus' EEZ overlaps with that of Northern Cyprus in the south/southeastern part of the Cyprus island.
- Turkey claims a portion of Cyprus's EEZ overlaps with its own EEZ.
- Lebanon claims that the agreement between Cyprus and Israel overlapped its own EEZ.

Regions where a permanent ice shelf extends beyond the coastline are also a source of potential dispute.

4. National Laws

National Regulations only bind persons and legal entities acting on the national territory and in the territorial Sea. With no common existing treaty, protocol, or Convention, the overall approach to the Law of the Sea is not harmonized and is fragmented at best. All current domestic and international laws do not require the underwater munitions common approach. Common examples of differences in National Laws of the states surrounding the Baltic Sea are as follows:

4.1. Finland

The Overview and Relevant Articles on Domestic Laws related to Legal Underwater Munitions Management in Finland.

4.1.1 Constitution (2000)

Section 20 - Responsibility for the environment

Nature and its biodiversity, the environment and the national heritage are the responsibility of everyone.

The public authorities shall endeavour to guarantee for everyone the right to a healthy environment and for everyone the possibility to influence the decisions that concern their own living environment.

4.1.2 Water Act (1961)

Chapter 1- General Restrictions on Use

Section 15

Unless otherwise prescribed in the provisions below or in a permit issued under said provisions, no water may be led from a water body, and no other measures taken in the water body or on land, if such measures may lead to a change in the position, depth, water level or flow of the water body and thereby

1) cause damage or harm to someone else's water area, fishing, land, buildings or other property;
2) cause a flood risk, general shortage of water or harmful changes in the aquatic environment and its functions;
5) cause a health hazard; or
6) infringe the public interest in some other way comparable to those mentioned above (prohibition of altering a water system).

Section 19

Unless otherwise provided below, no measures that may cause pollution of the water body may be taken without a water court permit (prohibition on polluting a water body). Such measures include conducting or discharging a solid, liquid or gaseous substance or energy into the water body so as to produce, either immediately or when allowed to continue, a change in the quality of the water in the water body or its bottom that

2) causes detrimental change in the aquatic environment and its functions or obvious damage to the fish stock,
3) causes a health hazard;
5) may cause some other infringement of a public or private interest comparable to those mentioned above.

4.1.3 Act on the Prevention of Marine Pollution (1979)

Section 1- Prohibition of marine pollution

No action which may result in the pollution of the high seas or the territorial waters of another state may be taken in the territory of Finland, on the continental shelf which belongs to Finland, or on board a Finnish vessel.

Section 3- International Agreements

In order to prevent marine pollution, the appropriate provisions of international agreements which are binding on Finland shall be observed in addition to the provisions of this Act.

4.1.4 Act on Compensation for Environmental Damage (1994)

Section 1- Scope of application

Compensation shall be paid for a loss defined in this Act as environmental damage, caused by activities carried out in a certain area and resulting from:

1) pollution of the water, air or soil;

Section 6- Costs of prevention and reinstatement

Compensation shall also be paid by virtue of this Act for:

2) the costs, incurred by authorities, of measures to prevent the threat or the effects of a nuisance referred to in section 1, or to reinstate a polluted environment to its original state, if the costs are reasonable relative to the nuisance or the threat thereof, and to the benefit gained by the measures;

3) the costs of investigations that proved unavoidable in carrying out the preventive measures or reinstatement referred to above in subparagraphs 1 and 2.

Section 7- Persons liable for compensation

Even when the loss has not been caused deliberately or negligently, liability for compensation shall lie with a person

1) whose activity has caused the environmental damage.

4.1.5 Environmental Protection Act (2000)

Section 1- Objective of the Act

(1) The objective of this Act is:
1) to prevent the pollution of the environment and to repair and reduce damage caused by pollution;
2) to safeguard a healthy, pleasant and ecologically diverse and sustainable environment;
(1) In this Act:

Section 3- Definitions

(1) In this act

1) environmental pollution refers to such emission or deposit of a substance, energy, noise, vibration, radiation, light, heat or odour caused by human activity in the environment that either alone or together with other emissions:
a) causes harm to health;
b) causes harm to nature and its functioning;
c)prevents or materially hinders the use of natural resources;
d)decreases the general amenity of the environment or degenerates special cultural values;
e) reduces the environment's suitability for general recreation purposes;
f) damages or harms property or its use; or
g) constitutes a comparable violation of the public or private good.

4.1.6 Government Decree on Substances Dangerous and Harmful to the Aquatic Environment (2006)

Establishes which substances are harmful to the aquatic environment.

4.1.7 Act on the Safe Handling and Storage of Dangerous Chemicals and Explosives (Chemicals Safety Act (390/2005)).

The Act depicts the safety requirements in industrial handling and storage of dangerous chemicals. This act may be applicable once underwater munitions are surfaced and processed.

4.2. Poland

In the years 1997 and 1998, two international scientific symposia dedicated to chemical weapons dumped in the Baltic Sea were held at the Westerplatte Heroes Polish Naval Academy (PNA) in Gdynia . The substantial interest in these conferences reflected the shared concerns prevailing in the public and military, and at the governmental level. As a consequence, the Commander of the PNA established the Chemical-Ecological Information Centre (Centrum Informacji Chemiczno-Ekologicznej, CICE) in 1999 in order to carry out an assessment of the threat emanating from chemical munitions dumped in the Baltic Sea and their impact on the marine environment.

In later years, the problem of dumped chemical munitions has gained a new dimension due to an increase in planned exploitation of the seafloor for large construction and infrastructure projects. A need was thus identified for the assessment of all consequences resulting from the possible disturbance of sea-dumped munitions during such undertakings. Consequently, the topic has often been on the agenda of scientific conferences related to the safety of sea basins. Of special note is the international conference 'Environmental Threats to the Baltic Sea', held in 2007 under the patronage of the Marshal of the Senate, Bogdan Borusewicz, and Chairman of the Agriculture and Environmental Protection Committee, Jerzy Chróścikowski, in Warsaw, and the 'International Seminar on Sea-dumped Chemical Weapons' in Vilnius in 2008. The latter meeting was supported by a Polish paper entitled 'The North European Pipeline and Chemical Warfare Agents Dumped in Bornholm Basin', which was subsequently discussed with representatives of the Ministry of Economy and the Ministry of Foreign Affairs of Sweden during a seminar in Stockholm.

As mandated by the Minister of Environment (5 January 2010), the Chief Inspector of Environmental Protection, Andrzej Jagusiewicz, serves as the leader of the flag-ship project 3.2. 'Assess the need to clean up chemical weapons' under Priority Area 3 'To reduce the use and impact of hazardous substances' of the EU Strategy for the Baltic Sea Region. He is also a member of the International Scientific Advisory Board (ISAB) on Sea-Dumped Chemical Weapons to the Government of Lithuania and is actively engaged in the work of the International Dialogue on Underwater Munitions. The Third Dialogue took place in Sopot, Poland, in 2011 and was co-organized by the Chief Inspectorate of Environmental Protection. The Fourth Dialogue was co-chaired by the Chief Inspector of Environmental Protection and took place in San Juan, Puerto Rico, in October 2012.

In support of the Lithuanian initiative, Poland organized a workshop on the environmental effects related to waste originating from chemical munitions dumped at sea. The event was co-organized by the Chief Inspectorate of Environmental Protection and the Polish Naval Academy and took place on 5 November 2012 in Gdynia at the premises of Polish Naval Academy. One of the main purposes of the workshop was to consider the elaboration of a reporting model for the strategy towards implementation of the UN General Assembly resolution A/RES/65/149.

The newest national project 'Poland for the Baltic Sea' is coordinated by the Chief Inspectorate of Environmental Protection and financed by the National Fund for Environmental Protection and Water Management. One of the project's aims is to communicate the subject of chemical

munitions and its impact on various groups of stakeholders to Polish civil society. On 19 November 2012, a conference was held in the framework of this project in Szczecin. The audience consisted mostly of fishermen, and representatives of tourism and local governments.

4.2.1 Constitution (1997)

Article 5
The Republic of Poland shall safeguard the independence and integrity of its territory and ensure the freedoms and rights of persons and citizens, the security of the citizens, safeguard the national heritage and shall ensure the protection of the natural environment pursuant to the principles of sustainable development.

Article 68

Section 4 Public authorities shall combat epidemic illnesses and prevent the negative health consequences of degradation of the environment.

Article 74

1. Public authorities shall pursue policies ensuring the ecological security of current and future generations.
2. Protection of the environment shall be the duty of public authorities.
3. Everyone shall have the right to be informed of the quality of the environment and its protection.
4. Public authorities shall support the activities of citizens to protect and improve the quality of the environment.

Chapter XI - Extraordinary Measures

Article 228,

1. In situations of particular danger, if ordinary constitutional measures are inadequate, any of the following appropriate extraordinary measures may be introduced: martial law, a state of emergency or a state of natural disaster.
2. Extraordinary measures may be introduced only by regulation, issued upon the basis of statute, and which shall additionally require to be publicized.
3. The principles for activity by organs of public authority as well as the degree to which the freedoms and rights of persons and citizens may be subject to limitation for the duration of a period requiring any extraordinary measures shall be established by statute.
4. A statute may specify the principles, scope and manner of compensating for loss of property resulting from limitation of the freedoms and rights of persons and citizens during a period requiring introduction of extraordinary measures.

4.2.2 ACT of 26 April 2007 on Crisis Management (2017)

Article 10

The Government Centre for Security shall be established, hereinafter referred to as the 'Centre' in the form of a state budget unit subordinated to the Prime Minister.

The Government Center for Security is preparing in accordance with the Act on Crisis Management, the National Crisis Management Plan (NSDC), which is the basic document regulating crisis management in the case of incidents with chemical munitions. It contains a general summary of individual types of threats and central level institutions responsible for implementing projects in accordance with the crisis management model adopted in Poland

Article 25

1. If in a crisis situation the use of other capabilities and resources is impossible or may prove to be insufficient, unless other regulations state otherwise, the Minister of Defence, at the request of the voivode may provide him with subunits or units of the Armed Forces of the Republic of Poland, hereinafter referred to as the 'Armed Forces units and assign them to carry out crisis management tasks.

2. The Armed Forces units may participate in the performance of crisis management tasks, according to their specialist training and pursuant to the voivodeship crisis management plan.

3. The tasks, as referred to in Section 2 that may be relevant to underwater munitions (and numbered as such) , shall include:
   1) participation in the monitoring of threats;
   2) performance of tasks related to the evaluation of the effects of events that occurred in the area where the threats exist;
   7) isolation of the area where the threats exist or the place where the rescue operation is carried out;
   8) performance of protective, rescue and evacuation activities on threatened buildings and historical buildings and monuments;
   9) performance of activities requiring the use of specialist technical equipment or explosive from the resources of the Armed Forces of the Republic of Poland;
   10) removal of dangerous materials and their neutralization using capabilities and resources at the disposal of the Armed Forces of the Republic of Poland;
   11) elimination of chemical contamination as well as biological contamination and infections; and
   14) participation in ensuring the suitability of transport routes for driving

4.2.3 NATIONAL CRISIS MANAGEMENT PLAN

The National Crisis Management Plan (NSMP) is a planning document prepared by the Government Security Center in cooperation with ministries, central offices and voivodships, based on the Act on Crisis Management. It was developed in particular for the needs of the Prime Minister and the Council of Ministers. It is an initial document in the civil planning process at the central and provincial level.

At NSMP, 19 hazards have been identified in the safety net: flood, epidemic, **chemical contamination**, disruption of telecommunications systems and services, disruption in energy, fuel and gas systems, severe frost, intense snowfalls, hurricane, large-area fire, epizootics, epiphytosis, sea catastrophe, drought, heat, radiation pollution, collective public disturbance, terrorist event, disruption in the functioning of networks and information systems, and hybrid activities.

NSMP includes:
- tasks in the field of threat monitoring
- crisis response procedures, defining how to proceed in crisis situations - a list of directories and task modules of ministers and voivods
- cooperation between services participating in the implementation of planned emergency projects;

In the field of chemical contamination NSMP also refers to release of chemical warfare agents from sunken chemical weapons repositories, caused by the corrosion of containers. It also states areas of dumping chemical warfare (known currently).
There are also tasks and responsibilities of crisis management participants, in case of chemical contamination in the sea, among which are: The minister competent for maritime economy and the maritime administration, Search and Rescue Service - they are leading entity. As a cooperating entity are: Minister responsible for the environment, Minister competent for public administration, Minister of National Defence (Navy), Minister competent for internal affairs (Border Patrol), The Government Center for Security.
In the NSMP, only in the part concerning chemical contamination at sea carried out during the prevention phase, there is one record of warfare toxic agents, which imposes on the Navy a task consisting in the successive identification and elimination of threats from sunken chemical agents.

Other documents that should regulate crisis management in the case of incidents with post-war chemical munitions are voivodeship, poviat and communal crisis management plans. Plans are developed in accordance with the requirements set out Management No. 16 if the Minister of Internal Affairs and Administrations of 20 April 2017 on guidelines for provincial crisis management plans (Journal of Laws of the Minister of Internal Affairs and Administrations 2017, position 17). The plans define the rules for the participation of public administration at the provincial, poviat and commune levels as well as services, inspections and guards in responding to all phases of crisis management, i.e. prevention, preparation, response and reconstruction. In addition, the plans are a supporting tool the work of Crisis Management Teams at the appropriate levels of administration (voivodship, poviat, commune). The essence of the actions

set out in the Plan is to quickly detect the threat and develop actions that will help to prevent or limit the consequences of crisis.

Analysis of available provincial plans (for the Pomeranian and West Pomeranian Voivodships), poviat and commune voivodships (for communes and poviats located in the coastal zone) in terms of taking into account the risks that may occur after hauling or dumping chemical munitions and actions to be taken, allows to state that only in a few cases (e.g. Crisis Management Plan for the Kosakowo commune) threats of post-war ammunition chemical from among all threats of chemical contamination. This situation means that the management procedures developed in the plans are identical to chemical contamination and contamination as a result of the release of warfare toxic agents and in accordance the above, identical forces and resources are separated to eliminate threats. Such an approach to the threats of chemical munitions causes in the best case a significant extension the chain of institutions, services and guards involved in the rescue operation, and considering the worst scenarios, it should be stated that not precisely defined forces and measures and ways of their actions can lead to permanent damage to the health of the victims even their deaths.

4.2.4 Management No. 16 of The Minister of Internal Affairs and Administrations of 20 April 2017 on guidelines for provincial crisis management plans (Journal of Laws of the Minister of Internal Affairs and Administrations 2017, position 17)

The basic objective of the Guidelines is to unify the principles of preparing voivodeship crisis management plans (VCMP) and to increase the level of their functionality and usefulness. Guidelines for plans are an auxiliary document addressed to voivodes, indicating elements that should be considered when preparing plans.

4.2.5 Regulation of The Minister of Internal Affairs and Administrations of 3 July 2017 on the detailed organization of the National Firefighting and Rescue System (Journal of Laws of the Republic of Poland 2017, position 1319)

Article 1

The regulation defines a detailed organization of the n National Firefighting and Rescue System, hereinafter referred to as "KSRG**"(comment: abbreviation in polish**), in particular in the scope of:
1) functioning in the poviat, voivodship and country;
2) fight against fires and other natural disasters;
3) technical, chemical, ecological and medical rescue;
4) dispose of for rescue operations;
5) managing the rescue operation;
6) cooperation within the framework of forces and resources with competent authorities and entities during extraordinary events caused by the threat of a biological agent, including during terrorist events;
7) keeping documentation of rescue operations and documentation of the functioning of ksrg;
8) organization of operational reserves;
9) organization of management positions.

This document includes developed principles for organizing rescue operations, development of rules for organizing rescue exercises, development of rules for increasing operational readiness; development of rules for analyzing events; development of principles for the organization of activities of specialized water and diving rescue teams in the book, development of principles for the organization of chemical and ecological rescue in a ksrg (article 4, section 3).

Article 16

Section 1
The KSRG in the field of chemical and ecological rescue includes planning, organizing and carrying out rescue actions necessary to reduce or eliminate direct threats posed by substances hazardous to people, animals, the environment or property.

Section 2
Rescue operations referred to in paragraph 1, include in particular:
1) identification and identification of threats;
2) securing the zone of rescue operations, including the designation and marking of the danger zone;
3) enabling or disabling installations, devices and utilities that affect the safety of endangered or injured persons and the safety of rescuers, using valves or fuses that are on the utility installation of the facility covered by the rescue operation;
4) priority execution of activities enabling:
a) reaching and performing access to endangered or injured persons, including carrying out medical rescue operations, or evacuating them outside the danger zone,
b) preparation of escape routes for endangered or injured persons and rescuers,
c) ensuring the safety of vulnerable or injured persons and rescuers,
d) evacuating and saving persons, and then animals, and saving the environment and property from the effects of direct threats posed by dangerous substances;
5) assessing the extent of the threat and forecasting its development;
6) liquidation, limitation or extension of the danger zone;
7) adaptation of rescue equipment and techniques to the place of occurrence and the type of dangerous substance in order to limit the effects of leakage, evaporation or emission of a dangerous substance;
8) putting dams on tanks, watercourses or reservoirs endangered by the effects of spilling dangerous substances;
9) binding or neutralization of dangerous substances;
10) protection of the area covered by leakage of a dangerous substance;
11) conducting activities in the field of initial decontamination;
12) assessment of the size of the incident.

Section 6

Rescue operations from chemical and ecological rescue, in the scope resulting from the rescue plan, are carried out by KSRG entities, including their training and equipment with specialist equipment and personal protection equipment, and in particular specialized chemical and

ecological rescue teams of the State Fire Service and other entities of ksrg that are fire protection units.

4.2.6 Water Law (2017, Journal of Laws of the Republic of Poland 2017, position 1556)

Article 150

Initial assessment of the environmental status of marine waters.

Section 1
Initial assessment of the environmental status of marine waters include:

1) analysis of basic features and properties of marine waters and the current state of the marine environment, including in particular:
    a. characteristics and properties of marine waters other than those mentioned in point (a) a-c, containing:
    b. description of the occurrence of chemical substances, including hazardous chemical substances, pollution of sediments, hot spots defined in international law regarding the protection of the marine environment of the Baltic Sea region, threats to human health and contamination of fauna and flora, in particular for human consumption,
    c. description of other typical or specific characteristics for the Baltic Sea region;

National program for the protection of marine waters - Report to the European Commission (2016)

In the National program for the protection of marine waters - Report to the European Commission, there is recommendation to introduce in the next cycle and to extend the monitoring work of sea waters by competent authorities within the scope of their competences, of the ammunition dumping areas identified in Polish sea areas, including warfare toxic agents. This document is reviewed every six year if there is a need it is updated.

Comment, Despite this provision in the Regulation Of The Minister Of The Environment of 17 February 2017 regarding the adoption of a set of environmental objectives for marine waters,(Journal of Laws of the Republic of Poland 2017, position 593), the provisions regarding extending the monitoring work of sea waters by competent authorities within the scope of their competences, of the ammunition dumping areas identified in Polish sea areas, including warfare toxic agents have not been included.

4.2.7 The Act of 16 March 1995 on the prevention of marine pollution by ships (Journal of Laws of the Republic of Poland 2017, position 2000)

Article 11

Section 3 **.** Captain of a ship located in Polish sea areas who notices pollution or accident causing or capable of causing spillage of oil or other types of pollution at sea shall immediately notify the nearest shore station or Vessel Traffic Control Service, hereinafter referred to as "VTS Service", and to the ship's owner.

Section 4**.** Captain of a ship located in Polish sea areas:

1) involved in an accident causing a threat of pollution of the marine environment or pollution of the marine environment,
2) where the event causing the threat of pollution of the marine environment or pollution of the marine environment occurred
- is obliged to immediately provide information to the nearest bank station or VTS Service and to the shipowner.

Article 21

Section 1
The director of the maritime office to which the report or report referred to in Article 11, or who receives information from another source about pollution or threat of pollution of Polish sea areas, is obliged to:

1) assess the actual situation to determine the type and degree of pollution of the sea or the threat of pollution;
2) if necessary, order and take appropriate action;
3) immediately inform the competent authorities of the other States Parties to the 1992 Helsinki Convention of the existing situation and the action taken or intended, if the displacement moves or may travel to the maritime area of these countries.

Section 2
In the event of pollution or a threat to pollution of the Polish maritime area, the director of a maritime office may order the captain to:

1) leaving the Polish sea areas by the ship;
2) reloading, rescuing a ship or carrying out necessary repairs;
3) discharging harmful substances in the right place;
4) directing the ship to a place of refuge.

Article 22

Section 1
The director of a maritime office, in order to combat pollution in Polish sea areas, may directly apply for assistance to the competent authorities of other States Parties to the 1992 Helsinki Convention, especially those that may also be affected by the effects of pollution.

Section 2

The director of the maritime office, called upon to aid by the authority of another State party to the 1992 Helsinki Convention, is obliged to undertake efforts to provide such assistance.

Section 3
In the cases provided for in paragraph 1 and 2, the director of the maritime office shall notify the Helsinki Commission of the action taken.

Article 23

Section 1
The director of the maritime office who receives information about pollution in the Baltic Sea area, which may constitute a serious threat to the environment of this area or the related interests of any state party to the 1992 Helsinki Convention, after checking, shall immediately forward all relevant information to the competent state authorities, which may be endangered as a result of pollution, including information on intended or action taken, and in relation to a ship-related incident, he also forwards this information to the competent authority of the ship's Member State.

Section 2
Sending to the competent authorities of the Parties concerned of the 1992 Helsinki Convention the information referred to in section. 1, shall be repeated until the notification of actions taken by these countries is received.

Section 3
If the size of the pollution justifies it, the director of the maritime office shall provide the information referred to in section. 1, the International Maritime Organization.

Article 23a

Tasks in the field of combating threats and pollution at sea are performed by the Search and Rescue Service, determined by the provisions of the Act of 18 August 2011 on maritime safety.

1) The director of a maritime office, in order to combat pollution in Polish sea areas, may directly apply for assistance to the competent authorities of other states of the 1992 Helsinki Convention Parties, especially those that may also be affected by the effects of pollution.
2) The director of the maritime office, called to help by the authority of another State party to the 1992 Helsinki Convention, is obliged to undertake efforts to provide such assistance.
3) In the cases provided for in paragraph 1 and 2, the director of the maritime office shall notify the Helsinki Commission of the action taken.

4.2.8 Council of Ministers' Decree of 8 August 2017 on the organization of combating threats and pollution at sea (2017, Journal of Laws of the Republic of Poland 2017, position 1631)

Article 1, Section 2

The method of combating hazards and pollution related to chemical warfare dumped in Polish maritime areas is regulated by separate regulations.

4.2.9 Act of Environmental Protection law April 27, 2001 (Journal of Laws of the Republic of Poland 2017, position 519)

Article 3 (Legal Definition)

environmental protection - it means either taking or abandoning actions that enable conservation or restoring natural balance; this protection consists in particular of:
a) rational shaping of the environment and management of environmental resources in accordance with the principle of sustainable development,
b) counteracting pollution,
c) restoring natural elements to the proper state;

serious failure - shall be understood as an event, in particular an emission, fire or explosion, occurring during an industrial process, storage or transport in which one or more hazardous substances occur, leading to immediate hazard to life or health of people or the environment or the creation of such delayed threats;

Comment: Although as a plant with an increased risk or for a plant with a high risk of failure is not considered road, rail, waterborne, sea or airborne hazardous substances transport and related temporary storage thereon outside of the premises, including loading and unloading and transport to and from docks, wharves and marshalling yards; (Article 248, section 2a)

hazardous substance - means one or more substances or mixtures of substances which, due to their chemical, biological or radioactive properties, may, in the event of improper handling, endanger human life or health or the environment; a hazardous substance may be a raw material, a product, an intermediate product, a waste as well as a substance resulting from an accident.

4.2.10 Act of 16 April 2004 on Nature Protection (Journal of Laws of the Republic of Poland 2018, position 142)

Article 1, Section 2

The purpose of nature protection is:

1) maintaining ecological processes and stability of ecosystems;
2) preservation of biodiversity;
3) preservation of geological and paleontological heritage;
4) ensuring the continuity of the existence of plant, animal and fungal species, including their habitats, by maintaining or restoring them to a favorable conservation status;

5) protection of landscape values, green areas in cities and villages as well as shelters;
6) maintaining or restoring natural habitats as well as other resources, creatures and elements of nature to a proper conservation status;
7) shaping the right attitudes of man towards nature through education, information and promotion in the field of nature protection.

4.2.11 Regulation Of The Minister Of National Defense of 21 June 2012 on safety conditions for performing underwater works in organizational units subordinated to or supervised by the Minister of National Defense (Journal of Laws of the Republic of Poland 2012, position 810)

Article 67

Underwater works particularly dangerous are:

1) work with the use of explosives;
2) welding and thermal cutting;
3) work in chemically and biologically polluted waters;
4) works related to the penetration of the interior of wrecks.

Article 79

Finding explosive and dangerous objects of military origin or unknown origin should be notified to the duty service of the parent organizational unit.

4.2.12 The Act of 21 November 1967 on the general obligation to defend the Republic of Poland (Journal of Laws of the Republic of Poland 2017, position 1430)

Article 3, Section 2

The Armed Forces may also take part in the fight against natural disasters and the elimination of their consequences, anti-terrorist activities and property protection, search and rescue or protection of human health and life, cleaning and neutralization of areas of explosive and hazardous materials of origin and implementation tasks in the field of crisis management.

The other document regulating crisis management in the case of post-war chemical munitions incidents is the "Manual of conduct in case of entrapping chemical munitions". On the basis of the Order Ordinance of the Director of the Maritime Authority in Gdynia No. 3, published in the Official Gazette of the Gdańsk Province No. 60, dated December 12, 1997, the Council of Directors of Maritime Authorities approved the text given above ordinances for use in sea areas of the Republic of Poland. The manual, consisting of three parts, contains, in addition to the list of alarm points and the description of war toxic agents, basic information on how to handle chemical munitions. The analysis of the discussed document allows to state that it is already largely obsolete, and the methods of action proposed in it are too vague and not adapted to the real threats posed by contact with combat poison agents.

4.2.13 Act concerning the Maritime Zones of the Polish Republic and the marine administration, 21 March 1991

Article 1

The Act defines the legal situation of the maritime areas of the Polish Republic, the coastal area and the authorities of the marine administration and their scope of jurisdiction.

Article 2

1. The maritime areas of the Polish Republic are: (1) The internal waters; (2) The territorial sea; (3) The exclusive economic zone, hereinafter referred to as "Polish maritime areas".
2. The internal waters and the territorial sea are part of the territory of the Polish Republic.
3. The territorial sovereignty of the Polish Republic over the internal waters and the territorial sea shall extend to the waters, to the airspace over such waters and to the seabed and the subsoil of the internal waters and of the territorial sea

Article 15

The exclusive economic zone is situated beyond and adjacent to the territorial sea. It includes the waters, the seabed and its subsoil.

Article 16

1. The boundaries of the exclusive economic zone shall be defined by international treaties.
2. If such international treaties as referred to in paragraph 1 do not exist, the Council of Ministers may, by means of an ordinance, define the boundary of the exclusive economic zone.

Article 22

In the exclusive economic zone, the Polish Republic shall have the exclusive right to construct, or to authorize and regulate the construction and utilization of, artificial islands, installations and structures of any kind intended for the conduct of scientific research, exploration or exploitation of resources.

Article 28

Scientific research in Polish internal waters and the territorial sea may be carried out by foreign States and foreign natural or juridical persons, as well as by competent international organizations, after obtaining the consent of the Minister of Transport and Marine Economy.

Article 29

1. Scientific research in the Polish exclusive economic zone may be carried out by the States, persons and organizations referred to in article 28 after obtaining a consent from the Minister of Transport and Marine Economy. Applications for the issuance of the consent, containing information on the intended research and the programme therefor, must be submitted not later than six months before the expected starting date of the research.
2. The Minister of Transport and Marine Economy, after obtaining the opinion of the Minister of Environmental Protection, Natural Resources and Forestry, shall refuse to issue a licence or shall revoke a licence if the scientific research threatens to pollute the environment. In the same

manner, the Minister of Transport and Marine Economy may withhold its consent to the conduct of such research if the said research:

(1) Relates directly to the natural resources of the zone;
(2) Involves drilling into the seabed, the use of explosives or the introduction of harmful substances into the marine environment;
(1) Involves the construction or use of artificial islands, installations and structures.

Article 30
Foreign States and foreign natural and juridical persons, as well as competent international organizations, conducting scientific research in Polish maritime areas shall be required to:

(1) Ensure the participation of Polish representatives in the research, including their presence on board research vessels and at other installations;
(2) Inform the Minister of Transport and Marine Economy, at his request, of the results of the research;
(3) Enable the Minister of Transport and Marine Economy, at his request, to have access to all data and samples derived from the research;
(4) Inform the Minister of Transport and Marine Economy without delay of any major change in the research programme;
(5) Remove the scientific research installations and equipment without delay once the research is completed, unless a separate licence to leave them has been obtained.

Article 31
Polish natural or juridical persons may engage in scientific research in Polish maritime areas without a licence. The said persons shall inform the director of the competent marine office concerning the geographical areas and method to be used for the research 14 days before the research is begun and after the research is concluded.

4.2.14 Summary

Research of the national law, using LEX service, and by interviewing representatives of marine administration and navy and subsequent review and analysis of national Polish legislation was conducted. As a result of the analysis, it was found that there are no specific records concerning chemical ammunition and how to manage when it comes to contact with humans or for disposal, except - The National Crisis Management Plan and The Manual of conduct in case of entrapping chemical munitions given by Director of the Maritime Authority in Gdynia. Research showed that the documents were concerned with managing chemical contamination in crises management than with strictly with post-war chemical munitions dumped in the sea.

According to the response to the interpretation of MP Adam Korol from 2016, the problem of submerged chemical munitions requires the involvement of resources within the competence of the Minister of National Defence and the Minister of the Environment. Consequently, the Ministry of Defense issued Decision No 450/MON. 25.11.2011 concerning the implementation of the CWC Convention Additionally, there is also the national Act of 22 June 2001 about execution

of the CWC, where it is known that the Convention does not require recovery of the ammunition, which was dumped before 1 January 1985.

Instructions on how to deal with the chemical munitions are not updated, but training on chemical weapons contamination is systematically conducted. Unfortunately, this training is only internally known or conducted within Navy without the involvement of fishermen and maritime administrations. Also, the maritime administration instructions on dealing with chemical ammunition are not updated. Mentioned is the decree of the Maritime Authority in Gdynia which is outdated and has been in force since 1997. It requires changes concerning technological advances and results of research. Moreover, this document only covers cases of fishermen capturing chemical munitions and does not include accidents or munition finds on the seashore. The last guide for crews of fishing boats was issued under the CHEMSEA project by Dr Jarosław Michalak. As gathered from the reports and information from CHEMSEA, participants training was aimed at fishermen and people involved in maritime work during a project.

In accordance with the involvement of the Minister of Environment in 2015 the agreement of 5 February 2010 concluded to fulfill obligations arising from the provisions of the following agreements and regulations:

a) the Convention for the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention) of 9 April 1992;
b) the Convention on the Control of Transboundary Movements Hazardous Waste Disposal (Basel Convention) of 22.03.1989; and
c) Baltic Sea Region Action Plan for priority area 1 called: "reduction of discharges of biogenic substances to the sea to acceptable levels" and the flagship project: "assessment of the need to remove contaminated wrecks and chemical weapons" of 10.06.2009, hereinafter referred to as "the Agreement of 5 February 2010" was terminated.

4.3. Germany

Since 1947, hundreds of Danish fishermen have been injured by mustard gas munitions mixed in with their catches. In 2005, three fishermen caught a bomb in their nets and were killed when it exploded on the vessel. Danish sailor and fisherman Lorenz Marquardt pulled a 500-kg (1,102-lb) bomb onto his boat alongside his catch in April 2013. In Germany's Usedom North region in 2012, two female tourists from Saxony and Saxony-Anhalt became victims of a phosphorous flame (which had leaked from incendiary bombs), leaving them with second- and third-degree burns. This was the 12th incident reported in the region since 1990.

In addition to injuries, underwater contamination has slowed offshore construction of wind farms and pipelines. Offshore wind farms are an integral part of the German government's renewable energy agenda - and the buried ammunition is slowing down their construction.

Boskalis Hirdes, a German company specializing in underwater construction and the disposal of unexploded ammunition, was hired to install wind turbines off the German coast. While undertaking the project, Boskalis Hirdes' technical director, Jan Kölbel, shared that they were

laying cable on one specific route where they expected to find 50 items of UXO but instead discovered 2,000.

Controlled detonations have a huge impact on marine life. Environmental organizations like Naturschutzbund Deutschland (NABU) have "issued demands for legal guidelines" on clearance of underwater UXO and explosive remnants of war. Currently there are no official guidelines when it comes to controlled explosions. Ordnance disposal specialist Kölbel agreed such guidelines would be helpful". At present we do not have any general rules of that kind," he said. "We are working in a very closed sensitive environment. "To blow up a sea mine in situ is very difficult for us as we have to check before what animals are in the area, how we can protect these areas against the detonation," he added.

4.3.1 The various legal considerations

The legal considerations and process flow for legal actions for Germany are summarized pictorially in the Figure 2 below:

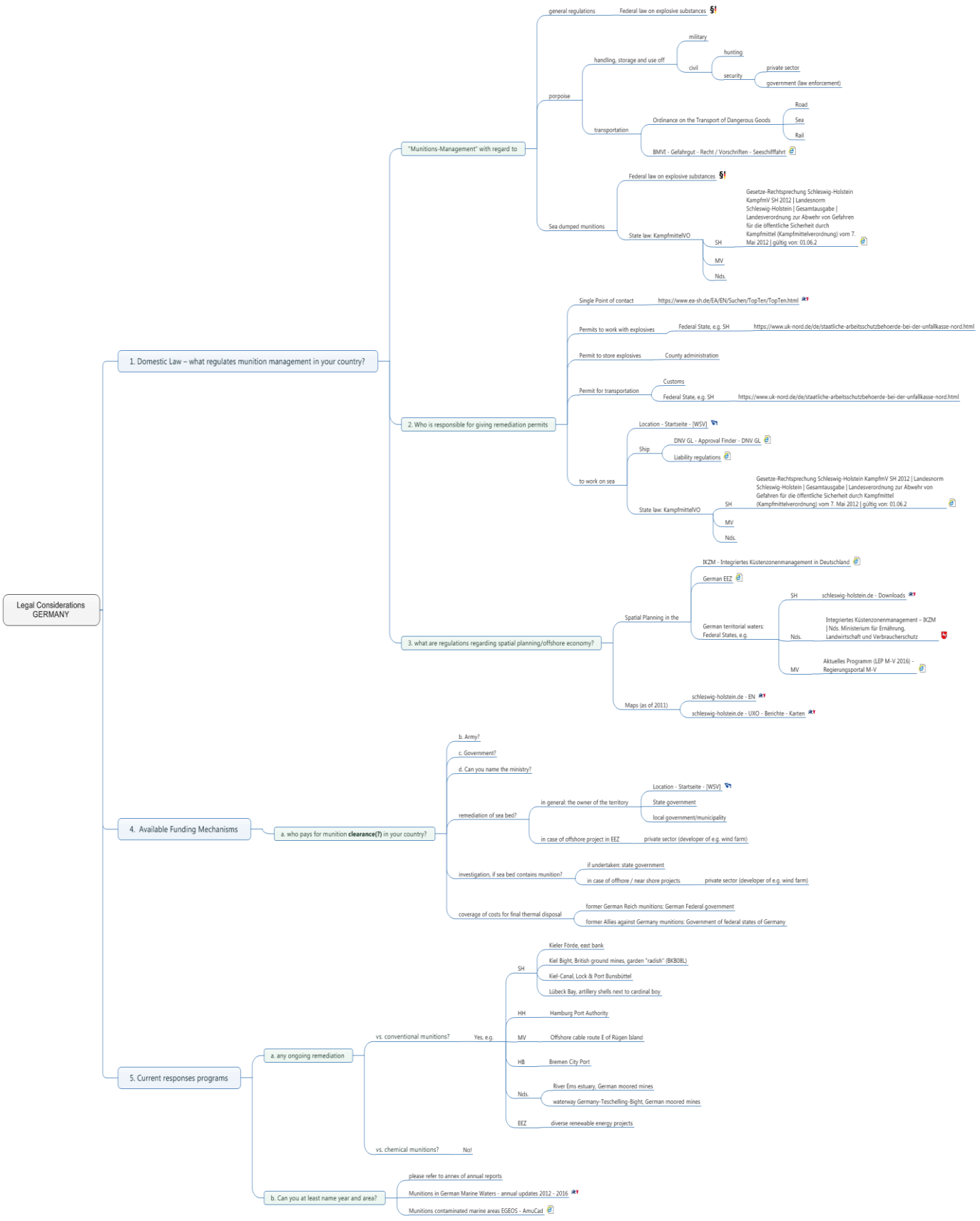

Figure 2: German Legal Consideration and Response Action Chart

4.3.2 Preliminary

The German Basic Law[55] (constitution) claims in Article 20 constitutional principles. Together with Articles 70cf. the division of power between the Federation and 16 Federal States (Länder) is defined. Article 87a (2) states that "apart from defense, the Armed Forces may be employed only to the extent expressly permitted by this Basic Law". This does not include the protection of people inside Germany, e.g. countermeasures against munitions older than those manufactured until the early days of May 1945.

As a consequence, regarding munitions in the marine environment it is necessary to understand that in Germany either the government of one the five coastal states or of the Federation will be the responsible administration, depending on, where the relevant object was found.

Consequently, the administrative subject, appointed to handle the object encountered, might vary by case. This certainly has its roots in the unpredictability of how the sea floor is used at present from the perspective of the German territory in 1948. Processes to adapt the German Basic Law to this recent development are under discussion. For now, the division of responsibility is valid currently as described as follows in the subsections below.

4.3.3 The division of territorial responsibility and law enforcement services

The German Federal Government in general is (beside others) responsible for defense, including civil defense, and the integrity of the state border, on land and at sea. This includes safety and security in the German EEZ to a far extent. In addition, the federal level takes care for safety of sea traffic in almost all parts of Germany, accessible for maritime vessels.

Federal services tasked with this are

- German Armed Forces (www.bundeswehr.de)
- German Federal Police (www.bundespolizei.de)
- German Customs (www.zoll.de)
- German Waterways Administration (WSV - www.wsv.de) and the
- German Federal Maritime and Hydrographic Agency (www.bsh.de).

On land and in the German territorial waters the five coastal states of Germany are tasked with law enforcement, safety and security, with one exception: Safety of maritime traffic remains with the Federal level, responsible is the German Waterways Administration.

Relevant state and municipal services are

- State Police,
- County rescue service, (voluntary) county and/or municipal fire departments and the
- States, county's or municipal's administration,

[55] https://www.gesetze-im-internet.de/englisch_gg/englisch_gg.html#p0118

depending on if the warfare material contamination occurs in a harbor area, estuary, beach or open coastal water.

To cope with this challenging legal system, the Federation and the coastal states have established the Central Command for Maritime Emergencies (CCME - https://www.havariekommando.de) in Cuxhaven, as a 24/7 central access to multiple maritime agencies in Germany. German Waterways Police Reporting and Coordination Centre, integrated in CCME, serves as national point of contact[56] for encounters of munitions in the sea.

4.3.4 EOD Operations in Germany

All Länder have individually tasked and enabled one entity required to act if munition objects produced before May 1945 are encountered, either on land, in fresh water or in the German territorial marine waters. The legal bases are state directives. As there are different opinions about how to deal with the threat of warfare material sufficiently, the type of service varies. The four coastal states tasked

- state police (Schleswig-Holstein, Bremen),
- metropolitan fire department (Hamburg),
- land survey administration (Lower Saxony) and
- Civil Protection (Mecklenburg-Western Pomerania).

The responsible state authorities handle their mission with their own resources to a certain extent. If workload is exceeded private companies or consortia of service providers are contracted in, on a case by case basis. Private sector contributors serve upon task and under close supervision of the responsible regulatory state authority.

None of the EOD services is equipped to handle e.g. leaking chemical warfare agents in an appropriate way. If this appears necessary administrative assistance will be requested from the CBRN-Squad of the closest County Fire Service or, if available, from German Armed Forces.

All warfare material recovered within state territory or which has been imported to a harbor will be confiscated by the locally responsible state service. The public authority identifies the objects and assesses it regarding safety. If judged as “safe to transport” it will be kept in a safeguarded interim storage facility, and there it will be either destroyed under controlled conditions or shipped to a high-temperature incineration facility, authorized for thermal destruction of all compounds of the weapon.

In subsidization of the state authorities, the German Armed Forces provide EOD-Services for their own munitions, of NATO partners and objects produced after May 1945 by foreign nations. The German Federal Police EOD-Services focuses on IED (airports and rail system) and trafficking of explosives or CBRN material.

[56] https://www.schleswig-holstein.de/DE/UXO/EN/Themes/Subjects/Munitions_encountered.html

4.3.5 The responsibility to take action

This is probably the most difficult point. In contrast to warfare material on land, underwater munitions are recognized as a latent threat, which leads to the opinion that the object itself might be considered a problem, but without obvious danger for objects of protection, no risk[57] appears.
If a munition was encountered at a specific location, the authority responsible to act is to be concluded e.g. on the type of object of protection at risk. The state EOD-Service provides advice and assesses the degree of danger posed by the munition object, but the decision on necessary operations, when and by who is with the public service responsible to protect the object at risk.

Examples:

1. In case of encounter of an artillery shell in the surf of a recreational beach the municipality is in charge to protect beachgoers and swimmers. The dangerous object will be handled by the EOD-Service that also declares safety after completions.
2. In case of the encounter of an airborne contact mine under a guided navigational route (lateral buoy system) in territorial water the German Waterways Administration (WSV) is responsible to act and has to reimburse the state's EOD-Service all necessary expenses for the counter measure exercised.
3. In case of an encounter of an aerial bomb during preparation of a corridor for a pipeline or an offshore power line in the German EEZ the license holder is responsible for all aspects of the construction operation. To achieve safety on the construction site the dangerous object must be handled in an appropriate way. What appears to be appropriate under the specified circumstances needs to be investigated and negotiated between the license holder and the German Federal Maritime and Hydrographic Agency (www.bsh.de) as the competent license authority for any kind of offshore installations in the German EEZ.

4.3.6 Considerations and limitations

Disregarding who does what in preparation of interventions into the marine environment any operator is obliged to assess possible effects of the planned activity. This assessment needs to be extended in case of foreseeable damaging effects towards protected species or marine areas under nature conservation status, e.g. EU Natura 2000[58]. The operator needs the agreement of environmental protection authorities regarding the operation plan, including description of the dangerous object, results of the assessment and prognosis of effects, comparison of variants to mitigate and a concrete plan of work.

The 17 German Nature conservation acts (Federal + 16 laws of Länder) are excusing violations of these rules in case of immediate danger and operations with regard to defense and military training operations.

[57] https://www.iso.org/iso-31000-risk-management.html
[58] EU, Natura 2000: http://ec.europa.eu/environment/nature/natura2000/index_en.htm

4.4 Lithuania

The First and the Second World Wars which took place in the territory of the Republic of Lithuania have resulted in the pollution of the territory with explosive remnants of war. That carries a potential danger to people, hinders the socio-economic development, organization of protection of the environment and culture and is detrimental to state, social and private activities in the territories, including the territorial waters of the Republic of Lithuania and exclusive economic zone, polluted by explosive remnants of war. During the period from 1990 to 2012 14 persons were killed and 7 persons were injured because of the explosive ordnances that were either left by the Soviet army or remained from the First and the Second World Wars. Over 240,000 explosive charges have been destroyed since 1990.

By the Law on the Ratification of the Protocol on Explosive Remnants of War to the 1980 United Nations Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects the Seimas of the Republic of Lithuania has ratified Protocol V, which came into force for the Republic of Lithuania on 12 November 2006. Although majority of the provisions of Protocol V apply to explosive remnants of war, which will be found after the entry into force of Protocol V, certain provisions impose the obligation on the states to also resolve the existing problems related to explosive remnants of war. The states having ratified Protocol V undertook the obligation to reduce the threat posed by explosive remnants of war by means of providing for the measures of information collection and analysis, clearance and destroying of explosive ordnances, also other measures that are to be implemented immediately and effectively. Article 5 of the Law on Civil Protection of the Republic of Lithuania stipulates that the civil protection and rescue system, considering the causes, character and threat of emergencies, shall carry out rescue and other emergency operations.

The Programme for the Clearance and Prevention of Explosive Remnants of War was updated and approved by the Minister of the Defence and Minister of Interior (2013) in order to ensure that the remained explosive remnants of war are eliminated in a methodical and consistent manner, no danger to humans and reduced negative impact. Such objectives of the Programme were determined: to investigate and assess the risk posed by explosive ordnances; prepare legislation in order to mobilize national institutions to reduce the risk and impact of the remained explosives; to carry out the clean-up activities of contaminated areas. The Programme shall be implemented during the period from 2012 to 2020. The main institutions responsible for the collection of information on territories polluted with explosive remnants of war in the territorial waters of Republic of Lithuania and exclusive economic zone is the Lithuanian Army Forces, whereas in municipal territories – administrations of municipalities.

Description of the procedure of the Submission of Information About the Danger of the Territories Polluted with Explosive Remnants of War to the Civilian Population was approved by the Fire and Rescue Department under the Ministry of the Interior (2013). The main objective of this description is to ensure submission of information to Civilian Population by municipalities

about the risks posed by the remaining contaminated areas of the war, information on the means of protection in the event of a disaster, their duties, when confronted with the remaining explosives from war, the warning signs used to mark explosive areas and the municipalities areas that may be contaminated by explosive remnants of war.
The Law on the Control of Circulation of Explosives (2003) has the aim regulating the circulation of explosives, explosive materials and means of detonation, and harmonizing it with a legal act of the European Union with a view to ensuring the security of persons, the public and the State. This Law defines the actions to persons who found explosives whose owners are unknown. According to Law such person must forthwith notify thereof a local police office. It must, without delay, undertake measures to preclude the explosives from posing a threat to human life and health, the environment and property. The explosives whose owner is unknown shall be destroyed in accordance with the procedure laid down in the Law and other legal acts. Authorized State institutions which are able to seize and destroy explosives and appropriate actions are provided in the Law.

Description of the Procedure of Neutralization of Explosive Charges approved by the Ministry of Defence (2008) regulates the execution of operations for the neutralization of the standard explosives remaining in the territory of the Republic of Lithuania from the First and Second World Wars and the Soviet Occupation Army in order to ensure the security of man, the society and the State. The purpose of this Act is to determine the use of the Lithuanian Armed Forces in the planning and neutralization of standard explosion neutralization and in the activities of other institutions during the neutralization of standard explosives.

In general, the Environmental Protection Law is the main legal Act regulating environmental aspects, basic rights and obligations, responsibilities, economic sanctions for the noncompliance with environmental protection rules, non-legal use of natural resources. On the basis of this Law, other legal acts regulating the use of natural resources and environmental protection were adopted. National environmental protection management in the Republic of Lithuania is carried out by the Government, the Ministry of the Environment, and other authorized national institutions. The management of environmental protection in the territories of municipalities in accordance with the procedure established by laws is be performed by the relevant local authorities. This Act regulates the production and use of hazardous chemicals. In the IV section of the Law (paragraph 20), it is stated that production, dislocation, transit and import of chemical weapons is prohibited in the Republic of Lithuania. This type of prohibition is regulated in the Law on the prohibition of chemical weapons (1998) and associated legal acts.

The Law on Protection of the Marine Environment of the Republic of Lithuania, establishes the key principles of and arrangements for the protection of the marine environment, the rights and duties of the persons engaged in the marine activities affecting or likely to affect, directly or indirectly, the marine environment, the competence of state and municipal institutions and the main functions thereof in the field of management of protection of the marine environment.
The Law describes the national Baltic Sea Environmental Strategy which aims to achieve and/or maintain a good status of marine environment. This Strategy seeks 1) to protect the marine environment, prevent it from degradation and, if possible, restore marine ecosystems in areas where this environment is adversely affected; 2) to prevent or reduce pollution of the marine

environment by ensuring that marine biodiversity, marine ecosystems, human health or the legitimate use of the sea are not affected or at high risk. The obligation to cooperate with other Baltic Sea countries in order to ensure coherence and coordination of the national strategy with the environmental strategies of other Baltic Sea countries is foreseen as well. Cooperation and coordination are carried out through the Helsinki Commission. The Law also regulates various human activities in the Baltic Sea including military exercises and other planned activities, which may have adverse effects on the marine environment.

The law regulates response to pollution incidents. According to the Law, the Lithuanian Army organizes, co-ordinates and are in charge of actions via the Marine Rescue Co-ordination Centre of the Lithuanian Naval Force in response to pollution incidents in the maritime area. Actions in response to pollution incidents shall be carried out in the maritime area, with the exception of the internal waters, by the Lithuanian Army, in the Curonian Lagoon – by the institutions authorized by the Ministry of the Interior, in the water areas of sea ports – by administrations of the sea ports. At the request of the Marine Rescue Co-ordination Centre, resort may be made to the forces and arrangements of the State Border Guard Service under the Ministry of the Interior, the Fire and Rescue Department under the Ministry of the Interior, administrations of the sea ports, other state and municipal institutions in the carrying out of actions in response to pollution incidents, where they are assigned for the carrying out of these actions under the Plan for Response to Pollution Incidents in the Maritime Area approved by the Minister of National Defence, the Minister of Environment and the Minister of the Interior.

The cleaning and restoration of the Curonian Lagoon and coastlines of the Baltic Sea, if polluted by oil or other harmful substances, shall be organized by municipalities.

In the Action plan for implementation of water sector development 2017-2023 programme it is planned to carry out the monitoring of the effect of the chemical weapons dumped in the Baltic Sea, to take part in the activities of international organisations to share the experience and information, to evaluate the monitoring data on the effects of chemical weapons, to initiate coordinated activities in the Baltic Sea region to solve the problem.
The period for the implementation of the measure is 2017-2022. The responsible institution is Environmental protection Agency of Ministry of Republic of Lithuania.

4.5 Sweden

The laws of Sweden do not specifically address the issue of their obligations in the remediation of underwater munitions or their dump sites. Present laws, regulations and emergency situations are reactive actions to unplanned scenarios. The text below describes the Swedish authorities responsible for handling of dumped chemical warfare agents that unexpectantly surface and unexploded munitions in general.

Background

The Swedish armed forces assist civil authorities i.e. police, coast guard and emergency services in munition clearance. According to the regulations from the Armed Forces, ammunition that cannot be classified and those found at sea that cannot be identified are not allowed to be cleared without permission. The marine tactical staff is responsible for the assistance to coast guard and emergency services of such finds located at sea and the Swedish explosive ordinance disposal (EOD) and Demining Centre is responsible for the assistance to police, coast guard and emergency services with finds located on land.

Furthermore, the Swedish Armed Forces are responsible for the disposal of ammunition and unexploded ordnances (UXOs) inside a military area or an area that is closed off for military activities. The role of the Swedish Armed Forces is governed by the Regulation (2002:375) of support to the society by the Swedish armed forces (Förordning (2002:375) om Försvarsmaktens stöd till samhället).

The Swedish coast guard is responsible for disposing of chemical warfare agents (CWA) in Swedish territorial sea and economic zone (EEZ) as well as the lakes Vänern, Vättern and Mälaren. In addition, they are responsible for disposing of CWAs on a ship, which is not located inside a port area. If the find or object is deemed to contain an explosive substance, the Swedish Armed Forces (marine tactical staff) are obliged to support in locating, identifying, indicating, decontaminating and neutralizing it.

The emergency services of respective Swedish municipalities are responsible for disposing of chemical warfare agents on land or on a ship which is located in port. If the find or object is deemed to contain an explosive substance, the Swedish armed forces (National CBRN Defence Centre) are obliged to support in locating, identifying, indicating, decontaminating and neutralizing it.

The Swedish police is responsible for disposal of ammunition and unexploded ordnance (UXO), of civilian as well as military origin, on civilian land. They are also responsible for munition clearance in connection with a crime or suspicion of a crime, including inside a military area or an area that is closed off for military activities. The armed forces can support the police after a request for assistance. After an accident with military explosives on civilian land decision of clearance or other action is taken by the police.

For clarity of various situations are given:

Scenarios

Scenario 1:
65cm diameter mine found in the traffic separation zone, less than 3 miles from coast.

As the mine can contain explosive substance and not CWA, and it is found at sea inside Swedish territorial waters, the Swedish Armed Forces (marine tactical staff), will be responsible for locating, identifying, indicating, decontaminating and neutralizing the mine.

Scenario 2:
Mustard lump in fish net extracted on deck of trawler, with booster charge – more than 3 but less than 12 miles from shore

As the mustard lump is a CWA, the coast guard is responsible. However, as it contains a booster charge, the Swedish Armed Forces (marine tactical staff), will support the operation of locating, identifying, indicating, decontaminating and neutralizing the lump of mustard.

Scenario 3:
Wreck with ammunition, more than 1 miles from coast, but in EEZ

In this situation there is unexploded ammunition inside a wreck. Once again, the Swedish Armed Forces should be the authority that is responsible. However, as the wreck is in the EEZ and not inside territorial waters, and it is debatable whether it is a find at sea or not. This scenario would probably not be prioritized.

Scenario 4:
150 small caliber munitions found on beach in tourist area.

There are munitions found on a beach, in a civilian area. As the baseline is calculated from the beachline at low water level this is classified as land. The Swedish police are responsible for the disposal of ammunition and unexploded ordnance (UXO) on civilian land. Therefore, the police would in this scenario be responsible for the clearance of the small caliber munitions.

4.6 Norway

National laws applicable after discovery of ammunition in Norway

Currently there is no designated agency responsible for WWI and WWII related munition dumped in Norway and its territorial water. Any discoveries of such munitions are handled on a case-by-case basis.

The Act Concerning Protection against Pollution and Concerning Waste [Pollution Control Act] is valid also outside the Norwegian EEZ if the pollution threatens the environment inside the EEZ.

Any discovery of ammunition should be reported to the police, unless in military firing ranges open to the public where the Army is notified. The police are responsible for the security and necessary evacuation, if needed which is seldom applicable at sea. If the encounter is military munition(s), the police district must ask the Norwegian Armed Forces for assistance to handle the UXO by military EOD specialists. The Armed Forces will aid as much as possible, without going beyond their acute military tasks (Norwegian White Paper no. 35, 2008–2009 p 44). Assistance to the Police from the Armed Forces is regulated by “Instruks om Forsvarets bistand til politiet (Bistandsinstruksen)” (FOR-2017-06-16-789 from 19.06.2017) and an agreement between the National Police Directorate responsible for the 12 police districts and the Norwegian Joint Headquarters responsible for planning

and managing the Armed Forces' operations in peace, crisis and war "Avtale om samarbeid om uskadeliggjøring eller fjerning av eksplosiver og lignende mellom Politiet og Forsvaret (Instructions for military assistance to the police" (2017). There are on average 30-50 encounters of conventional munition in sea and on shore/year.

The Norwegian Environment Agency (Miljødirektoratet) is responsible for all pollution in the sea, except what is inside the wrecks. The Norwegian Environment Agency could also give permission to emergency dumping of ammunition, if necessary.

The Norwegian Coastal Administration (Kystverket) is responsible for governmental preparedness against acute pollution and has nation-wide administrative authority in the case of acute pollution incidents. This responsibility also entails making sure that preparedness is appropriately dimensioned in proportion to the risk. Kystverket has issued guidelines for Norwegian fishermen when chemical warfare agents are discovered (in Norwegian: "Veiledning til norske fiskere ved funn av kjemiske stridsmidler"). Findings of conventional ammunition do seldom represent any acute environmental risk.

Other Norwegian laws that could be applicable in case of encounters inside Norwegian EEZ are:

- The Constitution of the Kingdom of Norway § 112 (the environment section)
- The European Parliament Directive 2000/60/EF (The Water Directive)
- Act of 13 March 1981 No.6 Concerning Protection Against Pollution and Concerning Waste [Pollution Control Act] with its regulations
- Act 2009-04-17-19: Act relating to harbours and fairways (The Harbour Act)
- Act of 19 June 2009 No. 100 relating to the management of biological, geological and landscape diversity (Nature Diversity Act)
- Act of 16 February 2007 No. 9 relating to ship safety and security [Ship Safety and Security Act] with its regulations, specifically Protocol of 1978 relating to the International convention for the prevention of pollution from ships, 1973, with annexes (MARPOL)
- The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, 1996 (The HNS Convention), changed in 2010, but not yet entered into force.
- Nairobi International Convention on the Removal of Wrecks, not ratified in Norway

4.7 Denmark

Most of the Danish environmental regulation is based on directives from the EU. The following will, in general terms, describe the major acts in the field of environmental law. The various Acts do not specifically address underwater munitions and the responsibility or obligation to remediate. One can infer however, that if damages are caused by a munition that washed ashore to compensate for economic losses. However, this seems of an internal

mechanism and attempting to identify the munition of another country for compensation may be futile with existing legal frameworks.

The Act of Protection of the Environment

The purpose of the Act is to prevent and control pollution of the environment. The Act specifically aims at prevention and control of the pollution of air, water and soil, but also at the inconvenience of noise.

Act on Soil Protection

The scope of the Act covers soil which due to human interaction may have a harmful impact on water, human health and the environment in general.

A central part of the protection of soil relates to the mapping of the polluted areas which is usually performed by the local authorities. The results of these mappings decide whether the soil may be used for habitation or business, or whether an order should be given.

A polluter is obliged to follow an order given by the local authorities. Typically, the order will demand that the polluter cleans the area. The owner of the polluted soil cannot generally be met with a claim to clean the pollution, if the owner is not the polluter himself. This follows from the "Polluter Pays" principle.

The polluter is either:

1. The person who, with a commercial or public purpose, manages the relevant activity, or uses the plant from which the pollution derives. The pollution or a part of it must be from that specific point of time, or
2. Other persons who may have caused the pollution through unreasonable behaviour, or other behaviour that due to other provisions leads to liability.

Acts on Protection of Nature

This area of Danish legislation is specifically based on two EU directives, The Wild Birds Directive and The Habitats Directive.

Through plans made by the EU, the national and local authorities designate several areas to be habitats of wild birds and other animals. These habitats are typically located near lakes, rivers and beaches.

Within these designated areas, it is generally impossible to carry out projects that affect the environment. An example could be that a farmer is prohibited from emitting waste water into local rivers if the river runs into a designated area later.

When designating areas of land already owned and used by a private owner, the owner has the right to compensation from the national authority.

The Act on Compensation for Environmental Damages

The Act regulates compensation for damages done against the environment, primarily in relation to air, water, soil and the underground.

Generally, no compensation may be granted for a non-economic loss unless special authorization is provided by an Act.

4.8 Russia

The following text has been derived from the Organization for Economic Cooperation and Development (OECD) and describes the Environmental Policy and Regulation in Russia[59].

Innovative policy instruments (such as industry rating, environmental management systems and corporate reporting) have been adopted or further promoted, and traditional instruments (e.g. environmental quality standards, permitting, and environmental liability) have been under reform. However, environmental policies and regulations continue to suffer from an important implementation gap. A rapid expansion of the regulatory framework resulted in a general loss of coherence. Although the government is acting to improve the quality of regulations, many unfeasible or unenforceable rules are still in force.

According to the OECD, there is a need for further reform of environmental policies, laws, institutions and compliance assurance strategies in the Russian Federation and they list five priority actions. Many systemic problems hinder environmental management in Russia, such as low priority of environmental issues on the political agenda, at all levels of governance and although important to Russian environmental management, it is therefore evident that Russia would not have a specific law or organized framework to manage strategies of dumped underwater munitions.

This by no means suggests that Russia would not be able to participate in underwater munitions management strategies and remediation efforts but understanding the legal framework to request such actions would be challenging.

The key authorities responsible for formulating and implementing the environmental policy and law at the federal level in Russia are the Ministry of Natural Resources (MNR) and the Federal
Environmental, Industrial, and Nuclear Supervision Service (Rostekhnadzor, or RTN). The compliance
assurance functions were delegated to two federal authorities: the RTN, accountable to the Prime-Minister,
and the Federal Service for Supervision over Use of Natural Resources (Rosprirodnadzor) that is subordinated to the MNR. They supervise industrial impacts and natural resource use, respectively.

[59] OCED (2006)

Law on Environmental Protection

This law may have several relevant chapters that could be useful in Russia deeming pollution from underwater munitions a relevant concern.

The law consists of 16 chapters, comprising 84 articles. Chapter I "General Provisions" defines 36 key concepts, lists
22 underlying principles of environmental protection and specifies its subjects. Chapter II focuses on the fundamentals
of environmental management and includes a number of articles traditional for the Russian legislation: on the powers
of public and executive authorities of different levels and those of local governments.

Chapter IV comprises five articles on the economic instruments of environmental protection, earmarked programmes, pollution charges, incentives for better environmental performance, and environmental insurance.

Chapter X comprises one article on setting up the state environmental monitoring.

Chapter XI determines the objectives and kinds of environmental compliance assurance (state, municipal, self-control,
public), rights, duties, and liability of state inspectors, and the final article is about state accounting for the facilities that
have negative environmental impact, which is maintained for the purposes of state regulation of environmental

activities and day-to-day and long-term planning of activities to mitigate such impact.

Chapter XII sets for the first time in the Russian legislation at a federal law level general provisions on environmental
research, assessing the adverse environmental impact of business and other activities, improving the legislation, developing best environmental techniques and programmes of rehabilitation of the environmental disaster areas.

Law on Technical Regulation

The Law consists of ten chapters comprising 48 articles. Chapter 2 of the Law governs the content and application of
technical regulations, types thereof, drafting, adoption, modification, and cancellation procedures. Environmental
protection is one of the specified objectives of the technical regulations. Exceptional cases are stipulated where it is
necessary to issue immediately a legislative act on technical regulation, *e.g.* in the circumstances posing immediate
threat to life or health or humans, fauna, or flora, environment, etc. The President of the RF has the right to issue such an act without public consultations.

Water Code

Chapter V – the largest one – on the regulation of the right to water use. Article 55 of Chapter VI formulates main requirements for the protection of water bodies and then specifies measures for their protection against various threats, primarily pollution.

Other Special Laws

- Fishing and Conservation of Biological Water Resources Dec 2004
- Social Protection of Individuals Engaged in Work with Chemical Weapons
- Customs Code of 2003 comprises a number of environmental provisions. Along with other legal acts, it details bans on bringing in goods and vehicles posing a threat to the environment
- Military Doctrine of 2000, approved by a Presidential decree, formulates the strategic objectives of improving the control over the turnover of hazardous substances, protection of hazardous facilities (nuclear power, etc.), organizing the destruction of chemical weapons, etc.

Table 2: Structure and functions of the Key Environmental Enforcement Authorities in Russia

Government of the Russian Federation	
Ministry of Natural Resources (MNR)	**Federal Service for Environmental, Technological and Nuclear Supervision (Rostekhnadzor)**
Development of policy and legal basis in the field of natural resource protection	**Territorial departments of Rostekhnadzor in sub-federal units**
Federal Service for Supervision in the Field of Nature Resources Use (Rosprirodnadzor)	**Development and adoption of regulations** in the field of environmental protection (brown issues), including industrial and domestic waste management. **Inspection (compliance monitoring) and administrative enforcement** in the field of environmental protection **State Environmental Review** of facilities with potential negative environmental impact **Permitting** of air emissions, effluents, waste disposal; **licenses** for waste handling **Management** of pollution charges
Territorial departments of Rosprirodnadzor in sub-federal units	
Inspection (compliance monitoring) and administrative enforcement in the field of	

Government of the Russian Federation	
Ministry of Natural Resources (MNR)	**Federal Service for Environmental, Technological and Nuclear Supervision (Rostekhnadzor)**
natural resource use **Conducting SER** of facilities with potential impact on natural resources **Licensing (permitting)** in the field of use and protection of natural resources (including biological resources)	

4.9 Latvia

A consequence of Latvia's secession from the economic grouping of the Soviet Union and its shift towards a market economy, has been major downturns in the economy in past years. As environmental policy had already been neglected during the Soviet era it was quite natural for the development of a forward-looking policy in this area to be given a low priority in this difficult economic and political transitional period. In recent years, however, not least with support from the European Union, efforts have been stepped up to improve the environmental situation markedly and to bring legislation up to EU standards.

Multilateral and bilateral relations

Latvia signed the Baltic Sea Protection Treaties of 1974 and 1992 in Helsinki and thereby undertook to participate in the cleaning up of the Baltic Sea. In addition, a number of international conventions including the Rio Convention on Biodiversity (1995) and the Ramsar Convention on the Conservation of Wetlands of International Importance (1995) have been signed and ratified.

Relatively close bilateral cooperation in the environmental sector has already existed for some time Environmental Policy in Latvia DOC_EN\DV\353\353893 PE 167.586 - 13 - with the neighbouring states of Estonia and Lithuania and with other states bordering on the Baltic.

Since 1990 there have been agreements between the Baltic states on the protection and use of natural resources. Agreements on cooperation in the field of environmental protection have been signed with some western European states (for example with the Federal Republic of Germany in 1993).

4.10 Estonia

In terms of environmental policy, Estonia faces the problem of the legacy of the Soviet era and obsolete industries.

The environmental protection law adopted in 1990 provides the framework for further environmental legislation. It defines the principles and objectives of Estonian environmental policy. These are in line with those of the EU. One major concern of the law is the creation of economic instruments to achieve environmental objectives. To this end, levies have been introduced for the use of natural resources and for environmental pollution. They are payable for the use of oil, natural construction materials, peat and water. Environmental pollution levies are payable for the discharge of harmful substances into water or into the air and for the dumping of waste matter.

However, when speaking of water quality, it is mostly about ground water quality and levels and harmful substances reduction discharged by Estonia into the Baltic Sea (waste etc.).
Bilateral relations Estonia is working with the other Baltic states on preserving the Baltic Sea. It has signed the conventions on the Baltic and the convention on the protection and use of cross-border water courses and lakes. There is an agreement with Russia on the protection and use of Lake Peispi (1991), an agreement on the protection and use of cross-border waters (1996). There have been agreements since 1990 with its Baltic neighbours on the protection and use of natural resources. There are framework conventions on the protection of the environment with Finland (1991), Denmark (1991), Sweden (1992) and Germany (1992). There are also agreements with Finland on the protection of air and water and on oil pollution and control (all 1993). There are fisheries agreements with Denmark, the USA, the EU, Canada, Sweden, Russia, Finland, Lithuania, Latvia and Poland. As part of their international aid programme, the USA, Italy, Switzerland, Great Britain, the Netherlands, Canada, Norway and Belgium fund environmental protection in Estonia even where there are no specific agreements. (Kraus, 1998).

Estonia is a party to considerable number of international marine conventions of global character. Convention on the Protection of the Marine Environment in the Baltic Sea Area, (1992 Helsinki Convention) was ratified by Estonia on April 19th, 1995. Nearly all traditional areas of Estonian environmental law are strongly influenced by EU Environmental Law. However, the quality of transposition and the state of implementation of EU directives varies. The Commission has initiated a relatively large number of infringement procedures against Estonia, including several directives in water sector (e.g. Water Framework Directive, Nitrates Directive and Waste water Directive).

Weapons Act not applied to explosives and pyrotechnic articles to the extend regulated by the Explosives Act.

The Weapons Act scope is civilian in nature and includes provisions for storage, conveyance, transport, finding and destruction of weapons and ammunition, and the repair, conversion, dismantling and rental of weapons and the rendering of weapons incapable of firing.

Chapter 11 - MANUFACTURE, MARKING, SALE, REPAIR AND CONVERSION OF WEAPONS AND AMMUNITION, RENDERING OF WEAPONS AND AMMUNITION INCAPABLE OF FIRING, AND DISMANTLING AND DESTRUCTION OF WEAPONS AND AMMUNITION

5. Developing Approaches to Marine Managment: International and EU Legal Framework

The seas have long been a historic mean of communication and commerce between nations. Traditional concepts of the international law of the sea are founded on the "principle of the high sea." The High Seas are open to every state, and claimable by no state individually. This historic principle allows for total freedom of navigation and use of the globe's common waters. However, as activity increased, the oceans seemed to become much smaller. One of the first global environmental concerns was man's ability to affect the oceans, providing the impetus for international cooperation.

5.1. 1958 Convention on the High Seas, Geneva

Article 1

The term "high seas" means all parts of the sea that are not included in the territorial sea or in the internal waters of a State.

Article 2

The high seas being open to all nations, no State may validly purport to subject any part of them to its sovereignty.

Article 25

1. Every State shall take measures to prevent pollution of the seas from the dumping of radioactive waste, considering any standards and regulations which may be formulated by the competent international organizations.

2. All States shall cooperate with the competent international organizations in taking measures for the prevention of pollution of the seas or air space above, resulting from any activities with radioactive materials or other harmful agents.

5.2. 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, London

The Convention contributes to the international control and prevention of marine pollution by prohibiting the dumping of certain hazardous materials. In addition, a special permit is required prior to dumping a number of other identified materials and a general permit for other wastes or matter.

Article I

Contracting Parties shall individually and collectively promote the effective control of all sources of pollution of the marine environment and pledge themselves especially to take all practicable

steps to prevent the pollution of the sea by the dumping of waste and other matter that is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

Article II

Contracting Parties shall, as provided for in the following articles, take effective measures individually, according to their scientific, technical and economic capabilities, and collectively, to prevent marine pollution caused by dumping and shall harmonize their policies in this regard.

Article III

For the purposes of this Convention:

"Dumping" means:

(i) any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;

(ii) any deliberate disposal at sea of vessels, aircraft, platforms or other man-made structures at sea.

Article VIII

In order to further the objectives of this Convention, the Contracting Parties with common interests to protect in the marine environment in a given geographical area shall endeavour, considering characteristic regional features, to enter into regional agreements consistent with this Convention for the prevention of pollution, especially by dumping.

5.3. 1974 Convention on the Protection of the Marine Environment of the Baltic Sea Area

Article 2- Definitions

For the purposes of the present Convention:

1. "Pollution" means introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, resulting in such deleterious effects as hazard to human health, harm to living resources and marine life, hindrance to legitimate uses of the sea including fishing, impairment of the quality for use of sea water, and reduction of amenities;

2. *a)* "Dumping" means:

(i) Any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;

(ii) Any deliberate disposal at sea of vessels, aircraft, platforms or other man-made structures at sea;

3. "Harmful substance" means any hazardous, noxious, or other substance, which, if introduced into the sea, is liable to cause pollution;

Article 3- Fundamental Principles and Obligations

The Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures in order to prevent and abate pollution and to protect and enhance the marine environment of the Baltic Sea Area.

Article 9- Prevention of Dumping

The Contracting Parties shall, subject to Paragraphs 2 and 4 of this Article, prohibit dumping in the Baltic Sea Area.

Article 11- Cooperation in combatting marine pollution

The Contracting Parties shall take measures and co-operate as set out in Annex VI of the present Convention in order to eliminate or minimize pollution of the Baltic Sea Area by oil or other harmful substances.

Article 12- Institutional and Organizational Framework

The Baltic Marine Environment Protection Commission, hereinafter referred to as "the Commission", is hereby established for the purposes of the present Convention.

Article 13- The duties of the Commission

The duties of the Commission shall be:

To define pollution control criteria, objectives for the reduction of pollution, and objectives concerning measures, particularly according to Annex III of the present Convention.

5.4. 1982 United Nations Convention on the Law of the Sea (UNCLOS) and its part XII (Protection and Preservation of the Marine Environment)

As of December 2018, 168 countries are parties to the convention and all **Baltic Region States** discussed in this study have signed, acceded, succeeded to, or ratified UNCLOS:

- Russian Federation (12 March 1997)
- Estonia (26 August 2005)
- Latvia (24 December 2004)
- Lithuania (12 November 2003)
- Poland (13 November 1998)
- Germany (14 October 1994)

- Denmark (16 November 2004)
- Sweden (25 June 1996)
- Finland (21 June 1996)

Article 1- Use of terms and scope

5) (a) "dumping" means:

(i) any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;

(ii) any deliberate disposal of vessels, aircraft, platforms or other man-made structures at sea;

Article 194- Measures to prevent, reduce and control pollution of the marine environment

1. States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavour to harmonize their policies in this connection.

2. States shall take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment, and that pollution arising from incidents or activities under their jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this Convention.

3. The measures taken pursuant to this Part shall deal with all sources of pollution of the marine environment. These measures shall include, inter alia, those designed to minimize to the fullest possible extent:

(a) the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere or by dumping;

4. In taking measures to prevent, reduce or control pollution of the marine environment, States shall refrain from unjustifiable interference with activities carried out by other States in the exercise of their rights and in pursuance of their duties in conformity with this Convention.

Article 197- Cooperation on a global or regional basis
States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, considering characteristic regional features.

Article 200- Studies, research programmes and exchange of information and data
States shall cooperate, directly or through competent international organizations, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment. They shall endeavour to participate actively in regional and global programmes to acquire knowledge for the assessment of the nature and extent of pollution, exposure to it, and its pathways, risks and remedies.

Article 204- Monitoring of the risks or effects of pollution

States shall, consistent with the rights of other States, endeavour, as far as practicable, directly or through the competent international organizations, to observe, measure, evaluate and analyze, by recognized scientific methods, the risks or effects of pollution of the marine environment.

Article 210- Pollution by dumping

1. States shall adopt laws and regulations to **prevent, reduce and control** pollution of the marine environment by dumping.

2. States shall take other measures as may be necessary to **prevent, reduce and control** such pollution.

5.5. 1985 EU Directive on Environmental Impact Assessment (EIA)

It applies to a wide range of defined public and private projects**,** which are defined in Annexes I and II. Some projects should be subject to an environmental impact assessment depending on its characteristics.

OBS: See Case Study 2 and 3.

5.6. 1991 Convention on Environmental Impact Assessment in a Transboundary Context

The Parties to this Convention,

Aware of the interrelationship between economic activities and their environmental consequences,

Determined to enhance international co-operation in assessing environmental impact in particular in a transboundary context, have agreed as follows:

Article 1- Definitions

For the purposes of this Convention,

(vi) "Environmental impact assessment" means a national procedure for evaluating the likely impact of a proposed activity on the environment,

(viii) "Transboundary impact" means any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party,

Article 2- General Provisions

1.The Parties shall, either individually or jointly, take all appropriate and effective measures to prevent, reduce and control significant adverse transboundary environmental impact from proposed activities.

2. Each Party shall take the necessary legal, administrative or other measures to implement the provisions of this Convention, including, with respect to proposed activities listed in Appendix I that are likely to cause significant adverse transboundary impact, the establishment of an environmental impact assessment procedure that permits public participation and preparation of the environmental impact assessment documentation described in Appendix II.

3. The Party of origin shall ensure that in accordance with the provisions of this Convention an environmental impact assessment is undertaken prior to a decision to authorize or undertake a proposed activity listed in Appendix *I* that is likely to cause a significant adverse transboundary impact.

OBS: See Case Studies 2 and 3.

5.7 1992 UN Rio Declaration on Environment and Development

Principle 7

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 10

Environmental issues are best handled with the 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 13

States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 16

National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, considering the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

The application of the polluter-pays principle (and its costs) would involve both preventive as well as remedial measures, such as remedial costs of hazardous waste clean-up. Principle 16 dealt with both costs of pollution and environmental costs, i.e. a set of costs broader than the costs of pollution prevention, control and reduction measures.

Implementation of the polluter-pays principle has not been easy. In spite of their strong commitment to encourage the adoption of the principle in the national policies of various countries, and particularly in Europe, States have found various ways of justifying subsidy schemes by interpreting the polluter-pays principle according to their convenience. The application of the principle in a transboundary context could also give rise to several problems between the State of origin and the affected States.

5.8. 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention)

This convention entered into force on 17 January 2000 after ratifications were made by the DU, Germany, Latvia, Sweden, Estonia, Finland, Denmark, Lithuania, Poland and Russia in taking measures to reduce pollution in the Baltic Sea. The Convention covers the whole of the Baltic Sea area, including inland waters as well as the water of the sea itself and the sea-bed. Measures are also taken in the whole catchment area of the Baltic Sea to reduce land-based pollution. It aims to prevent and eliminate all sorts of pollution in order to promote the ecological restoration of the Baltic Sea Area and the preservation of is ecological balance. The Convention is amended when deemed necessary, thus following, e.g., the developments in international environmental and maritime laws. The latest amendment entered into force on 15 November

2008.

Article 2- Definitions

For the purposes of this Convention:

1. "Pollution" means introduction by man, directly or indirectly, of substances or energy into the sea, including estuaries, which are liable to create hazards to human health, to harm living resources and marine ecosystems, to cause hindrance to legitimate uses of the sea including fishing, to impair the quality for use of sea water, and to lead to a reduction of amenities;

4. a) "Dumping" means:

i) any deliberate disposal at sea or into the seabed of wastes or other matter from ships, other man-made structures at sea or aircraft;

ii) any deliberate disposal at sea of ships, other man-made structures at sea or aircraft.

7. "Harmful substance" means any substance, which, if introduced into the sea, is liable to cause pollution;

8. "Hazardous substance" means any harmful substance which due to its intrinsic properties is persistent, toxic or liable to bio-accumulate;

9. "Pollution incident" means an occurrence or series of occurrences having the same origin, which results or may result in a discharge of oil or other harmful substances and which poses or may pose a threat to the marine environment of the Baltic Sea or to the coastline or related interests of one or more Contracting Parties, and which requires emergency actions or other immediate response;

Article 3- Fundamental principles and obligations

1. The Contracting Parties shall individually or jointly take all appropriate legislative, administrative or other relevant measures to prevent and eliminate pollution in order to promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance.

4. The Contracting Parties shall apply the polluter-pays principle.

Article 5- Harmful substances

The Contracting Parties undertake to prevent and eliminate pollution of the marine environment of the Baltic Sea Area caused by harmful substances from all sources, according to the provisions of this Convention and, to this end, to implement the procedures and measures of Annex I.

Article 17- Information to the public

1. The Contracting Parties shall ensure that information is made available to the public on the condition of the Baltic Sea and the waters in its catchment area, measures taken or planned to be taken to prevent and eliminate pollution and the effectiveness of those measures.

Article 19- Commission

1. The Baltic Marine Environment Protection Commission, referred to as "the Commission", is established for the purposes of this Convention.

Article 20 -The duties of the Commission

1. The duties of the Commission shall be:

d) to define pollution control criteria, objectives for the reduction of pollution, and objectives concerning measures, particularly those described in Annex III;

Article 24- Scientific and technological co-operation

2. (…) the Contracting Parties undertake directly, or when appropriate, through competent regional or other international organizations, to promote studies and to undertake, support or contribute to programmes aimed at developing methods assessing the nature and extent of pollution, pathways, exposures, risks and remedies in the Baltic Sea Area. In particular, the Contracting Parties undertake to develop alternative methods of treatment, disposal and elimination of such matter and substances that are likely to cause pollution of the marine environment of the Baltic Sea Area.

5.9. Resolution LC.51(16) adopted on 12 November 1993

Amendments to the Annexes to the London Convention 1972 concerning the prohibition of dumping radioactive wastes and other radioactive matter. A total ban on radioactive waste disposal at sea, thus including low-level radioactive matter, was stipulated. The Soviet Union opted out.

5.10. 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, London

The Protocol, which is meant to supersede the 1972 Convention, represents a major change of approach to the question of how to regulate the use of the sea as a depository for waste materials. It was the first formulation of the overarching ban on the dumping of wastes and other matter at sea. This ban is incorporated into the Chemical Weapons Convention (CWC) from 1993 through paragraph 13 of Part IV(A) of the Verification Annex, whereby States Parties are not allowed to destroy chemical weapons by means of dumping in any body of water. Although the protection of the marine environment is not among the underlying characteristics

of the CWC, the prevention of inappropriate destruction techniques may be seen in accordance with preambular paragraph 10 and Article I(2) of the CWC as one of the core obligations that the CWC imposes on States Parties. States Parties to the CWC are required to submit initial declarations to the Organization for the Prohibition of Chemical Weapons (OPCW) in accordance with Article III(1)(a) and (b) in respect of chemical weapons under their jurisdiction or control.

Article 1- Definitions

For the purposes of this Protocol:

4 .1 "Dumping" means:

1. any deliberate disposal into the sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;

2. any deliberate disposal into the sea of vessels, aircraft, platforms or other man-made structures at sea;

3. any storage of wastes or other matter in the seabed and the subsoil thereof from vessels, aircraft, platforms or other man-made structures at sea; and

4. any abandonment or toppling at site of platforms or other man-made structures at sea, for the sole purpose of deliberate disposal.

8. "Wastes or other matter" means material and substance of any kind, form or description.

10. "Pollution" means the introduction, directly or indirectly, by human activity, of wastes or other matter into the sea which results or is likely to result in such deleterious effects as harm to living resources and marine ecosystems, 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.

Article 2- Objectives

Contracting Parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter. Where appropriate, they shall harmonize their policies in this regard.

Article 12- Regional Cooperation

In order to further the objectives of this Protocol, Contracting Parties with common interests to protect the marine environment in a given geographical area shall endeavour, considering characteristic regional features, to enhance regional co-operation including the conclusion of

regional agreements consistent with this Protocol for the prevention, reduction and where practicable elimination of pollution caused by dumping or incineration at sea of wastes or other matter. Contracting Parties shall seek to co-operate with the parties to regional agreements in order to develop harmonized procedures to be followed by Contracting Parties to the different conventions concerned.

Article 13-Thechnical co-operation and assistance

Contracting Parties shall, through collaboration within the Organization and in co-ordination with other competent international organizations, promote bilateral and multilateral support for the prevention, reduction and where practicable elimination of pollution caused by dumping (…).

Article 14- Scientific and Technical Research

Contracting Parties shall take appropriate measures to promote and facilitate scientific and technical research on the prevention, reduction and where practicable elimination of pollution by dumping and other sources of marine pollution relevant to this Protocol. In particular, such research should include observation, measurement, evaluation and analysis of pollution by scientific methods.

Article 18- Meetings of Contracting Parties

Meetings of Contracting Parties or Special Meetings of Contracting Parties shall keep under continuing review the implementation of this Protocol and evaluate its effectiveness with a view to identifying means of strengthening action, where necessary, to **prevent, reduce and where practicable eliminate** pollution caused by dumping and incineration at sea of wastes or other matter.

5.11. 2008 Marine Strategy Framework Directive (MSFD)

The Marine Directive aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. In order to achieve its goal, the Directive establishes European marine regions and sub-regions on the basis of geographical and environmental criteria. The Directive lists four European marine regions – the Baltic Sea, the North-east Atlantic Ocean, the Mediterranean Sea and the Black Sea – located within the geographical boundaries of the existing Regional Sea Conventions. Cooperation between the Member States of one marine region and with neighbouring countries which share the same marine waters is already taking place through these Regional Sea Conventions. The Marine Strategies must be kept up-to-date and reviewed every 6 years.

Article 1- Subject matter

2. For that purpose, marine strategies shall be developed and implemented in order to:

b) **prevent and reduce** inputs in the marine environment, with a view to phasing out pollution as defined in Article 3(8), so as to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea.

Article 3- Definitions

For the purposes of this Directive the following definitions shall apply:

8. 'pollution' means the direct or indirect introduction into the marine environment, as a result of human activity, of substances or energy, including human-induced marine underwater noise, which results or is likely to result in deleterious effects such as harm to living resources and marine ecosystems, including loss of biodiversity, hazards to human health, the hindering of marine activities, including fishing, tourism and recreation and other legitimate uses of the sea, impairment of the quality for use of sea water and reduction of amenities or, in general, impairment of the sustainable use of marine goods and services.

5.12. Regional Sea Conventions

The Marine Directive requires that, in developing their marine strategies, Member States use existing regional cooperation structures to co-ordinate among themselves and to make every effort to coordinate their actions with those of third countries in the same region or sub-region. Cooperation among Member States and with third countries has been taking place through the Regional Sea Conventions for more than 30 years. There are four RSC and of them is The Convention on the Protection of the Marine Environment in the Baltic Sea Area of 1992 (further to the earlier version of 1974) – the Helsinki Convention (HELCOM).

Additionally, there is a regional convention: 1992 Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR Convention) with contracting parties being: Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom, together with the EU. The Convention aims to concert action at national, regional, and global levels essential to preventing and eliminating pollution and achieving sustainable management of the maritime area and also establishes a Commission tasked with monitoring the implantation of the treaty.

5.13. 2010 UN General Assembly Resolution A/RES/65/149

The general Assembly,

1. Notes the importance of raising awareness of the environmental effects related to waste originating from chemical munitions dumped at sea;

2. Invites Member States and international and regional organizations to keep under observation the issue of the environmental effects related to waste originating from chemical munitions dumped at sea and to cooperate and voluntarily share relevant information on this issue;

3. Invites the Secretary-General to seek the views of Member States and relevant regional and international organizations on issues relating to the environmental effects related to waste originating from chemical munitions dumped at sea, as well as on possible modalities for international cooperation to assess and increase awareness of this issue, and to communicate such views to the General Assembly at its sixty-eighth session for further consideration.

5.14. 2013 UN General Assembly Resolution A/RES/68/208

The General Assembly,

1. *Taking note* of the ministerial declaration of the Baltic Marine Environment Protection Commission (Helsinki Commission) adopted in Copenhagen on 3 October 2013, in which the signatories recognized the need for forward-looking options for solutions and an assessment of the environmental risks posed by, inter alia, munitions dumped at sea, welcomed the 2013 report of the ad hoc expert group to update and review the existing information on dumped chemical munitions in the Baltic Sea and agreed to produce, by 2015, a one-off thematic assessment of the environmental risks of hazardous submerged objects, also utilizing the 2013 report on dumped chemical munitions,
2. *Notes* the importance of raising awareness of the environmental effects related to waste originating from chemical munitions dumped at sea;
3. *Invites* Member States and relevant international and regional organizations to keep under observation the issue of the waste originating from chemical munitions dumped at sea, to continue outreach efforts to assess and increase awareness of environmental effects related to that issue and to cooperate, including by strengthening existing efforts within regional seas conventions and other international, regional and sub regional activities related to risk assessment, monitoring, information gathering, risk prevention and response to incidents;
4. *Encourages* voluntary sharing of information on waste originating from chemical munitions dumped at sea through conferences, seminars, workshops, training courses and publications aimed at the general public and industry in order to reduce related risks;
5. *Also encourages* partnerships between Governments, industry and civil society for raising awareness, reporting and monitoring of waste originating from chemical munitions dumped at sea;
6. *Invites* Member States in a position to do so to consider aiding and sharing expertise aimed at building capacities related to risk assessment, monitoring, information gathering, risk prevention and response to incidents resulting from waste originating from chemical munitions dumped at sea;
7. *Invites* the Secretary-General to continue to seek the views of Member States and relevant regional and international organizations on cooperative measures to assess and increase awareness of the environmental effects related to waste originating from chemical munitions dumped at sea, also with a view to exploring the possibility of establishing a database and options for the most appropriate

institutional framework for such a database, as well as identifying the appropriate intergovernmental bodies within the United Nations system for further consideration and implementation, as appropriate, of the cooperative measures envisaged in the present resolution, building on and without duplicating existing activities, and with a view to achieving efficiency and synergies, taking into account the mandates and capacities of relevant international and regional organizations.

6. International Activities

6.1. The Nord Stream Project[60]

In 2009, Nord Stream AG requested a permit for clearing munitions in the Finnish Exclusive Economic Zone (EEZ) as part of the Russia–Germany natural gas pipeline project. To ensure the safe installation and long-term integrity of the pipeline, clearance of standard munitions will be necessary. The 27 munitions intended to be cleared from the seabed constitute a risk for the construction and use of the pipeline, and also otherwise for safety and the environment. The pipelines would pass through the Finnish continental shelf and EEZ and will not extend to Finnish territorial waters or land areas. A full report considering the project area, its impact, risk assessment and monitoring was presented.

The permit was granted as follows:

Munitions clearance will change the seabed and its conditions near the clearance sites, and the clearance may result in harmful impacts to the Gulf of Finland maritime traffic and fishing, as set out in Chapter 1, Section 15 in the Water Act. The release of sediments' nutrients and contaminants may result in water pollution near the clearance sites, as set out in Section 3 of the Environmental Protection Act, and Chapter 1, Section 19 of the Water Act. Besides the applicable regulations set out in the Water Act, the application processing, pursuant to Chapter 2, Section 1a of the Water Act, follows the applicable parts of Sections 41–44, 46, 55 and 58 of the Environmental Protection Act. Section 110 of the Environmental Protection Act has been considered as well.

In comparison to the damage, disadvantages and other losses of interests resulting from the project, the benefit gained from the munitions clearance is considerable. Clearing the munitions by exploding them is an acceptable method which is commonly used in the Baltic Sea. Alternative clearance methods may result in hazards. The disadvantages and risks resulting from the clearance method can be reduces by carrying out the clearance according to the plan, and the permit provisions, as has been set out in Chapter 2, Section 3 of the Water Act. The clearance operations can be arranged pursuant to Sections 41 and 42 of the Environmental Protection Act. Furthermore, the operations will not result in consequences prohibited in the Environmental Protection Act.

[60] Taken from various literature from Nord Stream "The new gas supply route for Europe", September 2010

6.2. The Baltic Connector Project[61]

Gasum Oy is planning for a natural gas pipeline, which connects Finland and Estonia. The name of the project is Baltic connector. This environmental impact assessment programme launches the environmental impact assessment procedure (EIA procedure) in Finland and Estonia. The EIA procedure will be applied in both countries according to national legislation. Due to the international dimension of the project, the obligations of the Espoo Convention on Environmental Impact Assessment in a Transboundary Context as well as the bilateral agreement between the Government of the Republic of Finland and the Government of the Republic of Estonia on Environmental Impact Assessment in a Transboundary Context will also be observed in the EIA procedure.

The goal of the environmental impact assessment is to investigate the environmental impacts of the project in Finland and Estonia. The location of the natural gas pipeline from Inkoo in Finland to Paldiski in Estonia is examined in the EIA procedure. The studied pipeline route includes alternative alignments in Finland and Estonia. The aim of the Baltic connector offshore pipeline is to connect the gas transmission networks of Finland and Estonia, which would significantly improve the regional availability and supply of gas, and thus promote the reliability of gas transmission in different circumstances in Finland and the Baltic countries.

The Balticconnector natural gas pipeline project is categorized as a priority project in the European Union and has therefore already been previously granted Community financial assistance from the TEN (Trans-European Networks) -programme founded by the EU. Balticconnector is included in the list of ”Projects for Common Interest” (PCI), which was published in autumn 2013. The EU support applications for this part will be submitted during 2014. The offshore pipeline route has been studied and extensive marine surveys conducted in 2006. Additional environmental surveys are carried out in autumn 2013 – spring 2014. The developer’s view of the schedule is that it would be possible to start the Balticconnector construction works in the beginning of 2016 and to commission the pipeline during 2017.

The Balticconnector natural gas pipeline will be connected to the existing gas network in Finland and Estonia as well as to the planned Finngulf LNG-terminal in Inkoo. The development of the LNG terminal project is underway. The offshore pipeline will also be equipped with a compressor station in both countries, which will also enable bi-directional flow without the operation of the planned LNG terminal.

There are several possible mine fields in the Gulf of Finland. Between 1939 and 1945, thousands of mines were laid into the Gulf of Finland, most of which were removed after the end of the war. However, there are mines that have separated from the mine fields and sunk. The planned pipeline route crosses such areas in the Finnish and Estonian territorial waters.

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[61] Taken from various literature on the Baltic Connector project’s offshore pipeline. Article: Baltic Connector project’s offshore pipeline installation agreement signed, published by Lydia Woellwarth, April 2018.

Besides mines, a large amount of other kinds of munitions have been sunk in the Gulf of Finland in the past decades. The Russian institute for navigation and hydrography (The National Scientific and Research Institute of Navigation and Hydrography, Ministry of Defence of the Russian Federation) has excavated munitions in the Baltic Sea, including in the Estonian coast.

Also, Estonian Defence Forces are dealing with the munition clearance and exchanging information about it. Since year 1994, 850 munitions have been defused in Estonian Waters. A working group under HELCOM for chemical wastes immersed in the sea (HELCOM CHEMU) has examined chemical waste sunk in the Baltic Sea. Waste sunk in the sea may have floated from the place where they were originally left. Fishermen have found sunk wastes from time to time. According to existing information, no chemical weapons have been sunk in the Gulf of Finland.

In the seabed survey done for the Balticconnector project in 2006, no safety decreasing factors, such as mines, sunk weapons or hazardous waste, were found in the vicinity of the planned pipeline. At that time, equipment was used for measuring that scanned the seabed from a width of 150 – 400 meters and distinguished objects with a size of 20 centimeters or more. Besides the seabed itself, the equipment can display the soil type beneath the seabed. After all, it is possible that there are mines etc. in the vicinity of the planned pipeline, which are not found yet. If munitions are found in the close vicinity of the pipe- line area or in the anchoring corridor, they need to be cleared for safety precaution. The usual way is to blast them.

The Environmental impact assessment report from 2015 informs that unidentified items such as munitions and their remnants detected in the study corridor of the Balticconnector project will be examined and removed before laying the natural gas pipeline onto the seabed. Of the total of 48 man-made objects (including munitions, metal waste, barrels) detected in the study corridor, eight have been classified as probable munitions. Six of these are on the Estonian side and two on the Finnish side *(MMT 2006* and *2014).*

In order to clear the munitions or their remnants, an ordinance clearance plan will be developed in cooperation with relevant national authorities. Gasum Oy has conducted preliminary negotiations with the Finnish and Estonian Defence Forces, and it has been agreed that they will take part in the clearance work. The clearance methods used will be approved by the authorities and have been used previously.

In another part of the report, it is stated that the munitions clearance will be carried out by the Defence Forces, and separate environmental and safety plans in which the environ- mental impact mitigation perspectives will be taken into consideration will be drawn up for the clearance work. The clearance plan will include clear risk assessment procedures for the technical performance of the work together with the mitigation measures to be taken to minimize impacts on marine flora and fauna. The clearance methods used will be safe, proven and similar to those previously employed to dispose of munitions in the Baltic Sea.

6.3. The Nord Stream 2 Project

The Nord Stream 2 Project is based on the fact that access to natural gas is becoming increasingly critical for the EU as global demand rises and its own gas resources deplete. EU's

domestic natural gas production is in decline, especially in Norway, the Netherlands and the UK. With Nord Stream 2, the EU can secure additional gas resources in the long term in order to ensure global industrial competitiveness and meet domestic demand.

This leaves an import gap of 120 bcm of European gas supply to be compensated over the next two decades – by either gas from the global LNG market or Russian gas. The share between them will be set by the market. Nord Stream 2 can cover up to 55 bcm of this gap – enough for 26.5 million households for one year.

Russia has been a reliable partner in supplying gas to Europe for 5 decades. The strategic expansion of the connection from Russia to the European market is therefore important to secure the supply of natural gas to the EU over the long term. Together with other suppliers and transport options, such as LNG, gas from Nord Stream 2 will ensure a competitive supply. The project aligns with the goals the EU has for its energy system – to provide secure, affordable and sustainable energy supply to Europeans. EU industry in particular needs reasonably priced energy if it is not to relocate production to other regions.

The Nord Stream 2 is a project for up to two offshore natural gas transmission pipelines from Russia to Germany through the Baltic Sea. The pipeline route covers a distance of approximately 1,200 km. Pipelines are scheduled to be laid during 2018 and 2019, and to be operational at the beginning of 2020. Besides pipelay, the construction activities include e.g. munitions clearance, rock placement and crossing installations. The pipeline route is located entirely in the Finnish EEZ and does not enter Finnish territorial waters. The length of the route in the Finnish sector is approximately 378 km.

The Nord Stream 2 pipeline installation and the security corridors on both sides of the pipelines will be surveyed for munitions. Where munitions are found, these will be identified. The pipeline route has been optimized to avoid munitions to the extent possible. However, some of the munitions will have to be cleared to ensure the safe installation and operation of the pipeline. The most common way to clear munitions is to detonate them in-situ utilizing a donor charge. Nord Stream 2 will perform a study on alternative methods and mitigation techniques to reduce the impacts from munitions clearance.

In preparation of the construction of the Nord Stream pipelines in the Finnish project area, a total of 49 munitions was cleared through detonation and six were relocated. Based on the Nord Stream experience and the number of munitions remaining in the Gulf of Finland and the Northern Baltic Proper, it is expected that the number of munitions requiring clearance during the Nord Stream 2 Project is in the similar order of magnitude as during the Nord Stream Project. The exact number, types and locations of munitions requiring clearance will be defined following the completion of the munitions screening survey within the pipeline installation corridor and the visual inspection of items identified within the security corridor. This information will be presented in the permit applications.

The EIA procedure must be conducted before any decisions are made to officially approve a proposed project. The environmental impact assessment procedure aims to increase and enhance environmental information for decision-making and planning. For this purpose, the

project's environmental impacts are assessed, and possible different project alternatives compared. The procedure also aims to promote the participation of the public in the planning phase and to provide information to the public. Consequently, the purpose of the EIA procedure is to prevent the occurrence of harmful environmental impacts and to reconcile opposing views and goals.

Finland is a signatory to the Convention on EIA in a Transboundary Context ("Espoo Convention"), which promotes international cooperation and public engagement when the environmental impact of a planned activity is expected to cross a border. The Espoo Convention lays down the general obligation of countries ("Parties of Origin") to notify and consult one another ("Affected Parties") on all major projects that are likely to have a significant adverse environmental impact across state boundaries.

For the Nord Stream 2 Project, the parties of origin are Russia, Finland, Sweden, Denmark and Germany, and the affected parties are Russia, Finland, Estonia, Sweden, Latvia, Lithuania, Poland, Denmark and Germany. Russia has signed but not ratified the agreement. To comply with the Espoo Convention, Nord Stream 2 AG will issue a description of the project and its potential transboundary effects (so called "Espoo Report") to all potentially affected countries. International consultation will take place at the same time as national EIA consultation.

6.4. Offshore Gas Pipeline from Denmark to Poland

On 3 August 2017, GAZ-SYSTEM concluded a contract with Ramboll Denmark A/S for execution of the analytical, survey and design work necessary for securing the requisite building permits for construction of the Baltic Pipe offshore gas pipeline.

The scope of work covers geophysical, geotechnical and environmental surveys with the securing of requisite building permits for construction of the offshore pipeline. Ramboll Denmark A/S will also be responsible for developing legally required procedures, approvals and consultations. Furthermore, it will prepare detailed design and procurement documentation enabling commencement and pursuit of construction work.

"Our priority is timely and efficient construction of the offshore pipeline. We hope that our collaboration to date and the contractor's know-how will contribute to successful completion of the entire undertaking. The initial geophysical and environmental surveys in the Baltic Sea are scheduled to commence already in August. They will allow us to determine the exact route of the gas pipeline," says Tomasz Stępień, President of the Management Board of GAZ-SYSTEM.

The pipeline running from Denmark to Poland on the bottom of the Baltic Sea is one of the five elements enabling connection of the Polish transmission system to the deposits on the Norwegian shelf in the North Sea. The remaining elements of the project include the complex pipeline from the Norwegian system in the North Sea to the Danish tie-in, expansion of the existing transmission capacity in the Danish onshore system, construction of the Zealand compressor station in Denmark and expansion of the Polish transmission system.

7. International Treaties

There are currently no treaty, convention, commissions or authority that addresses the potential human health and environmental impact from chemical, conventional, radiological and biological weapons dumped or abandoned at sea. There is a Chemical Weapons Convention (CWC), however, the Convention only considers underwater chemical munitions dumped at sea prior to 1985, and only when they those munitions are brought to the surface and reported to the OPCW. The CWC does not consider conventional, biological or radiological weapons dumped or abandoned at sea.

7.1. 1993 Chemical Weapons Convention (CWC)

Article I General Obligations

1. (2) Each State Party undertakes to destroy chemical weapons it owns or possesses, or that are located in any place under its jurisdiction or control, in accordance with the provisions of this Convention.

2. (3) Each State Party undertakes to destroy all chemical weapons it abandoned on the territory of another State Party, in accordance with the provisions of this Convention.

Article II Definitions and Criteria

For the purposes of this Convention:

1. "**Chemical Weapons**" means the following, together or separately:

(a) Toxic chemicals and their precursors, except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes;

(b) Munitions and devices, specifically designed to cause death or other harm through the toxic properties of those toxic chemicals specified in subparagraph (a), which would be released as a result of the employment of such munitions and devices;

(c) Any equipment specifically designed for use directly in connection with the employment of munitions and devices specified in subparagraph (b).

2. "**Toxic Chemical**" means:
Any chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals. This includes all such chemicals, regardless of their origin or of their method of production, and regardless of whether they are produced in facilities, in munitions or elsewhere.
(For the purpose of implementing this Convention, toxic chemicals which have been identified for the application of verification measures are listed in Schedules contained in the Annex on Chemicals.)

3. "**Precursor**" means:
Any chemical reactant which takes part at any stage in the production by whatever method of a toxic chemical. This includes any key component of a binary or multicomponent chemical system.
(For the purpose of implementing this Convention, precursors which have been identified for the application of verification measures are listed in Schedules contained in the Annex on Chemicals.)

4. "Key Component of Binary or Multicomponent Chemical Systems" (hereinafter referred to as "key component") means:
The precursor which plays the most important role in determining the toxic properties of the final product and reacts rapidly with other chemicals in the binary or multicomponent system.

5. "Old Chemical Weapons" means:
(a) Chemical weapons which were produced before 1925; or
(b) Chemical weapons produced in the period between 1925 and 1946 that have deteriorated to such extent that they can no longer be used as chemical weapons.

6. "**Abandoned Chemical Weapons**" means:
Chemical weapons, including old chemical weapons, abandoned by a State after 1 January 1925 on the territory of another State without the consent of the latter.

7. "Riot Control Agent" means:
Any chemical not listed in a Schedule, which can produce rapidly in human's sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.

8. "Chemical Weapons Production Facility":
(a) Means any equipment, as well as any building housing such equipment, that was designed, constructed or used at any time since 1 January 1946:
(i) As part of the stage in the production of chemicals ("final technological stage") where the material flows would contain, when the equipment is in operation:
(1) Any chemical listed in Schedule 1 in the Annex on Chemicals; or
(2) Any other chemical that has no use, above 1 tonne per year on the territory of a State Party or in any other place under the jurisdiction or control of a State Party, for purposes not prohibited under this Convention, but can be used for chemical weapons purposes; or
(ii) For filling chemical weapons, including, inter alia, the filling of chemicals listed in Schedule 1 into munitions, devices or bulk storage containers; the filling of chemicals into containers that form part of assembled binary munitions and devices or into chemical submunitions that form part of assembled unitary munitions and devices, and the loading of the containers and chemical submunitions into the respective munitions and devices;

(b) Does not mean:
(i) Any facility having a production capacity for synthesis of chemicals specified in subparagraph (a) (i) that is less than 1 tonne;

(ii) Any facility in which a chemical specified in subparagraph (a) (i) is or was produced as an unavoidable by-product of activities for purposes not prohibited under this Convention, provided that the chemical does not exceed 3 per cent of the total product and that the facility is subject to declaration and inspection under the Annex on Implementation and Verification (hereinafter referred to as "Verification Annex"); or
(iii) The single small-scale facility for production of chemicals listed in Schedule 1 for purposes not prohibited under this Convention as referred to in Part VI of the Verification Annex.

9. "Purposes Not Prohibited Under this Convention" means:
(a) Industrial, agricultural, research, medical, pharmaceutical or other peaceful purposes;
(b) Protective purposes, namely those purposes directly related to protection against toxic chemicals and to protection against chemical weapons;
(c) Military purposes not connected with the use of chemical weapons and not dependent on the use of the toxic properties of chemicals as a method of warfare;
(d) Law enforcement including domestic riot control purposes.

10. "Production Capacity" means:
The annual quantitative potential for manufacturing a specific chemical based on the technological process actually used or, if the process is not yet operational, planned to be used at the relevant facility. It shall be deemed to be equal to the nameplate capacity or, if the nameplate capacity is not available, to the design capacity. The nameplate capacity is the product output under conditions optimized for maximum quantity for the production facility, as demonstrated by one or more test-runs. The design capacity is the corresponding theoretically calculated product output.

11. "Organization" means the Organization for the Prohibition of Chemical Weapons established pursuant to Article VIII of this Convention.

12. For the purposes of Article VI:
(a) "Production" of a chemical means its formation through chemical reaction;
(b) "Processing" of a chemical means a physical process, such as formulation, extraction and purification, in which a chemical is not converted into another chemical;
(c) "Consumption" of a chemical means its conversion into another chemical via a chemical reaction.

Article III Declarations

1. Each State Party shall submit to the Organization, not later than 30 days after this Convention enters into force for it, the following declarations, in which it shall:

(b) With respect to old chemical weapons and abandoned chemical weapons:

(i) Declare whether it has on its territory old chemical weapons and provide all available information in accordance with Part IV (B), paragraph 3, of the Verification Annex;

(ii) Declare whether there are abandoned chemical weapons on its territory and provide all available information in accordance with Part IV (B), paragraph 8, of the Verification Annex;

(iii) Declare whether it has abandoned chemical weapons on the territory of other States and provide all available information in accordance with Part IV (B), paragraph 10, of the Verification Annex;

2. The provisions of this Article and the relevant provisions of Part IV of the Verification Annex shall not, at the discretion of a State Party, apply to chemical weapons buried on its territory before 1 January 1977 and which remain buried, or which had been dumped at sea before 1 January 1985.

- PART IV (B) OLD CHEMICAL WEAPONS AND ABANDONED CHEMICAL WEAPONS

A. GENERAL

1. Old chemical weapons shall be destroyed as provided for in Section B.

2. Abandoned chemical weapons, including those which also meet the definition of Article II, paragraph 5 (b), shall be destroyed as provided for in Section C.

B. REGIME FOR OLD CHEMICAL WEAPONS

3. A State Party which has on its territory old chemical weapons as defined in Article II, paragraph 5 (a), shall, not later than 30 days after this Convention enters into force for it, submit to the Technical Secretariat all available relevant information, including, to the extent possible, the location, type, quantity and the present condition of these old chemical weapons.

In the case of old chemical weapons as defined in Article II, paragraph 5 (b), the State Party shall submit to the Technical Secretariat a declaration pursuant to Article III, paragraph 1 (b) (i), including, to the extent possible, the information specified in Part IV (A), paragraphs 1 to 3, of this Annex.

4. A State Party which discovers old chemical weapons after this Convention enters into force for it shall submit to the Technical Secretariat the information specified in paragraph 3 not later than 180 days after the discovery of the old chemical weapons.

5. The Technical Secretariat shall conduct an initial inspection, and any further inspections as may be necessary, in order to verify the information submitted pursuant to paragraphs 3 and 4 and in particular to determine whether the chemical weapons meet the definition of old chemical weapons as specified in Article II, paragraph 5. Guidelines to determine the usability of chemical weapons produced between 1925 and 1946 shall be considered and approved by the Conference pursuant to Article VIII, paragraph 21 (i).

6. A State Party shall treat old chemical weapons that have been confirmed by the Technical Secretariat as meeting the definition in Article II, paragraph 5 (a), as toxic waste. It shall inform

the Technical Secretariat of the steps being taken to destroy or otherwise dispose of such old chemical weapons as toxic waste in accordance with its national legislation.

7. Subject to paragraphs 3 to 5, a State Party shall destroy old chemical weapons that have been confirmed by the Technical Secretariat as meeting the definition in Article II, paragraph 5 (b), in accordance with Article IV and Part IV (A) of this Annex. Upon request of a State Party, the Executive Council may, however, modify the provisions on time-limit and order of destruction of these old chemical weapons, if it determines that doing so would not pose a risk to the object and purpose of this Convention. The request shall contain specific proposals for modification of the provisions and a detailed explanation of the reasons for the proposed modification.

C. REGIME FOR ABANDONED CHEMICAL WEAPONS

8. A State Party on whose territory there are abandoned chemical weapons (hereinafter referred to as the "Territorial State Party") shall, not later than 30 days after this Convention enters into force for it, submit to the Technical Secretariat all available relevant information concerning the abandoned chemical weapons. This information shall include, to the extent possible, the location, type, quantity and the present condition of the abandoned chemical weapons as well as information on the abandonment.

9. A State Party which discovers abandoned chemical weapons after this Convention enters into force for it shall, not later than 180 days after the discovery, submit to the Technical Secretariat all available relevant information concerning the discovered abandoned chemical weapons. This information shall include, to the extent possible, the location, type, quantity and the present condition of the abandoned chemical weapons as well as information on the abandonment.

10. A State Party which has abandoned chemical weapons on the territory of another State Party (hereinafter referred to as the "Abandoning State Party") shall, not later than 30 days after this Convention enters into force for it, submit to the Technical Secretariat all available relevant information concerning the abandoned chemical weapons. This information shall include, to the extent possible, the location, type, quantity as well as information on the abandonment, and the condition of the abandoned chemical weapons.

11. The Technical Secretariat shall conduct an initial inspection, and any further inspections as may be necessary, in order to verify all available relevant information submitted pursuant to paragraphs 8 to 10 and determine whether systematic verification in accordance with Part IV (A), paragraphs 41 to 43, of this Annex is required. It shall, if necessary, verify the origin of the abandoned chemical weapons and establish evidence concerning the abandonment and the identity of the Abandoning State.

12. The report of the Technical Secretariat shall be submitted to the Executive Council, the Territorial State Party, and to the Abandoning State Party or the State Party declared by the Territorial State Party or identified by the Technical Secretariat as having abandoned the chemical weapons. If one of the States Parties directly concerned is not satisfied with the report it shall have the right to settle the matter in accordance with provisions of this Convention or bring the issue to the Executive Council with a view to settling the matter expeditiously.

13. Pursuant to Article I, paragraph 3, the Territorial State Party shall have the right to request the State Party which has been established as the Abandoning State Party pursuant to paragraphs 8 to 12 to enter into consultations for the purpose of destroying the abandoned chemical weapons in cooperation with the Territorial State Party. It shall immediately inform the Technical Secretariat of this request.

14. Consultations between the Territorial State Party and the Abandoning State Party with a view to establishing a mutually agreed plan for destruction shall begin no later than 30 days after the Technical Secretariat has been informed of the request referred to in paragraph 13. The mutually agreed plan for destruction shall be transmitted to the Technical Secretariat not later than 180 days after the Technical Secretariat has been informed of the request referred to in paragraph 13. Upon the request of the Abandoning State Party and the Territorial State Party, the Executive Council may extend the time-limit for transmission of the mutually agreed plan for destruction.

15. For the purpose of destroying abandoned chemical weapons, the Abandoning State Party shall provide all necessary financial, technical, expert, facility as well as other resources. The Territorial State Party shall provide appropriate cooperation.

16. If the Abandoning State cannot be identified or is not a State Party, the Territorial State Party, in order to ensure the destruction of these abandoned chemical weapons, may request the Organization and other States Parties to aid in the destruction of these abandoned chemical weapons.

17. Subject to paragraphs 8 to 16, Article IV and Part IV (A) of this Annex shall also apply to the destruction of abandoned chemical weapons. In the case of abandoned chemical weapons which also meet the definition of old chemical weapons in Article II, paragraph 5 (b), the Executive Council, upon the request of the Territorial State Party, individually or together with the Abandoning State Party, may modify or in exceptional cases suspend the application of provisions on destruction, if it determines that doing so would not pose a risk to the object and purpose of this Convention. In the case of abandoned chemical weapons which do not meet the definition of old chemical weapons in Article II, paragraph 5 (b), the Executive Council, upon the request of the Territorial State Party, individually or together with the Abandoning State Party, may in exceptional circumstances modify the provisions on the time-limit and the order of destruction, if it determines that doing so would not pose a risk to the object and purpose of this Convention. Any request as referred to in this paragraph shall contain specific proposals for modification of the provisions and a detailed explanation of the reasons for the proposed modification.

18. States Parties may conclude between themselves agreements or arrangements concerning the destruction of abandoned chemical weapons. The Executive Council may, upon request of the Territorial State Party, individually or together with the Abandoning State Party, decide that selected provisions of such agreements or arrangements take precedence over provisions of this Section, if it determines that the agreement or arrangement ensures the destruction of the abandoned chemical weapons in accordance with paragraph 17.

Types of Chemicals

Annex on Chemicals

In this annex:
A. Guidelines for Schedules of Chemicals
B. Schedules of Chemicals

A. Guidelines for Schedules of Chemicals

Guidelines for Schedule 1

1. The following criteria shall be considered in considering whether a toxic chemical or precursor should be included in Schedule 1:

(a) It has been developed, produced, stockpiled or used as a chemical weapon as defined in Article II;

(b) It poses otherwise a high risk to the object and purpose of this Convention by virtue of its high potential for use in activities prohibited under this Convention because one or more of the following conditions are met:

(i) It possesses a chemical structure closely related to that of other toxic chemicals listed in Schedule 1, and has, or can be expected to have, comparable properties;

(ii) It possesses such lethal or incapacitating toxicity as well as other properties that would enable it to be used as a chemical weapon;

(iii) It may be used as a precursor in the final single technological stage of production of a toxic chemical listed in Schedule 1, regardless of whether this stage takes place in facilities, in munitions or elsewhere;

(c) It has little or no use for purposes not prohibited under this Convention.

Guidelines for Schedule 2
2. The following criteria shall be considered in considering whether a toxic chemical not listed in Schedule 1 or a precursor to a Schedule 1 chemical or to a chemical listed in Schedule 2, part A, should be included in Schedule 2:

(a) It poses a significant risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that could enable it to be used as a chemical weapon;

(b) It may be used as a precursor in one of the chemical reactions at the final stage of formation of a chemical listed in Schedule 1 or Schedule 2, part A;

(c) It poses a significant risk to the object and purpose of this Convention by virtue of its importance in the production of a chemical listed in Schedule 1 or Schedule 2, part A;

(d) It is not produced in large commercial quantities for purposes not prohibited under this Convention.

Guidelines for Schedule 3

3. The following criteria shall be considered in considering whether a toxic chemical or precursor, not listed in other Schedules, should be included in Schedule 3:

(a) It has been produced, stockpiled or used as a chemical weapon;

(b) It poses otherwise a risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that might enable it to be used as a chemical weapon;

(c) It poses a risk to the object and purpose of this Convention by virtue of its importance in the production of one or more chemicals listed in Schedule 1 or Schedule 2, part B;

(d) It may be produced in large commercial quantities for purposes not prohibited under this Convention.

B. Schedules of Chemicals

The following Schedules list toxic chemicals and their precursors. For the purpose of implementing this Convention, these Schedules identify chemicals for the application of verification measures according to the provisions of the Verification Annex. Pursuant to Article II, subparagraph 1 (a), these Schedules do not constitute a definition of chemical weapons.

(Whenever reference is made to groups of dialkylated chemicals, followed by a list of alkyl groups in parentheses, all chemicals possible by all possible combinations of alkyl groups listed in the parentheses are considered as listed in the respective Schedule as long as they are not explicitly exempted. A chemical marked "*" on Schedule 2, part A, is subject to special thresholds for declaration and verification, as specified in Part VII of the Verification Annex.)

Schedule 1

In this list:

A. Toxic Chemicals

B. Precursors

Table 3: A and B – Toxic Chemicals and Precursors

	A. Toxic Chemicals Schedule 1	(CAS Registry number)
(1)	O-Alkyl (<=C10, incl. cycloalkyl) alkyl (Me, Et, n-Pr or i-Pr)-phosphonofluoridates	
e.g.	Sarin: O-Isopropyl methylphosphonofluoridate	(107-44-8)
	Soman: O-Pinacolyl methylphosphonofluoridate	(96-64-0)
(2)	O-Alkyl (<=C10, incl. cycloalkyl) N,N-dialkyl (Me, Et, n-Pr or i-Pr) phosphoramidocyanidates	
e.g.	Tabun:O-Ethyl N,N-dimethyl phosphoramidocyanidate	(77-81-6)
(3)	O-Alkyl (H or <=C10, incl. cycloalkyl) S-2-dialkyl (Me, Et, n-Pr or i-Pr)-aminoethyl alkyl (Me, Et, n-Pr or i-Pr) phosphonothiolates and corresponding alkylated or protonated salts	
e.g.	VX: O-Ethyl S-2-diisopropylaminoethyl methyl phosphonothiolate	(50782-69-9)
(4)	Sulfur mustards:	
	2-Chloroethylchloromethylsulfide	(2625-76-5)
	Mustard gas: Bis(2-chloroethyl)sulfide	(505-60-2)
	Bis(2-chloroethylthio)methane	(63869-13-6)
	Sesquimustard: 1,2-Bis(2-chloroethylthio)ethane	(3563-36-8)
	1,3-Bis(2-chloroethylthio)-n-propane	(63905-10-2)
	1,4-Bis(2-chloroethylthio)-n-butane	(142868-93-7)
	1,5-Bis(2-chloroethylthio)-n-pentane	(142868-94-8)
	Bis(2-chloroethylthiomethyl)ether	(63918-90-1)
	O-Mustard: Bis(2-chloroethylthioethyl)ether	(63918-89-8)
(5)	Lewisites:	
	Lewisite 1: 2-Chlorovinyldichloroarsine	(541-25-3)
	Lewisite 2: Bis(2-chlorovinyl)chloroarsine	(40334-69-8)
	Lewisite 3: Tris(2-chlorovinyl)arsine	(40334-70-1)
(6)	Nitrogen mustards:	
	HN1: Bis(2-chloroethyl)ethylamine	(538-07-8)
	HN2: Bis(2-chloroethyl)methylamine	(51-75-2)
	HN3: Tris(2-chloroethyl)amine	(555-77-1)
(7)	Saxitoxin	(35523-89-8)
(8)	Ricin	(9009-86-3)

	B. Precursors	(CAS Registry number)
(9)	Alkyl (Me, Et, n-Pr or i-Pr) phosphonyldifluorides	
e.g.	DF: Methylphosphonyldifluoride	(676-99-3)
(10)	O-Alkyl (H or <=C10, incl. cycloalkyl) O-2-dalkyl (Me, Et, n-Pr or i-Pr)-	

	B. Precursors	(CAS Registry number)
	aminoethyl alkyl (Me, Et, n-Pr or i-Pr) phosphonites and corresponding alkylated or protonated salts	
e.g.	QL: O-Ethyl O-2-diisopropylaminoethyl methylphosphonite	(57856-11-8)
(11)	Chlorosarin: O-Isopropyl methylphosphonochloridate	(1445-76-7)
(12)	Chlorosoman: O-Pinacolyl methylphosphonochloridate	(7040-57-5)

Schedule 2

In this list:

Table 4: A and B - Toxic Chemicals and Precursors Schedule 2

	A. Toxic Chemicals	(CAS Registry number)
(1)	Amiton: O,O-Diethyl S-[2-(diethylamino)ethyl] phosphorothiolate	(78-53-5)
	and corresponding alkylated or protonated salts	
(2)	PFIB: 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-1-propene	(382-21-8)
(3)	BZ: 3-Quinuclidinyl benzilate (*)	(6581-06-2)

	B. Precursors	(CAS Registry number)
(4)	Chemicals, except for those listed in Schedule 1, containing a phosphorus atom to which is bonded one methyl, ethyl or propyl (normal or iso) group but not further carbon atoms,	
e.g	Methylphosphonyl dichloride	(676-97-1)
	Dimethyl methylphosphonate	(756-79-6)
Exemption: Fonofos:	O-Ethyl S-phenyl ethylphosphonothiolothionate	(944-22-9)
(5)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) phosphoramidic dihalides	
(6)	Dialkyl (Me, Et, n-Pr or i-Pr) N,N-dialkyl (Me, Et, n-Pr or i-Pr)-phosphoramidates	
(7)	Arsenic trichloride	(7784-34-1)
(8)	2,2-Diphenyl-2-hydroxyacetic acid	(76-93-7)
(9)	Quinuclidin-3-ol	(1619-34-7)
(10)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) aminoethyl-2-chlorides and corresponding protonated salts	

	B. Precursors	(CAS Registry number)
(11)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) aminoethane-2-ols and corresponding protonated salts	
Exemptions:	N,N-Dimethylaminoethanol	(108-01-0)
	and corresponding protonated salts	
	N,N-Diethylaminoethanol	(100-37-8)
	and corresponding protonated salts	
(12)	N,N-Dialkyl (Me, Et, n-Pr or i-Pr) aminoethane-2-thiols and corresponding protonated salts	
(13)	Thiodiglycol: Bis(2-hydroxyethyl)sulfide	(111-48-8)
(14)	Pinacolyl alcohol: 3,3-Dimethylbutan-2-ol	(464-07-3)

Schedule 3

In this list:

- A. Toxic Chemicals
- B. Procursors

Table 5: A and B - Toxic Chemicals and Precursors Schedule 3

	A. Toxic Chemicals	(CAS Registry number)
(1)	Phosgene: Carbonyl dichloride	(75-44-5)
(2)	Cyanogen chloride	(506-77-4)
(3)	Hydrogen cyanide	(74-90-8)
(4)	Chloropicrin: Trichloronitromethane	(76-06-2)

	B. Precursors	(CAS Registry number)
(5)	Phosphorus oxychloride	(10025-87-3)
(6)	Phosphorus trichloride	(7719-12-2)
(7)	Phosphorus pentachloride	(10026-13-8)
(8)	Trimethyl phosphite	(121-45-9)
(9)	Triethyl phosphite	(122-52-1)
(10)	Dimethyl phosphite	(868-85-9)
(11)	Diethyl phosphite	(762-04-9)
(12)	Sulfur monochloride	(10025-67-9)
(13)	Sulfur dichloride	(10545-99-0)
(14)	Thionyl chloride	(7719-09-7)
(15)	Ethyldiethanolamine	(139-87-7)

	B. Precursors	(CAS Registry number)
(16)	Methyldiethanolamine	(105-59-9)
(17)	Triethanolamine	(102-71-6)

- Article XV. Amendments

1. Any State Party may propose amendments to this Convention. Any State Party may also propose changes, as specified in paragraph 4, to the Annexes of this Convention. Proposals for amendments shall be subject to the procedures in paragraphs 2 and 3. Proposals for changes, as specified in paragraph 4, shall be subject to the procedures in paragraph 5.

2. The text of a proposed amendment shall be submitted to the Director-General for circulation to all States Parties and to the Depositary. The proposed amendment shall be considered only by an Amendment Conference. Such an Amendment Conference shall be convened if one third or more of the States Parties notify the Director-General not later than 30 days after its circulation that they support further consideration of the proposal. The Amendment Conference shall be held immediately following a regular session of the Conference unless the requesting States Parties ask for an earlier meeting. In no case shall an Amendment Conference be held less than 60 days after the circulation of the proposed amendment.

3. Amendments shall enter into force for all States Parties 30 days after deposit of the instruments of ratification or acceptance by all the States Parties referred to under subparagraph (b) below:

(a) When adopted by the Amendment Conference by a positive vote of a majority of all States Parties with no State Party casting a negative vote; and

(b) Ratified or accepted by all those States Parties casting a positive vote at the Amendment Conference.

4. In order to ensure the viability and the effectiveness of this Convention, provisions in the Annexes shall be subject to changes in accordance with paragraph 5, if proposed changes are related only to matters of an administrative or technical nature. All changes to the Annex on Chemicals shall be made in accordance with paragraph 5. Sections A and C of the Confidentiality Annex, Part X of the Verification Annex, and those definitions in Part I of the Verification Annex which relate exclusively to challenge inspections, shall not be subject to changes in accordance with paragraph 5.

5. Proposed changes referred to in paragraph 4 shall be made in accordance with the following procedures:

(a) The text of the proposed changes shall be transmitted together with the necessary information to the Director-General. Additional information for the evaluation of the proposal may be provided by any State Party and the Director-General. The Director-General shall

promptly communicate any such proposals and information to all States Parties, the Executive Council and the Depositary;

(b) Not later than 60 days after its receipt, the Director-General shall evaluate the proposal to determine all its possible consequences for the provisions of this Convention and its implementation and shall communicate any such information to all States Parties and the Executive Council;

(c) The Executive Council shall examine the proposal in the light of all information available to it, including whether the proposal fulfils the requirements of paragraph 4. Not later than 90 days after its receipt, the Executive Council shall notify its recommendation, with appropriate explanations, to all States Parties for consideration. States Parties shall acknowledge receipt within 10 days;

(d) If the Executive Council recommends to all States Parties that the proposal be adopted, it shall be considered approved if no State Party objects to it within 90 days after receipt of the recommendation. If the Executive Council recommends that the proposal be rejected, it shall be considered rejected if no State Party objects to the rejection within 90 days after receipt of the recommendation;

(e) If a recommendation of the Executive Council does not meet with the acceptance required under subparagraph (d), a decision on the proposal, including whether it fulfils the requirements of paragraph 4, shall be taken as a matter of substance by the Conference at its next session;

(f) The Director-General shall notify all States Parties and the Depositary of any decision under this paragraph;

(g) Changes approved under this procedure shall enter into force for all States Parties 180 days after the date of notification by the Director-General of their approval unless another time period is recommended by the Executive Council or decided by the Conference.

7.2. 1972 Biological Weapons Convention

The Convention Covers the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and their Destruction[62].

Biological and Toxin Weapons

Biological weapons are complex systems that disseminate disease-causing organisms or toxins to harm or kill humans, animals or plants. They generally consist of two parts – a weaponized agent and a delivery mechanism. In addition to strategic or tactical military applications, biological weapons can be used for political assassinations, the infection of livestock or agricultural

[62] Information taken from United Nations Office for Disarmament Affairs (UNODA) www.un.org/disarmarment/wmd/bio and The United Nations Office at Geneva (UNOG) www.unog.ch

produce to cause food shortages and economic loss, the creation of environmental catastrophes, and the introduction of widespread illness, fear and mistrust among the public.

Almost any disease-causing organism (such as bacteria, viruses, fungi, prions or rickettsiae) or toxin (poisons derived from animals, plants or microorganisms, or similar substances produced synthetically) can be used in biological weapons. The agents can be enhanced from their natural state to make them more suitable for mass production, storage, and dissemination as weapons. Historical biological weapons programs have included efforts to produce aflatoxin; anthrax; botulinum toxin; foot-and-mouth disease; glanders; plague; Q fever; rice blast; ricin; Rocky Mountain spotted fever; smallpox; and tularaemia, among others.

Biological weapon delivery systems can take a variety of forms. Past programmes have constructed missiles, bombs, hand grenades and rockets to deliver biological weapons. A number of programmes also designed spray-tanks to be fitted to aircraft, cars, trucks, and boats. There have also been documented efforts to develop delivery devices for assassinations or sabotage operations, including a variety of sprays, brushes, and injection systems as well as means for contaminating food and clothing.

In addition to concerns that biological weapons could be developed or used by states, recent technological advances increase the likelihood that these weapons could be acquired or produced by non-state actors, including individuals and terrorist organizations. For more information about recent scientific and technological advances relevant to the Convention. The 20th century saw the use of biological weapons by individuals and groups committing criminal acts or targeted assassinations, biological warfare conducted by states, and the accidental release of pathogens from laboratories. There were also several false accusations of biological weapons use, highlighting the difficulty in differentiating between naturally occurring disease, accidents, and deliberate use.

In practice, should a suspicious disease event occur, it would be difficult to determine if it was caused by nature, an accident, sabotage, or an act of biological warfare or terrorism. Consequently, the response to a biological event, whether natural, accidental or deliberate, would involve the coordination of actors from many sectors who together possess the capability to determine the cause and attribute it to a specific source. Likewise, the preparedness for and prevention of such an event should also involve multi-sectoral coordination. For more information about preparing for and responding to disease outbreaks and biological weapons attacks.

Because of the wide spectrum of potential biological hazards, efforts to manage the risks should be multi-disciplinary, multi-sectoral, and above all, coordinated. As such, the BWC relies primarily on a network approach based on coordination with international, regional, and nongovernmental organizations and initiatives as well as other nonproliferation regimes in order to address the interconnected nature of biological threats in a holistic manner. Under the framework of the BWC, improved coordination would provide positive externalities for managing disease, whatever the cause. Such an approach ensures that resources are used optimally to provide benefits for many. In this sense, for example, building capacities across sectors to monitor disease would not only strengthen the ability to detect and respond to a

biological attack, but it would provide states with the capacity to track and mitigate naturally occurring disease thus vastly improving public health worldwide.

As the Secretary General noted:

"To manage the full spectrum of biological risks, you need a cohesive, coordinated network of activities and resources. Such a network will help to ensure that biological science and technology can be safely and securely developed for the benefit of all."

Man has used poisons for assassination purposes ever since the dawn of civilization, not only against individual enemies but also occasionally against armies. The German army was the first to use weapons of mass destruction, both biological and chemical, during the First World War, although their attacks with biological weapons were on a rather small scale and were not particularly successful: covert operations using both anthrax and glanders attempted to infect animals directly or to contaminate animal feed in several of their enemy countries. During the Second World War, the Japanese army, for example, poisoned more than 1,000 water wells in Chinese villages to study cholera and typhus outbreaks.

7.3. 1980 Convention on Certain Conventional Weapons

The purpose of the Convention is to ban or restrict the use of specific types of weapons that are considered to cause unnecessary or unjustifiable suffering to combatants or to affect civilians indiscriminately. The structure of the CCW – a chapeau Convention and annexed Protocols – was adopted in this manner to ensure future flexibility. The Convention itself contains only general provisions. All prohibitions or restrictions on the use of specific weapons or weapon systems are the object of the Protocols annexed to the Convention.

As mentioned before, almost all the armaments used in crimes and conflicts around the world are categorized as 'conventional weapons', a term used for arms that are not deemed to have the 'mass destructive' capabilities ascribed to nuclear, chemical and biological weapons. Conventional weapons range from tanks, warships, fighter aircraft and remotely-guided drones, to 'Small Arms and Light Weapons' (SALW), an UN-recognized category that covers machine guns, rifles, hand guns, portable anti-tank and anti-aircraft guns, missile launchers, grenade launchers and mortars of less than 100mm caliber. SALW fuel intrastate conflicts, domestic and transnational crime, human rights violations and violence against civilian non-combatants, including women and children.

Protocol I establish that it is prohibited to use any weapon the primary effect of which is to injure by fragments, which in the human body escape detection by X-rays.

Protocol II relates to the use on land of the mines, booby-traps and other devices, defined herein, including mines laid to interdict beaches, waterway crossings or river crossings, but does not apply to the use of anti-ship mines at sea or in inland waterways. For the purpose of this Protocol:

1. “Mine” means a munition placed under, on or near the ground or other surface area and designed to be exploded by the presence, proximity or contact of a person or vehicle.

4. “Booby-trap” means any device or material which is designed, constructed or adapted to kill or injure, and which functions unexpectedly when a person disturbs or approaches an apparently harmless object or performs an apparently safe act.

5. “Other devices” means manually-emplaced munitions and devices including improvised explosive devices designed to kill, injure or damage and which are actuated manually, by remote control or automatically after a lapse of time.

Protocol III prohibits or restricts the use of incendiary weapons. For the purpose of this Protocol:

1. ”Incendiary weapon” means any weapon or munition which is primarily designed to set fire to objects or to cause burn injury to persons through the action of flame, heat, or combination thereof, produced by a chemical reaction of a substance delivered on the target. Incendiary weapons can take the form of, for example, flame throwers, fougasses, shells, rockets, grenades, mines, bombs and other containers of incendiary substances.

Incendiary weapons do not include:

(i) Munitions which may have incidental incendiary effects, such as illuminants, tracers, smoke or signaling systems;

(ii) Munitions designed to combine penetration, blast or fragmentation effects with an additional incendiary effect, such as armour-piercing projectiles, fragmentation shells, explosive bombs and similar combined-effects munitions in which the incendiary effect is not specifically designed to cause burn injury to persons, but to be used against military objectives, such as armoured vehicles, aircraft and installations or facilities.

Protocol IV states that it is prohibited to employ laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision that is to the naked eye or to the eye with corrective eyesight devices. The High Contracting Parties shall not transfer such weapons to any State or non-State entity.

Protocol V addresses the humanitarian impact of unexploded ordnance and abandoned explosive weapons. Includes provisions on clearance and destruction of explosive remnants of war (ERW), measures for the protection of civilians, recording the use of explosive ordnance, international cooperation, and victim assistance.

OBS: There is information about the fact that conventional munitions were also dumped at sea after First and Second World War.

- Protocol V

The High Contracting Parties,

willing to address generic preventive measures, through voluntary best practices specified in a Technical Annex for improving the reliability of munitions, and therefore minimizing the occurrence of explosive remnants of war,

Have agreed as follows:

Article 1- General provision and scope of application

1. In conformity with the Charter of the United Nations and of the rules of the international law of armed conflict applicable to them, High Contracting Parties agree to comply with the obligations specified in this Protocol, both individually and in cooperation with other High Contracting Parties, to minimize the risks and effects of explosive remnants of war in post-conflict situations.

2. This Protocol shall apply to explosive remnants of war on the land territory including internal waters of High Contracting Parties.

Article 2 Definitions

For the purpose of this Protocol,

1. Explosive ordnance means conventional munitions containing explosives, with the exception of mines, booby traps and other devices as defined in Protocol II of this Convention.

2. Unexploded ordnance means explosive ordnance that has been primed, fused, armed, or otherwise prepared for use and used in an armed conflict. It may have been fired, dropped, launched or projected and should have exploded but failed to do so.

3. Abandoned explosive ordnance means explosive ordnance that has not been used during an armed conflict, that has been left behind or dumped by a party to an armed conflict, and which is no longer under control of the party that left it behind or dumped it. Abandoned explosive ordnance may or may not have been primed, fused, armed or otherwise prepared for use.

4. Explosive remnants of war means unexploded ordnance and abandoned explosive ordnance.

5. Existing explosive remnants of war means unexploded ordnance and abandoned explosive ordnance that existed prior to the entry into force of this Protocol for the High Contracting Party on whose territory it exists.

Article 3 - Clearance, removal or destruction of explosive remnants of war

1. Each High Contracting Party and party to an armed conflict shall bear the responsibilities set out in this Article with respect to all explosive remnants of war in territory under its control. In cases where a user of explosive ordnance which has become explosive remnants of war, does not exercise control of the territory, the user shall, after the cessation of active hostilities, provide where feasible, inter alia technical, financial, material or human resources assistance,

bilaterally or through a mutually agreed third party, including inter alia through the United Nations system or other relevant organizations, to facilitate the marking and clearance, removal or destruction of such explosive remnants of war.

2. After the cessation of active hostilities and as soon as feasible, each High Contracting Party and party to an armed conflict shall mark and clear, remove or destroy explosive remnants of war in affected territories under its control. Areas affected by explosive remnants of war which are assessed pursuant to paragraph 3 of this Article as posing a serious humanitarian risk shall be accorded priority status for clearance, removal or destruction.

3. After the cessation of active hostilities and as soon as feasible, each High Contracting Party and party to an armed conflict shall take the following measures in affected territories under its control, to reduce the risks posed by explosive remnants of war:

(a) survey and assess the threat posed by explosive remnants of war;

(b) assess and prioritize needs and practicability in terms of marking and clearance, removal or destruction;

(c) mark and clear, remove or destroy explosive remnants of war;

(d) take steps to mobilize resources to carry out these activities.

4. In conducting the above activities High Contracting Parties and parties to an armed conflict shall consider international standards, including the International Mine Action Standards.

5. High Contracting Parties shall co-operate, where appropriate, both among themselves and with other states, relevant regional and international organizations and non-governmental organizations on the provision of inter alia technical, financial, material and human resources assistance including, in appropriate circumstances, the undertaking of joint operations necessary to fulfill the provisions of this Article.

Article 7 - Assistance with respect to existing explosive remnants of war

1. Each High Contracting Party has the right to seek and receive assistance, where appropriate, from other High Contracting Parties, from states non-party and relevant international organizations and institutions in dealing with the problems posed by existing explosive remnants of war.

2. Each High Contracting Party in a position to do so shall help in dealing with the problems posed by existing explosive remnants of war, as necessary and feasible. In so doing, High Contracting Parties shall also consider the humanitarian objectives of this Protocol, as well as international standards including the International Mine Action Standards.

Article 8 - Cooperation and assistance

1. Each High Contracting Party in a position to do so shall provide assistance for the marking and clearance, removal or destruction of explosive remnants of war, and for risk education to civilian populations and related activities inter alia through the United Nations system, other relevant international, regional or national organizations or institutions, the International Committee of the Red Cross, national Red Cross and Red Crescent societies and their International Federation, non-governmental organizations, or on a bilateral basis.

3. Each High Contracting Party in a position to do so shall contribute to trust funds within the United Nations system, as well as other relevant trust funds, to facilitate the provision of assistance under this Protocol.

4. Each High Contracting Party shall have the right to participate in the fullest possible exchange of equipment, material and scientific and technological information other than weapons related technology, necessary for the implementation of this Protocol. High Contracting Parties undertake to facilitate such exchanges in accordance with national legislation and shall not impose undue restrictions on the provision of clearance equipment and related technological information for humanitarian purposes.

5. Each High Contracting Party undertakes to provide information to the relevant databases on mine action established within the United Nations system, especially information concerning various means and technologies of clearance of explosive remnants of war, lists of experts, expert agencies or national points of contact on clearance of explosive remnants of war and, on a voluntary basis, technical information on relevant types of explosive ordnance.

6. High Contracting Parties may submit requests for assistance substantiated by relevant information to the United Nations, to other appropriate bodies or to other states. These requests may be submitted to the Secretary-General of the United Nations, who shall transmit them to all High Contracting Parties and to relevant international organizations and non-governmental organizations.

7. In the case of requests to the United Nations, the Secretary-General of the United Nations, within the resources available to the Secretary-General of the United Nations, may take appropriate steps to assess the situation and in co-operation with the requesting High Contracting Party and other High Contracting Parties with responsibility as set out in Article 3 above, recommend the appropriate provision of assistance. The Secretary-General may also report to High Contracting Parties on any such assessment as well as on the type and scope of assistance required, including possible contributions from the trust funds established within the United Nations system.

Article 11 - Compliance

1. Each High Contracting Party shall require that its armed forces and relevant agencies or departments issue appropriate instructions and operating procedures and that its personnel receive training consistent with the relevant provisions of this Protocol.

2. The High Contracting Parties undertake to consult each other and to co-operate with each other bilaterally, through the Secretary-General of the United Nations or through other appropriate international procedures, to resolve any problems that may arise with regard to the interpretation and application of the provisions of this Protocol.

7.4. Radiological Weapons

The discovery of radioactivity took place over several years beginning with the discovery of x-rays in 1895. Soon after that, it became clear that it not only had beneficial properties but could also pose health risks caused by irradiation, from both external contamination of the skin and internal contamination by digestion or inhalation. Since the dawning of the nuclear age there has also been a preoccupation with the possibility that fissionable nuclear material, such as plutonium and high enriched uranium (HEU) might be used for hostile purposes. In addition to the fact that such materials can be used in nuclear weapons, there has also been concern that they might be dispersed by conventional explosive to cause widespread death and injury. The multilateral disarmament negotiating body in Geneva, the Committee on Disarmament (subsequently the Conference on Disarmament) attempted for many years to negotiate a Radiological Weapons Convention which would have banned the use of conventionally-dispersed fissionable material for hostile purposes.

By the beginning of the 1990s there was a growing realization that non-fissionable radioactive sources might also be used for hostile purposes through dissemination by conventional explosives. They could, at the very least, be used to create panic and thereby societal and economic chaos. These factors and the ease with which their component materials could be obtained could make them attractive to terrorists. Such a device has come to be known as a radiological dispersion device (RDD) or by the general public as a ‘dirty bomb’. The terrorist attacks on the United States on 11 September 2001 greatly increased fears that RDDs would be used sooner rather than later. However, despite the notable increase in awareness of the threat, only a few countries have adopted or adapted legislation to deal with it.

7.5. Nuclear Weapons

Scattered across the ocean floor in the cold waters of the Arctic are nuclear submarines and reactors dumped by the Soviets up until the early 1990s. For decades, the Soviet military used Russia and its bordering oceans as dumping grounds for nuclear waste. Between 1965 and 1988 the Soviets secretly dumped 18 nuclear reactors, six of which still contained highly radioactive fuel, into shallow waters.

After decades of sitting on the ocean floor, some of the most dangerous pieces may be too unstable to remove, leaving the potential for radioactive material to leak, which could disrupt commercial fisheries and destroy aquatic ecosystems. "Taking reactors and cutting out the bottom of your ships and letting them sink to the bottom is about as irresponsible as you can get when it comes to radioactive waste," Jim Riccio, a nuclear expert with Greenpeace, told VICE News. "We've had some weird [behavior] in this country where we haven't been all that great with it but nothing that rose to the level of what the Soviets had done."

Before the London Convention of 1972, an international agreement that prohibited marine dumping, countries were free to use the oceans as a trash heap for nuclear waste. Though the Soviets signed the treaty in the late 1980s, it wasn't until after the breakup of the Soviet Union in 1991 that the Russians opened up to the international community about the extent of the Arctic dumping campaign.

The Nuclear Weapons Convention (NWC) is a proposed treaty which, if adopted, would outlaw the use, possession, development, testing, deployment, and transfer of nuclear weapons, as well as mandate internationally verifiable dismantlement of nuclear arsenals. The Treaty on the Non-Proliferation of Nuclear Weapon (NPT) obliges its states parties to pursue good-faith negotiations toward nuclear disarmament. However, many non-nuclear weapons states and disarmament activists have been disappointed by the perceived unwillingness of the nuclear-weapons states to work toward nuclear disarmament.

8. Legal Implications of Different Management Strategies (marine economy, environment, military)

8.1. Identification of the Disposal Sites

To identify the disposal sites, the following range of information is available, which also varies on availability from state to state.

Location:

- Ranged from 5 to over 250miles (10 to over 400km)
- Ranged from 5 to over 250 miles (10 to over 400 km) from shore
- Depths ranged from 50 to 16,000 feet (15 to 4,900 m)

Range of Disposal Methods.

- Disposal Sites used for Conventional Munitions, and Chemical Munitions.
- Designated Sites were usually 100 sq. miles (260 sq. km), may also have been used for the disposal of industrial and municipal wastes.

8.2. Identification of Navigational and Safety Hazards

- Risk Management Considerations
- Different issues are presented by different munitions types

- Big Risk to be considered when managing the munitions is their location (where is the point)
- Near the Shore, Shallow Water, Deep Water

8.3. Issues Related to Munitions Recovery

- Research and identification to demonstrated human health and the environment

- Great point for consideration comes when estimating when it is better to leaving the munitions than that of the recovery.

- Hazard to Workers may be significant
- Potential for disturbance and release of constituents into the sediment surface and water
- Exact location of the munitions on or beyond the sea floor
- Positively identifying the munitions and their fuse status prior to disturbance
- Identifying the specific site
- Identification of chemical and conventional munitions
- Location and Recovery of the Identified Munitions

9. United Nations Convention on the Law of the Seas

Today, UNCLOS is the predominant legal document in global marine management. UNCLOS establishes “a legal order of the sea.” It is one of the most comprehensive treaty regimes, covering a tremendously large area of the planet – including the seas, the ocean floor, and even air space above – and regulating a wide range of human activity. It is essentially “constitution for the sea,” which guides every aspect of management of our sea’s oceans. It is one of the most far-reaching and influential treaties having 166 states parties as of October 2013. UNCLOS has its own International Tribunal for the Law of the Sea (“ITLOS”), with competence to hear disputes submitted to it in relation to the Convention and other agreements.

United Nations Convention on the Law of the Sea (UNCLOS) – also called the **Law of the Sea Convention** or the **Law of the Sea treaty**, is the international agreement that resulted from the third United Nations Conference on the Law of the Sea (UNCLOS III), which took place between 1973 and 1982. The Law of the Sea Convention defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. The Convention, concluded in 1982, replaced four 1958 treaties. UNCLOS came into force in 1994, a year after Guyana became the 60th nation to ratify the treaty. As of June 2016, 167 countries and the European Union have joined in the Convention.

While the Secretary General of the United Nations receives instruments of ratification and accession and the UN provides support for meetings of states party to the Convention, the UN has no direct operational role in the implementation of the Convention. There is, however, a role played by organizations such as the International Maritime Organization, the International Whaling Commission, and the International Seabed Authority (ISA). (The ISA was established by the UN Convention.)

UNCLOS replaces the older 'freedom of the seas' concept, dating from the 17th century: national rights were limited to a specified belt of water extending from a nation's coastlines, usually 3 nautical miles (5.6 km) (Three-mile limit), according to the 'cannon shot' rule developed by the Dutch jurist Cornelius van Bynkershoek. All waters beyond national boundaries were considered international waters: free to all nations but belonging to none of them (the mare liberum principle promulgated by Hugo Grotius).

10. Conventional Munitions as Chemical munitions

Almost all the armaments used in crimes and conflicts around the world are categorized as 'conventional weapons', a term used for arms that are not deemed to have the 'mass destructive' capabilities ascribed to nuclear, chemical and biological weapons. Conventional weapons range from tanks, warships, fighter aircraft and remotely-guided drones, to 'Small Arms and Light Weapons' (SALW), an UN-recognized category that covers machine guns, rifles, hand guns, portable anti-tank and anti-aircraft guns, missile launchers, grenade launchers and mortars of less than 100mm caliber. SALW fuel intrastate conflicts, domestic and transnational crime, human rights violations and violence against civilian non-combatants, including women and children.

Conventional munitions are unsurprisingly the main proportion of the material that has been dumped and they consist primarily of TNT and other similar material. TNT and variants can be extremely toxic to marine organisms. There have been a number of studies that document this.

The literature implies that there may have been spontaneous detonations of dumped conventional munitions in the Beaufort's Dyke (UK), but as yet no definitive evidence exists. However, any dumped munitions which contain Shellite or Lyddite as the filling will be far more likely to spontaneously detonate than, for example, TNT-filled ordnance. Especially if the dumped munitions which contain Shellite or Lyddite as the filling are disturbed. This might arise, for example, from them being subjected to an impact due to the structure of a ship collapsing, or another munition falling, onto them. Thus, clearly, there is the possibility of spontaneous detonations of dumped conventional munitions, which might trigger further explosions.

There are three basic types of danger that these sea-dumped munitions can cause:

1) Direct physical contact with either chemical or conventional munitions resulting in threats to human health;

Direct physical contact with munitions can clearly come in a number of ways and include not only individuals who are involved in working in close proximity to dumped munitions, for example, fishermen, pipeline layers or those involved in construction projects such as dredging or off-shore wind farms. For example, there is literature to indicate that those using beaches are also under some threat as material following either oceanographic or man-made disturbance has been washed ashore and has the potential to cause injury.

2) Contamination of marine organisms and the environment in the vicinity of dumped munitions and the consequent potential for some concentration of toxic contaminants entering the wildlife and human food chains;

3) Spreading of contamination

4) Spontaneous explosions which can be both directly life threatening, but also have the potential to spread material away from the dump sites so increasing the potential for more of it to come into direct physical contact with individuals.

11. Legal manner of proceeding/sound policy or legal procedures

11.1 UN Treaty

Cooperation with the United Nations through the General assembly Binding Resolution.

To build a UN Treaty, the General Assembly Resolution needs to be passed. There is already exists a resolution of UN Resolution adopted by General Assembly on 20 December 2013 - "Cooperative measures on Sea-Dumped Chemical Munitions." The following resolution is non-binding, which means it does not require any financial commitment by Member States, or there is no enforcement mechanism to follow the resolution.

International Dialogue on Underwater Munitions (IDUM) helped to draft and presented UN Resolution 2010 and 2013 to the United Nations New York sponsored by the Lithuanian Mission to the UN. Resolution was tabled at UN supported by all EU Member Countries. As a result, the Resolution XXX Res declares chemical munitions as chemical waste.

However, to build the treaty on underwater munitions, the treaty should be binding as the tool to financial obligations. Only binding treaty will make member states to commit to financial obligations.

Without a binding treaty, could also negotiate yearly for the UN 'Budget Bill' to set appropriate allocation of funds to the underwater munitions' management.

11.2 Amendment to the CWC

Another way to make the issue of underwater munitions an international area of concern is to make an amendment to the Chemical Weapons Convention: it is very hard to achieve as the CWC will have to change its fundamental approach and values that it only covers the chemical weapons (the treaty should also cover conventional, radiological, and biological underwater dumped weapons).

CWC is arms control agreement and not agreement of human health and environment protection. The amendment process is long and requires an agreement from more than 64 states parties to start the process. The amendment will enter into force only when all states parties accept the amendment.

11.3 No Treaty

No treaty – establishment of the private sector company. Tailor-made programs should be developed for each country for each case, taking into the consideration all existing laws of underwater munitions cleanup. Also, no remediation process , leave in-place for 100's of years

No treaty – establishment of the private sector company, tailor-made programs for each country for each case, taking into the consideration all existing laws of underwater munitions cleanup.

11.4 New Treaty

The New treaty could follow the ensample Ottawa Treaty, 1999

1999 - The Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, known informally as the Ottawa Treaty, the Anti-Personnel Mine Ban Convention, or often simply the Mine Ban Treaty.

The Ottawa Treaty, 1999

1999 - The Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, known informally as the Ottawa Treaty, the Anti-Personnel Mine Ban Convention, or often simply the Mine Ban Treaty.

A New Treaty on underwater munitions would require a Humanitarian Trust Fund to support international countries efforts to develop Regional Underwater Action Centres (UWAC's). International cooperation would be needed to develop:

- Policy, Standard and Procedures
- Global Public Awareness
- Global Database and Maps (Regions)
- Underwater Munitions Action Centre (UWMAC)
- International Training Programs
- Promote Global Clean-up (Trust Fund)

International Dialogue on Underwater Munitions (IDUM)

IDUM is a non-governmental organization (NGO) founded in Canada in 2004, and established as a Dutch Foundation in The Hague, The Netherlands in 2014 to stop the human health and environmental impact and destruction on our seas and ocean from Underwater Munitions (UWM's).

IDUM's Mission is to create a Global Treaty for the Protection of our Seas and Ocean by eradicating chemical, conventional and radiological munitions from our waters. IDUM is cooperating with governments, international bodies, commissions, conventions and authorities to develop a global treaty on chemical, conventional, biological and radiological underwater weapons.

12. United Nations Environmental Program Voluntary Commitments (UNEP)

At the high-level United Nations Conference to Support the Implementation of Sustainable Development Goal 14 (SDG 14) - The Ocean Conference - held in June 2017 at UN headquarters in New York, close to 1,400 voluntary commitments for concrete action to advance implementation of SDG 14 were made by governments, the United Nations system, civil society organizations, academia, the scientific community, and the private sector. These commitments, together with the Conference outcome document Our Ocean, Our Future: Call for Action, mark a global breakthrough on the path to sustainable management and conservation of our oceans, seas and marine resources.

Each of the Ocean Conference voluntary commitments addresses one or several of the SDG 14 targets, often with associated positive impact on other SDGs, including for example SDG 3 on good health and well-being and SDG13 on climate action, among others.

To follow-up on the implementation of these voluntary commitments; to catalyze and generate new voluntary commitments; and to facilitate collaboration and networking amongst different actors in support of SDG 14, the United Nations have launched nine thematic multi-stakeholder Communities of Ocean Action. Each community is coordinated by designated focal points who work together with United Nations Secretary-General's Special Envoy for the Ocean, Ambassador Peter Thomson, and the UN Department of Economic and Social Affairs in carrying out the activities.

The nine Communities of Ocean Action are:

1. Coral reefs
2. Implementation of international law as reflected in United Nations Convention on the Law of the Sea
3. Mangroves
4. Marine and coastal ecosystems management
5. Marine pollution
6. Ocean acidification
7. Scientific knowledge, research capacity development and transfer of marine technology

8. Sustainable blue economy
9. Sustainable fisheries

To support implementation of the voluntary commitments, the Secretary-General's Special Envoy for the Ocean Mr. Peter Thomson, in collaboration with UN DESA, will be supporting Communities of Ocean Action among all stakeholders to spur further action and maintain the momentum generated by the first ever UN Ocean Conference held in June 2017. As a first step, on 7 September 2017, a webinar was organized with a focus on arrangements for following up on voluntary commitments, establishing action communities among stakeholders, and hearing updates from participants on commitments.

Mr. Terrance P. Long, Chairman of IDUM was able to intervene on 8 of the 9 Communities for Ocean Acton with the exception of Mangroves, to include all classes of underwater munitions for consideration moving forward on United Nations Environmental Program Ocean Action.

The International Dialogue on Underwater Munitions (IDUM) has established an Ocean Action Plan – Under Sustainable Goal 14 (Life below the Water) "Conserve & Sustainability use of our ocean and seas and marine resources for sustainable development" based on their commitment to "Establishment of the International Marine Training Centre for Innovative Science and Technology for Sea Dumped Weapons, and Shipborne Disposal Solutions to Support the Eradication of all Underwater Munitions" (#OceanAction21356) and to mobilizing partners in the private sector and academia to establish a Center, in addition to developing a roadmap for an International Treaty on Underwater Munitions.

Other SDGs:

Goal 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 6 – Ensure availability and sustainable management of water and sanitation for all

Goal 13 – Take urgent actions to combat climate change and its impacts

Goal 15 – Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reserve land degradation and halt biodiversity loss

Goal 16 – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels

Description:

International Dialogue on Underwater Munitions (IDUM), is a non-governmental organization founded in Canada in 2004, and established, as a Dutch Foundation in The Hague, The Netherlands in 2014, as a focal point for Voluntary Cooperation on underwater munitions (UWM's): Policy, Science, Technology and Responses.

IDUM, is an internationally recognized body of experts, where stakeholders (diplomats, environmental protection, fishery, fossil fuel, salvage divers, military, and others) can cooperate in an open and transparent forum to seek solutions and develop partnerships and responses for sea dumped chemical, radiological and conventional munitions.

The most cost-effective disposal method of munitions for more than 90 years, was to dump them into our waterways, seas, and ocean. Based on publicly available information, including archives, there is an excess of one billion tones of dumped munitions.

Underwater Munitions toxins ("Silent Killers") negatively affect our marine environment and human health. There are confirmed environmental implications that identify depleting fish stocks, extra fish diseases, stress on kidneys and livers of Cod fish, and the inability of juvenile fish to reproduce. Scientists believe, that some chemical weapons may dissipate in water, but others like arsenic, can bioaccumulation in the food chain, and, ultimately, produce human health concerns, including cancers. In many world regions people unknowingly consume contaminated fish. Chemical plums drift in our waters from underwater munitions sites, exposing large areas to chemical contamination. It's just a matter of time before chemical weapons plums begin to meet one-another in our seas and ocean, raising the temperature of our waters and destroying our marine ecosystem, unless we "Call to Action."

Underwater Munitions are the Point-Source Emitters of Pollution, which means that, in most cases, when we remove the source from the water, we remove the problem. Mostly, munitions are not fused, therefore can be safely removed, on a "case by case" basis.

IDUM commits to create an International Marine Training Center in Canada and The Netherlands for Innovative Science and Technology for underwater munitions and, to Cooperate with the international community, state parties, local and regional governments, commissions, conventions, international bodies, defense, NGO's, donors, private and public sectors on underwater munitions.

The Center will serve as the global focal point for exchange of information to further increase knowledge and awareness of Underwater Munitions Policy, Science, Technology and Responses by:

1. Cooperate to develop Policy and Standards, including an International Treaty for all Underwater Munitions on Human Health and Environment;

2. Creating Global Awareness on the Impact from Underwater Munitions on Human Health, Environment;

3. Creating a Global Database and Regional Maps of Underwater Munitions Sites for the Exchange of Information;

4. Developing an International Underwater Testing and Training Centre for Underwater Munitions Innovative Science and Technology Development;

5. Developing International Training Programs on Underwater Munitions for Marine Surveys, Investigations, Recovery, and Disposal;

6. Promoting Global Clean-up by developing Shipborne and in-situ Disposal Solutions for Underwater Munitions, and

7. Explore Deepwater Chemical Weapons Site/s to determine the impact on the environment and to develop responses.

SDG – 14 Targets Covered

14.1. By 2025, prevent and significantly reduce marine pollution of all kinds, from land-based activities, including marine debris and nutrient pollution.

Type of commitment: Warfare Materials

14.2. By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and act for their restoration in order to achieve healthy and productive oceans.

Type of commitment: Large Marine Ecosystem approach

14.3. Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels.

Type of commitment: Scientific research and cooperation to address ocean acidification knowledge gaps

14.4. By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics.

Type of commitment: Ecosystem approach to fisheries (EAF)

14.5. By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

Type of commitment: Marine protected area with partial protection

14.6. By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation.

Type of commitment: Removal or reduction of harmful fisheries subsidies; Information relating to harmful subsidies

14.7. By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

Type of commitment: Economic benefits from sustainable fisheries; Economic benefits from sustainable tourism; Economic benefits from sustainable aquaculture/agriculture; Economic benefits from marine biotechnology

14.a. Increase scientific knowledge, develop research capacity and transfer marine technology, considering the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, small island developing States and least developed countries.

Type of commitment:

- Scientific, socioeconomic and interdisciplinary research
- Research capacity development
- Data access and sharing
- Training and professional development
- Scientific cooperation
- Transfer marine technology

14.b. Provide access for small-scale artisanal fishers to marine resources and markets

Type of commitment: Legal/policy/institutional measures

14.c. Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want.

Type of commitment:

- Activities to raise awareness of the comprehensive legal and policy framework for the sustainable development of oceans and seas, in particular UNCLOS, its Implementing Agreements and other relevant ocean-related instruments and promote their effectiveness.
- Activities to develop the capacity of States towards broader participation in and effective implementation of UNCLOS and its implementing Agreements.
- Strengthening ocean governance, for example through the development of a national ocean policy or regional ocean policy.
- Development of necessary infrastructure and/or enforcement capabilities to comply with international law, as reflected in UNCLOS and as complemented by other ocean-related instruments.

13. Outcomes and Recommendations

The above analysis demonstrates that existing international customary and treaty law provides many principles and provisions covering various aspects of the underwater munitions problem. Under each set of provisions, existing law provides several common duties which could give guidance on the legal implications of underwater munitions. The interconnected framework and range of associated issues indicates that underwater munitions are a sustainable development issue.

Additionally, it is an environmental issue, an economic issue, safety and a disarmament issue. It is about resources, the environment, and the overall welfare of the world's populations. The law, however, is fragmented, and tends to be viewed in isolation. In the international legal system, norms do not apply in isolation, but should be interpreted against the background of other applicable rules and principles Under Article 31(3)(c) of the Vienna Convention on the Law of Treaties, relevant rules of international law applicable in the relations between parties should be considered in the interpretive process. Thus, interpretive rules of relationship must be considered. The judgments of international courts and arbitral tribunals indicate that sustainable development is now a common objective of certain treaty regimes and influences their interpretations. Even absent a conventional reference, sustainable development continues to guide treaty interpretation. This is a part of sustainable development's principle of integration. Similarly, the objective of sustainable development implies an evolutive understanding of legal duties. States should be aware of the interplay between certain legal frameworks to guide implementation of environmental objectives to concrete issues like underwater munitions.

Under these various frameworks, precaution can mean a number of things. In the underwater munitions problem, there are some risks that are known, and some risks that are unknown. "Precaution," could thus take place on two several levels: in relation to known and unknown risks; and on the national and international level. First, states should take precautionary measures in relation to the known risks. This includes identifying affected areas, educating industry and the public of the risks and producing guidelines on how to avoid, or mitigate those risks. As noted in section one, some states and regional organizations have acted in this regard. The US Military Munitions Response program allows the Army to respond to unexploded to unexploded ordinances, discarded military munitions and other munitions constituent contamination. In the

Baltic Area, CHEMSEA has undertaken this task by producing guidelines for fishermen on how to take safety precautions. In regard to seabed extraction and other construction states should implement precautionary measures to prevent pollution to the marine environment. This includes the implementation and use of best environmental practices: (1) environmental impact assessment and risk analysis; (2) and a system over oversight through responsibility and compensation systems for actual damage. However, in order to adequately warn of all the risk, continued research must be conducted to identify duping ranges.

Similarly, there are precautionary measures states may take in regard to unknown risk. What is compulsory, as a part of the duty of due diligence, is that some level of environmental and human health standards is required, but the preferred level of protection is left up to states. States could take a number of regulatory measures to reduce or mitigate the risks of underwater munitions. However, these measures should be based on an assessment of the risk, rather than sweeping precaution. Precaution and prudence do not mean acting without a valid assessment of the risk. Similarly, it does not mean zero risk, but an acceptable level of risk.

The issue with underwater munitions is not that states are completely ignoring their duties to the environment — and to the public at large — but rather, that the current cooperative framework is inefficient. Sustainable development relies on cooperation, which carries different implications for states according to the principle of common but differentiated responsibilities. Although wealthy states may be able to take care of their own problems within their EEZ, developing states lack the critical technology, resources, and scientific capacity to deal with the risks. Where there is not a specific cooperative regime, such as international trust fund set up under Protocol V to the Convention on Certain Conventional Weapons, any progress on the issue will rely on state-to-state relationships and bilateral negotiations. The Secretary General's report indicates that states are unlikely to provide financial and technical support unless there is an overarching framework. Rather than states taking precautionary measures *sua sponte* in diverging manners, states should take a harmonized approach to the risks.

International law is in favor of precaution, and mitigating risks. However, adequate precaution requires effective international cooperation. The international community has not yet finished its global risk assessment. Such an assessment will remain incomplete until there is a central location for compiling records and international monitoring and study of underwater munitions. Precaution in this case involves gathering the necessary information, analyzing the risks, and taking a rational response. As underwater munitions are point source emitters of pollution, the only way to remove the risks is to remove the source of the harm. Thus, any international risk assessment should be with a view towards eventual remediation measures. In the risk analysis, study should be given to both the risks of leaving munitions as they are, and the risks involved with remediation.

To facilitate cooperation, there are many international institutions who monitor at least one aspect issue. An analysis of each individual institution is beyond the scope of this study. Yet, it is evident that these organizations are only competent to address part of the problem. The IMO is primarily concerned with vessel-source pollution. The IMO's Integrated Technical Co-operation Programme works towards facilitating navigation, and its Marine Environment Protection Committee only addresses prevention of pollution from ships. It may lack the technical capability

to deal with chemical munitions study and remedial measures. While the OPCW may have the technical expertise in handling chemical munitions, hot button political security issues may set underwater munitions to the sideline. Any actual progress on this problem depends on the political will of the states and institutions actively engaged with it.

This has been a notable problem in sustainable development. With so many international organizations, each monitoring the effects from various angles, each with different capabilities, and without an end goal, is this type of precaution necessarily effective? The fragmented regulatory approach to sustainable development has identified as in issue in my areas. The largely inadequate and fragmented regime indicates that duties should be consolidated into a new treaty regime, much like the progressive Convention on Cluster Munitions.

States should consider developing a temporary, but task-oriented body, much like the short lived ICMCB. In order to deal with the problem in an effective, practical and efficient manner. Such a body should contain a central mechanism for sharing information, scientific monitoring, technology and financing, but also contain the technical capability to address sites outside areas of national jurisdiction. A specialized organization must work with all the relevant stakeholders and governments to put together a global comprehensive response to underwater munitions. Although it is not feasible or worthwhile to hold states accountable for past harm, the international community can hold states accountable for their present actions and due diligence obligations. We now have an idea of the impact on human health and the environment. Due diligence evolves with our continued understanding of munitions and requires the use of all available methods of protection, including the development of new, task oriented international projects.

13.1 Available Funding Options

DAIMON is developing cost scenarios that will compare the economic losses in doing nothing vs the cost for implementing various management strategies and remediation methods. A major part of this analysis is in work being completed by DAIMON to analyze, compare and educate Baltic States and other sponsors that the continued “do nothing” approach has significant costs in fishing, tourism, construction and navigation. Activities on the Baltic Sea are getting busier and as such the cost-benefit will have a more profound effect. More DAIMON – like projects may be proposed in future in order to further entrench specific cost – benefits of various underwater munition sites to convince sponsors and decision-makers of the economic and environmental need to better manage underwater munitions.

IDUM has previously proposed on a world-wide level, which can be scaled to the Baltic Sea that “Any tangible approach would require a multilateral response from all stakeholders coordinated by the United Nations to develop Standards, Policy and Procedures including international and regional institutional capacity-building and the creation of an International Donor Trust Fund” (Long, 2013).

Trust fund – like initiatives could be also be developed or added to through construction development financial levies in the manner that construction developers are charged in many local to national construction projects. Eliminating only those underwater munitions that are

inhibiting various construction projects should immediately cease, being replaced by policy that the entire site be remediated on the premise that future remediation of any underwater munition site would be then hampered by the new constructions. Achieving a more progressive economic future as proclaimed by new construction should not ensue without cleaning up the past.

Activities for funding include the need for further research, development of complete underwater munition sites, education and training and implementation of management strategies that may or may not advocate for entire recovery and destruction. Funding can be State specific or from a regional multi-national approach. Funding venues from UN sponsored programs, development levies, environmental cleanup funds, donors etc. are all viable options but may require a common central accounting regime.

Existing organizational frameworks could be further investigated in the pursuit of available funding accounting and compliance such as with the European Union Water Framework Directive (2000/60/EC). This directive; however, presently only covers such maritime waters one mile out from the coast.

Another framework that could be used is the EU Strategy for the Baltic Sea Region (EUSBSR) which embodies the concept of macro-regional cooperation which is based on effective and more coordinated used of existing funding sources in a complementary manner.

According to the Commission Communication (June 2009), the European Social Fund, European Regional Development Fund, Cohesion Fund, European Agricultural Fund for Rural Development and European Fisheries Fund (European Maritime and Fisheries Fund for the programming period 2014-2020), are the key funding sources of the Strategy. However, the actions and projects under the Strategy and its Action Plan can be funded by many other financial sources (Horizon 2020, BONUS Joint Baltic Sea Research and Development Programme, the LIFE programme, Education and Culture programmes, the Interreg Baltic Sea Region Programme etc.), as well as national, regional, private sources. For example, KEEP is a Database tool for search EU-funded cross-border, transnational and interregional cooperation projects with the European Union and between EU member States and neighbouring countries. It also includes data on EU macro-regional strategies projects[63].

The European Commission Environment Directorate has opportunities for funding through various grants and request for proposals and interests through the Marine Strategy Framework Directive (Directive 2008/56/EC).

Lastly, there are many other funding regimes in the EU which are listed on the Welcomeurope website[64]. On the site, presently is listed 136 European subsidies and calls for proposals that are available for environment including: HORIZON 2020, LIFE, etc. However, in utilizing these funding venues, underwater munition management strategy projects would be in competition for funding with other environmental ones.

[63] https://www.balticsea-region-strategy.eu/
[64] https://www.welcomeurope.com/european-subsidies-sector-Environment.html

14. Bibliography

Books and Articles

Adam Babich, *Too Much Science in Environmental Law, 28 CoLum.* J. ENVL L. 119, 119 (2003).

Alan Boyle, *Between Process and Substance, Sustainable Development in the Jurisprudence of International Courts and Tribunals,* in HANS CHRISTIAN BUGGE & CHRISTINA VOIGT (eds.), SUSTAINABLE DEVELOPMENT IN INTERNATIONAL AND NATIONAL LAW (2008).

Alan Boyle, *State Responsibility and International Liability for Injuries Consequences of Acts not Prohibited by International Law: A Necessary Distinction,* 39 INT'L & COMP. L.Q. (1990).

Alexander Gillespie, *The Precautionary Principle and the 21st Century: A Case Study of Noise Pollution in the Ocean,* 22 INT'L J. MARINE & COASTAL L. 61 (2007).

Carson Thomas, *Advancing the Legal Protection of the Environment in Relation to Armed Conflict: Protocol I's Threshold of Impermissible Environmental Damage and Alternatives,*

82 NORDIC L. J. 83 (2013)

Cristina Leb, *The UN Watercourses Convention: the eminence grise behind Cooperation on Transboundary Water Resources,* 28 WATER INT'L 146 (2013).

David M. Bearden, *U.S. Disposal of Chemical Weapons in the Ocean: background and Issues for Congress,* CONGRESSIONAL RESEARCH SERVICE, 3 January 2007.

Dr. Lev Fedorov, *Pre-Convention liquidation of Soviet Chemical Weapons,* **in** ALEXANDER **V.** KAFFKA (ed.), SEA DUMPED CHEMICAL WEAPONS: ASPECTS, PROBLEMS AND SOLUTIONS **(2010).**

Dr. Ronald DeMarco and Commander John P. Quinn, *The Impact of War and Military Operations other than War on the Marine Environment, Policy Making on the Frontiers of Knowledge,* in GRUNAWALT, KING & MCCLAIN, PROTECTION OF THE ENVIRONMENT.

Dr. Thomas Stock, *Sea Dumped Chemical Weapons and the Chemical Weapons Convention,* in

ALEXANDER V. KAFFKA (ed.), SEA DUMPED CHEMICAL WEAPONS: ASPECTS, PROBLEMS AND SOLUTIONS (2010).

Elise Anne Clark, *Strengthening Regional Fisheries Management - An Analysis of the Duty to Cooperate,* 9 NZ J. PUB. INT'L. L. 233 (2011).

Emily Baine & Margaret Simmons, *Mitigating the Possible Damage Effects of Twentieth-Century Ocean Dumping of Chemical Munitions,* Huntsville, AL, US Army Engineering & Support Center 6 (2005).

Guilherme Lotufo, Gunther Rosen, William Wild, and Geoffrey Carton, Summary Review of the Aquatic Toxicology of Munitions Constituents, US Army Corps of Engineers (2013).

Helen Duffy, *Harmony or Conflict? The interplay between human rights and humanitarian law in the right against terrorism,* in LARISSA VAN DEN HERIK AND NICO SCHRUVER (eds.), COUNTER-TERRORISM AND INTERNATIONAL LAW (2013).

Mariano J. Aznar-GOmez, *Environmental Damages and the 1991 Gulf War: Some Yardsticks Before the UNCC,* 14 LJIL 301, 301 (2001).

Marie Jacobsson, *Protection of the Environment in relation to Armed Conflicts* in International Law Commission ("ILC") Draft Articles on the Effects of Armed Conflicts on Treaties with Commentaries, Annex, Annex E, A/66/10 (2011).

Marie-Clarie Segger, *Sustainable Development in International Law* HANS CHRISTIAN BUGGE & CHRISTINA VOIGT (eds.), SUSTAINABLE DEVELOPMENT IN INTERNATIONAL AND NATIONAL LAW (20o8).

Michael Waldichuck, *International Approach to the Marine Pollution Problem, 1* OCEAN MANAGEMENT **211** (1973).

Priscilla Schwartz, *Sustainable Development in International Law,* 4 NON-STATE ACTORS AND INT'L L. 127, 128 (2005).

Proceedings of the NATO Advanced Research Workshop on Sea Dumped Chemical Munitions, (Kaliningrad Russia, January 12-15), in ALEXANDER V. KAFFKA (ed.), SEA DUMPED CHEMICAL WEAPONS: ASPECTS, PROBLEMS AND SOLUTIONS (201o).

Ronald J. Bettauer, *International Environmental Law-Making and the International Court of Justice,* 105 AM. SOC'Y INT'', L PROC. 61 (2011).

Richard Price, *A Genealogy of the Chemical Weapons Taboo,* 49 INTERNATIONAL ORGANIZATION

73, 8o (1995).

Robert Kolb, *The Main Epochs of Modern International Humanitarian Law since 1865 and their related dominant Legal Constructions,* in KJETIL MUJEZINOVI LARSEN, CAMILLA GULDAHL COOPER, GRO NYSTUEN (eds.), SEARCHING FOR A 'PRINCIPLE OF HUMANITY' IN INTERNATIONAL HUMANITARIAN LAW **29 (2012).**

Robert Pameroy et al., *Fish Wars: Conflict and Collaboration in Fisheries Management in Southeast Asia,* 31 MARINE POLICY 645 (2007).

Terrance Long, Response by International Dialogue on Underwater Munitions on the Questionnaire on IssuesRelating to the Environmental Effects Related to Waste Originating from Chemical Munitions Dumped at Sea. (UN Ref: DSD/2013/181)

Vaughan Lowe, *Sustainable Development and Unsustainable Practices,* in BOYLE & FREESTONE (eds.), INTERNATIONAL LAW AND SUSTAINABLE DEVELOPMENT - PAST ACHIEVEMENTS AND FUTURE CHALLENGES (1999).

Virginie Barral, Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm, 23 EJIL 377, 400 (2012).

International Conventions, Statutes, Declarations, and Draft Articles

Aarhus Convention on Access to Information, 2161 UNTS 447 (1999).

Additional Protocol to the American Convention on Human Rights, (1988).

African Charter of Human and Peoples' Rights, 1520 UNTS 217 (1981).

Agreement on the Application of Sanitary and Phytosanitary Measures (1994).

Convention Between France and Great Britain Relative to Fisheries, 21 IPE 1 (1867).

Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, 1992).

Convention on Biological Diversity, 1760 UNTS 79 (1992).

Convention on Biological Diversity, 1760 UNTS 79 (1992).

Convention on Certain Conventional Weapons, 1342 UNTS 137 (2003).

Convention on Cluster Munitions, CCM/77 (2008).

Convention on Environmental Impact Assessment in a Transboundary Context, 1989 UNTS 309 (1991).

Convention on International Trade in Endangered Species of Wild Fauna and Flora, 27 UNTS 1087 (1973).

Convention on Liability of Operators of Nuclear Ships, TRE-o00585 (1962).

Convention on the Continental Shelf, 499 UNTS 702 (1958).

Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1673 UNTS 126 (1989).

Convention on the High Seas, 450 UNTS 11 (1958).

Convention on the Law of Non-Navigational Uses of International Watercourses, 36 ILM 700 (1997).

Convention on the Law of the Non-Navigational Uses of International Watercourses, UN Doc. A/Res/51/299 (1997).

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 26 UST 2403 (1972).

Convention on the Prohibition of Military or any Hostile use of Environmental Modification Techniques, 1108 UNTS 151 (1976).

Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, 1015 UNTS 163 (1975).

Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction 1974 UNTS 45 (1993)•

Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction (1997).

Convention on the Territorial Sea and the Contiguous Zone, 516 UNTS 205 (1958). Convention on Wetlands of International Importance Especially as Waterfowl Habitat 14584 UNTS 246 (1971).

Convention the Rights of the Child, 1577 UNTS 3 (2002).

Declaration (IV, 2) concerning Asphyxiating Gasses (1899).

Declaration (IV,i), to Prohibit, for the Term of Five Years, the Launching of Projectiles and Explosives from Balloons and Other Methods of Similar Nature (1899).

Declaration (IV,3) Concerning Expanding Bullets (1899).

Declaration of the United Nations Conference on the Human Environment, U.N. Doc. A/Conf.48/14/Rev. (1973); 11 ILM 1416 (1972).

Declaration Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. Saint Petersburg (1868).

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), 619 UNTS 641 (1957).

General Agreement on Tariffs and Trade, 1867 UNTS 187, (1994).

Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases and of bacteriological Methods of Warfare (1925).

Hague Convention (VIII) relative to the Laying of Automatic Submarine Contact Mines (1907); Hague Convention II with Respect to the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land (1899).

Hague Convention IV respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land (1907).

Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea, 1507 UNTS 167 (Helsinki, 1992).

ICL Draft Articles on the Effects of Armed Conflicts on Treaties (2011).

ILA New Delhi Declaration of Principles of International Law Relating to Sustainable Development, **2** INT'L ENV'L AGREEMENTS **211** (2002).

International Commission for the Scientific Investigation of Tuna, 99 UNTS 4 (1949).
International Convention for the Northwest Atlantic Fisheries, 157 UNTS 158 (1949).
International Convention for the Prevention of Pollution of the Sea by Oil, 27 UNTS 3 (1954).
International Convention on Civil Liability for Oil Pollution Damage, 973 UNTS 3 (1969).
International Convention on the Establishment of an International Fund for Compensation for

Oil Pollution Damage (1971).

International Law Commission, Draft Articles on Responsibility of States for International Wrongful Acts (2001).

Ministerial Declaration of the International Conference on the Protection of the North Sea (1984).

North Sea Fisheries Overfishing Convention, UN Doc. ST/LEG/SR.B/6 (1882).

Protection of Victims of International Armed Conflicts, 1125 UNTS 3 (1977). Protocol V to the Convention on Certain Conventional Weapons, 2399 UNTS loo (2005). Rio Declaration on the Environment and Development, UN Doc. A/CONF.151/26 (1992). Rome Statute of the International Criminal Court (1988).

Santiago Declaration on the Maritime Zone 1006 UNTS 326, (1952).

Statute of the International Tribunal for Law of the Sea.

Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Underwater, 480 UNTS 6964 (1963).

Treaty Between Great Britain and the United States for Submitting to Arbitration the Questions Relating to the Seal Fisheries in the Bearing Sea, 176 CTS 44 (1892).

Treaty relating to the Use of Submarines and Noxious Gases in Warfare (1922).

United Nations Convention on the Law of the Sea, 1833 UNTS 3 (1982).

United Nations Framework Convention on Climate Change, 1771 UNTS 107 (1992).

Vienna Convention on the Law of Treaties, 1155 UNTS 331(1969).

Vienna Convention for the Protection of the Ozone Layer, 1513 UNTS 293 (1985).

United Nations Resolutions

UN Doc. A/65/149 (2011).

UN Doc. A/Res//1147(X11)(1957)•

UN Doc. A/Res/1252(XIII)(1958).

UN Doc. A/Res/1379(XIV)(1959)

UN Doc. A/Res/1649(XVI)(1961).

UN Doc. A/Res/2398(XXII1)(1968).

UN Doc. A/Res/3o29 (XXVII) (1973).

UN Doc. A/Res/9oo (IX) (1954).

UN Doc. A/Res/912(X)(1955).

UN Doc. A/Res/913(X)(1955).

UN Doc. E/Res.32 (IV) (1947). UN Doc. S/RES/692 (1991).

UN Doc. SIRES/697 (1991).

National and Intergovernmental Reports, and other Legislative Material

CHEMSEA, *Results from the CHEMSEA Project - Chemical Munitions Search and Assessment 19* (2014).

Commission of the European Communities, Communication from the Commission on the Precautionary Principle (2000).

Conclusions of the Work of the Study Group on the Fragmentation of International Law: Difficulties arising from Diversification and Expansion of International Law, UN. Doc. A/61/10 (2006).

HELCOM, Report on Chemical Munitions Dumped in the Baltic Sea, Baltic Sea Environment Proceedings No. 142 (2013).

IMCO, Preparations for the United Nations Conference on the Human Environment, Res.A.242 (VII) (1971).

International Maritime Organization, Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization, LEG/MISC.7, 19 January 2012.

Krause, Hans Herman, Environmental Policy in Estonia Briefing No. 5., Directorate B, Division for the Environment, Energy Research, STOA European Parliament. March 1998.

OSPAR Commission, Assessment of the Impact of Dumped Conventional and Chemical Munitions (updated 2009).

OSPAR Commission, Overview of Past Dumping at Sea of Chemical Weapons and Munitions in the OSPAR Maritime Area 5 (2005).

President Richard Nixon Special Message to the Congress About Waste Disposal, EDo5589, 15 April 1970.

Proclamation by President Truman with respect to Coastal Fisheries in Certain Areas of the High Seas, 28 September 1945: reproduced in 4o AJIL supp. 46 (1946).

Proposal of Lithuania, Poland, Bulgaria and Luxembourg, OPCW, Third Review Conference of States Parties, RC-3/NAT.14, 8 April 2013.

Report of the International Technical Conference on the Conservation of Living Resources of the Sea, A/Conf. lo/6 (1995).

Report of the Secretary General, Cooperative Measures to Assess and Increases Awareness of Environmental Effects Related to Waste Originating from Chemical Munitions Dumped at Sea, A/68/258, 24 June 2013.

Report of the Secretary-General Pursuant to Paragraph 19 of Security Council Resolution 687, S/22559 (1991).

Report of the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention, RC-3/3, 19 April 2013.

Strategic Environmental Research and Development Program, White Paper, Munitions in the Underwater Environment: State of Science and Knowledge Gaps 1 (2010).

The Precautionary Principle in Switzerland and Internationally, Synthesis Paper by the Interdepartmental Working Group on the Precautionary Principle (2003).

Tine Missiaen & Jean-Pierre Henriet (eds.), *Chemical Munition Dump Sites in Coastal Environments: a border-transgressing problem,* Belgian Federal Office for Scientific, Technical and Cultural Affairs (OSTC) (2002).

UN Department of Economic and Social Affairs, Population Division, ST/ESA/SER.A/236 4 (2004).

UN FAO, High-Level Expert Forum, Global Agriculture Towards 2050 (2009).

US Defense Environmental Programs Annual Report to Congress, Sea Disposal of Military Munitions, Fiscal Year 2009.

US Department of Defense, US Army Research, Development and Engineering Command, Historical Research and Response Team, Offshore Disposal of Chemical Agents and Weapons Conducted by the United States, Historical Database No. 26 (2001).