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The environmental impact of sunken shipwrecks

Report[1]
Committee on the Environment, Agriculture and Local and Regional Affairs
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Summary

Shipwrecks, together with ocean acidification and waste dumping into oceans, are among the biggest sources of ocean pollution. The North Atlantic Ocean has 25% of the potentially polluting wrecks in the world, which can contain up to 38% of the total volume of oil trapped in sunken vessels. The Mediterranean has 4% of the world's sunken vessels and around 5% of the estimated oil volume, figures that are worrying in view of its fragile marine ecosystem.

The Nairobi International Convention on the Removal of Wrecks, opened for signature in 2007, provides a harmonised legal framework for dealing with the problem of wrecks, but regrettably it is not yet in force.

The member States of the Council of Europe should therefore sign and ratify the Nairobi Convention, create a European database on wrecks, carry out systematic assessments of wrecks, support research in this area, and consider setting up a European fund for old wrecks that pose a threat to the environment.

1. Reference to committee: Doc. 12092, Reference 3635 of 25 January 2010.

Contents **Page**

A. Draft resolution 3
B. Explanatory memorandum by Ms Papadimitriou, rapporteur 5
1. Introduction 5
2. Overview in figures 5
3. International legal instrument: the Nairobi International Convention on the Removal of Wrecks (2007) 6
3.1. Financial liability 6
3.2. Entry into force 6
3.3. Limits 6
4. Feasibility and cost of wreck mitigation: can operations be carried out on sunken wrecks? 7
4.1. Data to be gathered 7
4.2. Wreck mitigation techniques 8
4.3. Assessing the costs 8
5. Assessing the risks of potentially polluting wrecks: should operations be carried out on sunken wrecks? 9
5.1. Environmental risks associated with oil spills 9
5.2. Underwater graves 10
6. New shipping routes and future threats 10
7. Recommendations 11

A. Draft resolution[2]

1. Shipwrecks, ocean acidification and waste dumping into oceans are among the biggest sources of ocean pollution. Some 75% of sunken wrecks date back to the Second World War; their metal structures are therefore ageing and the plates deteriorating, threatening to release their contents into the ocean under the effect of corrosion.

2. The North Atlantic Ocean has 25% of the potentially polluting wrecks in the world and these wrecks are estimated to contain nearly 38% of the total volume of oil trapped in sunken vessels. The Mediterranean has 4% of the world's sunken vessels and around 5% of the estimated oil volume, numbers that are high compared to its size and the fragile marine environment of a landlocked sea.

3. Oil is not the only threat to marine biodiversity. The warships used in the Second World War also carried munitions which, over the years, have become corroded to the point where they are liable to start leaking significant quantities of toxic substances. Some of these toxic substances, such as mercury, are not biodegradable and can cause chemical contamination of the food chain.

4. Referring to the research carried out by the World Wide Fund for Nature (WWF), Italy, and the non-governmental organisation Legambiente and to the report of the Parliamentary Assembly of the Mediterranean on "Dumping of toxic and radioactive waste and Human Trafficking in the Mediterranean", the Parliamentary Assembly of the Council of Europe expresses a strong concern over the illegal disposal of toxic and radioactive waste transported on old vessels that have been deliberately sunk in the Mediterranean.

5. The Parliamentary Assembly therefore underlines that, without maps charting these risks, no accurate assessment of the threat can be made. An inventory of potentially polluting wrecks was compiled by Environmental Research Consulting (ERC) in 2004. The International Marine Shipwreck Database has identified some 8 569 potentially polluting wrecks around the world, including 1 583 tank vessels. However, accurate information and data on deep-sea wrecks below 600 meters are scarce.

6. The Assembly considers that decisions to salvage oil and other dangerous substances from a sunken wreck must be based on a sound risk assessment and a thorough cost-benefit analysis since any salvage effort is usually expensive, time-consuming and risky.

7. The need for a common policy on the treatment and removal of wrecks has long been a topic of discussion at the International Maritime Organization. The Nairobi International Convention on the Removal of Wrecks, opened for signatures in 2007, therefore provides a harmonised legal framework for dealing with the issue of wrecks. The convention provides a set of rules aimed at ensuring the prompt removal of any wrecks that may pose an impediment to navigation or a threat to the environment and that are located in States parties' Exclusive Economic Zones, Environmental Protection Zones or on their continental shelf.

8. The Assembly welcomes the inclusion in the Nairobi Convention of a financial security regime which is intended to ensure that the owners of sunken vessels are primarily liable and financially responsible for marking and removing wrecks that pose a threat to the environment.

9. However, the Assembly strongly regrets that only four countries have so far signed the Nairobi Convention – that is Estonia, France, Italy and the Netherlands – precluding its entry into force for the moment.

10. In the light of the above considerations, the Parliamentary Assembly recommends that the member States of the Council of Europe:

10.1. sign and ratify the 2007 Nairobi International Convention on the Removal of Wrecks;

10.2. create a European database on wrecks, their location, cargo and pollution potential, in co-ordination with national maritime pollution bodies or within the framework of the Regional Sea Conventions (Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention") (1992, entered into force on 25 March 1998); Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean ("Barcelona Convention") (1976, amended in 1995); Convention on the Protection of the Marine Environment of the Baltic Sea Area ("Helsinki Convention") (1974, revised in 1992));

10.3. carry out systematic assessments of wrecks to identify any that pose a threat to the environment and keep them updated;

2. Draft resolution adopted unanimously by the committee on 28 November 2011.

10.4. support research in order to improve:

10.4.1. the ability to predict rates of corrosion and degradation of sunken wrecks for different conditions (water temperature, currents, etc.);

10.4.2. knowledge of the physical properties of oil, toxic and radioactive substances in deep water, cold water and high-pressure seawater environments;

10.4.3. the technology of remotely operated underwater vehicles (ROVs), with a view to reducing the cost of identifying and locating wrecks, as well as the cost of oil removal or neutralising toxic or nuclear waste, and/or wreck removal;

10.5. consider setting up a European fund for old wrecks whose owners are neither available nor solvent, to meet the cost of investigating and treating wrecks that pose a threat to the environment.

B. Explanatory memorandum by Ms Papadimitriou, rapporteur

1. Introduction

1. Current events are a regular reminder of the dangers that oil spills pose for the environment and marine biodiversity. In recent years, cases such as the *Erika*, the *Prestige*, the *Tricolor* and the *Ievoli Sun* have had a drastic impact on European public opinion and prompted changes in the law in the countries concerned to combat the effects of this massive pollution and prevent further incidents. At the same time, a number of vessels that sank decades ago have started to leak, polluting the marine environment and putting pressure on the authorities to act, either by offloading oil from the wrecks or by removing the wrecks themselves. These leaks, which may be from the vessel's cargo or fuel, have sparked criticism about the insufficient efforts undertaken to avoid oil spills.

2. The question now, however, is what to do with those sunken wrecks which have not yet started to leak? These potentially polluting wrecks are in some cases so old that it is difficult to find a responsible party capable of paying for their removal.

3. As the number of ageing wrecks grows, it is necessary and urgent for governments and the oil industry to begin planning together how best to respond to these potential threats. It is now clear that a large portion of the oil trapped in these wrecks will start leaking sooner or later. Some refer to these sunken wrecks, which pose a risk of explosion and can impede shipping, as "time bombs". Such concerns call for a systematic risk assessment process that takes into consideration the potential for leaks, the possible consequences of the pollution and the financial cost of oil or wreck removal and/or the clean-up operation.

2. Overview in figures

4. Information and data on deep-sea wrecks (below 600 metres) are scarce. Such wrecks are not yet systematically monitored and come under scrutiny only when pollution is found on the surface. Very few attempts have been made to mitigate these older vessels, unlike in the case of wrecks that lie in shallower waters or coastal areas. Consider the example of the *Silja* tanker, which in July 1969 sank in under 10 minutes after being hit by a French cargo vessel. Its wreck now lies at 2 500 metres, 20 nautical miles off Toulon. There are currently no data that would allow us to determine the state of corrosion of the vessel or how much oil remains trapped in its tanks.

5. An inventory of potentially polluting wrecks was, however, compiled by Environmental Research Consulting (ERC) in 2004; the International Marine Shipwreck Database identifies some 8 569 potentially polluting wrecks around the world, including 1 583 tank vessels. The database covers the period 1890-2004.

6. Some 75% of sunken wrecks date back to the Second World War and so have been underwater for more than sixty years; their metal structures are ageing and, under the effect of corrosion, the plates deteriorate, threatening to release their contents into the ocean.

7. According to these data, the North Atlantic Ocean has 25% of the world's potentially polluting wrecks and these wrecks are estimated to contain nearly 38% of the total volume of oil trapped in sunken vessels. The large numbers of wrecks in the Atlantic reflects the intensity of the maritime attacks between the German Navy and the Allied Forces during the Second World War. The Mediterranean, meanwhile, has 4% of the world's sunken vessels and around 5% of the estimated oil volume, numbers that are disproportionate to its size.

8. Oil is not the only threat to marine biodiversity. The warships used in the Second World War also carried munitions which, over the years, have become corroded to the point where they are liable to start leaking significant quantities of toxic substances. Some of these toxic substances (such as mercury) are not biodegradable and can cause chemical contamination of the food chain. Without a map charting these risks, no accurate assessment of the threat can be made. One example in this regard is the *SS Richard Montgomery*, a cargo ship that sank in the Thames Estuary in 1944 with approximately 1 500 tonnes of explosives on board. Although the wreck is being monitored by the Maritime and Coastguard Agency, the danger of an explosion remains. In the United Kingdom, there is in fact an act of parliament called "The Protection of Wrecks Act 1973", which lists dangerous wrecks. Only two are monitored at present: the *SS Richard Montgomery* and the *SS Castilian*, which sank in February 1943 off the Welsh coast, with its cargo of munitions.

9. Also worth mentioning here are shipwrecks involving chemical tankers such as the *Ievoli Sun* which was carrying 6 000 tonnes of chemicals when it sank in 2000, north of the island of Batz, France. In this particular case, a pumping and controlled release operation was carried out at a cost of 50 million French francs (approximately €7.5 million), at the expense of the vessel's owner.

3. International legal instrument: the Nairobi International Convention on the Removal of Wrecks (2007)

10. At international level, the need for a common policy on the treatment and removal of wrecks has long been a topic of discussion at the International Maritime Organization. For the first time, the 2007 Nairobi International Convention on the Removal of Wrecks provides a harmonised legal framework for dealing with the issue of wrecks.

11. The convention provides States parties with a set of rules aimed at ensuring the prompt removal of any wrecks that may impede navigation or pose a threat to the environment and that are located in States parties' Exclusive Economic Zones (EEZs), Environmental Protection Zones (EPZs) or on their continental shelf. The EEZ is situated beyond the territorial waters and extends up to 200 nautical miles from the baseline. The convention sets out the rights and obligations of the signatory States and establishes the powers of coastal States. States parties can elect to extend the application of the convention to wrecks located within their territory, including their territorial sea; they are also required to co-operate with other affected States. Any State which reserves the right to act must notify the State of the ship's registry and the State of the registered owner.

3.1. Financial liability

12. The inclusion in the Nairobi Convention of a financial security regime is intended to ensure that the owners of sunken vessels are primarily liable and financially responsible for marking and removing wrecks that pose a threat to the environment. States parties may remove wrecks, or have them removed, at the expense of the vessel owner. The convention in that case requires the owner of the vessel to meet the cost of locating, marking and removing the wreck if it constitutes a hazard. States potentially affected by the presence of polluting wrecks are thus protected from insolvency because all ships of 300 gross register tonnage or more and flying the flag of a State party are required to take out insurance to cover their liability under the convention.

3.2. Entry into force

13. The convention will enter into force twelve months after 10 States have ratified it. So far, only four countries have signed the instrument: Estonia, France, Italy and the Netherlands. Should the convention not come into force, the rights of Council of Europe member States in respect of shipwrecks will remain uncertain from a legal standpoint.

3.3. Limits

14. The introduction of international rules on the rights and obligations of owners of polluting wrecks, and hence the adoption of a harmonised legislative framework, would be an improvement on the current situation. The treaty in question does not apply to all wrecks, however. Rights to recover are extinguished if action is not taken within three years after the hazard is determined but in no case beyond six years after the casualty that caused the wreck. Also, nothing in the convention affects the right of the shipowner to limit its liability under a national law or an international convention such as the Convention on the Limitation of Liability for Maritime Claims (LLMC or the London Convention of 1976, as amended).[3]

3. This is the reference instrument on civil liability for maritime transport. It paved the way for the constitution of compensation funds in the amount of the value of the vessel. IMO member States, however, agreed that higher compensation was needed and that there should be a requirement to take out insurance. Three IMO conventions accordingly deal with specific risks: the 1992 Convention on Civil Liability for Oil Pollution Damage, the 1996 Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea and the 2001 Convention on Civil Liability for Bunker Oil Pollution Damage.

4. Feasibility and cost of wreck mitigation: can operations be carried out on sunken wrecks?

4.1. Data to be gathered

15. The risks of leaks and the methods of recovering oil from a wreck need to be examined. A typical oil removal operation includes the following phases:

– initial mobilisation;

– wreck assessment and leak prevention;

– removal mobilisation;

– oil removal;

– wreck stabilisation (or destruction).

16. The success of the operation depends to a large extent on the quality of the information compiled about the wreck. An accurate risk assessment is vital given the cost of these operations: the wreck must be studied, the bunkers located, the current measured and the moorings prepared. Consideration therefore needs to be given to the following factors:

– Environmental conditions (currents, winds, type of terrain, etc.): weather conditions at the wreck site must be taken into consideration for proper planning and mobilisation, since they directly affect the time window in which the work may be safely carried out. Tropical storms, winter winds and seasonal currents can disrupt the engineering work. Heavy work platforms and powerful tools, such as remotely operated vehicles (ROVs), can extend the weather window, but will also increase the cost. Currents, tides and water temperature also impact the selection of work platforms.

– The location of the wreck: a wreck that is a long way from the coast will require more time to mobilise and demobilise personnel and equipment. If the anticipated costs rise because of the distance of the wreck, simpler, alternative response options will become more attractive. That might include using support vessels and divers to carry out smaller and less expensive but longer clean-up or leak-sealing operations (possibly lasting several months or even years).

17. Except in the case of recent shipwrecks, the location phase is the most difficult to assess in terms of duration. Extending the search area is always very expensive. During this phase, if the sea floor is flat, recent innovations in acoustic imaging make it possible to scan tens of kilometres at a time. Any anomaly can be examined more closely using a side-scan sonar. If the sea floor is more uneven, detection becomes a much more complex process. Other aspects should be taken into consideration:

– the condition of the wreck: the task here is to ascertain what materials were used to build the vessel in order to determine the wreck corrosion rate. It should be possible to tell from the characteristics of the vessel exactly where the tanks are located. The volume of oil still on board also needs to be estimated and any leaks clearly located;

– the type of oil: the type, volume and location of oil on a wreck will vary depending on the type of vessel, its construction, age, propulsion, trade route, etc. Viscosity also plays an important part in wreck oil recovery operations. Lighter oils are usually fairly easy to recover from the bunkers; heavy, viscous oil is more difficult to handle and poses a greater threat to the environment. It requires heating to make it pumpable.

18. Operations to remove oil contained in sunken wrecks as cargo or in bunkers remain the exception. For while there are no technological barriers to recovering oil from deep-water wrecks, there are decisions to be made as regards financial liability. The State threatened by the wreck must be able to recover the cost of the operation from the owner of the vessel, where the owner is known and capable of paying. In the case of old wrecks, it would be helpful if States could turn to an international or European fund.

4.2. Wreck mitigation techniques

19. The French Centre of Documentation, Research and Experimentation on Accidental Water Pollution (CEDRE) has highlighted four methods of removing pollutants from sunken wrecks:

– *In situ* removal of oil from the wreck: this is the most common solution in the case of cargo oil; it is also the most manageable solution from a technical point of view. It does, however, have the disadvantage of leaving behind a certain amount of residue which clings to the walls or escapes into other enclosed areas of the wreck. The amount of residue can be reduced by washing out the cargo tanks or fuel bunkers with hot water or fluidizers.

– Burial of the wreck and cargo: this method remains somewhat academic as it has never been put into practice on a completely submerged wreck. While it may appear fast and inexpensive, the procedure has the disadvantage of leaving the oil cargo *in situ*, with no guarantee that the wreck will be 100% leak-proof.

– Removal of the wreck and cargo: this method enables all of the oil to be removed and takes less time than offloading the oil. It cannot be used in the case of damaged wrecks, however, and if an accident occurs, the risk of a large-scale discharge is significant. Also, if the site is a graveyard, removing the wreck is liable to cause anger among the families and/or the public at large.

– Controlled release of the cargo with surface recovery: in this case, openings are made in the hull using explosives or cutting tools. The released oil rises to the surface where it is trapped and pumped. This fast and inexpensive solution is only possible when conditions are highly favourable to start with (the quantity of pollutants contained in the bunkers is typically fairly small).

20. Unfortunately, there is as yet no reliable method of measuring the amount of oil contained in a wreck and very often it is overestimated. The problem of gauging the tanks aside, however, the task of locating and identifying wrecks and the operation itself have been facilitated by technological progress. Remotely operated vehicles are used to inspect the wreck, determine its position and the size of the breaches and hence the most appropriate method of dealing with the pollution threat.

21. The *Prestige* disaster in 2002, which polluted the coast of Galicia (Spain), showed that oil can be recovered in very deep water using these remotely controlled robots. In this particular case, nearly 14 000 tonnes of heavy fuel oil were recovered at depths of 3 500 metres.

22. Traditional operations involving ROVs in deep water do, however, require long cables and entail high operating costs. The devices are often restricted by their mooring systems, especially in challenging environments (polar regions, for example). With the advent of acoustically and optically controlled submarine vehicles (which are therefore no longer connected by cables), tasks will be able to be performed at less cost and with fewer personnel. The new devices will be better able to manoeuvre in the chaos that surrounds shipwrecks and represent a major step forward in the treatment and removal of sunken hazardous wrecks.

23. The CEDRE notes, however, that there are still a number of challenges to be addressed when recovering pollutants from wrecks:

– the problem of viscous oils that require heating to make them pumpable;

– the structure of the double-hull tankers that may increase the technical difficulty and risk of recovery operations;

– locating and estimating the volume of oil in the tanks and other spaces;

– close-out procedures.

4.3. Assessing the costs

24. There are only limited funds available for hazardous cargo recovery so it is important that the oil removal efforts be prioritised according to the likelihood and possible consequences of oil releases. The cost factors can be divided into four categories:

– mobilisation;

– equipment, tools and diving operations;

– days required on site;

– reprocessing the oil recovered.

25. In general, oil recovery costs are directly related to the complexity of the site, not to the volume of oil to be offloaded. In September 2010, for example, oil was offloaded from the frigate *Laplace* after fuel residue appeared in the bay of Fort-La-Latte (Brittany). A former American destroyer which had been converted into a meteorological ship by the French Navy, the vessel sank after hitting a German mine in September 1950. Traces of pollution in 2010 prompted the French Navy to set about removing 90 m^3 of oil, namely all the extractable fuel. Thanks to the shallow depth (about 10 metres), the proximity of the coast and the small number of personnel involved (35 members of the French Navy over a period of five days) the work was able to be completed at a cost of €150 000.

26. The case of the *SS Jacob Luckenbach*, on the other hand, shows that the sums involved in such operations can be considerable. A freighter, the *SS Jacob Luckenbach* sank nearly sixty years ago after a collision, 17 nautical miles from San Francisco, in 50 metres of water. The wreck, which for a time lay forgotten, had been steadily leaking oil from its cargo holds, killing over 50 000 seabirds between 1990 and 2003. Following a long search for the culprit, the source of the spills was eventually traced to the wreck, prompting the authorities to take action in 2002. The cost of the operation soared to US$20 million because of weather-related delays, the fact that the oil was in several different compartments, the viscosity of the oil (it had to be heated so that it could be pumped), the coldness of the water (approximately 5°C), the depth (55 metres), strong currents and poor visibility. The operation lasted ten months. Since there was no responsible party, the US$20 million cost was met by the National Pollution Funds Center. The wreck is now sealed.

5. Assessing the risks of potentially polluting wrecks: should operations be carried out on sunken wrecks?

27. The decision to salvage oil from a sunken wreck must be based on a sound risk assessment and a thorough cost-benefit analysis because any salvage effort is usually expensive, time-consuming and risky. The cost-benefit analysis should assess the potential environmental and biological impact of any pollution from the wreck as well as the socio-economic implications that such a spill might have for the coastal communities concerned.

28. Two considerations should be at the forefront of any decision to remove oil or the wreck itself:

– whether the potential environmental impact and risks posed by the oil outweigh the cost of the mitigation action;

– whether the combination of environmental risks, economic damage and social unrest that could be caused by repetitive spills of oil contained in the sunken vessel outweighs the cost of the mitigation action.

29. The primary difficulty with calculations of this kind is that evaluating the potential costs in terms of environmental damage is a complex process. It is easier to estimate the costs entailed in mounting the operation (cost of technologies, wages) than the costs associated with non-commercial losses (environmental integrity, protection of the landscape and coast, etc.).

5.1. Environmental risks associated with oil spills

30. Oil spills have an adverse impact on marine biodiversity and direct effects on the socio-economic balance of the affected region. The impacts of oil spills are as follows:

– physical and chemical alteration and even destruction of natural habitats, both short and long term;

– degradation of the ecosystem through smothering effects on the marine environment;

– lethal toxic effects on fish, plants and the aquatic environment as a whole;

– biological changes in marine animals (studies show that oil affects the immune system, fertility and metabolism of certain species); short- and long-term interruptions in the food chain;

– tainting of fish products, making them unfit for consumption. Risks for human health;

– damage to image in the case of tourist sites;

– sizeable economic losses for the fishing industry, temporary lay-offs and job losses. Fishing and the fishing industry account for over 400 000 jobs in Europe (European Union figures);

– fouling of boats and ports;

– temporary interruption of any marine-based industries.

31. In assessing the risk posed by a particular wreck, the following information needs to be assembled:

– description of the environment immediately adjacent to the wreck;

– modelling of the possible oil release scenarios and oil impact zones using oceanographic and meteorological data. This modelling should include the possible spill trajectory of the discharged oil and should also incorporate fluctuations of currents and tides;

– wreck location, orientation and distance to nearest coastline and sensitive habitats;

– information on the cargo types and their location including presence/absence of munitions and/or explosives;

– type of debris around the wreck site that may interfere with offloading operations or pose a safety hazard;

– description of the regional environment likely to be affected by a release of oil from the sunken wreck, including assessment of the risks to wildlife, habitats and marine and coastal resources within the region;

– description and assessment of the potential socio-economic impact of oil spills.

32. Assessing the environmental threat posed by sunken wrecks is no easy task. Each shipwreck is unique and needs to be handled on a case-by-case basis. One potentially useful option here would be to adopt European guidelines on the removal of wrecks that would take account of the various factors mentioned above in order to determine when a wreck should be removed.

5.2. Underwater graves

33. Most of the Second World War vessels that now lie at the bottom of the sea are also underwater graves for lost military personnel and civilians. These ships are not without owners and are often treated in the same way as military cemeteries on land. Removing such wrecks can be equivalent to grave robbing in the eyes of the military and their governments. Under no circumstances should the recovery of a wreck and the human remains on board take place without the specific and written consent of the country concerned.

34. It is necessary to preserve these wreck sites for their historical and cultural importance as well as for their status as war graves. When dealing with leakage, they should be therefore treated delicately. Multilateral agreements between governments need to be developed to control access to wreck sites, share confidential information and seize recovered artefacts in order to restrict the commercial exploitation of sites.

35. There are a number of such underwater graves. A notable example was the *HMS Royal Oak*, which was torpedoed and sank off the Orkneys in 1939 with all 833 men on board. The first battleship lost by the British in the Second World War, the vessel was carrying 3 400 tonnes of heavy fuel oil. Resting in 27 metres of water, *HMS Royal Oak* had been steadily leaking oil since its sinking. Aided by corrosion, the seepage grew to 1.5 tonnes per week and began to pose a threat to the local environment. There was considerable concern for the salmon and oyster fisheries, as well as the seals, sperm whales, otters and seabirds, and in 2004 it was decided that action must be taken. Because of the large number of casualties during the sinking, *HMS Royal Oak* remains one of Britain's largest war graves and, for this reason, the Ministry of Defence and the local community were reluctant to disturb the site. Only overriding imperatives of marine or environmental safety can justify moving war graves. In view of the risk posed, it was accordingly decided to drill directly into the wreck so that the oil could be pumped to the surface and stored. The operation cost several million pounds.

6. New shipping routes and future threats

36. There are indications that new shipping routes will open up in the Arctic and also intensify in the Mediterranean, both having extremely fragile and vulnerable marine ecosystems. An increasing amount of sea traffic is already beginning to move to the Northern Sea Route along the Siberian coast in the summertime, cutting the shipping distance between Europe, China and South-East Asia by a third. In 2007, Arctic sea ice shrank to its lowest ever level, opening for the first time the North-West Passage above Canada and Alaska.

37. This perspective opens up new economic opportunities and cuts fuel costs and carbon emissions, but it also raises important concerns about safety and pollution from oil and other toxic substance spills. A study commissioned by the Finnish Government in 2011 underlines that combating oil spills in icy water is almost impossible with current technology. Moreover, ships operating in or near the Arctic use advanced diesel engines that release black carbon into one of the most sensitive regions for climate change.

38. In the Mediterranean Sea, overall shipping activity has been rising steadily over the past ten years, bringing it among the world's busiest waterways that accounts for 15% of global shipping activity. Approximately 18% of global seaborne crude oil shipments currently take place within or through the Mediterranean. With the discovery of new oil and gas reserves in the Mediterranean Basin, shipping trends indicate further increase of traffic by 18% over the next ten-year period, while transits are expected to rise by 23%. Increase in traffic will be coupled with deployment of larger vessels, namely chemical tankers and container vessels calling in at the Mediterranean ports, and larger product and crude tankers for transit.

39. Furthermore, there is strong concern over the illegal disposal of toxic and radioactive waste transported on old vessels that have been deliberately sunk in the Mediterranean. In this respect, the rapporteur refers to the research carried out by World Wide Fund for Nature (WWF), Italy, and the environmental NGO Legambiente and to the report of Ms Angela Napoli, rapporteur on the issue for the Parliamentary Assembly of the Mediterranean.[4]

7. Recommendations

40. Taking the above into consideration, the committee proposes the following recommendations to be considered by the Assembly in its resolution addressed to the member States of the Council of Europe:

– sign and ratify the 2007 Nairobi International Convention on the Removal of Wrecks for all Council of Europe member States concerned;

– create a European database on wrecks, their location, cargo and pollution potential. This could be done in co-ordination with national maritime pollution bodies or within the framework of the Regional Sea Conventions – Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention") (1992, entered into force on 25 March 1998); Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean ("Barcelona Convention") (1976, amended in 1995); Convention on the Protection of the Marine Environment of the Baltic Sea Area ("Helsinki Convention") (1974, revised in 1992);

– carry out systematic assessments of wrecks to identify any that pose a threat to the environment. This information would need to be regularly updated (in particular data on corrosion rates). Better information about the wrecks located along Europe's coastlines could help to account for certain leaks that are sometimes wrongly attributed to illegal dumping of cargo. Time and resources are often wasted in the search for culprits (as in the case of the *SS Jacob Luckenbach* in the United States);

– support research in order to improve:

  - our ability to predict rates of corrosion and degradation of sunken wrecks for different conditions (water temperature, currents, etc.);

  - knowledge of the physical properties of oil in deep water, cold water and high-pressure seawater environments;

  - the technology of remotely operated underwater vehicles to reduce the cost of identifying and locating wrecks, as well as the cost of oil and/or wreck removal;

– consider setting up a European fund for old wrecks whose owners are neither available nor solvent. Such a fund could be used to meet the cost of investigating and treating wrecks that pose a threat to the environment.

4. Report on "Dumping of toxic and radioactive waste and human trafficking in the Mediterranean", PAM, First Standing Committee on Political and Security-Related Cooperation, adopted on 29 October 2010.