



MV X-PRESS PEARL

MEPA 2nd Interim Report of the Environmental Damage Assessment of
the X-PRESS PEARL – ITOPF Preliminary Review

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Executive Summary

The containership X-PRESS PEARL caught fire on 20th May 2021 and later sank 9.5 NM from Colombo Port, Sri Lanka on 2nd June 2021. At the time of the incident, the vessel was carrying 1,486 containers, as well as 305 m³ of bunker fuel. Of the containers on-board, 81 were classified as dangerous goods, while approximately 422 containers were carrying pre-production plastic pellets. On 26th May, large quantities of plastic pellets stranded on beaches due west of the vessel location. Shoreline pellet contamination was later observed on beaches across the west and southwest coasts of Sri Lanka. A shoreline response, coordinated by the Marine Environmental Protection Authority (MEPA), has been on-going since.

Following notification by MEPA and the shipowner, ITOPF technical advisers were mobilised to site on 26th May 2021. ITOPF operates on a not-for-profit basis and provides a wide range of technical services to back up its core role of responding to ship-sourced pollution incidents. ITOPF spent over 15-months providing advice to shipowner and government interests on spill response, environmental damage and claims and compensation. The advice ITOPF gives is objective and remains consistent, whether advising its members' interests or the government interests. ITOPF's advice is based on over 55 years of experience handling similar ship-sourced pollution incidents and sound scientific and technical principles.

ITOPF was requested to provide an objective assessment of the *2nd Interim Report of the Environmental Assessment of the MV X-PRESS PEARL Maritime Disaster (the '2nd Interim Report')* and its relevant annexes. The report was prepared by a local expert team and submitted by MEPA, via the Attorney General. The report sets out the methods for quantifying the overall claim for environmental damage as a result of the incident. The overall claim quantum is **USD 6,483,416,430.49** and covers aspects, *inter alia*, relating to air and water pollution, impacts to biota, fisheries related damages, clean-up and waste costs, monitoring costs and restoration costs.

The frameworks used to estimate and quantify claimed environmental damages appear to be based on the United States' Natural Resource Damage Assessment (NRDA) approach, and the Total Economic Value established under the Millenium Ecosystem Assessment Framework. MEPA, and its expert team, have therefore applied abstract and theoretical models, using use and non-use monetary values to quantify damages. For the purposes of ITOPF's critical analysis of the 2nd Interim Report, however, ITOPF has based its assessment on the criteria and principles set out under 1992 CLC and Fund Conventions, as well as the 2001 Bunkers convention for environmental damage claims and post-spill assessments and restoration. In addition, each component has been assessed based on the technical and scientific merits of the methods and analyses presented.

For almost all components, claims for damages have not been substantiated by robust scientific evidence demonstrating an actual impairment to the environment as a result of the X-PRESS PEARL incident. Although it is understood that environmental samples have been collected and analysed, the results of these analyses have not been provided that back-up many of the claimed impacts. Moreover, the claimed costs for each component are based on abstract and theoretical models which would not be considered admissible under the international regime for claims and compensation. Where claims for compensation may be admissible, insufficient supporting evidence has been provided.

ITOPF recommends that, for all components, the Government of Sri Lanka liaises directly and openly with the shipowner, and its experts, to address potentially admissible claim items.

Introduction

The containership X-PRESS PEARL (IMO 9875343; GT 30,911) caught fire on Thursday 20th May 2021 while at Colombo anchorage, Sri Lanka (7°04'17.6"N, 79°45'27.6"E), after arriving from Hazira, India. Despite efforts by the Sri Lankan Coast Guard and international salvors to control the blaze, the fire gradually spread, and the vessel's superstructure was engulfed. During attempts to tow the vessel to deeper waters, the vessel sank on 2nd June 2021, approximately 9.5 NM from Colombo Port.

It is understood that at the time of the fire, X-PRESS PEARL was carrying 1,486 containers, 81 of which were declared as dangerous goods. In addition, she carried 255 m³ of Very Low Sulphur Heavy Fuel Oil (VLSFO) and approximately 50 m³ of Marine Gas Oil (MGO). Hours after material was first reported to be spilled from the vessel, debris began stranding on the shoreline, mostly consisting of large volumes of pre-production plastic pellets.

ITOPF was first notified of this incident by the Sri Lankan Marine Environment Protection Authority (MEPA) on 25th May 2021. Following the deterioration of the ship and the spillage of container contents on 26th May, ITOPF was mobilised and arrived onsite on 2nd June.

ITOPF Background

ITOPF operates on a not-for-profit basis. It provides a wide range of technical services to back up its core role of responding to ship-sourced pollution incidents. Since its establishment in 1968, ITOPF has responded to over 850 incidents globally, involving spills of oil, chemicals and other products (e.g., plastic pellets). The five key services that ITOPF offers are spill response, claims analysis & damage assessment, contingency planning and advisory work, training and education and information.

ITOPF's services are provided to its members (tanker owners) or associates (other shipowners) and their pollution insurers (normally one of the Protection & Indemnity (P&I) Clubs). ITOPF also offers its services at the request of governments, intergovernmental organisations (such as International Maritime Organisation (IMO)) and the International Oil Pollution Compensation (IOPC) Funds, as well as other affected stakeholders and affected community members.

During ship-sourced pollution incidents, ITOPF's role is purely advisory. The organisation does not own any specific spill response equipment, neither does it fund a response or any related environmental impact assessments. The advice ITOPF gives is objective and remains consistent, whether advising its members or the government. ITOPF's advice is based on over 55 years of experience handling similar ship-sourced pollution incident and sound scientific and technical principles.

ITOPF remained on-site in Sri Lanka for almost 15-months to provide technical advice to the Sri Lankan authorities, contracted response organisations, salvors and appointed environmental specialists. After demobilising in May 2022, ITOPF continued to work remotely on all aspects of the case. ITOPF has subsequently returned to Sri Lanka on several occasions to provide advice to the aforementioned stakeholders. The last mobilisation to Sri Lanka was in August 2024 to assess the on-going shoreline clean-up operations. In total, ITOPF has spent around 563 person-days on-site in Sri Lanka.

During its time in Sri Lanka, ITOPF provided objective technical and scientific advice to the shipowner and government interests. This included aspects such as shoreline clean-up, salvage operations, environmental damage assessments, fisheries impacts and claims and compensation. ITOPF met with government agencies on a daily basis to ensure that international best practice was being followed

and endeavoured to promote close collaboration between the shipowner and the government of Sri Lanka. ITOPF demobilized from site when the organisation considered no further advice was considered useful to the Sri Lankan government. ITOPF continues to provide advice to its member, as well as the Sri Lankan government, when requested.

Key Incident Events

Due to the complicated nature of the incident, almost every aspect of a shipping related incident was covered, including wreck removal, multiple forms of pollutants, extended and protracted shoreline clean-up, waste disposal, fisheries related impacts and environmental impact assessments. For relevant context, a brief summary of ITOPF's understanding of each stage of the incident is provided in the subsequent sections.

Salvage and Wreck Removal

SMIT was originally appointed by owners to assist with firefighting and salvage operations. Firefighting activities were carried out by SMIT and the Indian Coastguard from 20th May to 2nd June 2021. Despite best efforts, the vessel sank 9.5 NM north west of Colombo Port, Sri Lanka. Subsequently, Resolve was appointed for wreck caretaking duties and Shanghai Salvage Company was appointed by Owners to carry out wreck removal activities. The X-PRESS PEARL wreck was officially removed in February 2023.

Oil Spill

At the time of the incident, the vessel was carrying 255 m³ of Low Sulphur Heavy Fuel Oil (LSHFO), 43 m³ of Marine Gas Oil (MGO), and 52 m³ of lube oils. The majority of LSHFO was considered to be incinerated in the ship's fire with only residues remaining in the fuel tanks. Notwithstanding, a sheen of non-persistent oil emanated from the wreck for several months, with a slick extending up to 14 km from the wreck at its maximum size. No observations were made of the surface slick reaching the shoreline. Oil Spill Response Limited (OSRL) were appointed by the shipowner to provide oil spill contingency measures, until it was demonstrated no risk of significant risk remained. Despite the continuous slick emanating from the vessel during the beginning of the incident, no shoreline impacts were observed. An *Oil Pollution Risk Assessment* was submitted by ITOPF to the government and shipowner.

Debris Removal

Following the incident, large numbers of containers remained unaccounted for and were considered to have burnt or sunk. Sub-surface surveys, later conducted by the National Aquatic Resources Research and Development Agency (NARA), the Indian Coastguard and DEEP, were used to identify the location of sunken material on the seabed which was potentially related to the incident. Resolve Marine were contracted by the shipowner to complete the recovery of all sunken waste believed to be related to X-PRESS PEARL in waters deeper than 10 m. This work was completed on 6th March 2022. Additional subsurface surveys along the shoreline (waters <10m deep) were completed by NARA in May 2022 identifying 41 potential targets related to X-PRESS PEARL. Dive surveys completed by 16th May 2022 revealed none of these targets to be related to the incident. The debris removal was closely monitored by MEPA and officially signed off upon completion.

Shoreline Clean-up

Debris from the X-PRESS PEARL began washing ashore on 26th May 2021 and consisted mostly of large quantities of the pre-production plastic pellets. The nature and magnitude of this type of shoreline contamination was unprecedented and resulted in a large-scale shoreline clean-up effort by the Sri Lanka authorities. Based on shoreline surveys, it was estimate that, initially, around 30 km of coastline experienced heavy contamination, while over 300 km of coastline has been affected by plastic pellet contamination to some extent.

As mandated by the Sri Lankan Marine Pollution Prevention Act, No. 35 of 2008, shoreline clean-up activities were coordinated by MEPA. In the first instance, shoreline clean-up was carried out by the Sri Lanka tri-forces and the Civil Security Force. OSRL was appointed by the owners to assist shoreline clean-up operations, but was later demobilised. ITOPF remained on-site to provide additional technical advice based on its past experience dealing with spills of plastic pellets.

Given the continued presence of plastic pellets along the coastline of western Sri Lanka, shoreline clean-up continues to be managed by the MEPA. The current workforce, however, now consists of around 100 -150 local community workers manually collecting plastic pellets daily. The shoreline clean-up is solely managed by MEPA, with the reasonable costs of cleaning the beaches submitted to the shipowner for compensation. MEPA remains the entity responsible for hiring and paying the community workers involved in the response. The shipowner has no involvement in managing the response and does not directly pay the community workers.

Due to operational limitations in the shoreline response, which may have unnecessarily increased prolonged presence of contamination, additional proposals were submitted in December 2022 and October 2023 by owners for the response to be completed by professional contractors. The response, however, remains under the control of MEPA at the time of writing and, based on ITOPF's experience and observations, falls short of being a fully effective operation.

Waste Disposal

All recovered subsurface debris were landed at Colombo Port. Wattala storage yard was established by Resolve Marine to process recovered material for disposal within Sri Lankan facilities. However, despite the development and submission of all necessary waste processing permits, the disposal has, up until recently, been unreasonably delayed by Sri Lankan authorities.

The shoreline response has recovered over 2,000 one-tonne 'big bags' of waste varying in composition in terms of sand/nurdle mix. Waste continues to be collected daily and is being stored at a warehouse in Pamunugama. This waste remains unsorted because the necessary licenses have not been provided by the competent authority, causing further unnecessary delays. The shipowner appointed waste management consultants, D3, have submitted comprehensive waste management and sampling protocols, but these proposals have not been acted upon for several months.

Fisheries Restrictions and Economic Losses

As a result of the incident, fisheries restrictions were implemented by the Ministry of Fisheries (MoF) across districts of Kalutara, Colombo and Gampaha. Restrictions were reasonably imposed as a precautionary measure to protect fishers from interacting with sunken debris and, initially, to prevent

potentially contaminated seafood being consumed by the public. The ban was implemented on 25th May 2021 and eventually lifted on 5th June 2022.

To date, it is unclear if any seafood safety analysis was carried out by the relevant authorities. ITOPF understands that fish samples were collected, but no results of any analyses were shared.

Throughout the salvage works ITOPF worked closely with the salvors to submit recommendations to MoF to allow reductions in fishing bans as underwater debris was recovered. This was intended to reduce negative impacts to the local fishing community. Three recommendations were made, in October 2021, in January 2022 and finally in May 2022 when it was suggested the entire ban be lifted except for a 1 km exclusion zone around the vessel.

As a result of the extended fishing ban, economic losses were incurred by effected communities. Consequently, the MoF submitted claims against the shipowner for losses incurred by direct and indirect fishers.

To effectively assess these claims, the shipowner appointed an independent fisheries consultancy – MRAG Ltd - to carry out a fisheries characterisation study. A rapid pilot study was completed in 2021, followed by a comprehensive study in January to April 2022. MRAGs work identified the level of economic impact to various fishing sectors due to the fishing restrictions associated to the incident. This study was presented to the MoF in May 2022 and was used to assess all fishing claims. At the time of writing, several compensation payments have been made to the MoF based on these claims assessments, who were acting on behalf of the impacted fishing community.

Environmental Impacts Assessments

ITOPF understands that MEPA appointed a local expert team to carry out environmental monitoring activities and to prepare a report on the environmental damage assessment of the X-PRESS PEARL incident. The local expert team was co-chaired by Professor Ajith de Alwis (University of Moratuwa) and Prasanthi Gunawardene (University of Sri Jayawardenapura). The expert team was reported to be assisted by forty additional experts. These experts have been liaising with state authorities such as MEPA, NARA and the Wildlife and Conservation Department (WCD) in the collection and analysis of samples in connection to the incident. ITOPF also understand that samples were sent to international research agencies for analysis, these agencies include, *inter alia*, the Centre for Environment, Fisheries and Aquaculture Science (Cefas) (UK), Cedre (France), and Universities in Italy and India.

During the 15-months ITOPF were on-site, its technical advisers regularly advised MEPA to involve the shipowner and its experts in discussions regarding environmental monitoring to avoid any contestation of results and queries surrounding future claims. ITOPF was only able to meet with a few members of the expert team, but overall, no results were shared with ITOPF or the shipowner, while close collaboration was strongly endorsed by ITOPF. ITOPF continues to recommend joint approach between shipowner and government interests are followed towards environmental monitoring.

Following concerns over damages to coral reefs in the vicinity of X-PRESS PEARL, the shipowner appointed a coral reef expert to work closely with MEPA to assess potential impacts. Despite operational challenges, a joint assessment of reported areas of coral reefs within the debris affected area was conducted by Seaground in January 2022. Minimal live coral was found in the area and a report was submitted to MEPA on January 11th 2022. It is understood that MEPA and NARA have

continued to survey local reefs outside the affected area, the results of this work are also undisclosed to other parties outside the government.

ITOPF has repeatedly asked for, and been promised, access to the sample analysis results to correctly understand the actual impacts and risks of the incident and to guide an appropriate response measure. No information was shared until the submission of the 1st and 2nd Interim reports and its annexure, two and a half years after the initial incident. A summary of the advice given to government agencies is provided below.

ITOPF Advice Given

ITOPF remained on-site for almost 15-months to provide technical advice to the Sri Lankan authorities, contracted response organisations, salvors and appointed environmental specialists. ITOPF provided advice to government agencies on oil spill response, shoreline clean-up, waste disposal, environmental monitoring, fisheries impact, and claims and compensation.

For several months, ITOPF met with MEPA on a regular basis to advise them on international best practise and to closely collaborate with the shipowner to achieve the best outcomes. In particular, ITOPF has, and continues to, recommended that shoreline clean-up is moved from a government led response to a contractor led response. Proposals for clean-up by a professional clean-up contractor, paid for directly by the shipowner, have been submitted on three occasions but, to date, have not been accepted.

ITOPF also met with, *inter alia*, the Attorney General's department, the Ministry of Coast Conservation and Low-Lying Lands Development, the MoF and the NARA. ITOPF, on multiple occasions, has advised the relevant government agencies on international best practise with regards to environmental damage, post-spill studies, restoration and claims and compensation. A summary of ITOPF advice on environmental monitoring was submitted to the shipowners' counsel on 3rd August 2023.

ITOPF has also provided advice to its member in relation to the assessment of claims for clean-up and fisheries losses, as well as the implementation of independent damage assessments. Further, ITOPF has advised its member regarding the appointment of other experts for the fisheries assessment, potential impacts to coral reefs and general environmental damage assessments.

Ship-Sourced Pollution Compensation; National Legislation and the International Insurance and Compensation Regimes

Recovery of costs incurred due to a discharge of pollution from a ship should be based on the statutes within the jurisdiction where damage or loss is incurred. Coastal states, therefore, should have the necessary legislation in place to govern liability and compensation following a ship-sourced pollution event.

Claims and Compensation for Ship-Sourced Pollution Damages

The X-PRESS PEARL incident involved the discharge of oil, hazardous and noxious substances (e.g., nitric acid) and other non-hazardous consumer goods (e.g., plastic pellets). Due to the fire on-board, oil pollution originating from the vessel's bunkers was limited to non-persistent sheen which dissipated naturally with no shoreline impacts observed or recorded. Pollution damage from the

vessels' HNS cargoes have not been demonstrated. Physical shoreline contamination by significant quantities of plastic pellets has been widely observed and recorded, while the potentially associated toxicological impact has not been demonstrated.

Oil Pollution Damage

Compensation for oil pollution damage caused by spills from tankers and non-tankers (i.e., bunkers) is governed, in signatory states, by an international regime developed under the auspices of the International Maritime Organisation (IMO). For tankers, the framework for the regime is the 1992 International Convention on Civil Liability for Oil Pollution Damage (1992 Civil Liability Convention (CLC)) and the 1992 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (1992 Fund Convention). For spill of bunkers, the applicable framework is the 2001 International Convention on Civil Liability for Bunker Oil Pollution Damage (2001 Bunkers Convention). The convention is modelled on the CLC Convention. The 1992 CLC governs the liability of shipowners for oil pollution damage by laying down the principle of strict liability for shipowners and creating a system of compulsory liability insurance.

The 1992 CLC, 1992 Fund and 2001 Bunkers Conventions cover pollution damage, which is defined as:

'..loss or damage caused outside the ship by contamination resulting from the escape or discharge of oil from the ship, wherever such escape or discharge may occur, provided that compensation for impairment of the environment other than loss of profit from such impairment shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken.'

It should be noted that, although Sri Lanka was not a signatory to the Bunkers Convention (2001) at the time of the incident, to ensure a consistent and fair approach, ITOPF utilises the principles of the international conventions across all cases. These guidelines outline international best practice, have been used and adopted by many nations, and overwrite national legislation when adopted. Sri Lanka is a signatory of the 1992 CLC and Fund Conventions and therefore recognises the application of principles for ship-source pollution incidents.

Under these conventions, compensation may be payable for the costs of reasonable reinstatement measures aimed at accelerating natural recovery of the environmental damage that is caused by an oil spill. Contributions can be made to the costs of post-spill studies provided that they relate to 'damage' as defined by the conventions. This can include studies to establish the nature and extent of environmental damage caused by an oil spill and to determine whether or not reinstatement measures are necessary and technically feasible. Under the IOPC Fund guidelines, compensation is not paid for claims of environmental damage based on an abstract quantification calculated in accordance with theoretical models. Nor would compensation typically be paid for damages of a punitive nature on the basis of the degree of fault of the shipowner.

Claims for reasonable costs of studies to determine the nature, extent and duration or threat of environmental damage and to monitor recovery both occurring naturally and following the implementation of reinstatement measures, are provided under 1992 CLC, 1992 Fund and 2001 Bunkers Conventions. Claims are subject both to general admissibility criteria and specific conditions for environmental damage.

Under the 1992 CLC, 1992 Fund and 2001 Bunkers Conventions, the general requirements for admissible claims for environmental damage are as follows:

- Claims will be paid for damage caused as a result of contamination by (persistent) oil and costs of preventive measures where there has been a grave and imminent threat of pollution damage.
- Compensation for impairment of the environment, other than loss of profit from such impairment, shall be limited to costs of reasonable measures of reinstatement actually undertaken or to be undertaken.
- There must be a close link between the contamination and the costs claimed.
- All claims should relate to measures that are reasonable and justified.
- Claimants must prove how much they have spent, or in the case of claims for reinstatement to be undertaken, will spend, and must provide information to support this.
- The expense must have actually been incurred or, in the case of environmental damage for reinstatement measures yet to be undertaken, a firm commitment to incur the expenditure must have been given.

The specific criteria for environmental post- incident studies are as follows:

- The scope of the study should be directed towards establishing the grave and imminent threat of damage, the nature, extent and likely duration of any damage that has occurred, and monitoring the recovery of damaged environments. Elements of the study might also be included to determine the necessity and feasibility of reinstatement measures. It should not be for general scientific interest.
- The scale of the study should be in proportion to the extent of the contamination, the likely effects of that contamination and the benefits achieved through reinstatement. The timing of studies should aim to avoid unnecessarily delaying those benefits.
- The study must provide reliable and useful information and should avoid repeating previous work or duplicating other ongoing studies or projects.
- The study should be carried out with professionalism, scientific rigour, objectivity and balance, that is, studies should follow principles of sound scientific investigation.
- The progress of the study should be monitored and the results clearly and impartially documented.

The specific criteria for reinstatement measures are as follows:

- The measures should have the aim of re-establishing the biological community in which the organisms' characteristic of that community at the time of the incident are present and are functioning normally, that is, the measures should be aimed at enhancing the recovery of the damaged component of the environment.
- The measures should have a realistic prospect of significantly accelerating the natural process of recovery and should be based on sound scientific principles. The measures should seek to prevent further damage as a result of the incident.
- The measures should, as far as possible, not result in the degradation of other habitats or in adverse consequences for other natural or economic resources.
- Measures taken at some distance from, but still within the general vicinity of, the damaged area may be acceptable so long as it can be demonstrated that they would actually enhance the recovery of the damaged components of the environment and the services that those components provide.

- The link between the measures taken and the damaged component of the environment is essential.
- The measures should be technically feasible.
- The costs of the measures should be in proportion to the extent and duration of the damage and the benefits likely to be achieved.

For oil pollution, in countries that are party to the 1992 CLC, 1992 Fund and 2001 Bunkers Conventions, the above criteria and principles form the basis for the assessment of admissibility in relation to post-spill studies and reinstatement project claims.

Hazardous and Noxious Substances Damages

Compensation for spill of hazardous and noxious substances will be governed by the 2010 Hazardous and Noxious Substance Convention (HNS) 2010. Although the 2010 HNS Convention has still not entered into force, it will provide the framework for ensuring that shipping and HNS industries provide compensation for those who have suffered loss or damage resulting from an HNS incident.

For the 2010 HNS Convention, the principles underlying claims for environmental damage and reinstatement will be the same as for the 1992 CLC, 1992 Fund and 2001 Bunkers Conventions. As such, the same criteria set out above will form the basis for assessment of admissibility in relation to post spill studies and reinstatement project claims.

Until such time as this comes into force, it is understood that third-party damages related to HNS would fall under national regulation.

Plastic Pellet Damages

There are currently no specific conventions relating to the recovery of costs incurred as a result of a discharge of plastic pellets from a ship. As such, ITOPF understands that requirements for clean-up and compensation will, therefore, be subject to the domestic law of Sri Lanka.

In the absence of an applicable framework for spills of plastic pellets, the guiding principles set out under the 1992 CLC and Fund Convention would be used as a proxy for the assessment of admissibility and reasonableness in relation to the clean-up of plastic pellets, to post-spill studies related to impact assessment and to any reinstatement measures that were deemed suitable, beneficial and technically feasible.

The Marine Pollution Prevention Act

The Marine Pollution Prevention Act, No. 35 of 2008 is a Sri Lankan law that aims to reduce, control, and prevent pollution in the country's marine environment. The Act aims to protect Sri Lanka's waters from pollution by controlling pollution from ships, ports, harbours, and offshore petroleum exploration projects. The act imposes both civil and criminal liabilities for offenders. The act is administered by the MEPA.

Sri Lanka is a Party to both the 1992 CLC and the 1992 Fund Convention and is enshrined within national law. For oil pollution damage from a tanker, Sri Lanka's claims would, therefore, be assessed based on the criteria and principles of these frameworks.

For the purposes of this report, given it is assumed that the government of Sri Lanka recognises the criteria and principles defined under the aforementioned conventions; these principles are applied for the Sri Lankan environmental damage claims.

MEPA Environmental Damage Assessment Framework

The objectives of the environmental damage assessment team are defined in the 2nd Interim Report as ‘realizing a value for the entire set of environmental aspects identified’. In attempting to do this, the assessment team have applied a number of theoretical modelling approaches which attempt to assign potential financial losses or damages to a number of environmental components. The environmental components and associated valuation approaches used to predict potential damages, losses or costs are summarised in Table 1 below.

Table 1 – Summary of valuation methods applied for each assessment item.

Item	Valuation Method
Oil Spill Damage	Based on US Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM)
Nitrogen Added to Ocean	Based on benefit transfer method – using ‘damage cost of eutrophication related to nitrogen’ for the Baltic Sea.
Air Pollution-Human Health Impacts	Based on benefit transfer method – using estimated costs of certain emissions from literature. Value of a Statistical Life (VSL) used for dioxins and furans.
Turtle Damage	Based on assessment of losses to turtle related income generating activities (e.g., turtle nest viewing) and contingent valuation for non-use values, i.e., willingness to pay (WTP).
Impacts on Whales	Based on estimated value of carbon sequestered by a whale over its lifetime.
Microplastic Related Damages-Fisheries	Based on a hypothesised 2% loss in fish export value resulting from the incident as derived from literature.
Microplastic and Chemical Related Damages-Fish Consumers	Based on an estimate derived via in-person and household telephone surveys.
Microplastic Related Damages-Beach Users	Based on a Willingness to Pay (WTP) survey of beach users.
Fisher Livelihoods	Based on estimated production losses (and livelihood losses) associated with the fishing ban.
Incurred Costs (Inc. Future)	Based on estimated incurred costs (to date and future) by relevant Agencies and Authorities responding to the incident. Includes estimated future waste treatment costs.
Monitoring	Based on a combination of incurred and proposed environmental monitoring costs.

In the broadest sense, if the assessment results detailed in the report are used to support the submitted claims, the majority of the items would be considered inadmissible in the context of the

international Convention framework (as detailed above). This is because under the relevant Conventions, *'compensation is not paid in respect of claims for environmental damage based on an abstract quantification calculated in accordance with theoretical models'*. Each of the assessments listed in Table 1, is a theoretical model that determines abstract values.

The MEPA 2nd Interim Report provides an account of Natural Resource Damage Assessment (NRDA) related to the X-PRESS PEARL ship accident. Whilst an element of 'environmental valuation' underpins the initial steps applied when undertaking NRDA, subsequent steps require the predicted losses or damages calculated to be evidenced as having actually occurred through the provision of sufficient, scientifically robust empirical evidence. Moreover, the main purpose of a NRDA is not to simply identify and quantify potential environmental loss but, instead, to determine the appropriate type and amount of restoration needed to offset impacts to, for example, fisheries, wildlife, habitats, and human uses impacted by an incident. As such, NRDA is described by the National Oceanic and Atmospheric Administration (NOAA) as *'a legal process that federal agencies (like NOAA) use to evaluate the impacts of oil spills, hazardous waste sites, and ship groundings on public natural resources'*. Even within the relatively mature framework and regime applied in the US (underpinned by the Oil Pollution Act), fulfilling the evidence requirements at each stage of an effective NRDA presents a number of challenges. For example, in carrying out a NRDA, NOAA have identified their responsibilities as:

- 1) National Oceanic and Atmospheric Administration
- 2) Carrying out a **preliminary assessment** to determine whether any damages have occurred. Scientists may collect data, review scientific literature and use mathematical models to help predict the effects of an incident;
- 3) Carry out an **injury assessment and restoration planning**, during which actual losses or damages are quantified through specific scientific and/or economic studies, and then identify potential restoration projects to offset the losses;
- 4) Where required (i.e., where sufficient evidence of an actual environmental loss or damage has been provided) and where effective and technically feasible restoration measures have been identified, proposed and agreed for implementation, the **restoration project** would be implemented.

In terms of the NRDA process applied by MEPA, as detailed in the 2nd Interim Report, stage one of the NRDA process appears to be in development in that some theoretical approaches have been applied to inform a preliminary assessment to determine whether any damages have potentially occurred as a result of the incident. However, significant follow-on studies will be required to substantiate these predicted losses as; 1) having actually occurred, and; 2) being specifically caused by the X-PRESS PEARL incident – i.e., through collection and interpretation of the necessary scientifically robust empirical data and evidence.

Not only does Sri Lanka not have the legal framework to support utilisation of the NRDA process, but in this instance, it has not been carried out in the correct manner, yet the results are reported as if it has been fully completed.

Report Objectives and Overview

In this review document, ITOPF aims to provide an overview and preliminary evaluation of the technical reasonableness of the claims presented by MEPA in the report *'2nd Interim Report of the*

Environmental Damage Assessment of MVXP Maritime Disaster (1st Interim Report with Addendum) Internal Draft 09Jan23'. The 2nd Interim Report makes reference to nine annexes which detail various technical reports and further information for the claim. The nine annexes were received on 26th February 2024, while the 2nd Interim Report was received by ITOPF on 30th July 2024.

Prior to this evaluation report, ITOPF produced a report for the owners summarising a review of the materials contained in the nine annexes. This report is called 'XPRESS_PEARL_EnvironmentalDamageReports_ITOPF-Comments_15032024' and was submitted to owners on 15th March 2024. This initial report contains more information and analysis of the annexes submitted and can be used in conjunction with this report to review the full claim from MEPA for environmental damages.

An earlier report submitted by MEPA to the owners on 3rd September 2021 called '1. Interim Environmental Damage Assessment Report - 03.09.2021' outlines the initial assessment and details analysis that was conducted in the early phase of the incident. This report ('1st Interim Report') should be considered alongside the 2nd Interim Report as it does not contain any claim calculation, but gives some technical context to the claim compiled in the 2nd Interim Report.

ITOPF has considered the 2nd Interim Report as a claim for compensation for damages to the environment and reviewed it as such. ITOPF has not considered the report as an indication of punitive measures relating to environmental fines. Should MEPA wish to consider this as an environmental fine it should present the information clearly as such. ITOPF will be unable to provide a review as fines constitute a legal matter and are not based on scientifically justified technical criteria, and hence falls outside of ITOPF's remit.

ITOPF's review is formatted such that each item in the 2nd Interim Report that contributes to the total claim of **USD 6,483,416,439.40** is considered separately and the technical rationale are reviewed. ITOPF has used its wealth of experience in other incidents around the world, as well as the technical expertise and scientific background of staff, to provide a preliminary evaluation. ITOPF has also used knowledge of claims previously submitted by the government of Sri Lanka for items such as clean-up costs, direct and indirect fisheries costs, fishing equipment costs, supervision of wreck removal activities and claims associated with the waste operations.

ITOPF has spent a cumulative 563 person days from 2021 to 2024 in Sri Lanka working on the X-PRESS PEARL incident, alongside MEPA, with five staff members involved in the project. As such, ITOPF has been heavily involved in many aspects of the incident, has seen much of the impact and is very familiar with the areas involved in the response. ITOPF's role has also involved speaking to claimants and visiting organisations and businesses reportedly impacted by the incident. This knowledge and experience have been drawn upon in our review of the 2nd Interim Report.

The quantum of the claim is shown in Table 2. The 2nd Interim Report contains claims for compensation for a wide range of items related to perceived damage to the environment. Details for many of the claim items are provided in the associated annexes one to nine, but other information can also be found in the 1st Interim Report. Many of the items claimed do not have any associated documentation to support the claim being made.

Table 2 – Summary of the Environmental Damage Cost Estimated by the Government of Sri Lanka

Item	Description	Claim Value (USD)
Damage Cost of Oil Spill	Socio-economic and environmental damages using BOSCEM model	58,459,868.00
Damage Cost of Nitrogen Added to the Ocean	Reactive nitrogen added to the ecosystem from the ship accident, firefighting chemicals and air pollution	56,875,158.64
Damage Cost of Air Pollution – Human Health Impacts	Damage cost due to the pollution load that reached the land during the ship fire	15,657,246.00
	Damage costs due to the dioxin and furan	46,534,716.00
Damage to Turtles and the Associated Economic Losses	Lost viewing value of female turtles. Present value of the total losses for 110 years (discount rate @3.5%)	4,298,415,643.00
	Lost non-use values of turtles	38,380,000.00
Impact of Whales	Lost values of ecosystem services performed by whales	35,100,000.00
Microplastic Related Damage Costs	Microplastic related damage costs to fishery industry	1,286,380,000.00
Cost to the Fish Consumers	Total losses to the households due to reduced fish consumption for a six-month period	307,713,600.00
Cost to the Beach Users	Cost to beach user households for a two-year period	3,857,327.00
Direct Losses to Fishery	Production loss of fisheries industry due to fishing ban	186,200,000.00
Impacts on Fisheries Livelihoods	Income losses for fishery and related livelihoods	1,960,538.61
Incurred Costs	Incurred costs for the institutions and for the damage assessments	7,559,948.58
Future Costs	Related to shoreline clean, waste disposal etc	23,552,844.06
Monitoring Costs	Proposed areas of monitoring and their costs	104,600,524.60
Restoration Costs	Proposed areas of restoration and their costs	12,169,025.00
Total		6,483,416,439.49

Damage Cost of Oil Spill

Using the BOSCEM model, the MEPA have estimated a damage cost of **USD 58,459,868.00** related to the oil spill. However, there were no observations of significant volumes of oil spilled at sea, or along the shoreline, during or following the X-PRESS PEARL incident. Indeed, under Table 3 of the 2nd Interim Report, MEPA states that *'so far, [the] oil slick was allowed to naturally disperse, and no response strategy was employed'*, therefore recognising the natural weathering processes involved.

At the time of the incident, relatively small amounts of sheen were observed emanating from the vessel, however it is recorded that the sheen dissipated quickly to unobservable levels. No shoreline oil was observed and critically no oil spill response activated, despite specific resources being deployed to country. Any persistent oil onboard the vessel at the time of the incident (bunker fuel) was

understood to have burnt in the fire. As a precautionary measure, OSRL were mobilised to site by the ship owner to monitor the situation and respond in the event of a release of oil. Due to the absence of oil observed no response was activated by OSRL.

As such, costs and losses claimed associated with an oil spill (originating from the X-PRESS PEARL) are not substantiated by the necessary empirical evidence. Firstly, there were no observations of persistent oil being spilled from the vessel, and no associated clean-up costs generated nor socioeconomic and/or environmental impacts reported. Furthermore, the estimated costs calculated are developed using a theoretical modelling approach (based on the US Environmental Protection Agency (EPA) Basic Oil Spill Cost Estimation Model (BOSCEM)) which are not substantiated by sufficient empirical data. There is, therefore, nothing to demonstrate or prove that these theoretical suggested damages actually occurred.

Damage Cost of Nitrogen Added to the Ocean

MEPA have estimated the financial cost implication of the damage caused by adding nitrogen to the environment is **USD 56,875,158.64**. An evaluation of the calculation used to reach this conclusion demonstrates a large number of assumptions, and estimations have been applied that are not considered technically justifiable.

The amount of nitrogen entering the waters from the ship's cargo is calculated from urea, nitric acid and food items on board the ship using the percentage weight nitrogen from the molecular formula. Where food items are also included it is unclear how the weight of nitrogen has been calculated from the overall item, however MEPA suggest that food items have a nitrogen content of 44.95%. ITOPF considers this to be unrealistic and unreasonable figure based on the normal composition of food stuffs which is mostly carbohydrate and does not contain any nitrogen. The total nitrogen reported by MEPA to have been discharged from the X-PRESS PEARL cargo is the upper possible figure reported as 1,740.99 Tonnes.

ITOPF considers that this is an unreasonable approximation because much of the nitric acid would have decomposed into nitrogen oxides upon exposure to the high temperatures in the fire on board. It is also not a reasonable figure because the nitrogen in urea is organic in nature and hence would not have the same behaviour or impact as nitric acid. Similarly, the urea would decompose above 133°C into various compounds and dissipate into the atmosphere.

Studies in the region have shown that dissolved inorganic nitrogen (DIN) flux can be as high as 952 kg N km⁻² month⁻¹ for the watershed of the Krishna River in India (Sinha et al, 2022). Using this as a comparative value for the Kelani River watershed in Sri Lanka (2,292 km²) the equivalent value for monthly nitrogen input into the sea would be approximately 2,181.98 Tonnes N km⁻² month⁻¹. This is considered a large underestimation for the area due to the other watercourses and water bodies such as the Ja-Ela River and the Negombo lagoon, the Maha River and many of the minor watercourses that flow into the sea in this region. This also does not account for the considerable input of sewage waste from the cities of Colombo and Negombo and does not consider other organic forms of nitrogen. Hence, ITOPF considers two key principles in relation to this point are key; firstly, that the estimated value of 1,740.99 Tonnes is grossly overestimated and unjustifiable figure; however secondly, even if this figure were true, it would not cause a variation beyond that which occurs naturally during floods after heavy rainfall from background sources of nitrogen entering the sea near the incident site.

A second table (Table 8) in the 2nd Interim Report claims that nitrogen was also added to the ocean from atmospheric emissions and from firefighting materials. It is not specified how the total quantity (1.83 Tonnes) of firefighting chemicals was established, nor does it specify how the emitted NOx (nitric oxide (NO) and nitrogen dioxide (NO₂)) was calculated or where this NOx specifically came from. The report further assumes that the NOx is split between NO (70%) and NO₂ (30%), which appears to be arbitrary and ITOPF understands this can vary greatly depending on the source of the NOx. ITOPF considers that none of these values for other sources of nitrogen are demonstrated empirically nor can they be reliably justified.

When considering the impact of the nitric acid and whether potential changes in pH may have been likely, it is useful to consider the context of the nearby area. The approximate area impacted by the fishing ban was 510 km², with an average approximated water depth of 18 m. The approximate volume of water in this area is around 9.14 billion m³. The addition of 28.7 Tonnes of 70% nitric acid to a water body of this size will have a negligible effect given it is miscible and would rapidly dilute in the water body. This can be demonstrated using simple mathematics and chemistry equations for pH in pure water. When the effects of currents, metocean conditions, river outflow and the natural buffering effects of the ocean are considered, any potential drop in pH would be extremely localised and rapidly diluted, subsequently the effects would be considered negligible.

It is notable that no empirical data has been provided to demonstrate that nitrogen levels were higher than before in the vicinity of the incident, which is critical information to substantiate in order to assert some damage has been caused. As per the water sampling locations (Figure 1) included in the 2nd Interim Report, ITOPF understands that samples have been collected and, therefore, analyses results should be available but it is not clarified exactly what analyses have been carried out and no results are shared.

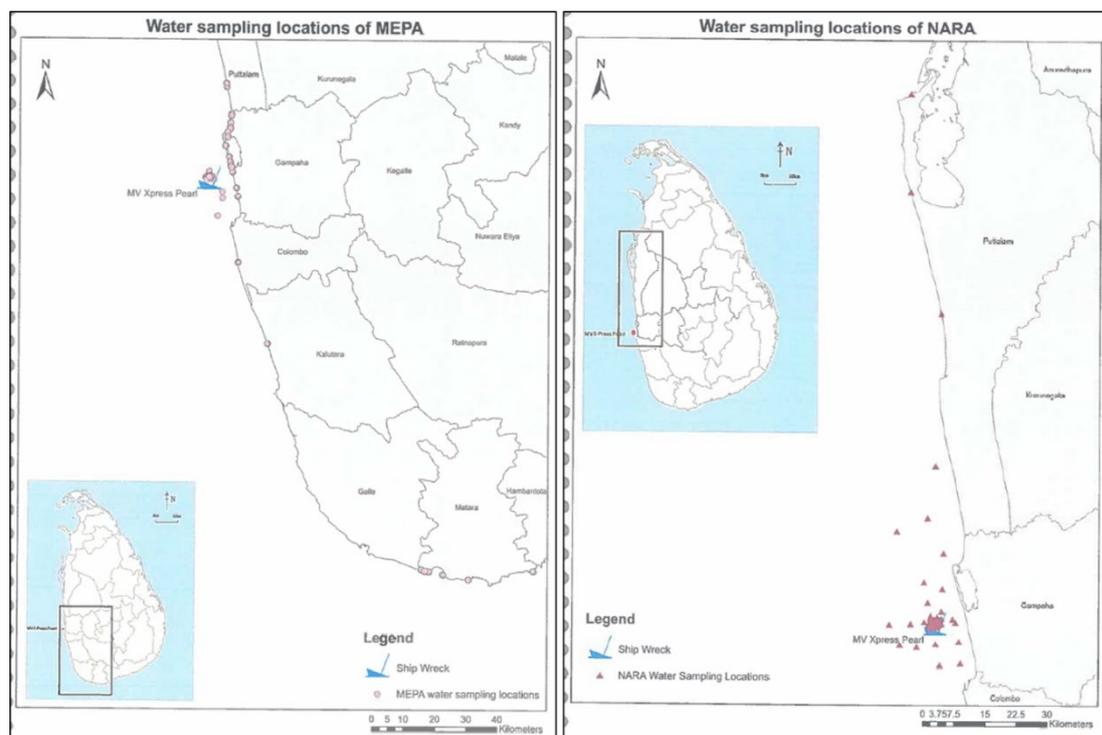


Figure 1 – Water sampling locations of the NARA, submitted in the 2nd Interim Report.

To convert the claimed quantity of nitrogen to a monetary value, MEPA has used a model outlined in a study of the Baltic Sea by Ytreberg et al. (2021). There are many reasons why the use of this model is unreasonable in the context of the X-PRESS PEARL incident:

- A model is theoretical and hence there are inherent uncertainties, assumptions and caveats associated with their use. This is outlined clearly in the guidelines for claims under the 1992 CLC and Fund Conventions, both of which Sri Lanka is party to. Although the input of nitrogen into the environment does not fall under these conventions, a similar rationale may be applied.
- The Baltic Sea, which the paper uses as a case study, is a very different environment to the Indian Ocean. The Baltic Sea is semi-enclosed, shallow, with brackish water, limited tides and currents, high freshwater input and considerable issues with eutrophication from outflow of sewage and agricultural run-off. The Indian Ocean by comparison is an extremely large, deep open body of water with strong currents and tides and is connected to and has free exchange with other oceans of the world.
- The original model factors in pre-existing conditions. Pre-existing conditions for the Sri Lanka context have not been included.
- The figures quoted from the study are for damage caused by eutrophication, which has not been either observed nor measured, to ITOPF's knowledge, in Sri Lanka.

It is also worth noting that should any eutrophication of waterways be observed it would not be possible to determine if this was as a result of the X-PRESS PEARL or if it was as a result of other unrelated factors e.g. sewage release, fishing activities, agriculture run-off or flood events, for example.

The report also makes mention of the 'nitrogen dead zone' as a further justification for the cost of damage caused by the nitrogen input. ITOPF does not see the relevance of referring to this 'dead zone' because the actual 'dead zone' being referred to (ITOPF assumes due to a lack of any references), is on the east coast of Sri Lanka and mainly refers to plastic pollution and overfishing.

Considering all the figures provided by MEPA in Section 4 of the report, ITOPF considers this claim to be technically unreasonable based on the large number of assumptions, many of which have been made inappropriately. In addition, the disregard for preexisting conditions and the overestimation of many of the values reported render this claim irrelevant.

In addition to these reasons, it is important to recognise that no measurable damage has been observed nor measured following the incident.

Damage Cost of Air Pollution – Human Health Impacts

MEPA have estimated a damage cost of **USD 15,657,246.00** relating to the perceived pollution load that reached the land during the fire which lasted from 21st May to 2nd June 2021. This claim relies on a number of unsubstantiated assumptions relating to the types and quantities of air pollutants emitted from the vessel, their transport path and likelihood of contact with coastal residents. An example of an unsubstantiated assumption is the 'emission load' in Tonnes that was released for each chemical species, as given in Table 10 in the report. No information about how this total was calculated has been provided. Furthermore, the split between land (40%) and sea (60%) is arbitrary, with no justification or explanation provided neither does the report explain how the various species could be split between sea and land.

No empirical evidence substantiating these assumptions (e.g. from real time air quality monitoring), has been provided to validate the predicted costs estimated via application of a theoretical modelling approach.

The cost of the impact has been calculated using a 'benefit transfer approach' from the model 'EcoSense Model' (Schmid, et al 2019, Brizio and Genon, 2004). This model considers a wide range of health outcomes relating to each pollutant and links these to changes in emissions of several air pollutants by integrating atmospheric modelling with epidemiological studies and economic assessment of impacts. For the standard atmospheric pollutants, a value has been applied from this model for each Tonne emitted (e.g. for SO₂ the cost is USD 11,910 per Tonne, resulting in a total of USD 12,720,094). A model is theoretical and hence there are inherent uncertainties, assumptions and caveats associated with their use and hence are not suited to a compensation claim which requires costs to actually have been incurred. The report is also claiming for losses in the future which, as an anticipated cost, are not considered reasonable. This is outlined clearly in the guidelines for claims under the 1992 CLC and Fund Conventions, both of which Sri Lanka is a party to. Although the input of pollutants into the atmosphere does not fall under these conventions, similar rationale may be applied.

Estimation of damage costs amounting to **USD 46,534,716.00** due to Dioxin and Furan has been carried out using the Value of Statistical Life (VSL) approach that aims to monetise fatality risks. However, the perceived risks stated as being associated with the X-PRESS PEARL incident have not been substantiated by sufficient empirical evidence that demonstrate the predicted outcomes actually occurred in reality. Furthermore, conclusively linking any observed deterioration in health of an individual specifically to the X-PRESS PEARL incident would be challenging given the prevalence of other confounding factors (e.g. background ambient pollution levels). ITOPF also notes that the quantity of dioxin and furan emitted (603 g) appears to be a completely arbitrary value, with no information provided about how it was calculated. No supporting information has been provided for the estimated health impact of dioxin emitted.

Values presented by NBRO in the report from August 2021 "MV X-PRESS PEARL Air Quality Assessment due to Fire Emissions" only include Particulate Matter (PM) 2.5 and PM10 for areas around Sri Lanka and these values do not indicate a large spike that may cause harm to the local inhabitants. The results for PM are also similar to values reported in other parts of Sri Lanka earlier in the year and hence do not represent a significant jump from baseline levels. Measurements were carried out at sea near X-PRESS PEARL on 23rd May 2021, but these only indicate values that may be of concern to responders and do not constitute a hazard to the wider environment of Sri Lanka or the long-term impact of the pollutants. ITOPF notes that some of the air quality monitoring may be admissible as part of the initial response in the days following the incident if a narrative of the sampling regime and equipment used can be provided.

In the section relating to air pollution, there is no mention of background levels of air pollution in the region. From ITOPF observations in Colombo, Gampaha and Puttalam, a large amount of biomass burning occurs throughout the region and for many households along the coast the main waste disposal method is burning. Along the shoreline near the X-PRESS PERAL incident site there are many areas where domestic plastic waste has been burned. This also contributes considerably to air pollution in the area, but no reference has been made in the report to background levels of pollution or how to consider the pollution from X-PRESS PEARL separately from the background pollution.

Based on consideration of all the figures provided by MEPA in Section 5 of the report, ITOPF considers this claim to be technically unreasonable based on the large number of assumptions that have been made inappropriately, the disregard for preexisting conditions and the unsubstantiated or overestimated values reported. Further cause to disregard this claim is that no measurable damage has been observed or demonstrated following the incident. ITOPF considers that some expenses could be considered reasonable regarding the monitoring conducted in the days following the incident. A reasonable claim could consist of details of the personnel who conducted sampling, what equipment was used and means of transport. This would only be considered reasonable for a number of days in the initial phase of the incident, proportionate to the risks posed by the plume of smoke.

Damage to Turtles and the Associated Economic Losses

MEPA has estimated a total environmental cost for turtles of **USD 4,336,795,634.00**. This estimated economic loss has been broken down as follows:

- Lost viewing value of female turtles over 110 years – **USD 4,298,415,634.00**
- Lost no-use value of turtles – **USD 38,380,000.00**

Supporting Evidence

The 2nd Interim Report states that a total of 419 turtles have died as a result of the incident, up from the 330 reported carcasses in the 1st Interim Report. It is noted that all five species commonly observed nesting and foraging around Sri Lanka have been reported. However, the claims that 419 turtles have died as result of the incident has not been supported by results of the post-mortem analysis.

Annexure two of the 2nd Interim Report comprise of 622 pages of post-mortem analysis reports, laboratory analysis results and a letter from veterinary surgeon Dr B.A.D.S.Jayawardana to the Director General of the DWC. No summary document has been provided. Some pages are presented in Sinhala or are illegible, while some pages have also been duplicated. Post mortem reports don't always append laboratory analysis. Only one post-mortem report includes photos. Please refer to ITOPF's report summarising comments on documents included in the annexure of the 2nd Interim Report.

ITOPF understands that, in total, post-mortems were carried out on 259 individuals between May – October 2021. Results of post-mortem investigations are generally inconclusive (n=178 (69%)) due to severe decomposition of stranded carcasses, as shown in Figure 2. Moreover, in many cases, results from additional analysis of tissue (liver, kidney, lung, flipper), body fluid and gastric content samples have also been inconclusive due to autolysis of samples. Where more conclusive diagnoses can be made, this generally relates to entanglement as a result of legal and illegal fishing operations. Interactions with illegal and legal fishing operations have been diagnosed due to the remanence of fishing gear (i.e., nets or hooks) or lesions from nylon line, in addition to pulmonary distress, indicating the individual eventually drowned.

The 2nd Interim Report states on page two that challenges were experienced in carrying out assessments on deceased turtles, with experts being invited to Sri Lanka and analysis being conducted in country instead of samples being sent overseas. It does, however, later mention that some samples were sent to Italy for analysis, but the results are still being awaited. As per ITOPF's comments on the

2nd Interim Report annexure, it is understood that analysis is being carried out by the University of Padova (UniPD) – Department of Comparative Biomedicine and Food Science. Receiving the reports and opinions of the UniPD would help understand the potential cause of death of these turtles.

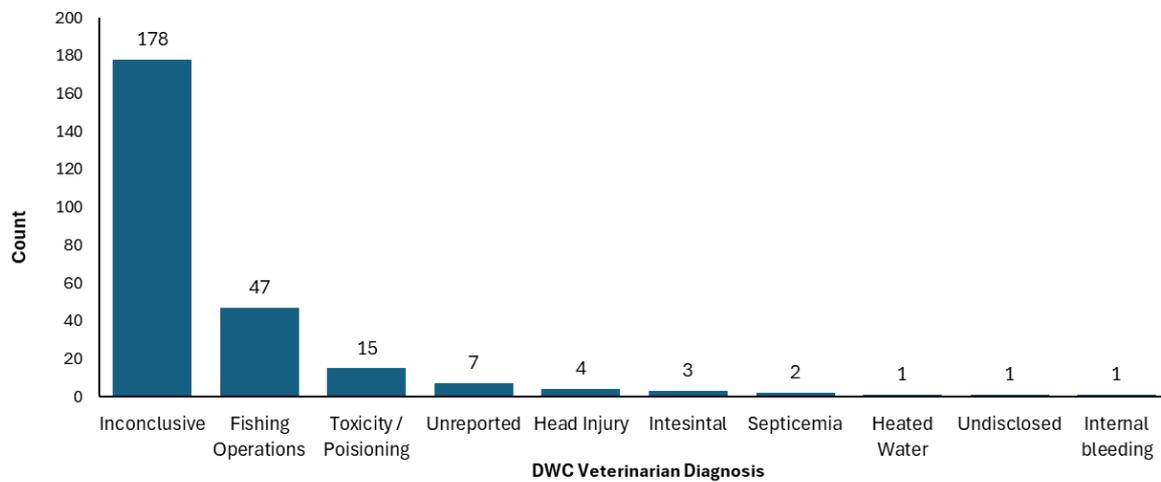


Figure 22 - General categorisation of turtle post-mortem assessment diagnoses between May and October 2021 (n=259). Summarised by Department and Wildlife Conservation post-mortem reports in Annex 2 of the 2nd Interim Environmental Damage Assessment Report.

The claims by the MEPA that all turtle mortalities are a result of X-PRESS PEARL is not substantiated by any robust empirical evidence. The claims also appear to overlook additional pressures turtles face, such as fishing activities, and the possibility of observer bias when reporting turtle carcasses. These two aspects are discussed in more detail below.

Fishing Activities

In MEPA's 1st Interim Report, it states on page 20 that, since 2014, 50 or fewer turtle carcasses were reported per year in Sri Lanka, citing a paper from Ekanayake, 2015, and unpublished data from the Department of Wildlife Conservation and Bio Conservation Society. This was attributed to fishing activities and natural causes, as well as unsubstantiated claims of turtle mortalities from the NEW DIAMOND incident in 2020. MEPA, therefore, attribute the significant rise in turtle strandings in 2021 to X-PRESS PEARL without robust evidence.

In the cited article by Ekanayake (2015), it states that by-catch is a major threat to all five species of marine turtles that nest and / or forage in Sri Lanka territories. Many fishing communities around Sri Lanka depend on seasonal, artisanal gill net fisheries, which have shown unwanted and costly interactions with marine turtles. These findings corroborate anecdotal reports from local fishers that, during certain seasons, great numbers of marine turtles are found entangled in fishing nets, or stranded on the coastline. It is understood that turtles actively seek and feed from gill nets and container captured fish, becoming entangle in the process. Once entangled, it has been reported (Ekanayake, 2015) that turtles may drown, but are more often hauled aboard fishing vessels where they are later discarded or brought back to shore for illegal processing.

In Ekanayake's (2015) report, its states that, during surveys carried out between August 2014 and July 2015, 47 deceased turtles were found between Chilaw and Kalpitiya in the North Western Province, approximately 75 km of coastline. Further interviews of 509 fishers along this stretch of the Sri Lanka

coastline confirmed that incidental turtle by catch occurs at a significant level. More than 50% of participants reported encountering turtles during their fishing activities, ranging from 1 – 2 turtles per day, and up to 20. A much earlier report by Kapurusinghe & Saman (2004), showed that, between November 1999 to November 2000, a total of 5,241 sea turtle by-catch incidents across Sri Lanka were reported in major fishing sites along the western and north western coast. These included all five species of sea turtles that nest along Sri Lanka beaches.

Although it is not clear what dates are covered in the map on sea turtle deaths reported around Sri Lanka (Figure 3), provided by MEPA in the 2nd Interim Report, it does highlight a significant issue of turtle strandings across the entire country. Although the exact figures are not provided, it appears the reports of deceased turtles is in the order of thousands, which would support the findings presented in the papers above. In addition, to these examples, there is a substantial body of literature highlighting the negative interactions between fishing activity and turtles in Sri Lanka, as well as the threat this poses to bio diversity in this region. It is highly possible, therefore, that fishing activities could be attributed to the turtle deaths reported after the X-PRESS PEARL incident.

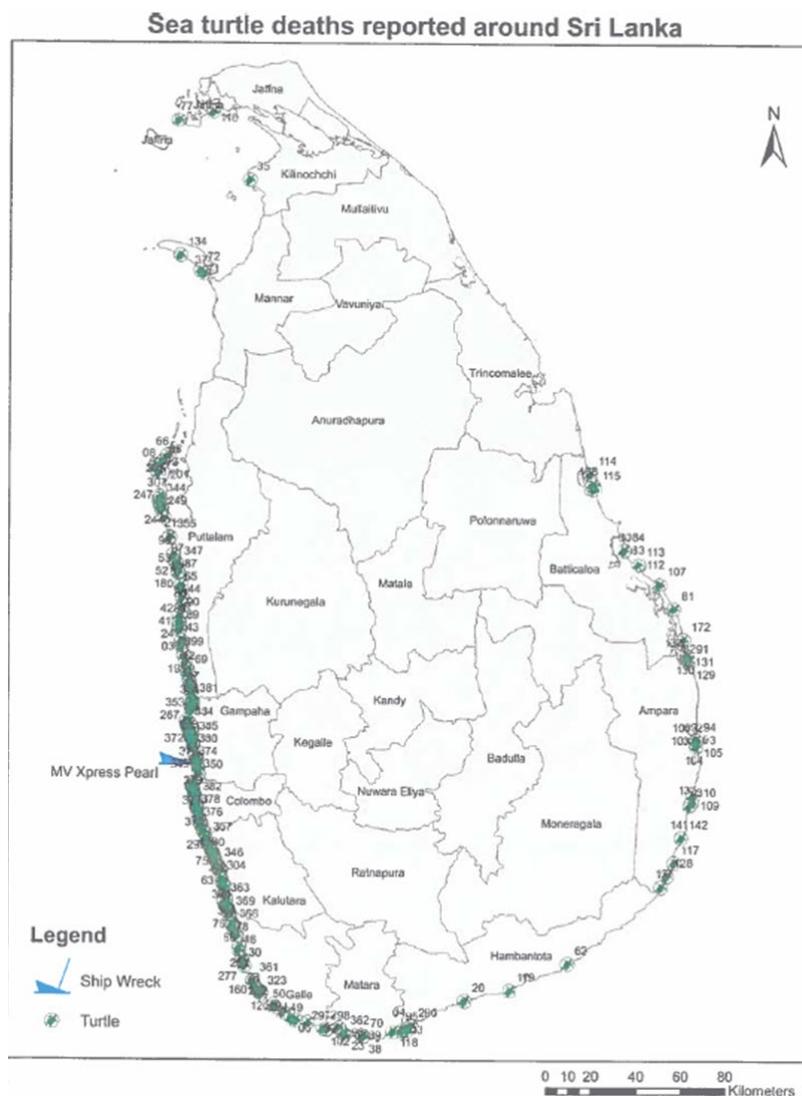


Figure 33 – Map provided in MEPA’s 2nd Interim Report on sea turtle deaths reported around Sri Lanka. Dates of strandings not specified.

Reporting and Observer Bias

It is understood that, despite MEPA's claims, there is generally little consensus within Sri Lanka's scientific community over whether the X-PRESS PEARL incident and increased turtle mortalities are linked¹. Lack of consensus has been attributed to the absence of baseline data to compare environmental parameters and stranding data, as well as bias that may have skewed the data collected during this period.

Observer bias, also known as detection bias, is a systematic error in the recording of data that can lead to inaccurate results and, therefore, inferences. This bias can occur when an observer's expectations or prejudices can influence what is recorded, or in this case, reported. This bias can lead to an over- or underestimated of reality and can affect the validity of results.

As per the 1st Interim Report, fewer than 50 marine turtle deaths were recorded in Sri Lanka between 2014 and 2020. However, based on available literature, a greater number of turtle mortalities are likely to have occurred during this time period. The Sri Lankan Fauna and Flora Protection Act of 1993 confirms that fines and prison sentences can be issued to those found guilty of killing and injuring any vertebrates such as marine turtle. It is therefore possible that, due to these provisions, many incidents of by-catch go unreported, severely underestimating the total annual strandings.

Conversely, following the X-PRESS PEARL incident, there was greater awareness of, and interest in, the presence of deceased turtles, which may have resulted in elevated numbers of strandings being reported. This, in combination with a greater number of people operating and frequenting on affected beaches, could have caused a skew in the data and an overall reporting bias. Given the above, it is not possible to make conclusions without sufficient robust evidence comparing historic strandings and other environmental parameters.

Turtle Loss Valuation Method

Despite there being no conclusive evidence or causal link between the X-PRESS PEARL incident and turtle mortalities, the impact and associated cost estimation is based on various valuation methods. It is understood that the total estimated number (n=1375) of female turtles lost to the incident is based on statements made in the 1st Interim Report, that previous research by Hart et al., 2006 and Koch et al., 2013 estimated that only 20% of turtle carcasses will strand on beaches after death. MEPA has therefore used this figure to assume a greater number of mortalities of female turtles than has actually been reported. In addition, the report further assumes generational losses for over the next 60 years, linking this to sexual maturity of turtles, but without a robust justification or relevant evidence. The predicted losses are based on lost annual viewing revenue (USD 340,786.21) of turtles at Rekawa Turtle Rookery along the south coast, however this has not been supported by any evidence.

Impact on Whales

Whilst a number of marine mammal deaths were reported around the time of the X-PRESS PEARL incident, associated post mortem results have not been able to conclusively link any of these deaths

¹ <https://news.mongabay.com/2021/07/abnormally-high-turtle-deaths-after-acid-laden-ship-sinks-off-sri-lanka/>

specifically to the incident. Therefore, the loss estimated (based on carbon sequestration potential per whale) is not considered relevant given that no causative link has been established between the incident and any reported marine mammal mortality. Furthermore, the values provided by MEPA for the value of a whale are based on theoretical models and abstract concepts including the 'market price of CO₂' which are not considered reasonable for use in a compensation claim.

No additional information has been provided on the content of the necropsies, the mechanism by which the incident affected the whales or any other information to support the claim. The map shown in Figure 4 shows locations far from the incident site which would expect not to be impacted.

ITOPF considers that the X-PRESS PEARL incident would have negligible and extremely hard to measure impact on whale populations and it would be unreasonable to conclude that any whale populations were impacted. Hence, this aspect of the claim is not considered technically reasonable.

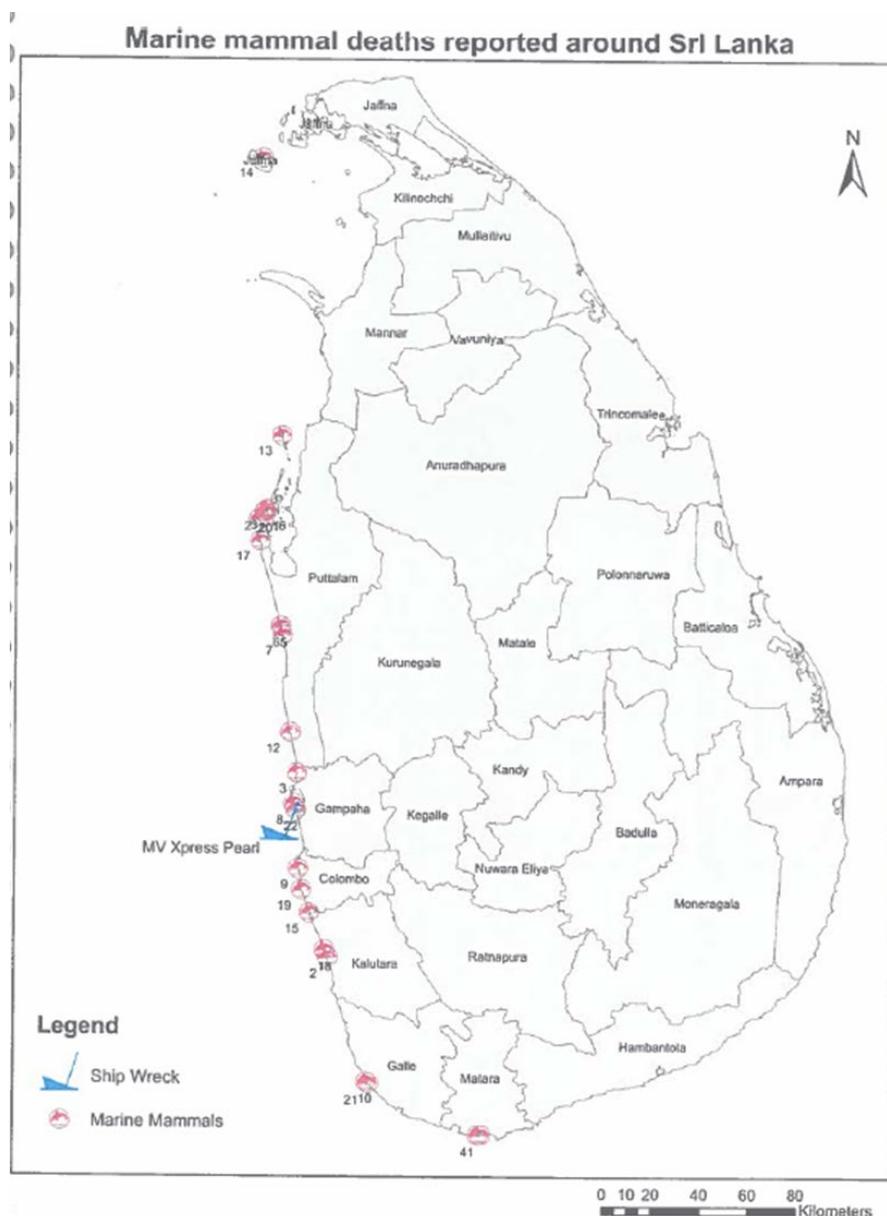


Figure 4 – Map showing marine mammal strandings from the 2nd Interim Report

Microplastic Related Damage Costs

The 2nd Interim Report has claimed damages of **USD 1,286,380,000.00** for costs to the fishing industry from microplastic damage.

The claim appears to have been calculated based on the annual value of fish exports in 2022 (Figure 5) and the assumption that microplastics from the X-PRESS PEARL will cause a 2% annual reduction in fisheries exports and will persist for 100 years. The annual 2% loss in export values is based on a paper by Lee (2015), but no reference is provided.

The claim is unsubstantiated by any relevant empirical evidence demonstrating elevated levels of microplastic concentrations in commercially important marine species as a result of X-PRESS PEARL. The claims states that damage will continue for an extended period, but does not specify or demonstrate what damage has or will occur.

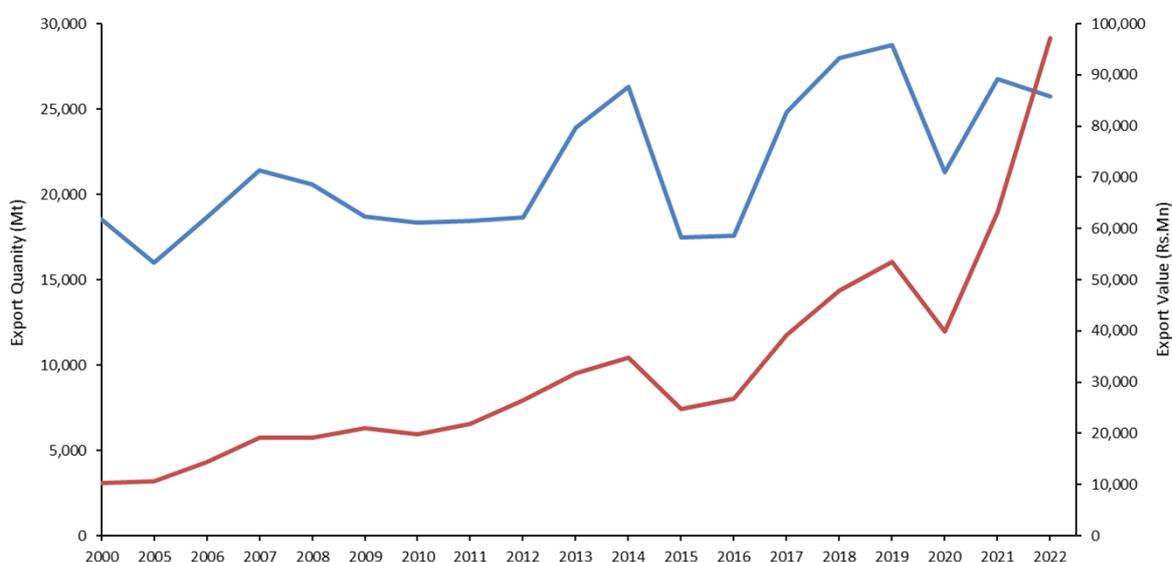


Figure 5 – Summary of Export of Fish and Fishery Product (2000 – 2022) (Statistics Unit, Ministry of Fisheries, 2023)

The report provides no evidence that export losses exist. Notwithstanding this, even if such losses were observed, insufficient evidence of causal links directly with X-PRESS PEARL exist. Plastic pollution in Sri Lanka has been observed to be a prominent issue and existed many years before the incident. Meegahakotuwa et al (2017) reported an abundance of microplastics in coastal waters off Maha Oya estuary, near Dūwana on the west coast of Sri Lanka as high as 11.84 ± 2.62 particles per litre. Likewise, Ranatunga et al (2021) recorded the presence of microplastics in the gut contents of goldstrip sardines (*Sardinella gibbosa*) that were obtained from the coastal waters of Pitipana and in 2017. The presence of such plastics highlights the possible microplastic contamination in commercial fish around Sri Lanka before the X-PRESS PEARL incident.

Cost to the Fish Consumers

A total of **USD 307,713,600.00** been claimed for losses to households due to reduced fish consumption for a six-month period.

The report claims that an island-wide consumer survey was conducted to quantify the costs to consumers due to reduced fish consumption. Telephone, on-line and in-person surveys were carried out from July to November 2021. The report states that 90% of participants indicated a 100% reduction in seafood consumption, which was mainly attributed to a reduction in consumer confidence. In addition, respondents indicated an unavailability of fish as a reason for reduction in consumption, as well as additional costs incurred sourcing suitable substitutes, sometimes at inflated prices.

The overall claim has been calculated by assuming the additional costs incurred by households while sourcing alternative to fish products over a six-month period. This, however, has been assumed for the total number of households in Sri Lanka in 2021 – 5,100,000. An unrealistic and unsubstantiated assumption.

Following the X-PRESS PEARL incident, a fishing ban was implemented across Kalutara, Colombo and Gampaha from 25th May 2021 to 5th June 2022, with an adjustment being made to the restricted areas in February 2022. In total, fisheries restrictions were in place for around 12-months. It is likely that a reduction in consumer confidence was experienced shortly after the incident, and under the international insurance regime, reasonable claims for costs incurred as a result could be classed as an admissible claim. However, such claims would need to be investigated following a jointly agreed and independent assessment on consumer behaviours and prices changes shortly after the incident.

As per the relevant claims criteria and principles under the 1992 CLC, 1992 Fund and 2001 Bunkers Conventions, it is the responsibility of the competent authority to conduct suitable seafood safety analysis and convey the results publicly as soon as possible. During the X-PRESS PEARL incident, however, it is not clear if such analysis was carried out, or the results publicised to alleviate concerns of the public. It even states in the report some respondents of the survey quoted a lack of reassurance from the authorities on safety as a reason for avoiding seafood.

If seafood safety analysis was carried out, then one could question why the results weren't publicised. Conversely, if seafood safety analysis was not carried out, then why not?

Unavailability of fish in directly affected areas may have occurred due to a lack of supply. Costs incurred while sourcing protein sources, either as an alternative or further away, may be considered admissible. Incurred costs, however, would need to be supported with evidence. During ITOPFs time on-site, however, vendors were regularly observed selling fish on the side of the road or at markets while the ban remained in place. These sales took place in the districts directly affected by the ban, while fish markets receiving fish from all over Sri Lanka remained busy and well supplied. It is highly unlikely that 90% of the entire Sri Lankan population reduced its consumption by 100%. Further evidence would need to be provided to support this claim and it is recommended that this takes place collaboratively with the shipowner. A start would be for the government to submit a report on the surveys that took place, including the methods, results and analysis.

Finally, the report also states that future costs may be incurred to the economy as a result of malnutrition. This claim has not been substantiated. Notwithstanding, given the observations of fish being available during the restricted period, it unlikely that malnutrition, as a result of inaccessibility to protein, occurred.

Cost to the Beach Users

A cost of **USD 857,327.00** to beach user households for a two-year period, perceived to result from plastic pollution emanating for the X-PRESS PEARL discouraging beach use, has been estimated by MEPA. The estimate relies on a 'willingness to pay' approach where by beach users are surveyed to identify the 'value' they place on restoring the beaches to their former condition. The 'value' of the beach is determined by how much a member of the public is willing to pay each month to have the beach cleaned to the condition before the incident. This damage cost estimate relies on a number of assumptions that are not sufficiently substantiated by empirical data and is also underpinned by theoretical, abstract methods that are not transferable into a direct and tangible economic loss value.

In this section the impact of the COVID-19 pandemic and the affect that a national lockdown had on beach usage is not mentioned, but ITOPF expects that this had a much greater effect at keeping members of the public away from the beaches than plastic pellets. ITOPF also attended at the time of the incident and witnessed the numbers of beach users on various beaches both affected and unaffected by the incident both during the lockdown and in 'normal' times. The difference in beach usage would be very difficult to quantify and using any models to determine a compensation amount is deemed unreasonable.

Direct Losses to Fishery

The claim for **USD 186,200,000** for direct loss to fisheries is summarised in Annex 07 of the 2nd Interim Report and details losses to direct and indirect fisheries. ITOPF had previously assessed claims from the Ministry of Fisheries for direct and indirect losses to the fishing community in the vicinity of the incident, covering the period from 21st May 2021 to 5th June 2022. This separate claim comes from the Central Bank of Sri Lanka and ITOPF understands that the claim is for losses to the fisheries community as a result of the fishing ban.

Figure 1 in Annex 07 shows the coastal and offshore production of fish and the report has circled the area in 2020/2021 when the production dropped. ITOPF notes that this drop occurred before the X-PRESS PEARL incident in 2020, likely as a result of the COVID-19 global pandemic. In 2021 this was likely still having an effect as the country in May and June 2021 was in lock-down, as was experienced by ITOPF at the time of the incident. Throughout the report there are many unsubstantiated claims and figures.

As this section is a fisheries claim, it should not be claimed as part of an environmental damage claim. ITOPF has previously assessed the full claim for direct and indirect fisheries as submitted by the Ministry of Fisheries. Hence, ITOPF considers that this claim summarised in Annex 07 is duplication and is hence unreasonable.

Impacts on Fisheries Livelihoods

This section details a claim for **USD 1,960,538.61** for impacts to the livelihoods of the fishing community.

This claim is considered unreasonable because:

- No supporting data has been received.

- Claims for impacts to fisheries from the Ministry of Fisheries have already been submitted against the shipowner.
- It is unclear how this claim differs from the claim in Annex 07 “production loss of fisheries industry’.
- No information regarding the ‘tourism and non-fishery SME’ sector.
- No breakdown has been provided for any of the items in the provided table.
- There are no references to other confounding factors at the time such as the economic crisis in Sri Lanka or the COVID-19 pandemic.

Incurring Costs

This section (Section 13 in 2nd Interim Report) contains a claim for **USD 7,559,948.58** which relates to costs incurred as part of the environmental monitoring for various agencies involved in the environmental damage assessment. This claim also includes costs for ‘coral reef survey’, ‘cost for shoreline clean-up’, costs of the expert panel and for conducting meetings.

Throughout the incident ITOPF has recommended that any claims submitted by MEPA for environmental monitoring are included separately from the clean-up claims and should be supported by the appropriate documentation.

ITOPF cannot recommend any of the costs detailed in the ‘Incurring Costs’ section as reasonable because there is no breakdown of any items. There are no details of what work was carried out, by whom and on what dates. There are no details about the expert panel or what the costs refer to. There are no receipts provided, no invoices, no meeting minutes, no work descriptions or any information that allows ITOPF to understand the narrative of the claimed costs. One key concept that is important to determine reasonableness is the scope of the monitoring and the need to ensure the monitoring is proportional to the threat posed by the incident, both in terms of resources deployed and also the timeframes involved. As the claim is currently presented, ITOPF has no means to determine whether the monitoring is proportionate.

ITOPF cannot recommend the clean-up costs in this section of **USD 5,767,839.54** as reasonable because this is a clear duplication. MEPA already claims monthly invoices for the clean-up.

Future Costs

The future costs section contains a claim for **USD 23,552,844.06** which is for future costs for:

- Shoreline clean-up, including estimated worker numbers for two years.
- Cleaning of Negombo Lagoon and the Dutch Canal.
- Waste disposal.
- A monitoring cell at the MEPA head office.
- Costs for the expert panel for three years.
- Printing and other administration.

ITOPF considers none of these items to be reasonable as they are predicted future costs, not costs actually incurred. Some of these items have also already been addressed by ITOPF as unreasonable and are not relevant to environmental monitoring. Waste is to be considered separately.

Monitoring Costs

The MEPA have estimated a cost of **USD 104,600,524.60** associated with environmental monitoring activities carried out following the X-PRESS PEARL incident. These monitoring costs are broken down as shown below:

Table 3 – Summary of the environmental monitoring activities detailed in the 2nd Interim Assessment Report.

Monitoring Type	Description	Estimated Cost (USD)
1. Surrounding Environmental Monitoring	1.1 National Aquatic Resource & Research Agency (NARA) short-term monitoring programme (3 years)	6,144,687.00
	1.2 Coastal Conservation & Coastal Resources Management Department short-term monitoring programme (3 years)	151,247.10
	1.3 National Aquatic Resource & Research Agency (NARA) long-term monitoring programme (2026-2035)	8,245,206.00
2. Sea Turtles Monitoring & Survey	2.1 Wildlife Conservation Department sea turtle hatchery monitoring programme	4,563,000.00
	2.2 Wildlife Conservation Department sea turtle nesting & stranding survey	67,490,400.00
	2.3 Wildlife Conservation Department satellite tracking of sea turtles	2,220,000.00
3. Marine Mammals Monitoring	3.1 Wildlife Conservation Department costs for distribution & abundance surveys of marine mammals	514,640.00
	3.2 Wildlife Conservation Department stranding monitoring costs	25,950.00
	3.3 Wildlife Conservation Department tagging & biopsy sampling	385,000.00
	3.4 Wildlife Conservation Department workshops, training & awareness	36,000.00
4. Seabird Monitoring	Seabird Monitoring	221,600.00
5. Air Quality Monitoring	Air Quality Monitoring	18,050.00
6. Environmental Monitoring (10 years)	Environmental Monitoring (10 years)	2,998,000.00
7. Socioeconomic Monitoring	Socioeconomic Monitoring	41,700.00
8. Monitoring Cost – Oil Spill	Water quality, socioeconomic, fish catch, turtle & mammal monitoring	2,257,506.00

Total	95,312,986.1 ²
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ITOPF has previously recommended that any proposed monitoring should be carried out in collaboration with the vessel owner. This advice was given to the relevant government agencies on multiple occasions. The insurance regime works on a pay to be paid basis meaning that unless the Owner is involved in conversations regarding monitoring, and is in agreement with its objectives, scale and costs, then the government would need to pay for this monitoring and claim back reasonable costs from the vessel owner. As such, costs are assessed for reasonableness and in consideration of the supporting documentation.

Comments on the specific items of monitoring proposed (and associated estimated costs) are provided below.

1. Surrounding Environmental Monitoring

1.1 National Aquatic Resource & Research Agency (NARA) short-term monitoring programme (3 years)

This claim requires substantiating in terms of actual, rather than predicted, costs through submission of associated invoices, receipts etc. This claim also requires substantiation through provision of the data and reports generated as part of the monitoring programme along with conclusions drawn and recommendations going forward.

1.2 Coastal Conservation & Coastal Resources Management Department short-term monitoring programme (3 years)

As above - this claim requires substantiating in terms of actual, rather than predicted, costs through submission of associated invoices, receipts etc. This claim also requires substantiation through provision of the data and reports generated as part of the monitoring programme along with conclusions drawn and recommendations going forward.

1.3 National Aquatic Resource & Research Agency (NARA) long-term monitoring programme (2026-2035)

Decisions around the need for and type of long-term post spill monitoring are typically informed by the outcomes of the initial, short-term monitoring programmes. As such, the requirement for the proposed long-term monitoring programme would need to be supported by observations and recommendations arising from the initial monitoring outcomes. At present, no initial monitoring reports (and associated recommendations) have been made available. Therefore, the need for long-term monitoring is, at present, unsubstantiated. ITOPF would recommend that any plans for long-term monitoring are discussed with the shipowner to reach an agreement for the scope of works and overall costs.

2. Sea Turtles Monitoring and Survey (Items 2.1, 2.2 and 2.3)

The requirement for this type of monitoring is typically informed by perceived risk posed to turtles by the incident (e.g., observations of injury or mortality that can conclusively be attributed to the incident). Results of the post mortem examinations of the turtles conducted to date indicate that it is not possible to conclusively establish a causative link between the X-PRESS PEARL incident and turtle

² This total appears to have been miscalculated in the MEPA 2nd Interim Assessment Report.

mortality. Furthermore, conclusions of the post mortem examinations indicate a number of other likely causes for the mortalities observed, namely entanglement in fishing gear and subsequent drowning and vessel strikes. Based on the outcomes of these post mortem results, it would typically be concluded that the incident poses minimal immediate or ongoing risk to turtle populations. As such, a subsequent risk-based post spill monitoring approach would not include any further monitoring and assessment of turtle populations.

3. Marine Mammals Monitoring

As with the turtle monitoring, the requirement for this type of monitoring is typically informed by perceived risk posed to marine mammals by the incident (e.g., observations of injury or mortality that can conclusively be attributed to the incident). Post mortem results on the marine mammal carcasses recovered were largely inconclusively in terms of cause of death with no conclusive causative link established with the X-PRESS PEARL incident. As such, a subsequent risk-based post spill monitoring approach would not include any further monitoring and assessment of marine mammal populations.

4. Seabird Monitoring

No information or reports have been made available detailing observations of seabird injury or mortality as a result of the X-PRESS PEARL incident. As such, it is unclear on what basis seabird monitoring is being considered.

5. Air Quality Monitoring

Any costs for air quality monitoring carried out at the time of the incident would need to be supported by provision of the data collected, associated reports and also provision of records of resource (time sheets) and equipment used for this activity.

6. Environmental Monitoring (10 years)

Decisions around the need for and type of long-term post spill monitoring are typically informed by the outcomes of the initial, short-term monitoring programmes. As such, the requirement for the proposed long-term monitoring programme would need to be supported by observations and recommendations arising from the initial monitoring outcomes. At present, no initial monitoring reports (and associated recommendations) have been made available. Therefore, the need for long-term monitoring is, at present, unsubstantiated.

7. Socioeconomic Monitoring

No information or reports have been made available detailing the outcomes of socioeconomic monitoring or impact assessments.

8. Monitoring Cost – Oil Spill

As there was no observed impact of an oil spill either at sea or on the shoreline it is unclear what these monitoring costs relate to.

Restoration Costs

The MEPA have estimated a cost of **USD 12,169,025.00** associated with environmental restoration activities to be carried out following the X-PRESS PEARL incident. These costs are broken down as shown below:

Table 4 – Summary of estimated restoration costs detailed in the MEPA 2nd Interim Report.

Restoration Type	Description	Estimated Cost (USD)
II. Sea Turtle Restoration Programme	Wildlife Conservation Department – cost of <i>in situ</i> turtle nest protection programme (10 years)	6,644,000.00
	Wildlife Conservation Department – upgrading of two Wildlife Health Management Centres to facilitate treatment of marine turtles	394,000.00
	Wildlife Conservation Department – establishment of turtle and marine research and rehabilitation centre at Dodanduwa	4,024,750.00

Processes to assess the requirements for post spill restoration and, where required, develop appropriate restoration approaches are extensively detailed as part of well-established frameworks (e.g., International Conventions, US Natural Resources Damage Assessment (NRDA)). Under the 1992 Conventions, *‘compensation for impairment of the environment is limited to loss of profit from such impairment and costs of reasonable measures of reinstatement actually undertaken or to be undertaken’*. The guidance goes on to say *‘in most cases, a major oil spill will not cause permanent damage to the marine environment due to its great potential for natural recovery. Whilst there are limits to what measures can be taken to improve on natural processes, in some circumstances it is possible to enhance the speed of natural recovery after an oil spill through reasonable reinstatement measures. The costs of such measures will be accepted for compensation under certain conditions’*. Under this framework, reinstatement measures will only be considered for cost recovery if they meet the following criteria:

- The measures should be likely to accelerate significantly the natural process of recovery;
- The measures should seek to prevent further damage as a result of the incident;
- The measures should, as far as possible, not result in the degradation of other habitats or in adverse consequences for other natural or economic resources;
- The measures should be technically feasible;
- The costs of the measures should not be out of proportion to the extent and duration of the damage and the benefits likely to be achieved.

Similarly, under the US NDRA framework, restoration plans are intended to *‘restore the resources and habitats that were harmed’*. Therefore, the first step is to establish an understanding of which (if any) *‘receptors’* have been impacted by the incident.

In this instance, no conclusive causal link has been established between the incident and any observed marine wildlife injury or mortality. Therefore, the criteria detailed above have not been fulfilled.

Summary

ITOPF has considered all of the documentation provided in a preliminary overview of the reasonableness of the items contained in the claim from MEPA for environmental damage. In conducting this preliminary assessment of the claim, the 1992 CLC and Fund Conventions guidelines

were considered as Sri Lanka has ratified these conventions. A brief summary of ITOPF's comments is provided in Table 5 below.

ITOPF considers that in many of the claimed sections, some costs associated with the claim may be considered reasonable. For example, much of the work conducted as part of the environmental monitoring could be considered reasonable. Examples of admissible items may be vehicles to visit sampling sites, boat charter to take samples at sea, laboratory analysis costs, personnel time working on the results or equipment and consumables used to take samples. There are many potentially reasonable items that may be claimed however they must be proportionate to the scale of the incident and the perceived threat to the environment. The 2nd Interim Report, the 1st Interim Report and the associated nine annexes do not provide any details or any supporting documentation that may allow any part of a claim to be considered reasonable. ITOPF is available to provide information to Sri Lanka relating to what may be considered reasonable for environmental monitoring.

Table 5 – Summary of the claim sections and ITOPF's comments.

Item	Claim Value (USD)	ITOPF Comments
Damage Cost of Oil Spill	58,459,868.00	The 2 nd Interim Report recognises that the slick naturally dissipated and no shoreline impacts were observed. The environmental damage claim is therefore unsubstantiated and is based on an irrelevant model.
Damage Cost of Nitrogen Added to the Ocean	56,875,158.64	The total claim for nitrogen added to the ocean is considered unreasonable. Some costs for sampling for a proportionate length of time could be reasonable, but most likely included as part of a general claim for monitoring costs with other sampling parameters and not considered independently.
Damage Cost of Air Pollution – Human Health Impacts	15,657,246.00	ITOPF considers that some costs may be considered reasonable resulting from the costs of the air monitoring in the emergency phase of the incident. However, these costs are not included in this report and the values reported are considered not to be admissible.
	46,534,716.00	
Damage to Turtles and the Associated Economic Losses	4,298,415,643.00	Empirical evidence needed to link turtle mortalities with the incident. Available post-mortem reports are mostly inconclusive. Laboratory analysis results should be provided. Claim overlooks issue of fishing related by-catch mortalities and potential observer bias.
	38,380,000.00	
Impact of Whales	35,100,000.00	ITOPF does not consider a claim for impact on whales to be reasonable.
Microplastic Related Damage Costs	1,286,380,000.00	No evidence that concentrations of microplastics have increased in commercially important species as a result of X-PRESS PEARL has been provided. Claim overlooks pre-existing knowledge of microplastics pollution in Sri Lanka.
Cost to the Fish Consumers	307,713,600.00	Claims for losses due to a reduction in consumer confidence may be considered amissible under the criteria of the international insurance regime. Claims, however, need to be properly substantiated, demonstrating losses were incurred as a result of the incident. Reports on seafood safety analysis and public notifications

		should be shared to demonstrate best endeavours were made by authorities to alleviate concerns over seafood contamination.
Cost to the Beach Users	3,857,327.00	As this claim was compiled purely from theoretical models with no cost actually incurred it is not considered reasonable.
Direct Losses to Fishery	186,200,000.00	This claim is considered a duplication of claims previously submitted by the Ministry of Fisheries.
Impacts on Fisheries Livelihoods	1,960,538.61	This claim is considered a duplication of claims previously submitted by the Ministry of Fisheries.
Incurred Costs	7,559,948.58	The costs incurred by the various agencies may be reasonable, but proper documentation should be provided and the activities carried out should be conducted as part of a proportionate environmental monitoring plan. The claim as it stands is considered unreasonable as there is no breakdown of any of the items.
Future Costs	23,552,844.06	Predicted future costs are not considered admissible.
Monitoring Costs	104,600,524.60	Predicted future costs are not considered admissible.
Restoration Costs	12,169,025.00	Predicted future costs are not considered admissible.
Total	6,483,416,439.49	

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