



# BLUE WATERS BLUE MILES?



## Newsletter

On Marine Environment Protection

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## From the Director General's Desk



The Indian Coast Guard (ICG) plays a crucial role in the protection of the marine environment. The responsibilities include enforcing marine pollution laws, preventing and responding to oil spills and promoting safe shipping practices. ICG conducts regular patrols to monitor and prevent marine pollution.

Hon'ble Prime Minister Narendra Modi, in his Independence Day speech stated that we have put forth the concept of "One World, One Family, One Future" and are working in the direction. He also mentioned that "as the world grapples with climate crises, we have shown the way and launched the Life Style for Environment – Mission Life Initiative". This vision encompasses marine ecosystem protection and environmental management aspects vis-à-vis sustainable usage of marine resources. The awareness amongst masses about the same is at an all-time high.

In case of oil spills, the Indian Coast Guard is responding quickly and effectively to contain the spill and minimize its impact on the environment. ICG has a specialized oil spill response team that is trained to handle such incidents. In addition, ICG promotes safe environmental practices by providing guidance and training to ports and oil handling agencies. There are also efforts to increase public awareness about marine environment protection. This includes educational programs for schools/ Colleges and the general public, as well as community interaction programmes for fishermen to raise awareness about the importance of marine ecosystems and measures to protect them.

Collaboration between various stakeholders is essential for the success of marine protection & prevention initiatives. By working together, we can develop effective strategies for further protecting marine ecosystems and ensuring their long-term sustainability.

Initiatives for marine environment protection are critical for preserving the health and biodiversity of our oceans. Through the creation of marine protected areas, sustainable fishing practices, the reduction of marine pollution and increased public awareness, we can work towards a future where marine ecosystems are protected and preserved for generations to come.

I wish all the readers and stakeholders 'Happy Reading'.

Vayam Rakshamah. Jai Hind.

A handwritten signature in red ink, which appears to be "Rakesh Pal".

(Rakesh Pal)  
Director General  
Indian Coast Guard

03 Oct 2023  
New Delhi



## EDITORIAL

Marine environment is essential to our planet's health, yet it faces numerous challenges emanating from the human activities. Pollution from Oil, Hazardous and Noxious substances, plastic disposal, runoff from land and overfishing has done immense damage to the health of our oceans. At the time when climate change is impacting our life in ways unprecedented, it is important to understand that healthy and productive marine ecosystem is vital for climate stability and resilience. Protection of marine environment for the benefit of our future generations is a collective responsibility. The targets set forth by the United Nations Sustainable Development Goal 14 for conserving and sustainably use the oceans, seas and marine resources can only be achieved through collective efforts, strong political will and utilization of available technologies, resources and knowledge.

Mission LiFE is one such initiative by Government of India which encourages individuals to adapt environmental conscious lifestyle. Embracing LiFE may significantly contribute to protection and preservation of our oceans as land based activities including marine debris and nutrient pollution are major contributors for marine pollution.

Oceans, besides providing food and sustenance to millions of coastal populace, are crucial for mitigating climate change as it absorbs around one quarter of the world's annual Carbon dioxide emissions.

To counter the ongoing trends leading to deteriorated health of our oceans and seas, seamless coordination and collaboration among all the stakeholders is crucial. Indian Coast Guard as the Central Coordinating Agency for oil spill response at sea is working in coordination with various agencies for ensuring cleaner seas.

The editorial team expresses gratitude to all the contributors of insightful articles to this edition of "Blue Waters" and wishes happy reading experience to all.



(Surendra Kumar Karwasara)  
Commandant (JG)  
Deputy Director (FE)



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# ARTICLES

## **NEW HIGH SEAS TREATY - MARINE BIODIVERSITY OF AREA BEYOND NATIONAL JURISDICTION (BBNJ)**

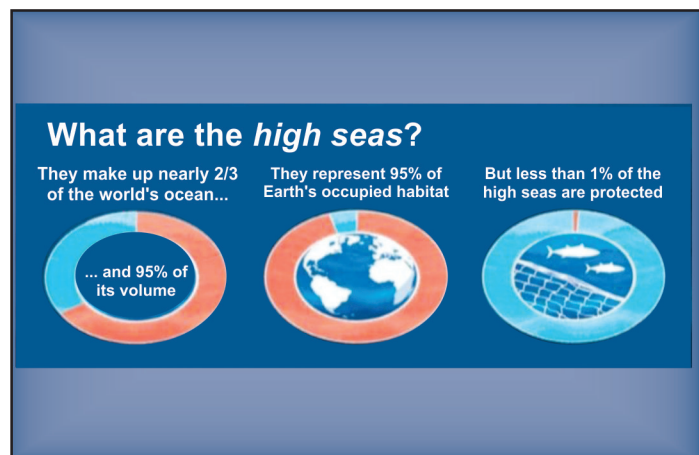
*(Dy Comdt Pradeep Singh, ICGAS Chennai)*

### Introduction.

The world's oceans cover over two-thirds of our planet, supporting a vast array of life and ecosystems. However, much of the marine biodiversity lies beyond the jurisdiction of any single nation. The areas beyond national jurisdiction, commonly referred to as the high seas, are critical to the health of the Earth's oceans and the well-being of countless marine species. To address the urgent need for conservation and sustainable management, the international community has been diligently working on a new high seas treaty, aiming to protect and preserve the marine biodiversity of these vast regions.

### The High Seas: A Global Commons.

The high seas comprise vast stretches of ocean beyond the 200-nautical-mile Exclusive Economic Zones (EEZs) of coastal nations. These areas fall under the status of the "global commons," meaning they are open to all states and are not subject to the



*Fig 1. High Seas*

jurisdiction of any particular nation. Although the high seas have long been considered a realm of freedom for maritime activities, their exploitation and use have led to significant challenges, particularly for marine biodiversity and ecosystem health.

### The State of Marine Biodiversity Beyond National Jurisdiction.

The marine biodiversity found in areas beyond national jurisdiction is incredibly diverse and ecologically vital. From microscopic plankton to majestic whales, numerous species call the high seas home. These waters also harbour unique habitats such as seamounts, deep-sea vents, and coral reefs, which are crucial for the life cycles of many marine organisms. Furthermore, these areas play a significant role in regulating global climate patterns, nutrient cycles, and carbon sequestration. Despite their ecological importance, the high seas face several threats. Overfishing, illegal, unreported, and unregulated (IUU) fishing, plastic pollution, climate change, and deep-sea mining are among the most pressing issues. The absence of a comprehensive legal framework to address these challenges has resulted in the degradation of marine biodiversity and ecosystems, leading to irreversible consequences for future generations.

### The Need for a New High Seas Treaty.

Recognizing the urgent need for action, the international community, through the United Nations Convention on the Law of the Sea (UNCLOS), initiated negotiations for a new high seas treaty. The treaty aims to establish a robust legal framework for the conservation and sustainable use of marine biodiversity in areas beyond national



jurisdiction. Key Objectives of the New High Seas treaty are: -

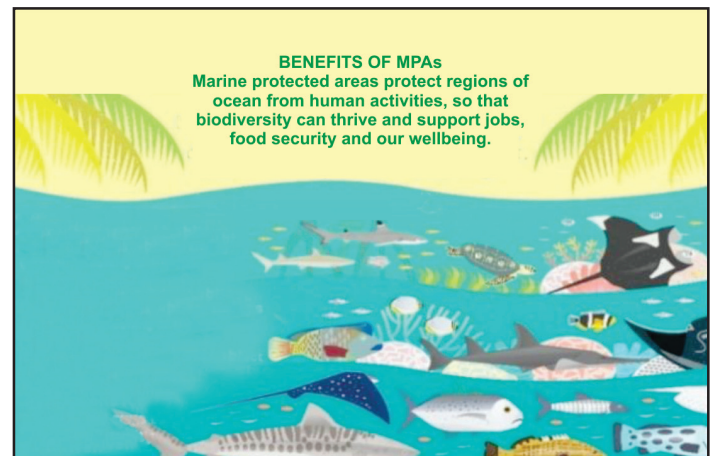
- **Marine Protected Areas (MPAs):** The treaty seeks to establish a network of MPAs on the high seas to safeguard vulnerable ecosystems and provide refuge for endangered species. These protected areas will be designated based on scientific evidence and cooperation among nations.
- **Environmental Impact Assessments (EIAs):** To minimize the negative impact of human activities on marine biodiversity, the treaty will require comprehensive EIAs for proposed projects, such as deep-sea mining and other extractive activities.
- **Capacity Building and Technology Transfer:** Recognizing that some countries may lack the resources or technology to effectively protect the high seas, the treaty will promote capacity building and technology transfer to support sustainable practices.
- **Biodiversity Beyond National Jurisdiction (BBNJ) Authority:** The treaty may establish an international body to oversee the implementation of conservation measures and ensure compliance with the agreement.
- **Benefit Sharing:** The treaty will address the equitable sharing of benefits arising from marine genetic resources on the high seas to promote fair and sustainable utilization.

**Challenges and the Way Forward.**

Negotiating a new high seas treaty is indeed a complex and challenging process that involves a myriad of considerations and interests from various nations. One of the primary challenges is

striking a balance between economic interests, such as deep-sea mining and fishing, and conservation goals to protect the delicate marine ecosystem. Here are some key points to consider in the negotiation process:

- **Resource Management:** Developing guidelines for responsible deep-sea mining and fishing activities is essential. This includes defining quotas, implementing sustainable fishing practices, and ensuring that mining activities don't cause irreversible harm to the marine environment.
- **Scientific Research and Data Sharing:** Utilizing scientific data and research to inform decisions is vital. Encouraging nations to share relevant data and research findings will lead to better-informed policies and management strategies.



*Fig 2. Benefits of MPAs*

- **Benefit Sharing:** Determining how the economic benefits from deep-sea mining and fishing will be shared among nations is a sensitive issue. Ensuring that less developed countries equitably benefit from the resources.
- **Enforcement Mechanisms:** Creating robust enforcement mechanisms and penalties for



non-compliance is necessary to ensure that all parties adhere to the treaty's provisions. This could involve surveillance, monitoring technologies, and cooperation between naval forces to address illegal activities.

- **Dispute Resolution:** Establishing effective procedures for resolving disputes that may arise between nations will help maintain cooperation and prevent conflicts.
- **Involvement of Stakeholders:** Including various stakeholders, such as environmental organizations, fishing communities, and industry representatives, in the negotiation process will ensure a more comprehensive and balanced treaty.
- **International Cooperation:** Strong international cooperation and commitment are essential for the treaty's success. Diplomatic efforts and multilateral agreements will be necessary to gain broad support and participation from nations.
- **Adaptability and Review Mechanisms:** The treaty should be designed to adapt to changing circumstances and emerging challenges. Regular review processes can help assess the treaty's effectiveness and make necessary adjustments.

**Conclusion.**

The new high seas treaty represents a critical milestone in the ongoing efforts to protect and conserve marine biodiversity in areas beyond national jurisdiction. As our understanding of the oceans' interconnectedness and fragility grows, so does the imperative for global cooperation in safeguarding these invaluable resources for future

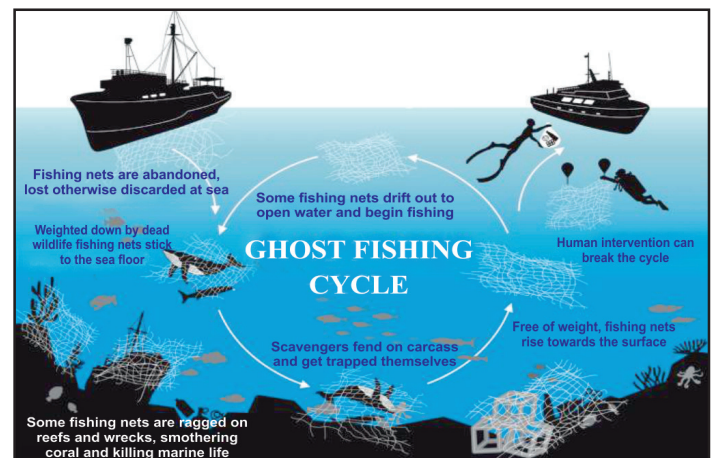
generations. By working together to establish an effective and comprehensive legal framework, the international community can secure the health and resilience of our oceans and the diverse marine life that relies on them.

**THE HAUNTING REALITY OF GHOST NETS**

*(Commandant PV Gopal, SO to ADGCG)*

**Introduction.**

In the vast expanses of our oceans, a silent menace lurks beneath the surface - ghost nets. These discarded fishing nets, lost or deliberately abandoned by fishermen, continue to wreak havoc on marine ecosystems, entangling and suffocating marine life. As the scale of this problem grows, it is imperative that we shed light on the haunting reality of ghost nets and take immediate action to combat this environmental catastrophe.



*Fig 3. Ghost-Fishing-Cycle*

**The Ghostly Origins.**

Ghost nets are fishing nets that have been left or lost in the ocean. These nets are typically made of strong, durable materials such as nylon, designed



to withstand the harsh conditions of fishing. However, when these nets are discarded, they persist in the marine environment for years, continuing to trap and kill marine life indiscriminately.

## Silent Killers of Marine Life.

Once adrift in the ocean, ghost nets transform into death traps for marine creatures. The entangled nets entrap fish, turtles, dolphins, whales, and countless other species, leading to suffocation, drowning, or starvation. Additionally, these nets continue to drift and accumulate debris, making them even more lethal for unsuspecting marine animals.

## Impact on Ecosystems.

The presence of ghost nets disrupts the delicate balance of marine ecosystems. Large-scale entanglement can decimate populations of certain species, disrupt breeding patterns, and harm critical habitats such as coral reefs. Furthermore, the entangled nets can smother and damage coral reefs and other underwater structures, hindering their recovery and growth.

## Human Toll.

Ghost nets not only harm marine life but also pose risks to human safety and livelihoods. Abandoned nets can damage boats and other fishing gear, leading to financial losses for fishermen. Moreover, when fishing nets become entangled in propellers or boat engines, it can endanger the lives of fishermen and even result in accidents at sea.

## Tackling Ghost Nets.

Addressing the ghost net problem requires a multi-faceted approach involving international



*Fig 4. Ghost-Net*

cooperation, innovative technologies, and public awareness. Some key strategies include:

- **Improved Fishing Practices.** Encouraging responsible fishing practices and promoting the use of biodegradable or easily retrievable fishing gear can help reduce the number of ghost nets in our oceans.
- **Retrieval and Recycling.** Establishing programs to retrieve and properly dispose of abandoned nets is crucial. These nets can then be recycled or repurposed into useful materials, minimizing their impact on the environment.
- **Technology & Innovation.** Developing advanced technologies like satellite tracking systems and underwater drones can help identify and retrieve ghost nets more efficiently. These innovations aid in reducing the time and resources required to locate and remove these deadly traps.
- **Education and Awareness.** Raising public awareness about the environmental consequences of ghost nets is essential. Education campaigns, community outreach



programs, and collaborations with fishing communities can help foster a sense of responsibility and encourage sustainable fishing practices.

### Conclusion.

The haunting presence of ghost nets in our oceans demands immediate attention. By recognizing the devastating impact these abandoned nets have on marine life and ecosystems, we can collectively work towards solutions. Through international cooperation, innovative technologies, and a commitment to responsible fishing practices, we can eliminate the silent killers that haunt our oceans and ensure a sustainable future for marine life. Let us take action now, before it's too late, to preserve the beauty and diversity of our oceans for generations to come.

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## **WOMEN DIVERS OF RAMESWARAM SEAWEED HARVESTER**

*(Commandant Md Shahnawaz, TM)*

### Introduction.

Seaweed is a type of marine algae whose consumption and usage by humans dates back to centuries. They may grow in oceans, rivers, lakes and other water bodies. The use of seaweed as food has risen in South-East Asian nations like Japan, China and South Korea. The migration of people from these countries to other different countries led to the demand of seaweed in the rest of the world. There are several other uses of seaweed, like it is being used in cosmetics industry, fertilizers industry and used in various chemical extracting processes. Around the world, people dive into the sea to extract marine resources. In majority of countries, diving is considered male dominated activity. But the women divers of Rameswaram are leading this field for past many decades. These women divers are collecting the *Gelidiella*, *Gracilaria*, *Sargassum*, *Turbinaria* and *Gracilariacrassa* varieties of seaweed.



*Fig 5 . Lonsdale outer reef, Antonia Cooper, 2023*





*Fig 6. Durvilleapotatorum, Joanna Smart, 2023*

Source: <https://www.imas.utas.edu.au>

**Importance of Seaweed.**

The Seaweed is unique type of plant which is primitive in nature. Generally, it lack any leaves, stems and roots. There are predominately three types of Seaweed available in the nature.



*Fig 7. Effect on seaweeds*

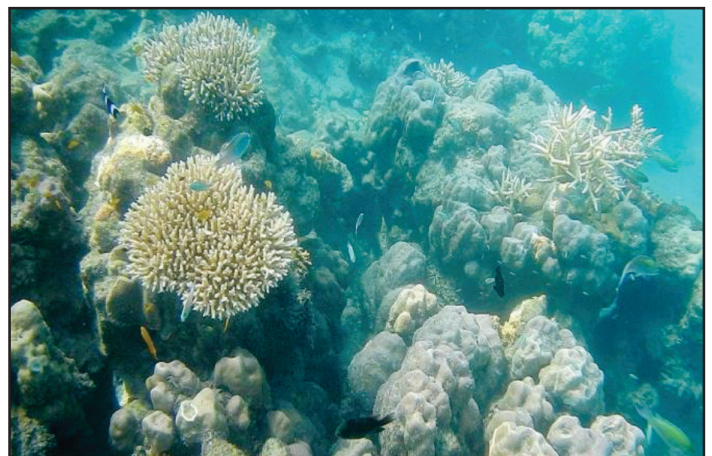
Source: <https://www.imas.utas.edu.au>

The first is the Cholorophyta (green Algae), the Phaeophyta (brown algae) and the Rhodophyta (red algae). They play important role in marine ecosystems. It provides safe habitats to thousands of marine species and protects them from threats. The large seaweeds act as a dense underwater forest and act as underwater breeding ground for fish, sea urchins and snails. Many herbivorous marine animals also feed on seaweeds. The seaweed also releases

oxygen and drives energy from nutrients present in seawater. In large water bodies, some of the nutrients are very toxic in nature and can even kill marine life. Seaweeds, found mostly in shallow waters, balance this toxicity by absorbing all excess nutrients. The seaweeds are best bio-indicator available in oceans. The blooming of algae in the water is a clear indication of an increase of toxicity in the water and a sign of marine damage. The seaweeds rely on iron for the photosynthesis process. Whenever, a healthy level of heavy metal exceeds in water, the seaweeds trap it and prevent damage to marine life. In India seaweed is considered as a cash crop and exported as a raw material. However, there is a rising trend of domestic demand for seaweed for various agro, cosmetics and pharmaceutical-based industries. Seaweed is a vital ingredient in medicines, ice-cream, toothpaste, fertilizers and many other products that we consume daily. They are also integral to the ecological balance of marine life.

**Effect of Climate change.**

Due to the increase in the surface temperature of the sea, the effects are seen in the harvesting of seaweeds. Numerous changes are visible in the ecosystems linked with the seaweed environment



*Fig 8. Bleached Coral Reef*

Source: <https://scroll.in/article/949636>



due to the direct effects of climate change. Rising sea levels, rising average temperature and increasing salinity of the water all have a prominent impact on the productivity, distribution and overall composition of seaweed. The 2004 Indian Ocean Tsunami had severe long-term damage to seaweed habitats in the region. Post Tsunami many studies have revealed the loss and long time damage to coral sea-beds and seagrass habitats.



*Fig 9. Seaweed Harvesting*

### Women Divers – Seaweed Harvesters.

Seaweed harvesting is a traditional occupation for women in Rameswaram. These women are a unique set of divers, clad in sarees with basic diving equipment and borrowed goggles. They dive into the sea to earn their living without any sophisticated gear. They dive into the sea to pluck seaweed by hand. These women divers have now emerged as the guardians of the marine biosphere of the Gulf of Mannar. For these women divers, harvesting seaweed is the only source of income. In 1986, to safeguard the marine environment, the Gol declared the Gulf of Mannar as a Marine Biosphere Reserve. Later the Gol declared a total ban on the collection of seaweed in the reserve area. This ban threatens the only source for income of these Women Divers.



*Fig 10. Women Divers*

### Implementation of Sustainable Practices.

The seaweed divers are facing increasing challenges due to the climate crisis and coastal development. Extreme weather conditions and changes in nutrient cycling are affecting their only source earnings. Government regulations to protect marine ecosystems are also bringing new obstructions to their work. The women divers decided to switch to sustainable collection practices particularly to the Gulf of Mannar area and decided to come together as a collective to protect their only source of income. They started educating each how they could protect the seaweed habitats and same time earn from it. The women divers formed a union of seaweed harvesters and agreed to conserve this precious source of income. As per agreement, they would limit seaweed collection to 12 days in a lunar month, they would have a 45-day ban period from the first of April every year, and they would stop using metal tools to scrape seaweed. Now only hand plucking of the seaweed is being practiced widely. There was a huge reduction in their usual collection in a day. They will go to sea for harvesting only for 06 days during the new moon and give a break for 09 days. Again during the next phase of the moon, they



venture out at sea. Thus, allowing the seaweed to regenerate. Earlier per day collection of seaweeds was 5 to 10 kgs, but now with new practice, the collection has gone up to 25 to 30 Kgs. It's a great example where the conservation of nature leads to an increased in income. For many years, these women divers have committed to 12 day collecting schedule and there is not a single case of breaching this code.

### ICG and CGWWA Outreach Programme.

The ICGS Mandapam and CGWWA Mandapam launched a unique outreach programme to help the Women Diver of Chinnapalam village. The village is situated in the Pamban panchayat on the island of Rameswaram. The village had a population of about 1100 people comprising around 400 families with 612 men and 562 women. Most of the people in the village are engaged in sea-based activities, including seaweed collection. There are around 200 seaweed collectors in the village. Sixty of the women seaweed collectors also participate in fishing.



*Fig 11. Women Divers*

Jointly with the active involvement of CGWWA, ICGS Mandapam undertook the project of studying the profile of the village and its settlers to provide

them required assistance. Presently these women divers are using very basic diving and safety gears for this challenging task. They wore sarees and basic diving goggles for diving. To protect their bare hands from injuries while collecting seaweeds, they warp a cloth around their fingers and fasten them with rubber bands. These divers wore normal slippers, which do not provide full protection to their feet and mostly result in cuts and bruises.



*Fig 12. Before*



*Fig 13. After*

A meeting was held with the representatives of women divers to understand the challenges faced by them. CGWWA Mandapam donated basic safety equipment useful during diving like snorkeling sets, gloves, diving shoes and hats to the women divers.





*Fig 14. Distribution of New snorkelling*



*Fig 15. Old Snorkelling Mask*

A medical awareness camp was organized at Chinnapalam and some basic first aid medicine was donated to the divers. ICGS Mandapam in collaboration with women divers carried out cleaning of the ecologically sensitive coral reef sites in the Gulf of Mannar at Krusadai, Pumurichan and Pullivasai Islands.



*Fig 16. Cleaning of the ecologically sensitive coral reef*

On 04 Aug 23, a team of 04 ICG Divers alongwith 20 women divers from Chinnapalam carried out 09 hours of diving and retrieved multiple ghost nets that trapped large numbers of fishes, most of which were found decomposed. The team cleared 90 mtr (295 feet) of ghost nets from the coral site weighing around 80 kg.



*Fig 17. Removal of ghost nets at Pullitivu Island*



*Fig 18. Women Divers with ICG team*

### **Conclusion.**

The seaweeds plays very important role in the preservation of marine ecosystem. It is essential part of food chain of many marine species and same time provide shelter and nursery grounds for juveniles. Its rich nutrients value made it as a important source of food for humans and commonly used in various agro, cosmetics and pharmaceutical based



industries. The sustainable farming and harvesting of seaweed is the need of the hour. The women divers of Rameswaram are a unique set of divers in the country. They have preserved an age-old tradition of marine activity. The livelihood of these women divers is based on the collection of seaweed. They all come together to protect their only source of income and implement a sustainable way of seaweed harvesting techniques. ICG has taken a small initiative to help these divers by donating them some basic safety equipment. The collective efforts of all stakeholders along with coastal community are very important towards preservation of the marine ecosystem.

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**FISHING FOR LITTER:  
A WAY TO CONTROL  
PLASTIC POLLUTION AND  
MARINE LITTER IN THE SEA**

{Commandant (JG) Abhishek Tripathi, ICGS Diglipur}

KIMO, *Komunernes International Miljø Organisation (Local Authorities International Environmental Organisation)* founded by the Grampian Region Council and Shetland Islands Council in Scotland, Esbjerg in Denmark and Vågsøy in Norway on 22 August 1990 with a mission to unite local governments to prevent pollution and protect, preserve and enhance the seas and coastal waters of the North-East Atlantic and Baltic regions. This Organisation, in year 2004, created a project named **“FISHING FOR LITTER”** with the idea to involve the fishermen community in collecting plastic wastes and marine litter caught during normal fishing at sea. The wastes collected during fishing are then brought back to fishing harbours in the hard-wearing bags provided to them by the organization and then handed over to the KIMO, representatives for further its proper disposal.



Fig 19. ICGS Diglipur Fishing for Litter



Since 2004, started as a small project, “FISHING FOR LITTER” at present has grown in a very giant movement to curb plastic wastes and marine litter at sea, expanding across Europe with over 80 member municipalities across 08 countries collecting tons of Marine litter and plastic waste from the sea every year only with the help of the fishermen community.



*Fig 20. ICGS Diglipur Fishing for Litter*

### Project like “Fishing for Litter” in India will be a Success or Failure.

Approx. 7500 Kms of coastline of India, spreads along nine coastal states, two groups of Islands and four union territories consisting of seven major fishing harbours, nearly 70 minor fishing harbours and 95 fish landing centres with about 2.5 Lakhs of fishing boats including deep sea fishing vessels, motorized non-mechanical fishing vessel, motorized mechanical fishing vessel and non-motorized which operates at sea for fishing from these harbours/ fish landing centres.

Looking at such a bigger figure of fishing vessels in India, the project can prove a mass movement in tackling the problem of plastic pollution and marine litter in the seas around the Indian Subcontinent, even if the involvement

of fishing boats is just 30-35 percentage of the whole of the total figure of the fishing boats operating from Indian fishing harbours. Thus, with the dedicated involvement of fishermen supported by the Central/State government’s projects like ‘Fishing for Litter’ may demonstrate a successful venture in dealing with the problem of marine litter and plastic pollution at sea in a very cost-effective manner without engrossment of additional human recourses.

### Will Indian Fishermen Participate in Such Project Willingly?

In the year 2017, Kerala witnessed an exceptional commitment from the fishing community wherein as a part of **Suchitva Sagaram (Clean Ocean)**, a project launched by the state fisheries department, some 800 fishing boats head out from the Shakthikulangara and Neendakara-the twin fishing harbours off the Kollam coast in the south Kerala, and nearly 40 fishing boats returned harbour with plastic wastes and marine litter collected at sea on daily basis during the period of the project. By 5<sup>th</sup> August, approximately 250 tons of marine litter and plastic mainly comprised of an array of bottles, polythene bags, ropes, buckets and discarded fishing nets was collected by the fishing boats and then processed at the collection centre placed at Neendakara by the fisheries department. The project was successful as claimed by the State Fisheries Department and the also it has planned to extend the project throughout the 580 km coastline of Kerala.

The project **SUCHITVA SAGARAM’s** success indicates that the fishing men community of India when supported by the Government machinery can create a mass movement in fighting the menace of





*Fig 21. ICGS Diglipur Project Like Fishing Litter*

pollution of our seas by marine litter and plastic waste.

India is the third largest fish-producing country in the world accounting for 7.96% of global production, providing income and employment as



*Fig 22. ICGS Diglipur Project Like Fishing Litter*

fishermen to more than 28 million people of its population can play a vital role in controlling marine litter and plastic wastes at sea by implementing following factors to motivate Indian fishing communities to actively and dedicatedly participate in projects about cleaner seas: -

- Enlightening fishing communities regarding the effect of marine litter and plastics waste in

the sea causing the deprivation of fish resources at sea, which in turn is affecting their livelihood.

- Involvement of state/central government machinery in providing basic infrastructure for storage and recycling of marine litter and plastic wastes collected by the fishermen during fishing at sea at various fishing harbours.
- Recognizing the efforts of the fishing communities in the cleanup of the seas through appreciating them on a national platform, will further motivate the fishing communities to participate in the project making it a grand movement.

**Conclusion.**

India being a developing nation has to get on par with various challenges including its economic challenges and challenges to protect and conserve its environment on land and also at sea. In such a situation, methods that works towards the growth of the economy of the country and also at the same time help in conserving the marine environment will prove as a path to greater success of the country. With the involvement of the Indian fishermen community augmented with the support of Central/ State machinery the implementation of projects like **“Fishing for Litter”** & **“Suchitva Sagaram”** throughout the Nation will flourish as a movement towards cleaner seas, setting up an example for the World.

**Reference:**

<http://www.kimointernational.org/>



**NEW TECHNOLOGIES IN THE FIELD OF OIL POLLUTION MONITORING AND RESPONSE**

{Commandant Kushal Singh Bora, Adm Officer (CGSB)}

**Introduction.**

The devastating impact of oil pollution on our environment and the ecosystem has spurred a global effort towards developing cutting-edge technologies for effective monitoring and response systems. The last few decades have seen numerous devastating effects of oil pollution on humankind warranting us to strive together towards a greener and sustainable future, thereby a number of government and private organisations including innovators and researchers are coming together to push the boundaries of science and engineering to combat oil pollution.

The new emerging technologies and innovations that are revolutionizing oil pollution monitoring and response systems towards paving the way for a greener future are enumerated below:-

- **Drones for Aerial Surveillance.** Unmanned aerial vehicles have emerged as valuable tools for oil spill monitoring. Equipped with

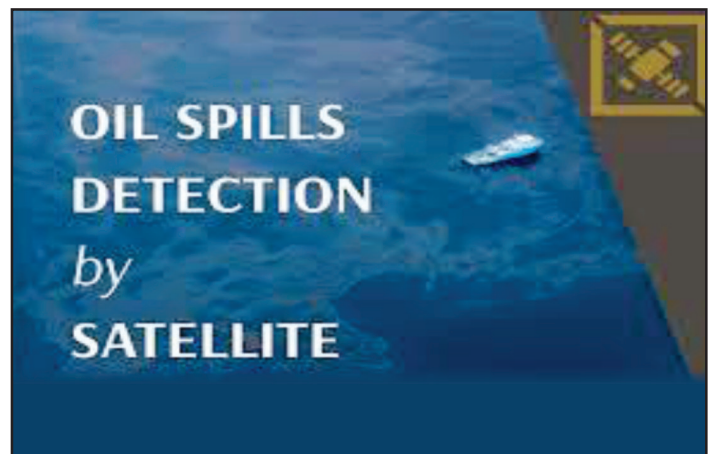


*Fig 23. Aerial Surveillance*



*Fig 24. Aerial Surveillance*

high-resolution cameras with advanced sensors can effectively survey large areas and provide real-time data on oil spill locations, facilitating containment efforts and minimizing the environmental damage. The integration of artificial intelligence and machine learning algorithms enables automated detection and classification of oil slicks, optimizing the monitoring process.



*Fig 25. Satellite imaging*

- **Satellite Imaging for Global Coverage.** The satellite imaging technology has become a game changer in monitoring the oil spill on a global scale. Satellites equipped with synthetic aperture radar (SAR) and high-end infrared sensors will provide real time data to researchers to monitor the large expanses of oceans and even identification of oil



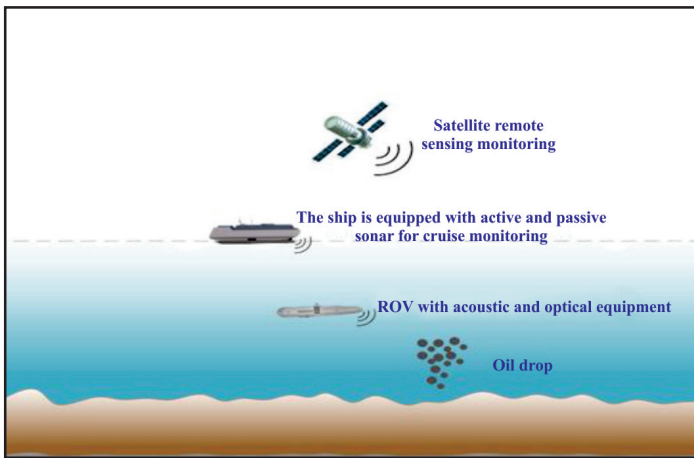


Fig 26. Satellite imaging

spills even areas that are remote, shallow and inaccessible. The continuous monitoring capability of satellites ensures early detection of spills, enabling rapid response and mitigation actions, thereby preventing further escalation of the environmental catastrophe.

- **Autonomous Underwater Vehicles (AUVs).** Oil spills can have catastrophic impacts beneath the water surface, impacting marine life and ecosystems. The AUVs can be revolutionizing oil pollution monitoring systems in the deep sea. These unmanned vehicles can navigate autonomously, collecting data on water quality and oil concentrations and tracking the movement of spilled oil. Equipped with advanced sensors



Fig 27. Autonomous Underwater Vehicles (AUVs)8

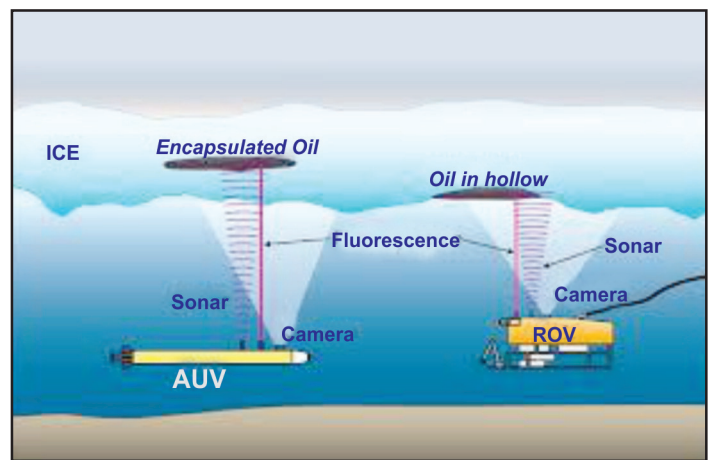


Fig 28. Oil spill Monitoring

and sonar systems, AUVs can provide invaluable insight into the spread of oil underwater, helping scientists, researchers to design/ model the response design for targeted clean-up strategies.

- **Oil-Eating Microorganisms for Bioremediation.** The use of living organisms to break down pollutants, has shown promising results in oil spill cleanup. Researchers have identified naturally occurring oil-eating microorganisms that can consume hydrocarbons, thereby effectively degrading spilled oil. The Genetic field of Engineering is being explored to enhance the capabilities of these microorganisms further. Implementing the bioremediation technologies offer a more eco-friendly approach

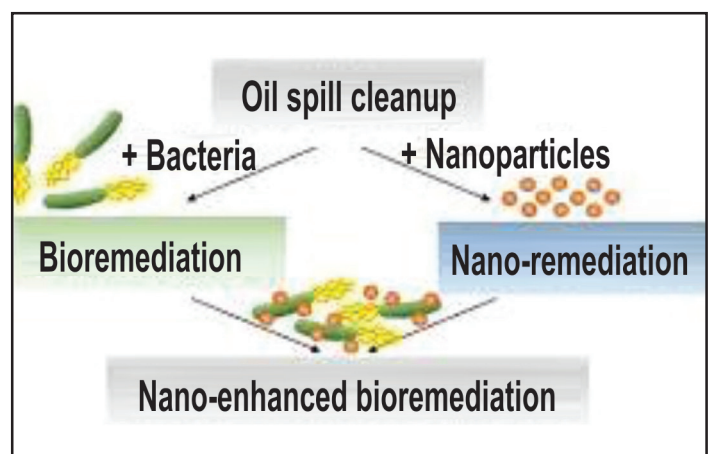


Fig 29. Oil Spill cleanup



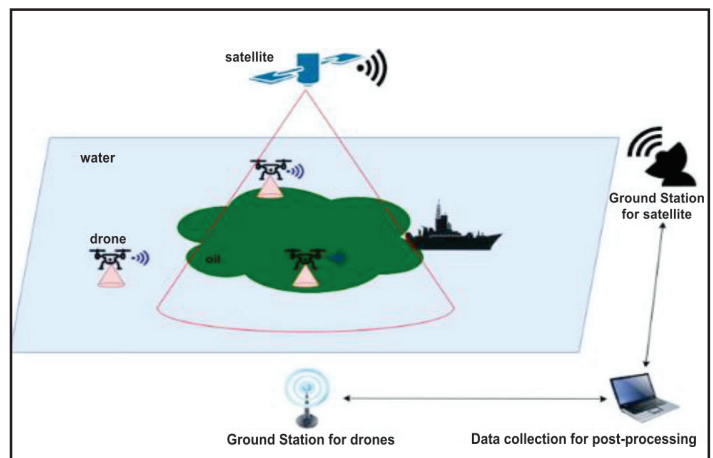
to combat oil pollution, reducing the use of chemical dispersants and their potential harmful effects on marine life.



*Fig 30. Oil-Eating Microorganisms*

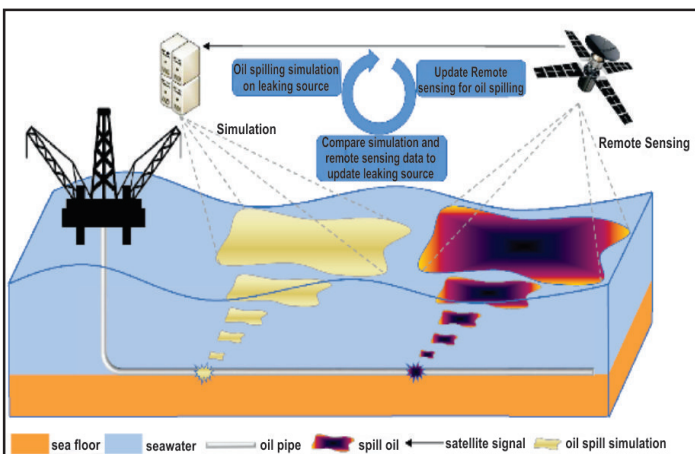
- Nanotechnology - Infused Sorbents.** Nanotechnology has opened new avenues in oil spill cleanup by introducing innovative sorbent materials. Nano sorbents, composed of nano-materials with high surface areas, exhibit enhanced oil absorption capacities. These materials can be utilized in various forms, such as floating booms, sponges or even form of powders to effectively soak up oil from the water's surface. Additionally, these sorbents can be reused after oil extraction, reducing the financial and environmental impact of cleanup operations.

- Machine-based Predictive Modeling.** The integration of machine learning algorithms with historical data has enabled predictive modelling of oil spill patterns and their potential impact on coastal regions. By analyzing environmental variables, ocean currents and historical spill data, these models can forecast the trajectory and severity of oil spills. This information allows authorities to proactively mobilize response efforts and deploy resources to protect sensitive areas.

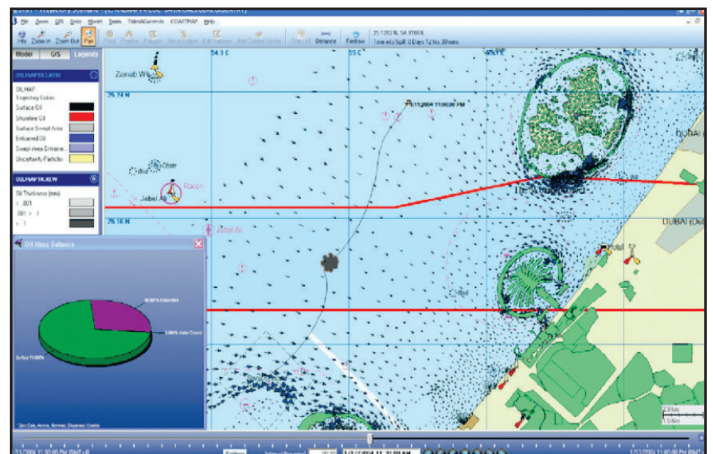


*Fig 32. Predictive Model*

The emergence of new technologies in oil pollution monitoring and response system offers greater opportunities for combating oil spills and paving the way for greener future.



*Fig 31. Predictive Modeling*



*Fig 33. Monitoring Chart*



These innovative approaches facilitate early detection, efficient containment and targeted cleanup, reducing the ecological impact of oil spills. As we continue to invest in research and development, collaboration between governments, industries and research institutions becomes paramount to ensure a sustainable and cleaner planet for generations to come. Thereby embracing new age technology and fostering a collective commitment, we can mitigate the devastating effects of oil pollution and pave the way towards a healthier, thriving Earth.



*Fig 34. Chart*

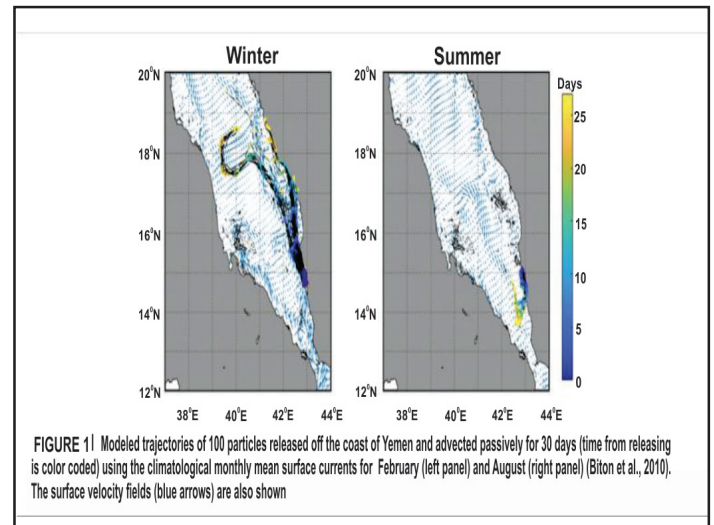
**SPECTACLE TO  
A SPECTRE SAVED -  
THE CASE OF FSO SAFER**

*(DIG Rajesh Mittal, ICG)*

Floating Storage Offloading (FSO) ship Safer, is a Yemeni ship about 5 nautical miles from its coast. FSO Safer is carrying more than 1 million barrels of crude oil onboard. The vessel was originally built in 1976 in Japan with overall length 362 m and 406,640 DWT. Subsequently, it was converted into

an unpropelled storage vessel and was moored south of the coast of Al-Jazirah. The vessel is abandoned since 2015 as a fallout to civil war in the area and has deteriorated since then. The potential catastrophe is shown in Figure 1, as simulated (K, et al., 2020).

Initial inquiry establishes the fact that FSO Safer may now be classified as a ‘wreck’ under Article 1(4) of the Nairobi International Convention on the removal of wrecks, 2007. Secondly, the liability under the established international regime



**FIGURE 11** Modeled trajectories of 100 particles released off the coast of Yemen and advected passively for 30 days (time from releasing is color coded) using the climatological monthly mean surface currents for February (left panel) and August (right panel) (Biton et al., 2010). The surface velocity fields (blue arrows) are also shown

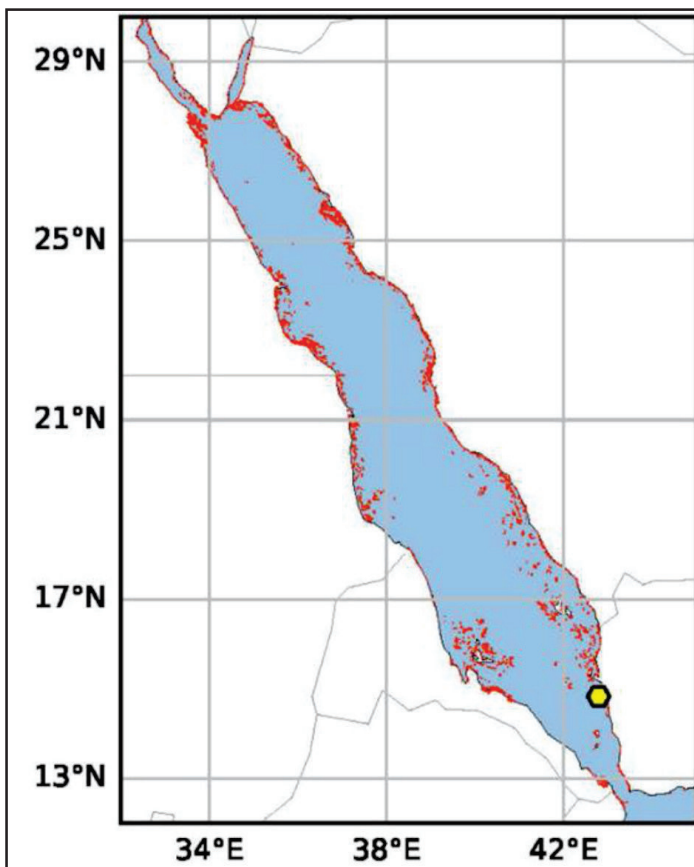
*Fig 35. Potential Catastrophe*

clearly makes Yemen, the Flag State of the vessel to be responsible for the vessel and any pollution emanating there from under Article 194 of the United Nations Convention on Law of the Sea, 1982 (UNCLOS) as well as under Article 1 & 2 of the International Convention for the Prevention of Pollution from Ships 1973/1978 (MARPOL). Thirdly, the insurance and liability regime proves frustrated in light of the war clause. Therefore, it may be seen that there is no single legal regulatory framework for the operation of FSOs or similar structures at sea.



Such a complex situation only leaves the option of international community to come together as two organs of the United Nations (UN); the International Maritime Organisation (IMO) and the United Nations Development Programme (UNDP) started a campaign called ‘pledging’ to raise awareness and necessary funds (estimated USD 140 Million). Interestingly, the response by neighbouring States of Red Sea has been lukewarm. Yemen itself is in the throes of a bloody civil unrest and in such a situation, any reparations may be offset against Article 2 of the UN Convention on Responsibility of States for Internationally Wrongful

UNDP is implementing this complex and high-risk project. The operation on the water comprises two phases (Source –The UN):



*Fig 36. Map of the Red Sea with reefs denoted in red and the Safer tanker's location marked in yellow (UNEP-WCMC et al., 2018)*

Acts, 2001 (Elements of an internationally wrongful act of a State) as an ‘omission’ or ‘force majeure’.



*Fig 37. FSO Safer; Source–The UN*

- An emergency phase, during which a leading global salvage company will inspect the Safer and make it safe for the operation, transfer the oil into a replacement vessel, and ready the FSO Safer to be towed away; and
- The installation of a catenary anchor leg mooring (CALM) buoy to which the replacement VLCC will be connected as safe long-term replacement capacity for the Safer, and the towing and scrapping of the Safer.

***The revised budget for the plan reflects the current market conditions***

As outlined in the UN's initial plan in April 2022, the budget for the two-track operation was \$144 million. While the adoption of the CALM buoy solution initially lowered the estimated budget, the rising prices of VLCCs and other factors pushed the working budget higher. The current budget is \$148 million.

The current budget gap for the emergency phase of the operation is \$29.4 million (against the \$99.6 million that has effectively been raised).

The United Kingdom and the Netherlands are co-hosting a pledging event on 4 May with the aim of filling the funding gap for the first phase of the operation and raising the \$19 million needed for the critical second phase. The UN is simultaneously considering internal means to bridge the financial gap.

As reported at the IMO website, the ship-to-ship transfer of more than 1.1 million barrels of oil from the FSO Safer to a replacement tanker, the Yemen

(formerly known as the Nautical), has been completed on 11 Aug 23.

Rapidly reducing gap of distinction between natural and manmade disasters is a contemporary phenomenon. Moreover, the International Humanitarian Law (IHL) vis-à-vis other legal regimes do not operate in isolation. The rise of 'Non-State Actors' effectively governing large areas, over long period of times, makes application of both national as well as international obligation an impasse. Therefore, the link between environment and peace is fraught with multi-dimensional issues. A recent Report defines environmental peace building as "multiple approaches and pathways by which the management of environmental issues is integrated in and can support conflict prevention, mitigation, resolution and recovery" (Zabara & Zumbrägel, 2022). Whereas, long-term and comprehensive aspects essentially involve restorative and sustainable environmental peacebuilding (Dresse et al. 2019; see also Carius 2007; Fröhlich 2021). Surprisingly the liability and compensation regime for transboundary pollution damage from offshore exploration and exploitation is non-existent even now though guidelines are available through IMO (Doc. LEG/104/14/2, Annex, 21 Feb 2017).

The situation in India is not so different, albeit absence of conflict is distinct. In the year 2022 alone, three major incidents of shipwrecks, MV Princess Miral, MT Parth and MV Global King-1 occurred in Indian waters. It is a considered opinion that the existing provision in Part XIII of the Merchant Shipping Act, 1958 relating to wreck removal are not adequate in dealing with increasing amount of wrecks on the coast of India. The Merchant Shipping Bill,

2020 and Indian Ports Bill, 2022 are welcome steps towards further strengthening and harmonising municipal law with international legal regime aimed to implement a clear policy on shipwrecks and adopt a unified, informed and comprehensive system for dealing with wrecks. Lest spectacle of efficient maritime trade may turn into an environmental spectre.



**REPORTS**

**WORLD WATCH**

**RESIDENTS HIT BY DIZZINESS AND FEVER AS OIL SPILL BLANKETS COAST OF PHILIPPINE ISLAND**

Source: <https://edition.cnn.com/2023/03/09/asia/philippines-oil-spill-residents-tourism-impact-intl-hnk/index.html>

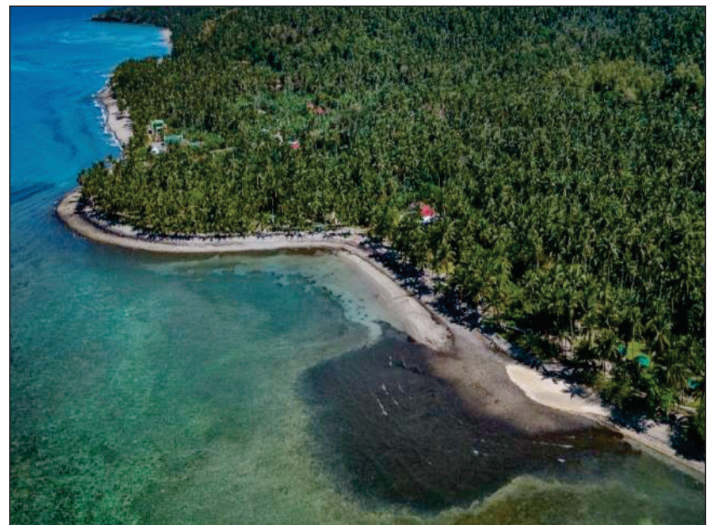
As per the official statement, MT Princess Empress tanker which was carrying 800,000 liters (211,340 gallons) of industrial fuel oil, sank off the coast of Manila on 28 Feb, bringing forth severe consequences both for the residents and tourists, as well as for the environment and the local economy in the region. According to the Department of Environment & Natural Resources (DENR), the sunken vessel is estimated to be releasing oil at a rate of 35,000 to 50,000 liters (around 9,240 to 13,200 gallons) a day. The authorities have declared a state of calamity in nine towns of the province while imposing ban on



*Fig 38. An oil slick from the sunken tanker MT Princess Empress along a shoreline on March 8, 2023, in Pola, Oriental Mindoro, Philippines.*

fishing and swimming. The repercussions of this oil spill have been detrimental, resulting in severe health issues amongst individuals, while also adversely impacting the surrounding ecosystem and economic activities.

As per the statement given by Jennifer Cruz, the mayor of Pola, to CNN affiliate CNN Philippines, more than 50 residents have fallen ill, reporting symptoms of cough, dizziness, eye irritation and fever, with the number of sick people still on the rise. According to the Mayor, oil is already covering mangroves, which play a role in preventing coastal erosion and offer protection from extreme weather events like the typhoons that regularly hit the Philippines. The graphics from Pola beach have been reported to show black pools of oil floating in the water and drifting onto



*Fig 39. Oil coats the shoreline in Pola, Oriental Mindoro, Philippines.*

the shore against a lush backdrop of palm trees, while responseteams pick up fuel-stained debris by hand.

Many individuals have been reported to experience dizziness and fever shortly after the

incident. The inhalation of toxic fumes released from the spilled oil may have led to this adverse health impact. The emissions of volatile organic compounds found in the oil can irritate the respiratory system and cause symptoms such as dizziness, headache, and nausea. Additionally, some individuals might have come into direct contact with the oil, leading to skin irritations and other related ailments.

Aside from the human toll, the environmental consequences of the oil spill are extensive with the scale of impact yet to be determined. The spill could adversely affect at least 21 marine areas, harming sea-grass beds, coral reefs, and mangroves if not contained in due time, said the Department of Environment & Natural Resources (DENR), while also adding that the spill has reached the Cuyo Island group in line with the forecast by the University of the Philippines Marine Science Institute according to which the spill will spread further, threatening northern Palawan.

Another significant consequence of the oil spill is the adverse impact on various economic activities in the region. The destruction of coral reefs not only disrupts the fragile balance of the marine ecosystem but also reduces the attractiveness of the region for tourists, impacting the local economy as well. Oriental Mindoro is touted as the country's emerging eco-tourism destination, attracting visitors from both within the country and abroad. However, the incident has significantly thwarted tourist inflows. The jeopardized reputation of the region as a tourist destination is evident, resulting in significant losses in revenue for the local businesses and stakeholders who rely heavily on tourism. Additionally, the spill has disrupted the fishing industry, which sustains many livelihoods in



*Fig 40. Coast guard personnel clean up the oil slick in Pola.*

the region. The pollution of coastal waters has forced the temporary closure of fishing zones, depriving fishermen of their primary source of income.

The Japanese ambassador to Manila on Wednesday tweeted about the advent of the Japanese relief team to assist with the cleanup. Meanwhile, the authorities are still scrambling to recover the sunken tanker. As a precautionary measure, the Philippine Coast Guard has deployed personnel to monitor the resort island of Boracay, a major tourist destination that only reopened in 2018 following rehabilitation work. As per the statement released by Philippine President Ferdinand Marcos Jr., the cleanup is expected to be completed within four months.



**PROHIBITION ON THE USE AND CARRIAGE OF HEAVY FUEL OIL AS FUELS IN ARCTIC WATERS COMES INTO EFFECT IN 2024**

Source: <https://www.marineregulations.news/prohibition-on-the-use-and-carriage-of-heavy-fuel-oil-as-fuels-in-arctic-waters-comes-into-effect-in-2024/>

### Amendments to MARPOL Annex I.

A prohibition on the use and carriage of heavy fuel oil as fuels in Arctic waters comes into effect in 2024.

As part of amendments to MARPOL Annex I, MEPC.329(76), which entered into force on 1 November 2022, Regulation 43A in Chapter 9 of the convention means the use and carriage of oils listed in Regulation 43.1.2 of MARPOL Annex I as fuel by ships will be prohibited in Arctic waters, as defined in MARPOL Annex I, Regulation 46.2, on or after 1 July 2024.

### Optional waivers until 2029.

While consulting IMO guidelines, the Administration of a Party to MARPOL Annex I, whose coastline borders Arctic waters, may temporarily waive the above requirements for ships flying the flag of that Party while operating in waters subject to the sovereignty or jurisdiction of that Party.

Such waivers issued will not apply on or after 1 July 2029.

### Other exemptions until 2029.

For ships with oil fuel tanks that comply with Regulation 12A of MARPOL Annex I or Regulation 1.2.1 of Chapter 1 of Part II-A of the Polar Code, the use and carriage of oils listed in Regulation 43.1.2 of MARPOL Annex I as fuel will be prohibited in Arctic waters, as defined in Regulation 46.2 of MARPOL Annex I, on or after 1 July 2029.

### Exception to new rules.

An exception to these new requirements is for ships engaged in securing the safety of ships or in search and rescue operations, and ships dedicated to oil spill preparedness and response.

When prior operations have included the use and carriage of oils listed in MARPOL Annex I, Regulation 43.1.2 as fuel, the cleaning or flushing of tanks or pipelines is not required.

**UPDATED UNIFIED INTERPRETATIONS TO MARPOL ANNEX VI**

International Maritime Organization (IMO), on 16 Dec 2022, published a circular annexing the unified interpretations to MARPOL Annex VI, revoking MEPC.1/ Circ.795/Rev.6.

At its 79<sup>th</sup> session held from 12-16 Dec 2022, the Marine Environment Protection Committee approved unified interpretations to MARPOL

Annex VI which are as follows:-

- Extension of scope of the unified interpretation of regulation 18.3 of MARPOL Annex VI concerning the use of biofuels to include synthetic fuels.
- Clarification regarding reporting of boil-off gas (BOG) consumed on board ships in the IMO Data Collection System (IMO DCS).
- Clarification of EEDI reporting requirements in regulation 22.3 of MARPOL Annex VI.
- Issues related to the development and verification of the SEEMP and the issuance of the Statement of Compliance for CII reporting.

The revised and comprehensive text containing all current unified interpretations for MARPOL Annexure VI, including those detailed in circular MEPC.1/Circ.795/Rev.6, can be found in the annexure. These interpretations correspond to the regulations in the 2021 Revised MARPOL Annexure VI, which were adopted through resolution MEPC.328(76) and became effective on November 1, 2022. Member Governments are encouraged to use these unified interpretations when applicable and to inform relevant parties about them. Additionally, Member Governments are also encouraged to take note of MEPC.1/Circ.897, which provides cross-reference tables comparing the 2021 Revised MARPOL Annexure VI with the previous version.

**ZERO CARBON GOALS AND  
"FUND AND REWARD" SYSTEM:  
ICS SUBMITTED A REVISED  
PROPOSAL TO THE IMO**

Source: <https://www.marineregulations.news/zero-carbon-goals-and-fund-and-reward-system-ics-submitted-a-revised-proposal-to-the-imo/>

The International Chamber of Shipping (ICS), representing more than 80% of the global merchant fleet, has presented an updated proposal to the International Maritime Organization (IMO) on 15 Feb 23. This proposal reconfirms the industry's commitment to achieving net-zero carbon emissions by 2050. It outlines a 'Funds and Reward' system where ships would make mandatory contributions based on CO<sub>2</sub> emissions to an IMO fund. This fund would reward those pioneering the use of low-carbon alternative fuels like methanol, ammonia, hydrogen, sustainable biofuels, synthetic fuels, and new technologies such as carbon capture.

The ICS suggests that the contribution by ships per tonne of CO<sub>2</sub> emitted could be set at a relatively low level by the IMO to bridge the price gap between alternative and conventional fuels. These funds would incentivize the adoption of low-carbon fuels and support their production in developing countries while also aiding the development of bunkering infrastructure.

Simon Benett, Deputy Secretary General of ICS, emphasizes the simplicity of this mechanism and aims for its adoption by the IMO by 2024. The level of contributions to the IMO fund would be determined by governments.



The ICS's proposal envisions an annual fund of around USD 10 billion, which might necessitate an initial contribution of about US \$50 per tonne of marine fuel oil consumed. It argues that such contributions would have a minimal impact on States, as supported by previous assessments.

Guy Platten, Secretary General of ICS, underscores the need for government support to catalyze the shipping industry's transition to net-zero fuels, emphasizing the fairness and effectiveness of a global contribution by ship owners into a fund.

The submission builds upon the growing government support for an economic measure to accelerate the energy transition discussed at MEPC 79 in December 2022. It provides additional details for decision-making at MEPC 80 in July 2023 regarding GHG reduction measures and outlines the regulatory package, including suggested amendments to MARPOL Annex VI, necessary for implementing the Fund and Reward mechanism by 2024.

The eligibility of alternative fuels for rewards from the IMP fund will depend on IMO Guidelines on carbon lifecycle assessment, set to be adopted at the next MEPC meeting.



## Indian Coast Guard Calendar of Pollution Response Training and Exercise - 2023 (Oct-Dec 23)

Date	Venue	Event	Coordinator
.04-05 Oct 23	Off Chennai Port	Area Level PR Exercise	To be conducted by Chennai Port Trust
09-13 Oct 23	CGPRT(A&N), Port Blair	IMO Level-I Training	CGPRT(A&N), Port Blair
09-13 Oct 23	CGPRT(NW), Vadinar	IMO Level-I Training for ICG and Stakeholders	CGPRT(NW), Vadinar
09-13 Oct 23	HMS Rehman/ VITS Mumbai	IMO Level-II Training for ICG and Stakeholders	M/s OSCT, Mumbai and CGPRT(W), Mumbai
25-26 Oct 23	CGDHQ-14, Port Blair	PR Seminar/ Workshop and Mock Drill/ Table Top Exercise	CGDHQ-14, Port Blair
01-03 Nov 23	Off New Mangalore	Regional Level PR Exercise (Day 1 – Paper Exercise, Day 2 – Sea Exercise and Day 3 – Shoreline Cleanup)	To be conducted by CGRHQ(W)/ CGDHQ-3, New Mangalore.
06-10 Nov 23	CGPRT(E), Chennai	IMO Level-I Training for ICG Staff	CGPRT(E), Chennai
20-24 Nov 23	CGPRT(W), Mumbai	IMO Level-I Training for ICG Officers/SOs & EPs	CGPRT(W), Mumbai
21-23 Nov 23	Paradip	Regional Level PR Exercise (Day 1 – Paper Exercise, Day 2 – Sea Exercise and Day 3 – Shoreline Cleanup)	To be conducted by RHQ(NE)/ DHQ-7, Paradip.
29-30 Nov 23	CGDHQ-12, Kavaratti	PR Seminar/ Workshop and Mock Drill/ Table Top Exercise	CGDHQ-12, Kavaratti
04-08 Dec 23	CGPRT(W), Mumbai	IMO Level-I Training for Stakeholders	CGPRT(W), Mumbai
11-14 Dec 23	CGPRT(W)/ HMS Rehman	IMO Level-III Training for ICG and Stakeholders	M/s OSCT, Mumbai and CGPRT(W), Mumbai
11-15 Dec 23	CGPRT(E), Chennai	IMO Level-I Training for ICG officers	CGPRT(E), Chennai
12-14 Dec 23	Port Blair	Regional Level PR Exercise (Day 1 – Paper Exercise, Day 2 – Sea Exercise and Day 3 – Shoreline Cleanup)	To be conducted by RHQ(A&N)/ CGDHQ-14.
14-15 Dec 23	Off VOC Port, Tuticorin	Area Level PR Exercise	To be conducted by VOC Port, Tuticorin

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