North American Marine Environment Protection Association

NAMEPA

MARPOL & YOU

Understanding Your Role in Marine Environmental Protection

POCKET GUIDE

Acknowledgements

This booklet was developed from NAMEPA's *Marine Environmental Protection & Awareness (MEPA) Program* for maritime professionals. Its development was made possible through the generous support of the National Fish & Wildlife Foundation, and through the expertise and partnership of ProSea Marine Education.

These MEPA modules have been expanded and adapted into a resource for maritime professionals in all regions—advancing environmental protection, MARPOL compliance, and responsible, resilient practices across the global maritime sector.

About NAMEPA

The North American Marine Environment Protection Association (NAMEPA) is a maritime industry-led organization of environmental stewards preserving the marine environment by promoting sustainable marine industry best practices and educating seafarers, students and the public about the need and strategies for protecting global ocean, lake, and river resources.

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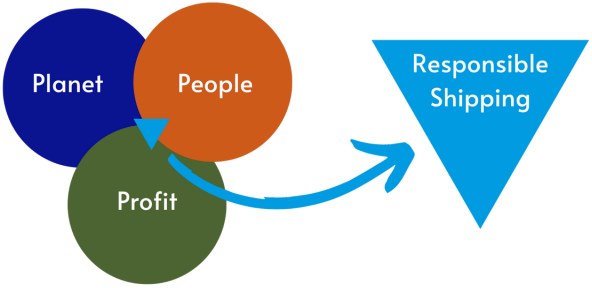
SHIPPING & THE ENVIRONMENT

Over 90% of the world's trade moves by ship. Shipping is a major part of the **global economy**. More than 55,000 merchant ships and 1.5 million seafarers work around the world to make this possible.

Shipping is also one of the most efficient ways to move goods. It uses less energy than many other types of transportation, and the industry is working to reduce pollution and protect the environment.

Responsible shipping means meeting economic needs while also caring for the environment and society. It supports today's needs without harming the future. In shipping, protecting the environment and supporting the economy can work together—not against each other.



THE MARINE ENVIRONMENT

The ocean covers about 71% of Earth's surface and holds 97% of the planet's water, making it essential for life. Beyond supporting global shipping and trade, the ocean produces around half of the oxygen we breathe. It also provides food for billions of people, helps regulate Earth's climate, and supports economies worldwide.

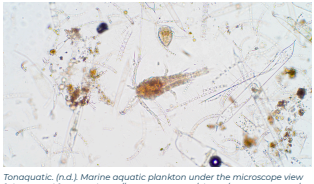
The ocean contains many different **ecosystems**. These include rocky and sandy coastlines, the open ocean, coral reefs, seagrass meadows, mangrove forests, kelp forests, and intertidal zones. Each ecosystem has unique species and environmental conditions.

Kandi, H. (n.d.). Coral reef teeming with life [Photograph]. Canva. https://www.canva.com/photos/MAGsX7MqwpI/

Tanaka, C. (n.d.). Scenic mangrove trees in Indonesian wetlands [Photograph]. Canva. https://www.canva.com/photos/MAGm7nU0U_Q/

Scientists estimate that about 2.2 million species live in the ocean. While we often think of large marine animals, most ocean life depends on tiny plankton. Plankton form the base of ocean food webs, and without them, much of marine life could not survive.

Oceana. (n.d.). Great white shark [Photograph]. https://oceana.org/marine-life/great-white-shark/



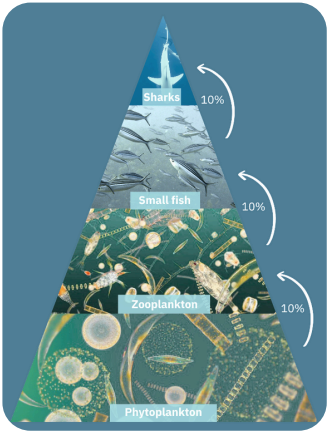
Tonaquatic. (n.d.). Marine aquatic plankton under the microscope view [Photograph]. Canva. https://www.canva.com/photos/MADEYFcWZVE/

HOW DOES THE SEA WORK?

Plankton plants perform **photosynthesis**, using sunlight energy to convert carbon dioxide and water into glucose (sugar). They contribute to about 95% of production in the ocean; the other 5% is produced by seaweed and other plants.

The organic matter produced is passed on to other marine organisms through the food chain. In a food chain, primary producers are eaten by plant-eating organisms (like plankton animals), which in turn are consumed by animal-eating organisms such as fish.

As energy moves up the food chain, only 10% of the energy is transferred from one level to the next. The remaining 90% is used for movement, growth, and other life functions. This means that the higher an organism is in the food chain, the fewer individuals there are at that level.



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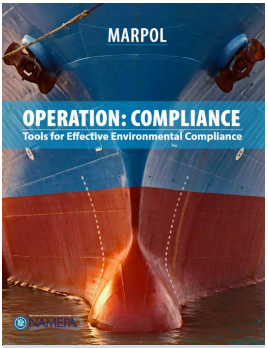
Knowledge of the marine environment helps to identify the impacts of shipping and forms the basis of regulations to protect the marine environment.

DID YOU KNOW?

A teaspoon of sea water contains 500,000 plankton plants, 5 million bacteria and 50 million viruses.

ENVIRONMENTAL REGULATIONS

The **International Maritime Organization** (*IMO- the United Nations specialized agency responsible for the safety and security of shipping, along with the prevention of pollution from ships*) has adopted a wide range of measures to prevent and control pollution caused by ships and to mitigate the effects of any damage that may occur because of maritime operations and accidents.



You can access NAMEPA's Operation: Compliance at www.namepa.net/marpol

MARPOL is the International Convention for the Prevention of Pollution from Ships. It accounts for approximately 99% of the world's merchant tonnage and has significantly contributed to a substantial decrease in pollution from international shipping. It has 6 annexes covering:

Annex I: Oil	**Annex II**: Noxious Liquids	**Annex III:** Packaged Goods
Annex IV: Sewage	**Annex V** Garbage	**Annex VI**: Air Emissions

Additionally, the IMO addresses antifouling paint, ballast water management, and ship recycling through other conventions.

Now, let's look at some environmental impacts of shipping.

LIQUID WASTE

Like many sectors, the maritime sector produces operational waste. It is actively working to reduce the environmental impact of liquid waste.

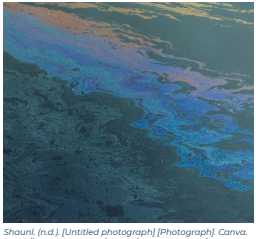
OIL

MARPOL Annex I addresses the prevention of pollution by oil from ships.

While major oil spills draw most public attention, even a small spill can cause serious harm. The impacts of oil do not only depend on the size of the spill, but also on its location (for example, how close to the coast) and timing (for example, during the breeding season of sea birds).

One well-known effect of oil spills at sea is bird mortality, but oil also impacts small organisms. Studies have demonstrated that oil in the water column is toxic and lethal to plankton. In addition, industries such as tourism and fishing can suffer economic losses from oil pollution.

Jouni. (n.d.). An oil spill affecting marine life, a pelican covered in oil [Photograph]. Adobe Stock. https://stock.adobe.com/images/an-oil-spill-affecting-marine-life-a-pelican-covered-in-oil/598438693



Shaunl. (n.d.). [Untitled photograph] [Photograph]. Canva. https://www.canva.com/photos/MAEENwSJCWI/

Since the implementation of MARPOL Annex I, oil spills from ships have decreased significantly, demonstrating that effective regulation can make a real difference in protecting our marine environment.

HAZARDOUS MATERIALS & CHEMICALS

Regulations to prevent hazardous materials and chemicals from polluting the marine environment can be found in **MARPOL Annex II** and **Annex III.**

NOXIOUS LIQUIDS

The shipping industry uses and transports **chemicals**. Around 2,000 of them are transported on a regular basis. During transport, chemicals can enter the marine environment and may cause harm. Chemicals can cause problems for marine life such as effects on reproduction, developmental changes, cancer and death.

Uğurhan. (n.d.). Chemical products [Photograph]. Canva. https://www.canva.com/photos/MAEEd5coFMA/

The impact of any chemical depends on its type, quantity, and toxicity, with effects varying widely across different substances and species.

SEWAGE

Sewage discharges from ships are regulated under Annex IV of MARPOL.

Sewage from toilets, medical units and live animal spaces contains nutrients. Sewage is no problem in the open ocean but may cause problems in coastal areas. There, nutrients from sewage can lead to oxygen shortage and the death of marine organisms-a process called eutrophication.

Kovtun Hydrobio, O. (n.d.). Eutrophic settling pond overgrown with aquatic plants — Piscia [Photograph]. Canva. https://www.canva.com/photos/MAGMDwHeQzc/

SOLID WASTE

MARPOL Annex V prohibits the discharge of solid waste—commonly referred to as garbage—into the ocean from ships.

If properly managed, solid waste does not need to harm the environment. However, once it enters the ocean, it becomes marine litter or marine debris and can have devastating effects on human and marine life.

About 10 million tons of litter enters the ocean every year. About 80% of this comes from land-based sources. At sea, the main contributors include the fishing sector, recreational vessels, and commercial shipping.

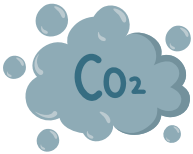
Around 60-80% of all marine debris that is found worldwide is plastic. Plastic does not biodegrade; instead, it breaks down into microplastics (less than 5 mm) and nano plastics (less than 100 nanometers), a process that can take decades.

> **Plastic in the ocean is a global problem. It affects marine life, people, and the economy.**

AIR EMISSIONS

MARPOL Annex VI sets limits on air pollution from ships. Ship engines are the main source of air emissions, releasing various compounds that contribute to environmental and health problems. For example:

Carbon dioxide (CO_2): During combustion, the carbon (C) from the fuel combines with oxygen (O_2) from the air to produce carbon dioxide (CO_2). CO_2 contributes to climate change.



Although shipping is one of the most energy-efficient modes of transport, with lower CO_2 emissions per ton-kilometer than road or air, its contribution to global emissions remains significant. Like most sectors, shipping is working to reduce its climate impact.

Sulfur dioxides (SOx), Nitrogen Oxides (NOx), and Particulate Matter (PM): These are also formed during combustion and can cause acid rain and health issues for humans.

Reducing emissions is not only essential for protecting the marine environment—it also improves air quality and benefits human health, including that of coastal communities and seafarers who work and live near engine exhaust every day.

ENERGY & CLIMATE CHANGE

Life on Earth is made possible by **energy** from the sun. It warms the planet and drives the climate. Thanks to the natural greenhouse effect, the Earth is a comfortable place to live with an average temperature of 15°C (59°F).

However, over the past decades, concentrations of greenhouse gases - especially CO_2 - have increased significantly in the atmosphere due to the burning of fossil fuels. As a result, the temperature on Earth has already risen by around 1.1°C (2°F) since 1880.

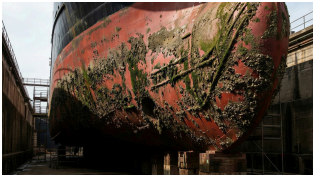
There is strong scientific consensus that climate change is happening and that it is largely caused by human activities, already leading to more frequent heatwaves, floods, and wildfires.

While the future impacts of climate change are hard to predict, climate models indicate continued temperature rise. This will likely cause more extreme weather events, changes in the survival of many species, sea level rise, ocean acidification, coral bleaching, and health impacts.

The IMO is developing specific regulations for the shipping industry with the aim to improve **energy efficiency** and reduce greenhouse gas emissions.

OTHER RELEVANT IMO CONVENTIONS

ANTIFOULING CONVENTION



The 'International Convention on the Control of Harmful Anti-Fouling Systems on Ships' prohibits the use of harmful organotin (organic compounds containing tin) in anti-fouling paints used on ships and creates a possibility to prevent the potential future use of other harmful substances in anti-fouling systems.

BALLAST WATER CONVENTION

The regulations for the management of ships' ballast water are described in the 'International Convention for the Control and Management of Ships' Ballast Water and Sediments'. The Convention requires all ships to manage their ballast water to avoid the transfer of invasive species from one region to another.

SHIP RECYCLING CONVENTION

The IMO Convention on 'Safe and Environmentally Sound Ship Recycling' contains guidelines for human and environmentally friendly recycling of ships. Every ship must have a list of all materials present on board that may be hazardous to man and nature, including materials present in the ship's structure, systems and equipment. Ship owners are responsible for maintaining and updating this IHM (Inventory of Hazardous Materials) throughout the life of the ship.

EVERYONE CAN MAKE A DIFFERENCE!

Every seafarer, including ratings, officers, and shoreside personnel, can contribute to a more responsible maritime industry. First and foremost, seafarers contribute by following their company's procedures and all applicable international, national, and local regulations. While compliance benefits the company, it also reflects each individual's professionalism and personal responsibility.

Complying with environmental and safety regulations is the right thing to do. Personal commitment begins when seafarers trust that their company genuinely values compliance and responsible practices.

By staying engaged and adopting a proactive mindset, personal motivation and a sense of responsibility lead to compliance by commitment and inspire consistent and committed action.

Making a difference in the maritime industry extends beyond regulatory compliance and operational responsibility; it also includes caring for the people who make global trade possible. Seafarers spend long months at sea, often far from family, support networks, and familiar surroundings. Supporting their well-being, both on board and ashore, is an essential part of building a truly responsible and sustainable maritime industry.

Honoring Those Who Sustain Global Trade

NAMMA
NORTH AMERICAN MARITIME MINISTRY ASSOCIATION

The North American Maritime Ministry Association (NAMMA) is a diverse network of seafarers' canters, missions, churches, and individuals committed to caring for the physical, social, and spiritual well-being of mariners. Serving both in-port and online, NAMMA members provide practical support and a compassionate presence to seafarers who spend long months at sea, far from home. These ministries welcome all mariners freely, without regard to nationality, religion, or background.

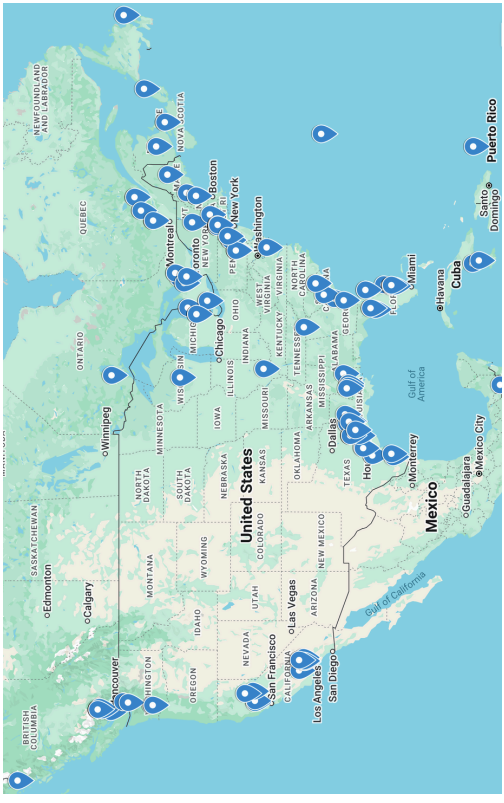
Some of NAMMA's member organizations trace their histories back more than two centuries, reflecting a long tradition of hospitality toward those whose work sustains global trade. NAMMA's current work continues this tradition of hospitality to the mariners who make modern life possible.

For visiting seafarers, NAMMA centers provide essential services such as Wi-Fi connections, SIM cards, and transportation for shopping and other needs. More importantly, they provide a safe and welcoming place for rest, conversation, and pastoral care during brief hours ashore. Whether through a simple ride to the shops, help contacting family, or a listening ear, the network exists fundamentally to listen and serve.

For mariners, it is good to know that these resources exist in ports across North America. For those in the maritime industry—and for anyone who wants to express gratitude—supporting a local seafarers' center is a meaningful way to give back. Volunteers help prepare Christmas gifts, drive vehicles, welcome crews, and sustain these centers year-round.

Together, NAMMA and its members form a network dedicated to serving and saying "thank you" to the people of the sea.

NAMMA Locations Across North America



ABOUT NAMMA

NAMMA is an ecumenical, Christian association of individuals and affiliated organizations involved in maritime ministry throughout North America, including the United States, Canada, Mexico and the Caribbean.

Founded in 1932 as the National Group of Seamen's Agencies, it was renamed NAMMA in 1991. Its mission is to provide a framework to support and assist port chaplains and others in their ministry to the spiritual, moral, human rights, and physical concerns of mariners and all others in the maritime community.

NAMMA helps equip port chaplains with the resources needed to carry on their ministry. It acts as a consultant and coordinator for services and training, as well as providing standards for these services. NAMMA includes many ministries from a wide variety of denominations, as well as the maritime ministries of North America. NAMMA welcomes 60 affiliated maritime ministry agencies and approximately 90 Member chaplains.

NAMMA serves as the North American region of the International Christian Maritime Association.

Image courtesy of: North American Maritime Ministry Association (NAMMA), About Us webpage, https://namma.org/about

ABOUT PROSEA MARINE EDUCATION

Prosea is an independent maritime non-profit delivering practical sustainability and marine environmental training for seafarers and maritime professionals worldwide.

We empower crews and companies to strengthen compliance, adopt sustainable practices, and take personal responsibility for protecting the marine environment.

Visit **www.prosea.info** to learn more

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