

what is happening to our oceans?



A QUICK EXPLAINER ON

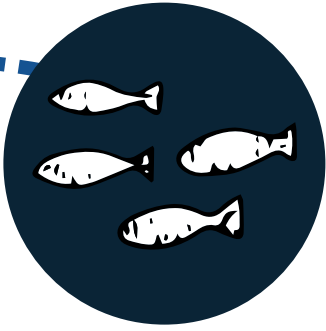
Marine Conservation Issues

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What are the threats?

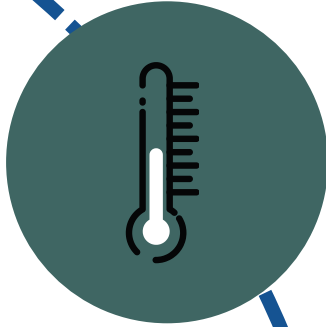
Overfishing

This unsustainable practice leads to a decline in fish stocks, compromising the long-term health and productivity of marine ecosystems.



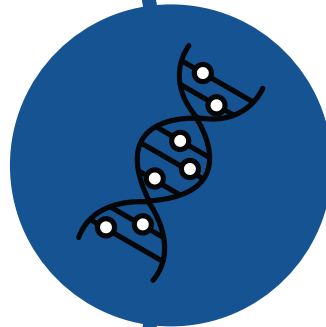
Climate Change

Climate change profoundly impacts the ocean in various ways, presenting a range of challenges to marine ecosystems, biodiversity, and coastal communities.



Acidification

This phenomenon occurs when carbon dioxide (CO₂) from the atmosphere dissolves in seawater, making it more acidic.



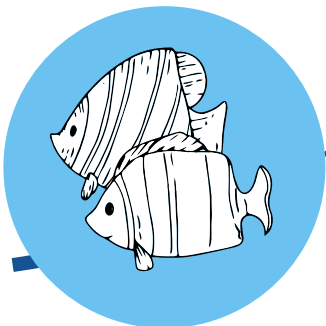
Habitat Destruction

Habitat destruction disrupts ecosystems, affecting their functioning and stability, and can result in the loss of ecosystem services vital for human well-being.



Invasive Species

The impacts of invasive species extend to economic losses, ecological imbalances, and threats to biodiversity and ecosystem functioning.



Overfishing:

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overfishing

definition

The act of harvesting fish from the ocean at a rate that exceeds the ability of fish populations to replenish themselves naturally. Essentially, it occurs when fish are caught faster than they can reproduce.

how does this happen?

Firstly, there is a heightened demand for seafood due to population growth, shifting dietary preferences, and increased globalization of markets. Advancements in fishing technologies and gear lead to higher catch rates and intensified fishing pressure on target species. Additionally, inadequate regulation and enforcement of fishing activities in many regions enable overexploitation of fish stocks, as fishers may exceed catch limits, employ illegal fishing methods, or operate in restricted areas.

what is being done?

Efforts to combat overfishing involve implementing sustainable fisheries management practices, such as setting catch limits, regulating fishing gear and methods, protecting spawning grounds and critical habitats, and enforcing fishing regulations. Additionally, consumer awareness and support for sustainably sourced seafood can help drive demand for responsible fishing practices and contribute to the conservation of marine resources.

IUU fishing

Bycatch is the unintended capture of non-target species during fishing operations, contributes to overfishing by reducing the reproductive capacity of non-target species and disrupting marine ecosystems.

Illegal, unreported, and unregulated (IUU) fishing exacerbates overfishing by operating outside of regulations and exploiting fish stocks beyond sustainable levels. This can lead to insufficient data on fish populations and fishing activities in some areas as scientists don't get the "full picture" of what is going on in a region, which poses a challenge in accurately assessing the status of fish stocks and addressing overfishing effectively.

Combating overfishing necessitates sustainable fisheries management practices, including setting and enforcing catch limits, reducing bycatch, combating IUU fishing, and promoting ecosystem-based approaches to fisheries management.

bycatch

Climate Change

An underwater photograph of a coral reef. The scene is dominated by various types of coral, including branching and table corals. Several fish are visible, including a prominent yellow-striped snapper in the middle ground and smaller fish in the background. The lighting is somewhat dim, creating a serene and slightly somber atmosphere.

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climate change

definition

Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates.

what comes from it?

Climate change exacerbates extreme weather events like hurricanes, cyclones, and typhoons, impacting coastal communities and marine ecosystems. These events bring storm surges, heavy rainfall, and strong winds, causing habitat destruction, coral bleaching, sedimentation, and pollution runoff -- all which lead to long-term ecological damage and loss of biodiversity. Additionally, climate change alters ocean circulation patterns like the Atlantic Meridional Overturning Circulation (AMOC), affecting regional climates, precipitation patterns, and marine ecosystems, with potential implications for fisheries, coastal economies, and weather extremes.

The ocean absorbs 90% of excess heat trapped by greenhouse gases, leading to ocean warming which alters species distributions, and affects their metabolism, reproduction, and behavior. Sea level rise - resulting from this rising temperature - poses risks to coastal communities, infrastructure, and habitats, leading to erosion, inundation, and saltwater intrusion into freshwater sources, threatening coastal ecosystems (e.g. mangroves, salt marshes, and coral reefs).

WHAT ARE SOME WAY COUNTRIES AND POLITICIANS ARE ADDRESSING THE IMPACTS OF CLIMATE CHANGE?

International Agreements: Countries are committing to reducing greenhouse gas emissions and enhancing climate resilience (i.e. Paris Climate Agreement).

National Climate Policies: Implementing national climate policies and strategies to mitigate greenhouse gas emissions and adapt to the impacts of climate change (e.g. getting emission reduction targets, promoting renewable energy deployment, improving energy efficiency, investing in climate-resilient infrastructure).

Carbon Pricing: Introducing carbon pricing mechanisms such as carbon taxes or cap-and-trade systems to incentivize emission reductions and encourage the transition to low-carbon technologies and practices.

Investment in Renewable Energy: Increasing investment in renewable energy sources (solar, wind, and hydroelectric power) to mitigate greenhouse gas emissions.

Promotion of Climate-Smart Agriculture: Supporting sustainable practices that enhance carbon sequestration, improve soil health, and increase resilience to climate impacts such as droughts and floods.

Conservation and Reforestation: Implementing measures to protect natural carbon sinks, such as forests and wetlands, which absorb and store carbon dioxide from the atmosphere.

Adaptation Planning: Developing and implementing plans/strategies to reduce vulnerability and build resilience to the impacts of climate change, especially in vulnerable communities and regions.

Technology Development and Innovation: Investing in research and development of climate-friendly technologies, innovations, and solutions to accelerate the transition to a low-carbon economy.

Education and Public Awareness: Raising public awareness about the impacts of climate change and the importance of collective action.

A C t i v i t y C o n t r i b u t i o n

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acidification

definition

A process whereby the pH of the ocean decreases over time, making it more acidic. This phenomenon occurs when carbon dioxide (CO₂) from the atmosphere dissolves in seawater, forming carbonic acid. This acidification reduces the availability of carbonate ions, which are essential building blocks for calcifying organisms such as corals, shellfish, and some types of plankton.

how bad is it?

The ocean's pH has decreased by approximately 0.1 units since the beginning of the Industrial Revolution, representing a 30% increase in acidity.

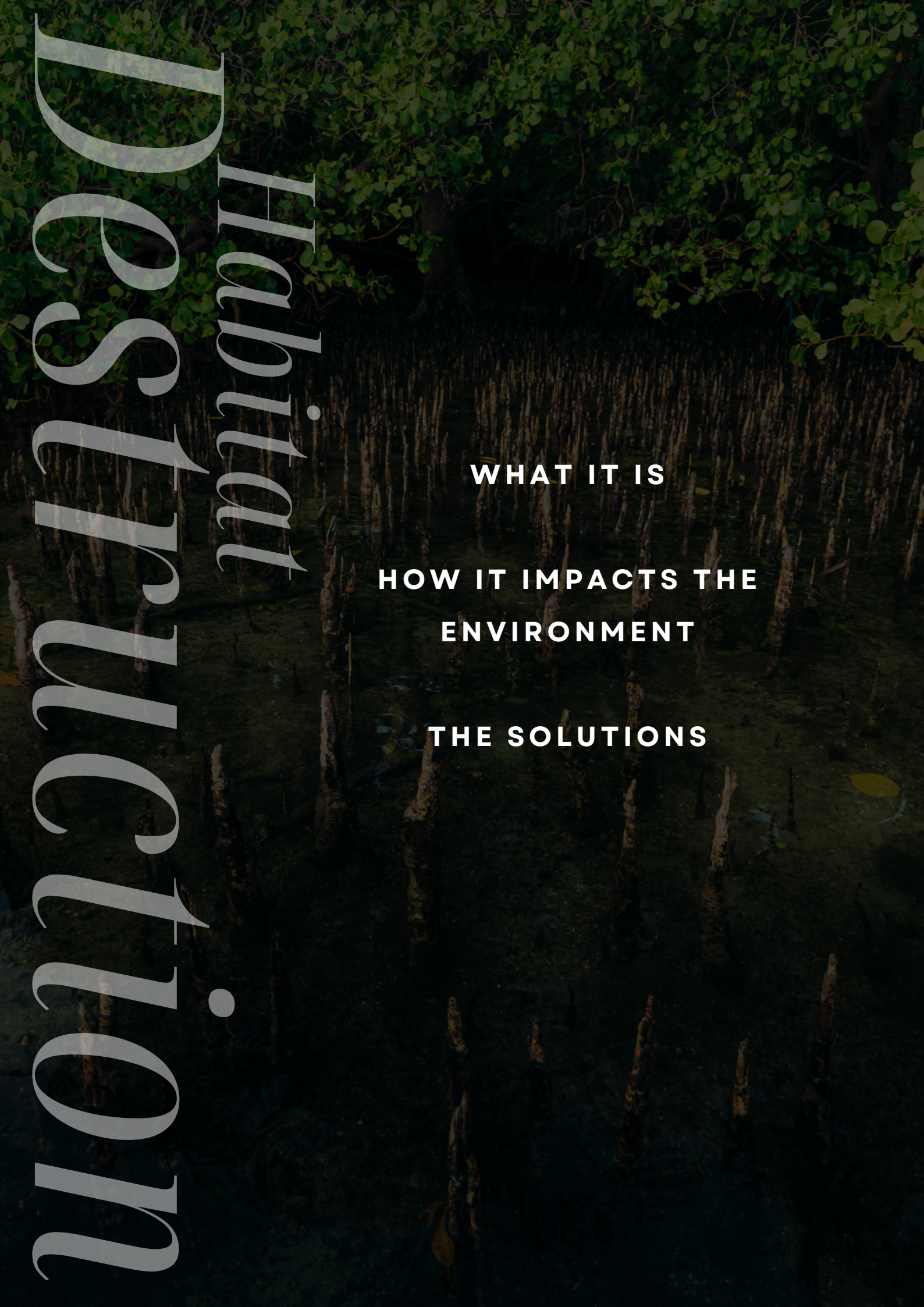
how does this impact the ocean?

Ocean acidification weakens coral reefs by hindering the growth and calcification of coral skeletons, increasing vulnerability to bleaching events and physical damage. Not to mention that shell-forming organisms like mollusks, crustaceans, and some plankton struggle to maintain their calcium carbonate structures in acidic conditions (which impacts their survival, growth, and reproduction)! These effects cascade throughout marine food webs, affecting species reliant on calcifying organisms for food, shelter, and habitat. And this can change species abundance and distribution, which has widespread implications for ecosystems, fisheries, coastal economies, and global food security.

ADDRESSING OCEAN ACIDIFICATION REQUIRES A MULTI-FACETED APPROACH INVOLVING VARIOUS STAKEHOLDERS, INCLUDING GOVERNMENTS, SCIENTISTS, INDUSTRIES, AND CIVIL SOCIETY.

Governments are enacting policies and regulations to address ocean acidification at the national and international levels. Efforts to curb greenhouse gas emissions are fundamental to addressing ocean acidification, as it is primarily driven by the absorption of carbon dioxide from the atmosphere. So, monitoring programs and scientific research is key in fully understanding the issue. This includes monitoring carbon dioxide levels in seawater, studying the responses of marine organisms to acidification, assessing the vulnerability of marine ecosystems to changing ocean chemistry, further developing carbon capture and storage (CCS) and ocean alkalinity enhancement, etc.

Policies and initiatives aimed at transitioning to renewable energy sources, improving energy efficiency, and reducing fossil fuel consumption also contribute to mitigating this issue. And don't forget - education campaigns, outreach programs, and communication initiatives help raise awareness and promote sustainable behaviors that reduce carbon emissions. ALL important endeavours as we need collective action to tackle ocean acidification!



Habitat *DESTRUCTION.*

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habitat destruction

definition

This term refers to the degradation, alteration, or loss of natural habitats underwater due to human activities. What habitats? Those like coral reefs, mangroves, seagrass beds, salt marshes, and deep-sea ecosystems.

how does this happen?

Occurs through coastal development (like port construction and dredging), pollution (oil spills and marine debris contaminates), overfishing, climate change, invasive species introduction, and natural disasters.

what is being done?

One significant approach is the establishment of Marine Protected Areas (MPAs), which aim to safeguard critical marine habitats and biodiversity by restricting certain activities such as fishing and development. Governments also regulate coastal development through zoning laws and environmental impact assessments to mitigate potential habitat destruction. Sustainable fisheries management practices, including catch limits and gear restrictions, are implemented to minimize habitat damage caused by fishing activities (and prevent overfishing). Pollution control measures are targeting land-based and ocean-based sources of contamination. Efforts to raise public awareness about the importance of marine habitats is also a crucial component of habitat conservation initiatives.



Invasive species

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invasive species

definition

Non-native organisms that establish populations in marine environments outside of their natural range and cause harm to native ecosystems, species, and habitats. These species are typically introduced through human activities such as shipping, aquaculture, and recreational boating.

how bad is it?

It's hard to get exact numbers since the ocean is so big... but it isn't exactly *good*. Aquatic invasive species are found throughout the world with very few exceptions.

how does this impact the ocean?

Once established, invasive marine species can outcompete native species for resources, disrupt ecological processes, alter habitat structure, and threaten biodiversity.

what is being done?

Efforts to combat invasive marine species include the following: prevention strategies focus on regulating ballast water discharge from ships and managing biofouling on hulls to reduce the risk of introducing invasive species; surveillance/monitoring programs facilitate early detection; management strategies (mechanical removal, chemical control, and habitat restoration). Number one thing you can do: never release a pet (fish or other animal) into the wild!

IT'S IMPORTANT TO NOTE THAT THIS QUICK EXPLAINER ON MARINE CONSERVATION ISSUES ONLY SCRATCHES THE SURFACE OF THE MYRIAD CHALLENGES FACING OUR OCEANS. WHILE I'VE ATTEMPTED TO SUMMARIZE SOME OF THE MAJOR ISSUES CURRENTLY PLAGUING MARINE ECOSYSTEMS, IT'S IMPOSSIBLE TO COVER EVERY PROBLEM OR THREAT COMPREHENSIVELY IN THIS MINI GUIDE. THE OCEAN FACES A COMPLEX ARRAY OF ISSUES, INCLUDING THOSE WITHIN THIS PDF. BUT EACH OF THESE ISSUES REQUIRES IN-DEPTH UNDERSTANDING, DEDICATED RESEARCH, AND MULTIFACETED APPROACHES TO ADDRESS EFFECTIVELY.

THEREFORE, WHILE THIS GUIDE PROVIDES A BRIEF OVERVIEW OF SOME WELL-KNOWN MARINE CONSERVATION ISSUES, IT'S ESSENTIAL TO RECOGNIZE THE DEPTH AND COMPLEXITY OF THE CHALLENGES SCIENTISTS FACE IN SAFEGUARDING OUR OCEANS FOR FUTURE GENERATIONS.