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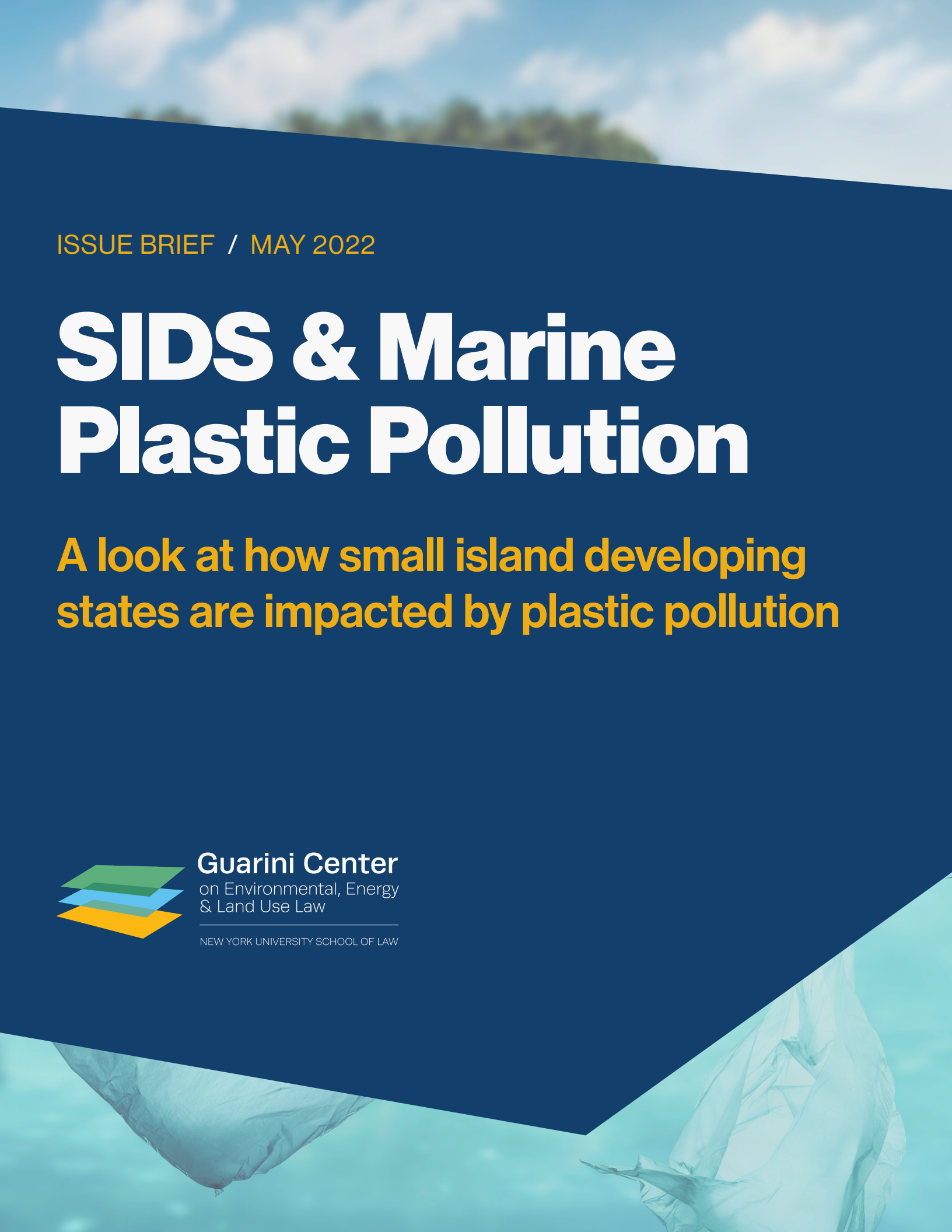
SIDS & Marine Plastic Pollution

A look at how small island developing states are impacted by plastic pollution

Guarini Center
on Environmental, Energy
& Land Use Law

NEW YORK UNIVERSITY SCHOOL OF LAW



ISSUE BRIEF

SIDS & Marine Plastic Pollution: A look at small island developing states are impacted by plastic pollution

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Plastic—one of the world's most ubiquitous materials—currently poses one of the greatest threats to the environment, human health, and livelihoods. Indeed, the unprecedented surge in plastic pollution, particularly in the marine environment, has prompted UN member states to begin a process of developing a new international legally binding instrument to address this transboundary problem. However, the impacts of plastic pollution are neither distributed nor experienced equally by all countries; while plastic pollution affects many countries across the globe, small island developing states (SIDS) have been disproportionately affected by the growing threat of plastic pollution.

What are Plastics?

Plastics are a man-made material primarily derived from non-renewable fossil fuel resources such as crude oil, natural gas, or coal. Through a chemical process called polymerization, these raw materials are refined and turned into resins and then transformed into plastic pellets or nurdles. These pellets or nurdles are then used to manufacture end-use plastic products.

Why are plastics considered harmful?

There is no disputing the important role that plastics play in society given their affordability, convenience, availability, and durability. Plastics can be found in virtually every part of the world and in every kind of product, from technological devices, food packaging, medical equipment, sanitary products, and everyday consumer products. Despite their benefits, however, plastics also present serious risks to the environment and human health.

Plastics are non-biodegradable

Plastics cannot easily decompose under natural processes. Plastics can deteriorate or break down in the environment under certain physical, biological, and/or chemical conditions, however this typically results in smaller fragments and particles called microplastics (>5 mm) and nanoplastics (>100 nm),[1] which are much more difficult to retrieve, manage, and remediate due to their size.[2] Studies have shown that plastic particles have permeated aquatic and terrestrial systems and food webs, with traces of plastics even being detected in human placenta, faeces, and blood.[3] Because they are non-biodegradable, plastics can outlive humans by hundreds or thousands of years and thus pose a serious long-term hazard as a persistent environmental pollutant.[4]

Plastics are toxic

Depending on their intended end-use plastics may also contain harmful chemical additives , including flame retardants, plasticizers, antioxidants, UV stabilisers, and pigments; contaminants created by chemical reactions (e.g. as a result of UV radiation on plastic waste); and chemicals introduced during certain treatment processes (e.g. recycling).[5] While scientific research is still developing, there are growing concerns about the health risks posed by expo-

1 Gallo, F., Fossi, C., Weber, R. et al. **Marine litter plastics and microplastics and their toxic chemicals components: the need for urgent preventive measures**. Environ Sci Eur 30(13), 3 (2018).

2 Wu, W.M., Yang, J. and Criddle, C.S., **Microplastics pollution and reduction strategies**, Frontiers of Environmental Science & Engineering, 11(1), 1 (2017).

3 H.A. Leslie, M. J. M. van Velzen, S.H. Brandsma, D. Vethaak, J.J. Garcia-Vallejo, M.H. Lamoree, **Discovery and quantification of plastic particle pollution in human blood**, Environment International (2022).

4 **Single-use Plastics: A Roadmap for Sustainability**, United Nations Env't Programme, 12 (2018).

5 Frederic Gallo, et al, **Marine litter plastics and microplastics and their toxic chemicals components: the need for urgent preventive measure**s, Environmental Sciences Europe, 30, Art. 13, (2018).

sure to these chemicals, including through the consumption and ingestion of plastics.

Plastic production harms the environment

The plastic production process involves a series of environmentally harmful activities, from the extraction, production, and refinery of fossil fuels to the wider plastic-manufacturing activities. For instance, leakage from activities along the industrial plastic production chain, such as in transportation of plastic pellets/nurdles to manufacturers, can result in the most problematic kinds of plastic particles entering the environment.[6] Moreover, petroleum extraction and production disturb natural environments and ecosystems, and exacerbate the risk of pollution incidents such as gas flaring, oil spills, wastewater, and dumping.

Plastic production is also inherently carbon intensive. Greenhouse gases (GHG) are emitted across the entire spectrum of production activities, from the extraction and refining of fossil fuels to the manufacturing of end-use plastic products. With over 300 million tonnes of plastic produced annually[7], and production projected to double by 2050,[8] current patterns of production and consumption of plastic products will stymie humankind's efforts to combat climate change.[9] By 2050, GHG emissions associated with plastics could represent 10–13% of the remaining carbon budget within the context of the Paris Agreement's 1.5°C goal.[10]

What makes SIDS so uniquely vulnerable?

SIDS encounter an array of unique challenges due to their sizes, remoteness, narrow resource base, reliance on tourism and susceptibility to economic shock, rendering them most likely to be disproportionately affected by global environmental challenges. The plastic pollution crisis is no different, especially when considering the transboundary nature of this issue.

Approximately 11 million tonnes of plastic waste from all across the globe leak into the marine environment annually,[11] 80% of which comes from land-based sources, including through lakes, rivers, and other waterways.[12] Estimates show that there are potentially 5.25 trillion macro and micro pieces of plastics in the oceans, with 46,000 pieces in every square mile,[13] amassing the potential to cover as much as 40% of the ocean's surface.[14] SIDS are geographically situated in close proximity to ocean gyres where currents naturally accumulate floating material, including marine plastic litter, and much of this waste culminates along the coastlines of many SIDS.[15]

In addition to managing transboundary plastic waste, SIDS are experiencing larger volumes of plastic waste nationally; a significant portion of which is illegally dumped or stored in land-

6 **What are nurdles? Why you need to worry about them**, Ocean Blue Project.

7 **Issues Brief: Marine Plastic Pollution**, International Union for Conservation of Nature (2021).

8 **The New Plastics Economy: Rethinking the Future of Plastics and Catalyzing Action**, Ellen Macarthur Fund (2021).

9 **Plastic & Climate: The Hidden Costs of a Plastic Planet**, Center for International Environmental Law (2019).

10 *Id.*

11 **Breaking the Plastic Wave: A comprehensive assessment of pathways toward stopping ocean plastic pollution**, Pew Charitable Trust & SYSTEMIQ, 26 (2020).

12 **How Countries are Turning the Tide on Marine Plastic Pollution**, United Nations Env't Programme (Jul. 12, 2021).

13 Plastics in the Ocean: Statistics 2020-2021, Shocking ocean plastic statistics: The threat to marine life, ocean and humanity, Condor Ferries (2021).

14 Olivia Lai, **'8 Shocking Plastic Pollution Statistics to know about'**, Earth.org (February 2022)

15 Florina Lachmann et al., **Marine plastic litter on Small Island Developing States (SIDS): Impacts and measures, Swedish Institute for the Marine Environment**, University of Gothenburg, 13 (2017).

fill sites.[16] Given their limitations in technology, statistical data, policy, legislation, and infrastructure required to effectively manage this waste (including via recycling), it has proven difficult for SIDS to prevent plastic pollution and leakage into the marine environment.[17]

These challenges severely affect the livelihoods, health, culture, tourism, and biodiversity of SIDS in a manner disproportionate to most other states, underscoring the need for a potential plastics instrument to provide support to SIDS in order for them to play an effective role in curbing this global environmental issue.

What are the impacts that SIDS face?

Plastic pollution poses several risks to SIDS' livelihood, health, cultural and aesthetic value, tourism, and biodiversity.

Livelihood

Plastic pollution threatens the livelihoods of millions of people, including minority groups such as indigenous peoples, across the SIDS who rely on marine ecosystems and the resources they provide for their livelihood. SIDS rely on the marine environment for food, tourism, transportation, fisheries, and other related industries. For instance, in the Caribbean SIDS region alone, total fish production averaged 162,220mt across Caribbean Regional Fisheries Mechanism (CRFM) member states during 2013–2014, with an estimated value of USD $460 million annually and an approximate workforce of 341,668.[18] However, this industry has been on a sharp decline, with marine litter being one of the most significant contributors.[19]

Plastic waste in the aquatic environment can also cause severe damage to marine equipment and vessels, resulting in delays in supply chains, loss of life or injury, increased costs for operators, and a decline in sustained marine transport activities.[20]

Health

Plastic pollution also poses severe risks to mental and physical health.[21] There are growing concerns about hormonal, biological, and physiological changes to the body as a result of consuming plastic particles, particularly in SIDS where much of their diet is dominated by seafood.[22] It has been estimated that humans ingest approximately five grams of plastic each week, amounting to as much as five pounds of plastic in a decade.[23] Health concerns also arise due to plastic polluted rivers and waterways among SIDS serving as breeding grounds for diseases and pests.[24] These health concerns may also impact both local and global demand for seafood.[25]

16 Florina Lachmann et al., **Marine plastic litter on Small Island Developing States (SIDS): Impacts and measures**, Swedish Institute for the Marine Environment, University of Gothenburg, 23-24 (2017).

17 *Id.*

18 S. Diez et al., **Marine Pollution in the Caribbean : Not a Minute to Waste**, World Bank Group (2019).

19 *Id.*

20 Florina Lachmann et al., **Marine plastic litter on Small Island Developing States (SIDS): Impacts and measures**, Swedish Institute for the Marine Environment, University of Gothenburg, 35 (2017).

21 **From Pollution to Solution: A global assessment of marine litter and plastic pollution**, United Nations Environment Programme, 32-34 (2021).

22 *Id.*

23 Olivia Lai, **8 Shocking Plastic Pollution Statistics to know about,** Earth.org (2022).

24 Diez, S. et al., Marine Pollution in the Caribbean: Not a Minute to Waste. World Bank Group, 39 (2019).

25 Vince Joanna, Hardesty Britta D, **Governance Solutions to the Tragedy of the Commons That Marine Plastics Have Become**, Frontiers in Marine Science Vol. 5 (2018).

Cultural and aesthetic value

SIDS commonly comprise many multi-ethnic and diverse communities who place much significance to pristine and well-preserved marine environs. Indeed, the coastal marine environment provides aesthetic, cultural, and religious value to many inhabitants of SIDS.[26] For instance, practitioners of Hinduism, African spiritualism, and indigenous customs frequently make use of lakes, streams, rivers, and coastal waters in the exercise of their beliefs.[27] However, these practices may be diminished by the accelerated presence of plastic waste in these areas of significance.

Tourism

SIDS are widely renowned tourist destinations due to their typically pristine beaches, coral reefs and eco-tourism activities, and many SIDS are heavily dependent on tourism as a key economic sector, providing many forms of employment to locals and increases in foreign exchange earnings. Indeed, the United Nations Conference for Trade and Development (UNCTAD) reports that coastal and marine tourism is SIDS' largest sector, with an average of two in three people employed by the services industry, which is typically tourism-oriented.[28] As an example, tourism contributed to a whopping 87% of the GDP of the Cook Islands in 2020.[29] However, plastic waste washing ashore the coastal areas of SIDS severely undermines many of the tourism industry's services. Additionally, revenues and resources that governments and private operators must deploy to restore the locations, such as beach clean-ups, impose additional economic costs and reduce economic viability for the operators.

While studies on the impacts of plastic pollution on the tourism industry in SIDS appear to be limited, studies in other territories illustrate the extent of these impacts. For instance, coastal debris in South Korea caused an estimated USD $29–37 million loss in tourism revenues, and studies in Brazil and California have shown that the majority of visitors prefer to travel longer distances locally or to other global destinations altogether in order to avoid polluted beaches.[30] A similar empirical study in Barbados concluded that there is a strong link between the quality of the coastal environment and tourism demand, noting the potential for economic losses where the quality of the coastal environment is diminished by the presence of litter.[31]

In the Asia Pacific Economic Community (APEC) region, which includes some SIDS, marine litter causes an estimated USD $622 million per year in tourism revenue.[32] While tourism revenues differ among SIDS, the impacts of plastic pollution are particularly significant for SIDS where the tourism industry is one of the main economic drivers.[33] In addition to the more obvious tourism activities which are likely to be affected, such as recreational beaching, diving, watersports, fishing, and ecotours, the loss in revenues may also

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26 S. Diez et al., **Marine Pollution in the Caribbean : Not a Minute to Waste**, World Bank Group, 19(2019.

27 *See, e.g.*, Siewdass Sadhu Shiva Mandir Temple in the Sea, Waterloo, Trinidad and Tobago.

28 **UNCTAD Development and Globalization: Facts and Figures 2021**, United Nations Conference on Trade and Development (2021).

29 **Plastic Pollution Prevention in Pacific Island Countries: Gap analysis of current legislation, policies and plans**, Environmental Investigation Agency (2020).

30 Vince Joanna, Hardesty Britta D, **Governance Solutions to the Tragedy of the Commons That Marine Plastics Have Become**, Frontiers in Marine Science Vol. 5 (2018).

31 P.W. Schuhmann, **Tourist perceptions of beach cleanliness in Barbados: Implications for return visitation**, Études caribéennes, Vol. 19, 11 (2011).

32 **Marine Litter Socio Economic Study** 69, United Nations Environment Programme (2017).

33 Florina Lachmann et al., **Marine plastic litter on Small Island Developing States (SIDS): Impacts and measures**, Swedish Institute for the Marine Environment, University of Gothenburg, 34 (2017).

extend to the rest of the economy. For example, lower visitation rates may affect restaurants, hotels, local businesses, transport, specialized goods and services, and food production, among other industries.[34]

Biodiversity

Plastics threaten the bountiful marine biodiversity found in and around many SIDS and permeate the food web, with hundreds of species of animals having been found with traces of plastics internally. Recent research has shown that as many as 60% of fish studied globally contained microplastics,[35] and approximately one million seabirds die annually due to the ingestion of plastics.[36] Impacts on individual organisms, sub-organisms, and wider marine life have also been extensively documented and reported with experts concluding that entanglement, ingestion and chemical contamination serve as the most significant means of susceptibility to impacts.[37] Widely circulated cases in SIDS regions include a sea turtle found in the Pacific Ocean with an array of plastic debris in its system, and a blue striped grunt fish in the Caribbean Sea whose growth was restricted by a plastic band.[38]

Moreover, the transboundary movement of plastics also provides a means of travel for invasive alien species, which contribute significantly to biodiversity loss, disturbances in the food web, and the spread of diseases.[39]

Sensitive marine ecosystems across the various geographic regions of SIDS are severely affected by plastic pollution. For instance, the growth and development of seagrass, coral reef and mangroves, which are considered important 'natural infrastructure' for adapting to climate impacts (including rising sea level) and protecting coastal communities, are inhibited by plastic waste.[40] Studies conducted in the Marshall Islands found that plastic debris caused abrasion, shading, suffocation and mortality of coral communities, and in Papua New Guinea it was discovered that plastic litter severely affected the rehabilitation of mangrove forests.[41] These forests also provide critical carbon sequestration services and function as sanctuaries for many endangered species of flora and fauna, which are also affected by the presence of plastics.[42]

Next steps

While various international instruments touch on specific aspects of plastic pollution,[43] there is

34 Diez, S. et al., **Marine Pollution in the Caribbean : Not a Minute to Waste**, World Bank Group, 31 (2019).

35 Inês F. Sequeira et al., **Worldwide contamination of fish with microplastics: A brief global overview**, 160 Marine Pollution Bulletin (2020).

36 Luisa Cortat Simonetti Goncalves and Michael Gerbert Faure, **International Law Instruments To Address The Plastic Soup,** 43 Wm. & Mary Envtl. L. & Pol'y Rev. 871, 883 (2019).

37 Vince Joanna, Hardesty Britta D, **Governance Solutions to the Tragedy of the Commons That Marine Plastics Have Become**, Frontiers in Marine Science Vol. 5 (2018).

38 Simon Reddy, **Plastic Pollution affects sea life throughout the ocean**, Pew Charitable Trust (2018).

39 **Marine Litter Socio Economic Study**, United Nations Environment Programme, 21-22 (2017).

40 Diez, S. et al., **Marine Pollution in the Caribbean : Not a Minute to Waste**, World Bank Group, 55 (2019).

41 Florina Lachmann et al., **Marine plastic litter on Small Island Developing States (SIDS): Impacts and measures**, Swedish Institute for the Marine Environment, University of Gothenburg, 31 (2017).

42 Diez, S. et al., **Marine Pollution in the Caribbean: Not a Minute to Waste**, World Bank Group, 55 (2019).

43 For example: Article 207 of the United Nations Convention on the Law of the Sea requires states to prevent, reduce and control pollution of the marine environment from land-based sources, as well as to establish rules, standards and procedures to achieve this; the International Convention for the Prevention of Pollution from Ships prohibits the disposal of garbage, including plastic, at sea, and further prescribes monitoring, compliance and enforcement protocols and procedures, including the use of a Garbage Record Book (GRB), in order to prevent leakage of plastic waste from sea-based sources; and Basel Convention has recently promulgated the Plastic Waste Amendments allowing for the import and export of plastic waste to be better regulated

currently no international legally binding agreement which offers a dedicated, comprehensive, and global regime for addressing the plastic pollution crisis.

Following a series of resolutions and multilateral discussions on the issue, UNEA 5.2 paved the way for the adoption of a new international legally binding instrument on plastic pollution. While the resolution includes many matters of interest to SIDS, it fails to specifically highlight the special circumstances and needs of SIDS. With the INC's work expected to conclude by the end of 2024, it remains to be seen how the new instrument will take into account SIDS's vulnerablities to plastic pollution. However, states are now presented with an opportunity to design a new instrument that sets out a cooperative and coordinated approach to effectively address the plastics problem and also recognize the problem's disproportionate impact on SIDS.

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as a hazardous waste.

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