DP WORLD

CHANGING THE PERCEPTION OF WATER:

DP World considers a way forward

FOREWORD: ADVANCING WATER AND OCEAN WELL-BEING GLOBALLY

Water is crucial for life on Earth and vital for our well-being. In today's globalised world, DP World believes that businesses, including ours, play a significant role in changing how water is used and its ecosystems are safeguarded. The trade sector is a comprehensive value chain, necessitating integrated management solutions that address the permeating nature of water as a resource.

Water in the atmosphere, in the Ocean, and on land, forms a crucial system for life and is critical for our biosphere to thrive. Moreover, the Ocean, serving as the Earth's circulatory system, carries over 80% of global trade and thus plays an important role in supporting a global economic lifeline. However, this has meant the sector also contributes to 20-30% of global CO2 emissions (Kyriakopoulou, Kyriacou and Pearson, 2023) and is in large part responsible for the fact that the total area of seafloor impacted by built infrastructure is greater than the area of the world's mangrove and seagrass forest habitats (Living Seawalls, n.d.). There is a pressing need to diversify the global approach to decarbonisation and better integrate nature and biodiversity-linked indicators as part of core business practices; helping to bring us back within safe planetary boundaries and avoid an increase in the persistent degradation of our natural environment.

DP World's own asset portfolio and communities have experienced the cost of inaction across climate and nature first-hand. Increased severity and frequency of extreme weather events like floods, droughts and storm surges worsen already deteriorating aquatic biodiversity conditions and negatively impact people and communities – with only 19% of the global population having basic water access (World Health Organization, World Bank Group and UNICEF, 2022) and 52% lacking access to safely managed sanitation services (World Water Forum 7, 2023).

BASIC WATER ACCESS

Drinking water from an 'improved' source – one that is designed to deliver safe water (e.g. a borehole or covered well), taking no more than 30 minutes for a roundtrip collection, including queuing (WaterAid, 2020).

Accelerated global warming is redistributing water, with serious consequences for humanity and the environmental networks that support it. In 2022, DP World took a decision to expand our "Oceans" legacy pillar to include freshwater ecosystems, along with water, sanitation and hygiene (WASH). In considering "Water" at large, we have been better able to understand the interdependency of these elements, allowing us to address the water crisis as part of our wider climate action response agenda. Our inclusive approach to water management is crucial for adapting our operations to the climate crisis and using water as a frontline defence against climate challenges.

We view this whitepaper as a crystallisation of our renewed strategic direction for integrated water resource management and hope that by sharing a snippet of our approach thus far, we can palpably demonstrate how the private sector can stand to benefit from embracing concepts like Source-To-Sea, the Sustainable Blue Economy, Blue Carbon and Nature-based Solutions (NbS).

Maha AlQattan
Group Chief Sustainability Officer, DP World

OUR WORLD, OUR FUTURE

Our Sustainability Strategy, "Our World, Our Future" commits us to responsible business practices, with a focus on sustainability and the impact we have on people, the environment and the communities where we conduct our business. This commitment guides us towards a more socially equitable and sustainable future.

SOURCE-TO-SEA: INTEGRATED WATER MANAGEMENTY

Land-based activities have impacted freshwater ecosystems, aquifers and the health of the ocean for millennia, with serious implications for human health and well-being (Landrigan, Stegeman and Fleming, et al 2020). Water bodies are highly connected; therefore, the improper use of water in one location can result in ecological and social impacts in another. Solutions and management decisions cannot be contained to specific segments of the water cycle or at single sites (Häder, Banaszak and Villafañe, et al 2020).

Conceptually, a 'Source-To-Sea' (Stockholm International Water Institute, n.d.) approach helps to reassert the benefit of considering water resources as part of a holistic system that requires a collaborative, cohesive and consolidated approach to water management. In changing the conceptual understanding of water as a resource and establishing the interdependent nature of its impacts, Source-To-Sea helps to highlight the push and pull implications of a robust approach to water. A lack of consideration for ecological systems, ecosystems, flora and fauna influences the overall quality of water systems and their ability to meet the needs of both the environment and people. Conversely, its misuse directly influences the stability of these complementary systems, setting a ceiling for the positive impacts they can have.

For DP World, as our operations have evolved from ports & terminals to end-to-end supply chain logistics, the link between our independent business activities and their interconnected impacts to the ocean, coastal ecosystems, freshwater ecosystems and water access is becoming increasingly apparent.

IMPACTS
(INCLUDING, BUT NOT LIMITED TO)

Ecological impacts:

- Loss of biodiversity
- Introduction of invasive species
- Extinction
- Changes to animal and plant phenology
- Ecosystem service

Social:

- Loss of livelihoods
- Worsening of human health
- Increasing need for disaster preparedness
- Growing pressure on resources
- Rising number of climate migration

CONNECTING SDG'S

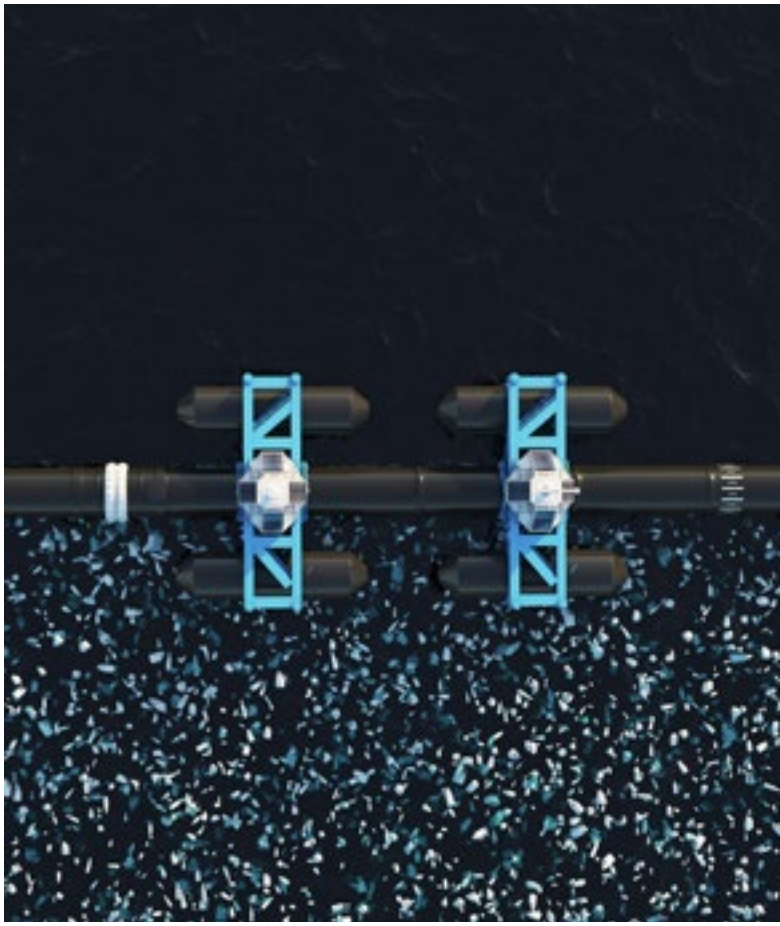
Adopted by the UN in 2015, the Sustainable Development Goals are a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030 (United Nations Development Programme, 2023). The SDGs are integrated and interconnected; actions in one area affect outcomes in others, and a recognition that development balances social, economic and environmental sustainability. Water is no exception.

SDG6: CLEAN WATER AND SANITATION
Requires that we ensure the availability of and sustainable management of water and sanitation for all.

SDG14: LIFE BELOW WATER
Requires that we conserve and sustainably use the oceans, seas and marine resources.

SDG15: LIFE ON LAND
This can help marry the SDG6 and SDG14; taking actions to protect and restore freshwater, wetlands, and combat drought.

The need for a more robust approach to water resource management is reflected in the make-up of the United Nations Sustainable Development Goals (SDGs), especially amongst SDG6, SDG14 and SDG 15. Linking these goals establishes an imperative to dissolve the potential divisions between land, coastal and marine restorative actions and impact mitigation strategies. Moreover, it helps to accentuate the importance of strengthening WASH infrastructure to combat people's susceptibility to water-related vulnerabilities and their contributions to water-based environmental impacts.



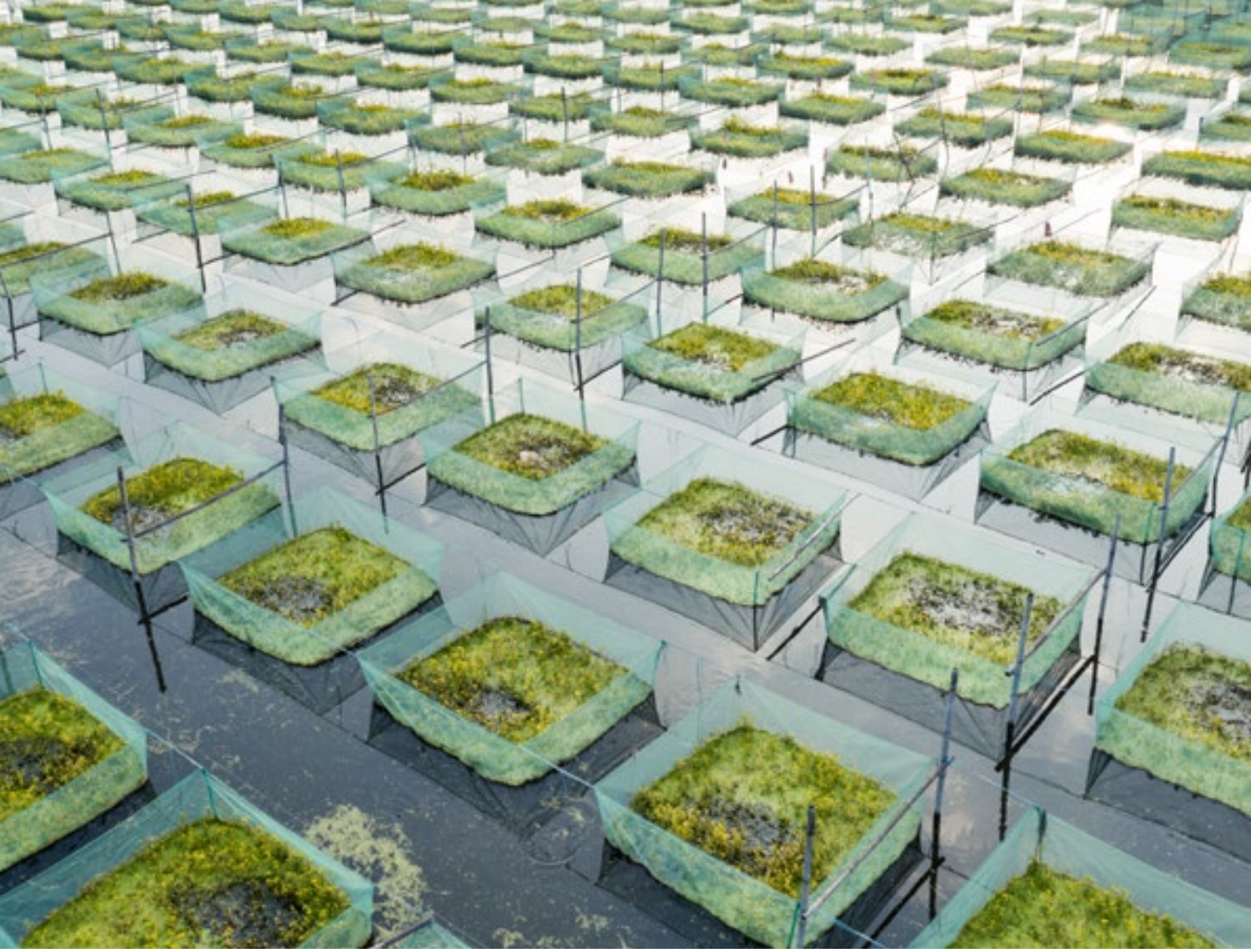
THE SUSTAINABLE BLUE ECONOMY

Broadly, the concept of a 'blue economy' encourages the responsible use of ocean resources, benefiting economies and livelihoods while preserving ocean and marine ecosystem health. It facilitates an ecosystem services approach to ocean resource management, attaching a monetary cost to the inaction of conservation, restoration and impact mitigation efforts (World Bank, 2017). With there not yet being a universally recognised definition of the concept, entities like WWF have sought to make it clear that a 'sustainable' interpretation of the blue economy must "ensure that the economic development of the ocean contributes to true prosperity, today and long into the future" (World Wildlife Fund, 2018). Functionally, this makes it evident that ecosystem integrity, low-carbon and circular economy principles must underpin how market-based instruments are used to mechanise the 'sustainable' blue economy (Crona, Wassénius and Lillepold, et al 2021). Global policy recommendations advocated by the OECD, the Ocean Panel and the UN Global Compact (through the Ocean Stewardship Coalition) reassert the benefit of updating our interpretation of a Sustainable Blue Economy (Organisation for Economic Co-operation and Development, 2020).

Given that ocean health, especially across coastal waters, is dependent on land, freshwater and community water-related activities, we at DP World believe that this ambition to maintain the long-term vitality of ocean and marine ecosystems must reflect our approach to effective water management. Achieving wholescale and far-reaching environmental social and economic change by isolating the way the ocean and marine ecosystems alone are managed is not conducive for long-term success. This means finding a way to mend our commitment to a 'Source-To-Sea' approach with Sustainable Blue Economy principles is essential. We believe that for the trade sector to flourish, while continuing to safeguard ocean health and the well-being of coastal communities, an expanded blue economy framework is a good first step. This will involve adopting systems science to help connect land-sea pathways and people, recognising the multilevel, exogenous factors that influence the outcomes of integrated water management (Columbia Mailman School of Public Health, 2016).

FUNDING THE SOLUTIONS: AN OPPORTUNITY PRESENTED BY EXPANDING THE BLUE ECONOMY

There is variation in the funding for the SDGs, with a significant gap in financing for both SDG6 and SDG14. There is an urgent need for increased financial support to prepare for climate change and safeguard global water resources. Expanding the Blue Economy with a 'Source-To-Sea' approach brings with it the possibility of a combined investment opportunity, where SDG6 and SDG14 can be viewed as one to address climate change-induced challenges.



In such an amended blue economy context, water becomes a dynamic and integrated force for climate action, environmental impact mitigation and community resilience - propelling strategic action across industries like shipping, logistics, fishing, tourism and renewable energy. In introducing a better-rounded approach to water, we hope to address the private sectors limitations of a traditionally siloed approach to the governance of the resource by:

1. Scaling up the level of impact, responsibility and sectoral reach of water initiatives; increasing the financial capital available for blue finance, Nature-based Solutions and WASH infrastructure investments. The annual economic value of water and freshwater ecosystems is estimated to be US$58 trillion – equivalent to 60% of global Gross Domestic Product (GDP) (World Wildlife Fund, 2023) – and so the economic incentive is self-evident.
2. Improving the penetration and short-, medium- and long-term outcomes of ecologically focused water management solutions. This includes biodiversity loss and ecosystem service provision (World Wildlife Fund, 2018)
3. Streamlining stakeholder engagement by establishing channels for cross-sectoral collaboration between upstream and downstream supply chain partners. This includes vulnerable communities who require assistance to adapt to infrastructure and access challenges (World Wildlife Fund, 2018).

WATER AND CLIMATE ACTION

As the concept of the Green Economy has matured, it has seen itself adopted as the globally recognised designate for an environmentally conscientious mode of economic development. This has helped to account for ecological scarcities (in terms of both good and services) and introduced the need to fully account for the negative externalities associated with the misuse of natural resources.

At DP World, we see the Blue Economy as an extension of this mission, encapsulating water adjacent economic activities that have not yet benefitted from the same mainstreamed support. As our operations have progressed from Ports and Terminals to integrated supply chain solutions in the last couple of years, we have come to recognise how the trade value chain is uniquely positioned to address climate and nature through the support of healthy and accessible water systems.

The trade sector stands as testament to how climate, nature and water action are intertwined, each influencing the other. By broadening the approach to integrated water management in a targeted manner, we have an opportunity to not only meaningfully address climate mitigation targets, but simultaneously help build climate adaptation and resilience capacity. DP World's interaction with a far-reaching network of biomes including coastlines, wetlands, in-land water bodies and water scarce communities have presented an opportunity to scale climate action to better incorporate water systems as part of the solution to driving holistic, systems-wide change. This includes mitigation efforts that leverage the health of Blue Carbon ecosystems to not just augment carbon sequestration capacities, but also uphold the interconnectivity of aquatic and terrestrial ecosystems – protecting their ecological integrity. In turn, these respective mitigation and adaptation efforts will help to further embolden climate resiliency by reducing the risk of slow on-set phenomena like droughts, desertification and sea-level rise, and promoting healthier biomes that provide ecosystem services, disaster protection and livelihood opportunities.

THE INFLUENCE OF WATER ON CLIMATE ACTION

Water influences climate change in a myriad of ways (Secretariat of the Convention on Biological Diversity, 2015), including but not limited to:

- Urban water management
- Agricultural water management
- Renewable energy
- Disaster risk reduction
- Drinking water supply

Water and climate mitigation

In the context of climate mitigation, deep decarbonisation efforts underpin good practice. DP World has identified 5 pillars for deep decarbonisation: equipment electrification and efficiency, process efficiency and digitalisation, renewable energy supply, low carbon fuel supply and carbon compensation. As expected, much of our existing approach to climate mitigation relies on operational actions and renewable energy. However, with the maturation of our Oceans Strategy, we will integrate Blue Carbon ecosystems as part of this suite of climate mitigation pillars.

Blue Carbon leverages Sustainable Blue Economy principles to present environmental, social and economic incentives to conserve and protect marine habitats. There is a positive correlation between the sequestration capacity of Blue Carbon sinks and their relative ecological stability. The REDD+ framework, which aims at "reducing emissions from deforestation and forest degradation in developing countries" (United Nations Framework Convention on Climate Change, n.d.), leverages this relationship to incentivise the "sustainable management of forests". REDD+ also applies to aquatic ecosystems, such as mangroves, and the framework recognises that comprehensive ecosystem health, inclusive of coastal livelihoods, marine biodiversity and ecosystem services aspects, contribute to the overall "conservation and enhancement" of carbon stocks in such environments. There is a clear indication that 'developing countries' have the potential to be more adversely impacted by deforestation. International frameworks, like REDD+, recognise that comparatively less robust environmental legal frameworks can promote international policy capture. This makes dramatic land-use changes for large-scale industrial projects (like ports and terminals facilities) easier to come by and presents a lower threshold of safeguards to protect marine environments.

Blue Carbon initiatives help to provide a fiscal benefit to the conservation, restoration and maintenance of ocean and coastal habitats by providing payments for emission reductions generated by reduced deforestation. DP World views this an opportune market-based approach to help optimise infrastructure design plans and reduce the environmental and social impacts of infrastructure project concession agreements by creating an incentive to prevent the deforestation of diverse ecosystems.

IMPACT ON TRADE

Each year, we are seeing more examples of the growing impact of flooding and water scarcity on trade, including:

- Low water levels in the Panama Canal are reducing the capacity for cargo in the Canal, increasing backlog and prices for customers (Partridge, 2023).
- Last year, Germany recorded the lowest volume of trade on the Rhine and other inland waterways since 1990, as a result of drought in the region (Sorge, Eckl-Dorna and Look, 2023).
- While flooding in northern China is impacting the export of grain from the region (Thukral and Ningwei, 2023).

This prospect of Blue Carbon compensation enables both governments and its private sector partners to integrate the cost of marine ecosystem degradation, using carbon as a currency. In practice, this can allow Organisations like DP World to invest in both coastal Blue Carbon ecosystems for carbon compensation ambitions, as well as to offset the costs of developing and maintaining regenerative Sustainable Blue Economy ecosystems. These can help in supporting, accelerating and up-scaling biodiversity regeneration, livelihood protection and ecosystem service provision, above and beyond helping to meet carbon compensation ambitions.

UNVEILING THE WATER CHALLENGE: KEY STATISTICS

Water influences climate change in a myriad of ways (Secretariat of the Convention on Biological Diversity, 2015), including but not limited to:

HALF THE WORLD'S POPULATION FACES **SEVERE WATER SCARCITY**

ONLY **0.5%** OF EARTH'S WATER IS **AVAILABLE FRESHWATE**R

AGRICULTURE CONSUMES **70%** OF **FRESHWATER** RESOURCES

TERRESTRIAL WATER STORAGE **DROPS** 1 CM/YEAR OVER TWO DECADES

PROJECTED **GLACIER** AND **SNOW** COVER **REDUCTIONS**

INCREASED TEMPERATURES **DISRUPT** THE WATER CYCLE

RISING SEA LEVELS LEAD TO **GROUNDWATER SALINISATION**

CLIMATE CHANGE IMPACTS WATER QUALITY AND QUANTITY

MORE HEAVY PRECIPITATION EVENTS MEAN **MORE FLOODS AND DROUGHTS**

70% OF NATURAL DISASTER **DEATHS** ARE WATER-RELATED

THE OCEAN ECONOMY CONTRIBUTES OVER USD **$1.5 TRILLION ANNUALLY**

THE OCEAN ABSORBS 90% OF EXCESS HEAT AND **30% OF CO2 EMISSIONS**

MOST **OCEAN POLLUTION** ORIGINATES FROM LAND-BASED ACTIVITIES

CASE STUDY

PRESERVING PUNÁ ISLAND'S MANGROVES FOR WATER SUSTAINABILITY

Nestled off Ecuador's coastline, Puná Island holds a secret vital to our planet's water sustainability: mangroves. Often underestimated, these ecosystems play a pivotal role in safeguarding water resources, biodiversity, and climate resilience. In 2017, DP World, Ecuador, embarked on a mission not just to conserve, but to rekindle life in these vital wetlands.

Mangroves are champions of water sustainability. They act as natural filtration systems, mitigating water pollution and stabilising coastlines. These unique ecosystems also capture and store carbon – four times more efficiently than rainforests – playing a vital role in reducing greenhouse gas emissions and combating climate change. In collaboration with the CALISUR Foundation, DP World Posorja initiated the 'Sembrando Vida' program (Sowing Life) in 2017. The effort united staff, volunteers and local communities to plant over 175,000 mangrove seedlings. Today, this number has surged to 43,000, with an additional 32,000 seedlings planned for 2024 (DP World, 2023).

This concerted effort not only enhances water sustainability by preserving Puná's wetlands but also acts as a coastal natural defence against rising sea levels. Mangroves serve as protective buffers, capable of withstanding sea-level rises of up to 0.5mm per year. Beyond their environmental benefits, these mangroves foster biodiversity and water sustainability by creating a nurturing environment that supports marine life – a crucial asset for the local fishing community. DP World Posorja's dedication to this transformative project has earned international acclaim, with recognition in the Climate and Energy category at the International Association of Ports and Harbors (IAPH) awards. More importantly, DP World has had a tangible and measurable impact on the local marine environment and contributed to the mitigation of global climate change. This remarkable journey not only promotes life but also secures the water sustainability, ecological health and resilience of Puná Island and its surroundings.

Water and biodiversity

As we confront biodiversity challenges, the integrity and connectivity of atmospheric, land, ocean and freshwater aspects of the biosphere must be considered as integral components of whole-system ecology protection. Given that the water cycle interacts with all these biomes, it has the ability to play a pivotal role in facilitating effective action to protect and preserve biodiversity. Concepts already explored, including Source-To-Sea, the Sustainable Blue Economy and Blue Carbon solutions, have all alluded to the positive influence integrated water management has on biodiversity. This is especially true given that aquatic systems' ecological health is intrinsically linked with water use and misuse.

A synthesised approach to managing our impacts across on-land and ocean activities will be important in enabling an effective protection of biodiversity in all its forms. This includes introducing Nature-based Solutions as part of the complement of conventional climate action solutions (E Cohen-Shacham et al., 2016). Not only will this further diversify global approach to decarbonisation (incorporating Blue Carbon solutions, as outlined in the previous section), but it will also help to concurrently strengthen the integrity of ecosystems and the services they provide. DP World's Biodiversity Statement enshrines an organisational recognition of this interrelated relationship between water-based ecosystems, terrestrial ecosystems and climate change resilience. As the Earth's climate continues to change at an alarming rate, establishing collective principles for guided action, and common ground for our Ocean, Biodiversity and Environmental Impact strategies, is becoming increasingly important.

Nature-based Solutions (NbS) are "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature" (IUCN, 2020). Ultimately, they target major climatic challenges, including climate mitigation, but seek to operationalize a rounded approach that may or may not include decarbonisation ambitions. NbS are a natural fit as part of the Sustainable Blue Economy mode of environmental action, whereby environmental and social performance indicators are used to further materialize benefits for both climate and nature – not just the economy. DP World has pursued two distinct types of Nature-based Solutions; ecosystem restoration and ecological engineering.

GLOBAL BIODIVERSITY FRAMEWORK: TWO GOALS FOR 2050

GOAL A
The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;

Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels;

The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential (Convention on Biological Diversity, 2023b).

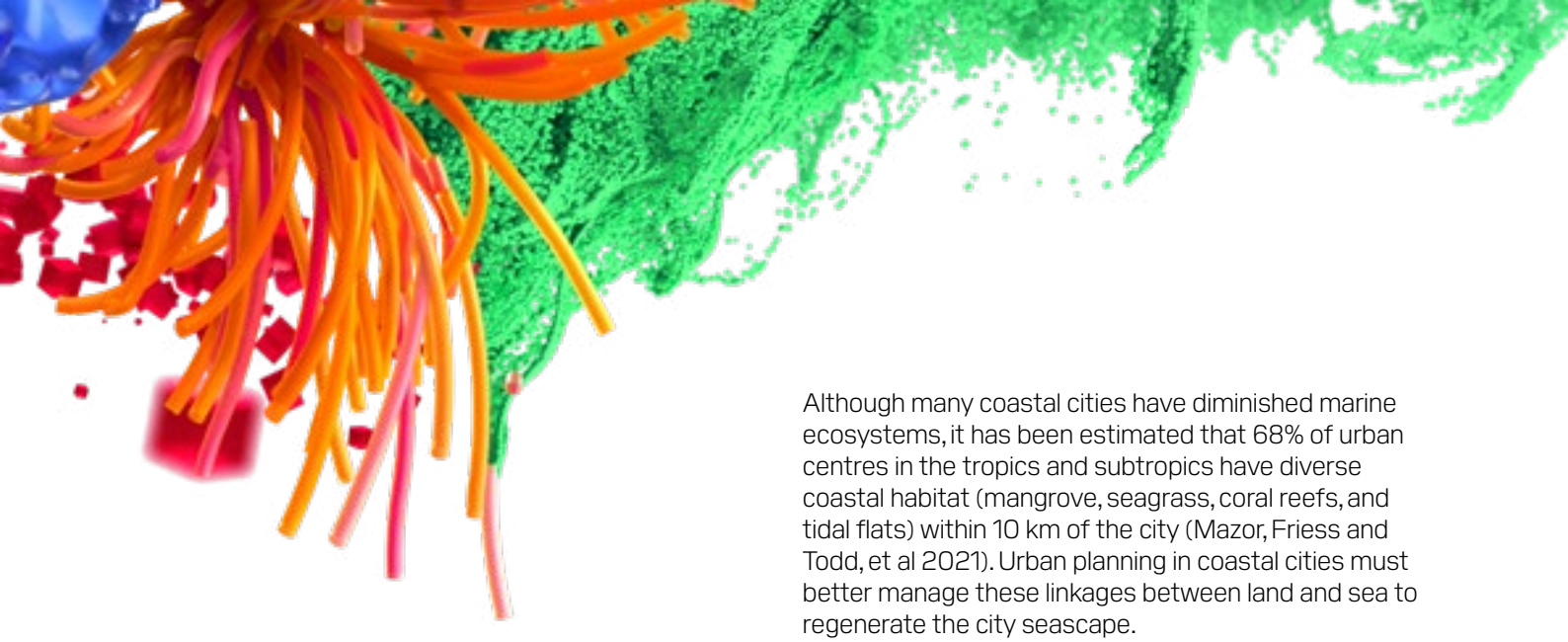
GOAL B
Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050 (Convention on Biological Diversity, 2023b).

Notably, neither rely on carbon markets for financing as the company considers NbS as a solution to first and foremost address operational biodiversity impacts, as opposed to our carbon reduction targets. However, DP World recognise that incorporating Blue Carbon Nature-based Solutions will offer an opportunity to address livelihood, disaster prevention, ecosystems services and biodiversity restoration benefits at markedly lower capital expenditure costs - considering the potential to redeem Blue Carbon credits and deliver triple bottom line benefits in the process.

Furthermore, as early signatories of the Ocean Stewardship Coalition, DP World has adopted the Ocean Stewardship Principles to help strengthen our approach to delivering on the 2030 Agenda for Sustainable Development. Principles One and Two (looking at strategic actions and sustainable business opportunities for ocean health, respectively) (UN Global Compact, n.d.) have been especially useful in helping us to better consider actions that will benefit the long-term health of the Ocean. This includes the restoration, protection and maintenance of ocean ecosystems. In addition, global frameworks, such as the Convention on Biological Diversity (CBD) (Convention on Biological Diversity, 2023b) and Kunming-Montreal Global Biodiversity Framework (GBF) (Convention on Biological Diversity, 2023a), have provided added context and helped in extending core tenets of our biodiversity conservation approach. In doing so, DP World hopes to engage in a collaborative approach that address challenges to ocean health, while integrating efforts to manage and protect resources on land that influence wider hydro-ecology.

THE GLOBAL BIODIVERSITY FRAMEWORK: A TARGET FOR CITIES

TARGET 12
Significantly increase the area and quality, and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, ecological connectivity and integrity, and improving human health and well-being and connection to nature, and contributing to inclusive and sustainable urbanization and to the provision of ecosystem functions and services.



Progressive global policy frameworks such as the Kunming-Montreal Global Biodiversity Framework and the Global Biodiversity Framework Fund offer progressive and coordinated mechanisms to guide us towards a nature-positive future

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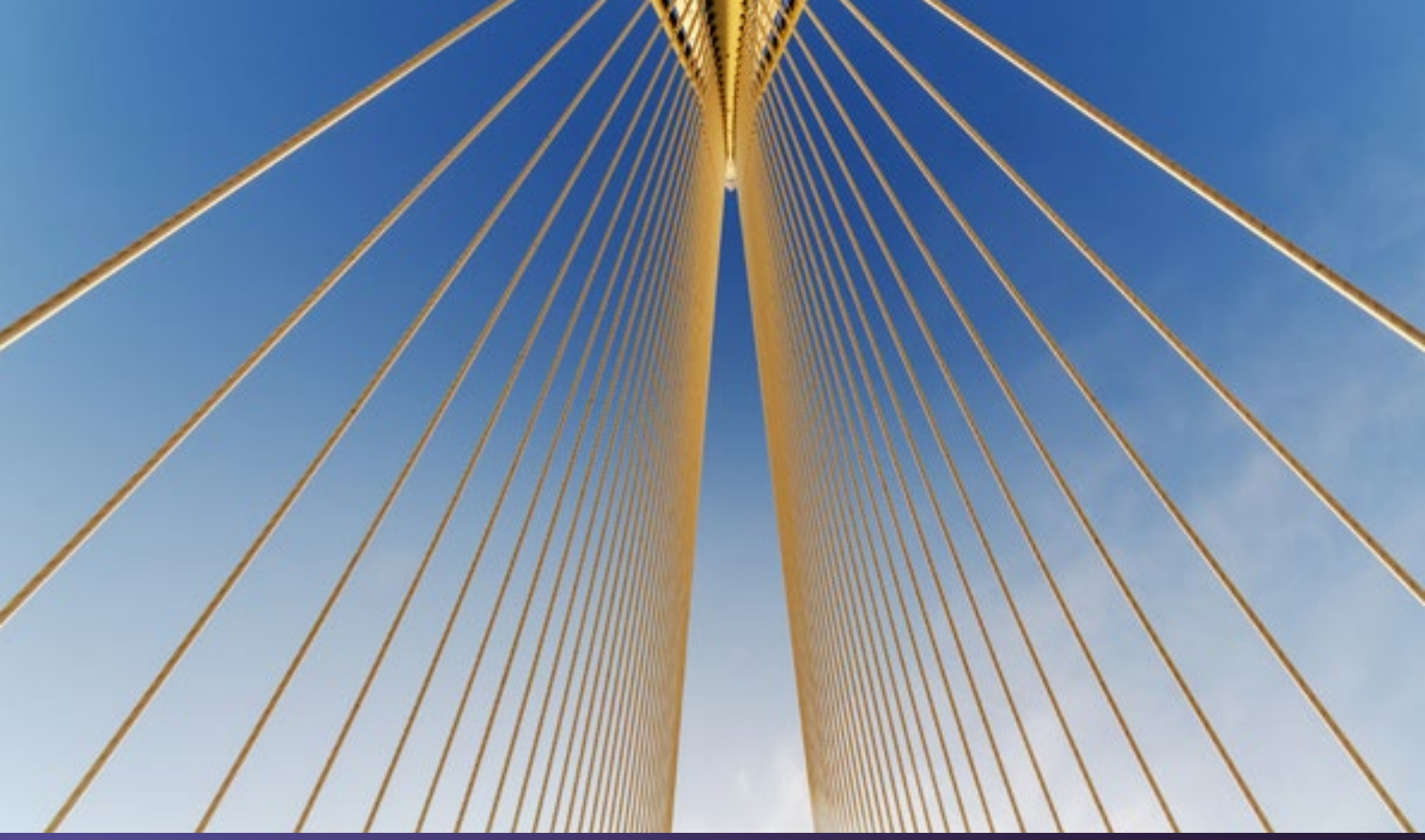
Asserting this connect between global water systems helps in facilitating action to better tackle broader encompassing phenomena, like biodiversity loss. An example of a holistic initiative designed to address multiple SDGs (nexus) in an urban setting is the concept of 'City Marine Parks" (Pittman, Rodwell and Shellock, et al 2019) – championed by Dr. Simon Pittman (School of Geography and the Environment, University of Oxford) who notes that only 7% of all MPAs are located within one kilometre of the world's urban centres. As a result, the conventional placement of MPAs rarely address the protection of urban waters against cumulative human impacts from cities and overlook the opportunity for valuable well-being benefits that could be delivered to biodiversity and people.

Although many coastal cities have diminished marine ecosystems, it has been estimated that 68% of urban centres in the tropics and subtropics have diverse coastal habitat (mangrove, seagrass, coral reefs, and tidal flats) within 10 km of the city (Mazor, Friess and Todd, et al 2021). Urban planning in coastal cities must better manage these linkages between land and sea to regenerate the city seascape.

The implementation of City Marine Parks or urban MPAs in coastal cities is a sizable action in addressing Target 12 of the Global Biodiversity Framework and puts cities on a regenerative pathway to a more sustainable and healthier place to live. These types of place-based actions recognise the interdependence of Ocean heath and city health. City Marine Parks help recognise that biodiversity is not just a function of environmental action, but economic, behavioural and governance efforts as well.

Given DP World's proclivity to championing the sustainable development of large-scale port facilities in the emerging markets, DP World recognises the role we must play in enabling and supporting impactful initiatives to safeguard and enhance the city seascape for people and biodiversity - especially in newly industrialised environments. To mobilise a change in attitude and help incentivise the "holistic management of terrestrial, freshwater, coastal and marine systems" (Stockholm International Water Institute, 2022), we understand the need to translate targets into actionable, organisational-specific goals that promote accountability. The Science-Based Targets for Nature (SBTN) and the Task Force on Nature-related Financial Disclosures (TNFD) provide guidance to businesses on how to set targets, coordinate and track progress towards goals for a nature, climate and people-positive future. Together, they offer an opportunity to help regulators and policymakers enforce a reliable, data-driven approach to biodiversity protection; in turn, initiating a more consolidated approach to the water management solutions required to address them.



CASE STUDY

RESTORING THE SOLENT'S SEASCAPE FOR PEOPLE, NATURE AND CLIMATE

The Solent, a 522-square-kilometer strait between mainland England and the Isle of Wight, is more than just water; it's a dynamic and thriving ecosystem. Saltmarshes, seagrass beds, mudflats and oyster reefs create an intricate ecosystem, hosting diverse species from king scallops to seahorses. This unique habitat is not just a sanctuary for these creatures – it's also a refuge for endangered species like the European Eel and Thresher Shark. It attracts marine predators, from seals to dolphins, and is a haven for over 12,000 breeding pairs of birds, offering wintering grounds to millions of ducks, geese and wading birds, including 10% of the world's Dark-Bellied Brent Geese population.

However, the Solent faces increasing challenges due to a growing population, intensified shipping movements and coastal pressures. More than half of its saltmarshes have vanished, oyster populations have plummeted by 95% and seagrass beds are in a state of decline. These habitats, while ecological wonders, are also essential for carbon storage, coastal protection, water quality improvement and tourism.

To address these issues, the Blue Marine Foundation, in collaboration with partners, is embarking on an ambitious programme to restore and reconnect the Solent's seascape. Over the next five years, they will work closely with local stakeholders and communities to develop a comprehensive seascape recovery plan. Their focus includes active restoration efforts, such as the revival of saltmarshes, seagrass beds, oyster populations and seabird nesting sites, with a long-term vision of achieving a self-sustaining coral reef. Additionally, they will assess the broader ecosystem service benefits of these restoration initiatives, covering aspects like carbon sequestration and biodiversity enhancement.

What sets this project apart is its aim to upscale seascape restoration, advocating for financial mechanisms and regulatory support while actively engaging and empowering local communities. The ultimate goal is to protect and restore at least 30% of the Solent's seascape (Blue Marine Foundation, n.d.), transforming a degraded environment into a flourishing, connected and productive ecosystem. In doing so, the project demonstrates the power of Nature-based Solutions to address complex environmental challenges and contribute significantly to climate change mitigation. This initiative is a best practice guide for restoring our world's precious seascapes for the well-being of people, nature and climate.

CASE STUDY

PRESERVING ESTUARY ECOSYSTEMS - A SOURCE-TO-SEA COMMITMENT

Imagine the serene expanse of estuary nature reserves, nestled gracefully along the Scheldt River, a stone's throw from the Antwerp Gateway terminal. Here, mud flats and salt marshes engage in a delicate ballet with the rhythmic ebb and flow of tides, creating a masterpiece of nature's design. Welcome to the 'Galgeschoor' and 'Groot Buitenschoor' estuary reserves, where every ripple tells a tale of life's intricate interplay.

Amidst this serene beauty, a supportive partnership has blossomed, one that holds the promise of safeguarding these precious ecosystems for generations to come. Natuurpunt in Antwerp, a staunch guardian of nature's wonders, invited us to join in a committed stewardship that recognises the vital role these estuaries play in nurturing life on our planet.

As part of a two-year commitment, DP World's contribution breathes life into the restoration and enrichment of these pristine wetlands (DP World, 2023a). But this alliance is not just about financial support; it embodies the essence of collective responsibility and tireless conservation efforts.

Within these estuaries thrives a symphony of specialised flora and fauna, finely attuned to the rhythms of their unique environment. Rare salt-tolerant plants and enigmatic reed birds, such as the bearded warbler and reed warbler, find sanctuary here amidst the mud and marsh.

Yet, the sanctity of these reserves faces a formidable adversary: industrial plastic pollution, the relentless force of climate change and the ever-present spectre of flooding. It is against this backdrop that we have marshalled the collective strength of our employees and their families, who actively engage in the difficult, yet highly rewarding task of cleaning and preserving these vital reserves.

These estuaries are more than just ecological gems; they stand as resolute barriers against the ravages of flooding and staunch allies in the global battle against climate change. In the grand tapestry of water sustainability, DP World's partnership with Natuurpunt stands as a testament to the boundless potential of Source-To-Sea initiatives in safeguarding our planet's precious waterways and the vibrant life they cradle.

CASE STUDY

THE OCEAN CITY VISION - TRANSFORMING COASTAL URBAN CENTRES

In a world undergoing unparalleled urbanisation, coastal cities wield unprecedented influence on our planet's fate. By 2030, over half of Earth's inhabitants will reside within 100 kilometres of coastlines (Pittman and Moseley, 2019), giving rise to urban powerhouses with both great potential and profound environmental responsibilities.

These urban giants consume 78% of global energy and generate more than 70% of greenhouse gas emissions, rivalling entire nations in their impact on climate change (Pittman and Moseley, 2019). Their rapid expansion exacerbates rising sea levels, putting over 570 low-lying coastal cities and millions of lives at risk by 2050, with the projected global economic costs to cities, from rising seas and inland flooding, amounting to $1 trillion (C40 Cities Climate Leadership Group, 2018).

Coastal cities hold the key to positive transformation

While historically contributing to river, estuary and coastal pollution, they also possess the potential to drive regenerative change. The 'Ocean City' concept embodies a holistic vision for coastal urban centres. It champions integrated marine ecosystems in city planning, promotes ocean literacy among citizens and builds resilience against climate change.

The 'Ocean City Pledge,' co-created with the Biophilic Cities Network, unites citizens and leaders in envisioning a future where cities and oceans harmoniously coexist. Ocean Cities adopt blue city strategies to protect marine ecosystems, biodiversity, and embrace marine nature.

Recognising the need for long-term vision

Ocean Cities extend their planning horizons to enhance civic life, inspire confidence and attract businesses while fostering resilience. Through collective action, Ocean Cities empower their citizens to become ocean advocates, creating inclusive spaces for marine stewardship and actively engage in restorative activities. They work toward a safer, healthier, and more sustainable future.

Now is the time for coastal cities to lead in global ocean conservation, protect marine ecosystems, educate citizens and deepen their connection with the sea. By adopting the Ocean City concept and implementing its transformative actions, coastal cities can become beacons of responsible, resilient and compassionate coexistence with the ocean, securing the future of our Blue Planet for generations to come.

WATER, SANITATION & HYGIENE (WASH)

Water-related challenges possess the power to either stabilise or destabilise peoples, often serving as a root cause for social disruption. Extreme weather not only displaces communities but also brings forth a host of health hazards, from waterborne diseases to clean water contamination. The threat of rising sea levels further exacerbates these challenges, rendering coastal regions increasingly vulnerable. Data from the World Health Organization helps to contextualise the scope of impact, stating 'approximately 829,000 lives are claimed each year due to unsafe water, inadequate sanitation and poor hygiene" (World Health Organization, 2022).

Building resilience in infrastructure, particularly in coastal regions, is heavily reliant on fortifying water, sanitation and hygiene facilities (WASH). This requires strong networks for sewage infrastructure and wastewater disposal. In addition, building community WASH resilience requires addressing core water security and storage capacity concerns - such as the lack of available boreholes, reservoirs and natural storage aquifers which worsen acute water scarcity challenges and limit communities' adaptive capacity in times of crises. This is especially true when associated support infrastructure for the storage and transportation of clean water is compromised. There has been both a lack of investment and under-representation of 'Small Water' challenges in global discussions on water management. This reflects the historical difficulty in deploying adaptation finance in general and underpins the susceptibility of people and the environment to WASH related vulnerabilities. Importantly, capital allocation for water access and security related projects do not flow to the localities and regions that most need to improve their WASH service infrastructure, reenforcing the climate adaptation gap (WaterAid, 2020).

In crystalising the link between WASH, community and broader climate and biodiversity water-related initiatives, there is an opportunity to scale investments into responsible robust water management and enable comprehensive action that addresses both the push and pull factors that shape a healthy water cycle. Strengthening 'Small Water' infrastructure helps to build community WASH resilience and improves its ability to withstand extreme weather risks such as floods or storm surges; it also prevents the contamination of water sources and marine environments, safeguarding these ecosystems in the process. WASH infrastructure is the first barrier of defence between human and environmental water-related impacts and is a useful example of the need to consider Source-To-Sea when establishing an effective management approach.

Source-To-Sea helps to connect the dots on the importance of 'Small Water' management in the context of mitigating downstream water-related climate challenges. Specifically, a consolidated, systems-based approach addresses the fragmented governance challenge which remains a significant barrier to holistic action. The Stockholm International Water Institute's pilot projects in Vu Gia-Thu Bon River Basin and Hoi An, in central Vietnam, demonstrate the effectiveness of such a multistakeholder approach (Stockholm International Water Institute, 2023). Although, these projects focus on facilitating a Source-To-Sea "action on plastic" in particular, principle takeaways remain relevant for wider WASH related aspects. Namely, how the identification of effective practices, paired with active stakeholder engagement for community participation, can serve to foster a sense of ownership over water management practice and drive collective behavioural change. When we consider that over 40% of the global population relies on water sources originating from river basins shared by two or more countries (Global Environment Facility, 2015), the crucial need for stakeholder participation is underscored.

A lack of water access infrastructure also manifests as a contributing factor to the worsening of gender imbalances in countries where women and girls are disproportionately burdened with water collection responsibilities (WaterAid, 2020). Limited accessibility and a reliance on remote footpaths, hampered with inclement weather, can make the journey long and arduous. This further adversely impacts their geographic and occupational mobility, narrowing already small windows for economic opportunity. Ultimately, WASH infrastructure becomes a conduit for addressing a plethora of tangential socio-economic issues that have historically impacted the emerging markets, revealing how fundamental water issues can metastasise into broader development impact challenges.

These overlooked WASH components of our water system are materially significant, especially in mitigating societal impacts and allowing coastal and in-land communities to thrive. This includes clean water access and security, marine pollution and disaster preparedness. In the context of DP World's own operations, and the work we are doing with our partners at WaterAid to drive climate resilient WASH, we have seen firsthand how many communities within the emerging markets heavily rely on a disjointed network of on-site pit latrines and septic tanks for sanitation. Importantly, this existing system fails to safeguard against long-term water contamination risks in the event of flooding and wastewater overflow. WaterAid highlights that in many of the cities where they operate, access to a comprehensive sewerage network is restricted to 20% (even as low as 12% of the population) and is concentrated within city centres". This is especially prevalent in densely populated lower-income neighbourhoods and peri-urban regions that have yet to receive targeted investment or benefit from strategic urban planning. There is an urgent need for significant investments in urban sanitation to address this challenge effectively.

> **In the complex landscape of global water challenges, promoting unity, resilience and sustainability within communities becomes imperative for preserving our collective water heritage and ensuring water remains a unifying force rather than a potential source of conflict."**
>
> **Daniel Crockett**
> Director of Ocean and Climate, Blue Marine Foundation.

WaterAid's collaboration with DP World in Mozambique has focused on WASH in healthcare facilities and is a useful demonstration of the proactive steps needed to bridge the gap between water, health and the well-being of communities. Through the DP World funded project in the Cuamba District, WaterAid is actively working to improve access to clean water, sanitation and hygiene in healthcare facilities and surrounding communities. This has helped to address critical health challenges and contribute to the overall improvement of community well-being.

CASE STUDY

TRANSFORMING LIVES IN MOZAMBIQUE- A TALE OF CLEAN WATER AND EMPOWERMENT

In the heartlands of Sub-Saharan Africa, in the rural northern Niassa Province, a simple act used to be a gruelling daily challenge. Fetching water meant embarking on laborious journeys, with women shouldering the heavy burden of carrying containers filled with murky water over great distances. It was a story all too common – and disproportionately so in this region. The World Heath Organization (WHO) estimates that while more than 90% of the population in the southern province of Maputo has access to safe water, in Niassa the figure is only 38% (DPWorld, 2022).

The WaterAid and DP World partnership
DP World and WaterAid are working together in Niassa Province to improve WASH facilities in three healthcare centres and across their surrounding communities.

Through the partnership we will be constructing solar panel water provision systems, improving water access infrastructure, and facilitating clean, accessible water supply that helps to safeguard health and hygiene standards. DP World is also supporting a graduate programme created to encourage an increase in employment opportunities and collective participation within the WASH sector.

Together with WaterAid, DP World hopes to leverage the outputs and results of the project to crowd-in additional and sustained investment for institutional WASH infrastructure from the government and private sectors actors.

Connecting SDG 6 and SDG 14
SDG 6 (Clean Water and Sanitation) and SDG 14 (Life Below Water) are intrinsically connected through the Source-To-Sea approach. Ensuring access to clean water and sanitation (SDG 6) is fundamental to reducing pollution - preserving the health of oceans and marine life (SDG 14).

Clean water and proper sanitation practices prevent contamination of water sources and the discharge of harmful waste into rivers and seas. This, in turn, safeguards marine ecosystems and promotes the sustainable use of aquatic resources. The connection is clear: by addressing SDG 6 in communities like Niassa and Cuamba, the oceans are also protected, aligning with the objectives of SDG 14.

This partnership, grounded in the belief that access to clean water and sanitation is a fundamental human right, embodies a commitment to facilitating authentic and meaningful change within communities.

By integrating Water, Sanitation and Hygiene (WASH) interventions into DP World's operational framework, and equipping staff with the prerequisite knowledge and expertise to help develop and maintain WASH infrastructure, this collaboration helps demonstrate that businesses can play a crucial role in addressing global challenges, improving lives and advancing progress towards sustainable development goals.

As the 2030 deadline for Sustainable Development Goal 6 (SDG 6) rapidly approaches, DP World's partnership with WaterAid stands as irrefutable evidence that positive change is attainable, regardless of geographical location or the scale of the challenge.

Water and livelihoods: Water's vital role in rural prosperity

Water is the backbone of rural economies. It provides jobs and supports rural livelihoods, such as agriculture and fishing, that are essential to maintaining strong rural community networks. As per the United Nations, approximately 40% of global jobs are linked to water-dependent sectors like agriculture, fishing, and tourism (UN Water, 2016). The resource plays a central role in the rural blue economy: fostering crop growth, sustaining fisheries and boosting economic development by allowing for sustainable livelihoods. Therefore, neglecting water access can have far-reaching consequences for both rural and ocean-based economies.

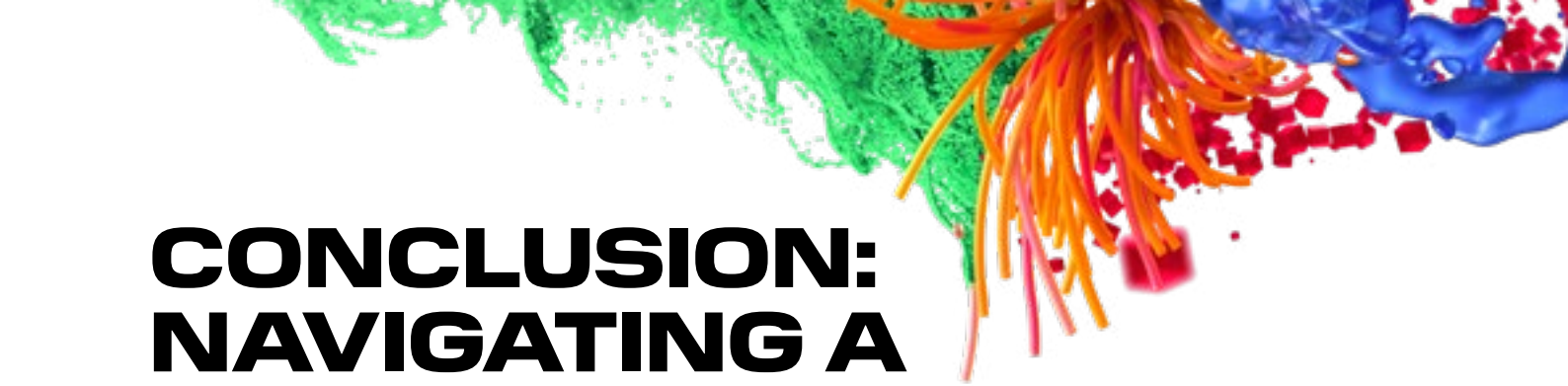
In line with adopting a Source-To-Sea understanding of water systems, rural activities also feed into the push and pull characteristic of integrated water management. Not only do rural communities rely on water for livelihood security and economic opportunity, but rural economic activities directly influence the quality of local and regional water supplies given their proximity to in-land and marine water systems. Therefore, proactive strategies to enable clean water access must be coupled with a recognition of how inappropriate water-use practices serve to exacerbate the quality of the shared resource - creating unaccounted for climate, nature and biodiversity related impacts. Establishing natural buffers and reducing groundwater runoff to large natural water repositories are essential to preventing ecological damage in the form of eutrophication, chemical contamination and sedimentation from agricultural activities.

Fortifying WASH infrastructure and making sure to positively influence rural livelihood practices requires a conscientious, considered and targeted approach to integrated water management. Global best practice like the IFC Performance Standards help guide an environmental and socially responsible approach to infrastructure development. DP World has looked to find ways to embed this understanding across both our operational footprint and that of the communities in which we operate, fulfilling the need for a strategic approach. Partnerships with entities like WaterAid (explored in the previous section) help meaningfully contribute to this, but taking on a multi-tiered stakeholder approach to sustainable development cements the private sector's ability to adopt proportionate responsibility for the prospective impacts of water on livelihoods and livelihoods on water.

> **Education is the key. It connects us to the complex relationship between water, marine life and our sustainable future. It prompts us to make wise decisions, encourages us to take responsibility and prepares a new generation to protect our precious water resources"**

Daniel Crockett
Director of Ocean and Climate, Blue Marine Foundation.

Rural economies in the emerging markets remain underexposed to the extent to which improper agrarian practices can compromise ecological integrity and community health. Capacity building is a useful mechanism through which to prolong the success of adopting bottom-up water governance, maximising the likelihood for a localised, multistakeholder approach to succeed in the long-term. Tripoli's comprehensive rehabilitation of its own WASH infrastructure is an effective example of the need to change the perspective on the role water plays in building community resilience (World Health Organization, World Bank Group and UNICEF, 2022). There is greater probability to bypass societal tensions, government bureaucracies and other external bottlenecks that contribute to the degradation of WASH services by nudging the collective to appreciate water as a scarce and precious resource – contextualising health and well-being in the process (World Health Organization, World Bank Group and UNICEF, 2022). This encourages behavioural change that maintains the physical improvements made to WASH infrastructure improvements and prompts a sense of ownership and responsibility around water management practices.



CONCLUSION: NAVIGATING A SUSTAINABLE FUTURE FOR WATER AND OCEANS

This whitepaper amplifies the need for multi-tiered solutions that assume a more holistic approach to water management. We hope to have laid the foundations for constructive dialogue with our industry peers, subject matter experts and the wider public on how to operationalise a renewed approach to mitigating climate and nature related impacts that are proliferated by water.

The health of both climate and nature are indicative of the strength of climate action. Water, as a throughline between these concepts, must be considered as part of the available complement of climate adaptation and mitigation initiatives to reduce carbon emissions, prevent biodiversity loss, promote ecosystem services, and safeguard community livelihoods and resilience. In the context of the global trade sector, this requires fair consideration of both upstream and downstream aspects, encompassing waters' role in the environment and in industry.

Adopting a Source-To-Sea perspective promises to enable a systems science approach that appreciates the interdependence of water-based ecosystems and their surroundings. Impacts are not likely to be limited to specific segments of the water-cycle; therefore, adopting an integrated water resource management approach will help to elevate conventional and prevailing water governance paradigms. In turn, helping to broaden the scope and mechanising Blue Carbon, Nature-based Solutions and resilient WASH infrastructure to help realise a Sustainable Blue Economy.

Water is not just a resource but a shared legacy for generations to come. A collectivised approach guides our path forward. While the journey may be challenging, the destination is a sustainable future where water and ocean ecosystems thrive, and humanity prospers.

OUR PRIORITIES GOING FORWARD ARE CLEAR:

01 ENHANCE CLIMATE MITIGATION, WITH CONTINUED DEEP DECARBONISATION INITIATIVES AND INVESTING IN RENEWABLE ENERGY ON A SCALE REQUIRED FOR A SUSTAINABLE FUTURE.

02 STRENGTHEN INTEGRATION FOR MULTILEVEL WATER MANAGEMENT FACTORS.

03 INCORPORATE NBS FOR SUSTAINED BIODIVERSITY BENEFITS.

04 INVEST IN URBAN SANITATION PROJECTS TO ADDRESS WATER CONTAMINATION CHALLENGES.

05 FORGE PARTNERSHIPS AND ENGAGE WITH GLOBAL FRAMEWORKS FOR COLLECTIVE ACTION.

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Simon Pittman Ph.D.
Honorary Research Associate at School of Geography and the Environment, University of Oxford & Director Seascape Analytics Ltd.
Interview date: 3 August 2023

Daniel Crockett
Director, Ocean and Climate, Blue Marine Foundation
Interview date: 5 September 2023

WaterAid
Interview date: 3 August 2023 & 8 August 2023

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