UNIVERSAL

PLASTIC

Digital **Ocean** Solutions

WHITE PAPER

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3. ABBREVIATIONS

AI: Artificial Intelligence

dMRV: Digital Measurement, Reporting, and Verification

ESG: Environmental, Social and Governance

IoT: Internet of Things

ONDAs: Ocean Notarised Digital Assets

ODIS: Ocean Data and Information System

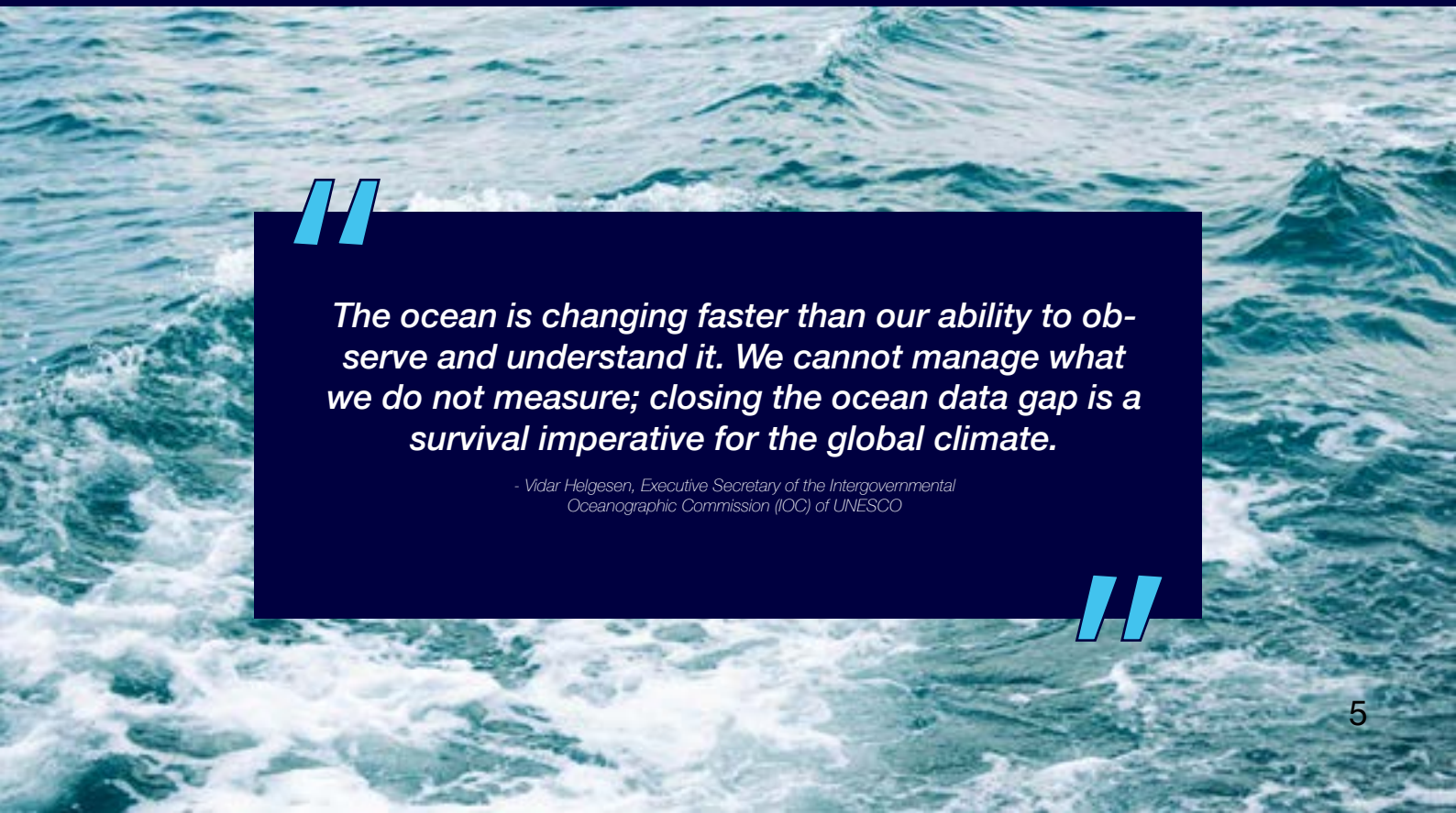
PMDS: Plastic Monitoring Data Space

ReF: Regenerative Finance

SDGs: Sustainable Development Goals

UNESCO-IOC: Intergovernmental Oceanographic Commission

UP: Universal Plastic



> ***The ocean is changing faster than our ability to observe and understand it. We cannot manage what we do not measure; closing the ocean data gap is a survival imperative for the global climate.***
>
> *- Vidar Helgesen, Executive Secretary of the Intergovernmental Oceanographic Commission (IOC) of UNESCO*

4. FOREWORD

Empowering Ocean Resilience Through Digital Intelligence

Dear partners and stakeholders,
The ocean underpins climate stability, biodiversity, and the livelihoods of billions of people. Its resilience is being steadily weakened by plastic pollution, an environmental and economic challenge that demands more than awareness or isolated initiatives. It requires **credible intelligence, shared standards, and coordinated execution** across public institutions, industry, and civil society.

Universal Plastic was founded on a clear premise: **ocean regeneration becomes scalable when impact is measurable, interoperable, and verifiable**. We are a science-driven technology company building the digital infrastructure needed to convert verified plastic recovery and monitoring into reliable, standardised data. Governments can use this intelligence to plan and finance interventions, while companies can evidence credible contributions within ESG and sustainability frameworks.

We deliver this through an integrated ecosystem. **The Plastic Monitoring Data Space (PMDS)** serves as a standards-aligned data backbone, connecting fragmented datasets and enabling cross-border collaboration while preserving data sovereignty. **Blue Resilience OS** equips public authorities to model risk, prioritise interventions, and unlock sustainable finance through verifiable evidence. Ocean Notarised Digital Assets (ONDAs) convert validated recovery actions into auditable, transparent, and reportable digital units—supported by **digital MRV**, traceability, and interoperability.

Systemic change, however, requires participation at every level. By connecting citizens and local actors through our **app and the Ocean Defenders** network, recovery efforts become visible, traceable, and comparable. This strengthens accountability, expands coverage, and channels value toward the coastal communities sustaining this work.

This whitepaper presents a **new operating model for ocean resilience**, one in which data integrity and shared infrastructure enable credible investment, effective policy, and measurable outcomes. We invite governments, partners, and companies to collaborate with us in accelerating the transition from fragmented action to coordinated impact, and in building the foundations of a productive, regenerative Blue Economy.

As we step into 2026, we see a profound opportunity, not to fight plastic pollution, but to solve it. Let us embark on this journey with determination, and a shared commitment to restore our oceans.

Álvaro Bravo
CEO Universal Plastic

5. EXECUTIVE SUMMARY

Marine plastic pollution is an environmental and economic risk that remains difficult to manage at scale because the underlying evidence base is still fragmented. Data is collected across institutions, geographies, and methodologies, which limits comparability, slows decision-making, and reduces confidence in reported outcomes. This weakens policy precision and constrains the efficient allocation of public and private finance.

Universal Plastic (UP) addresses this gap by building the digital infrastructure for measurable ocean regeneration. UP converts verified recovery activity and monitoring signals into reliable, standardised datasets that can be used across stakeholders and jurisdictions.

This is delivered through an ecosystem structured around four core pillars. At the **intergovernmental level**, the Plastic Monitoring Data Space connects science, technology, and institutions under shared standards, enabling interoperable collaboration while preserving data sovereignty. At the governmental level, Blue Resilience OS equips **public authorities** with tools to model risk, prioritise interventions, and unlock blue finance through verifiable evidence.

For companies, our Ocean Notarised Digital Assets (ONDAs) and the Become Blue Verification translate recovery actions into credible, auditable contributions aligned with CSR and ESG requirements. **For communities**, UP's citizen science approach ensures that locally generated data strengthens global intelligence, improving coverage and accountability while recognising the role of coastal actors in delivering recovery outcomes.

To support decision-quality prioritisation, UP also introduces the **Biodiversity Impact Index**, a proprietary metric that translates the positive outcomes of coastal plastic removal into a standardised impact score. Rather than focusing only on volume collected, it reflects ecological sensitivity and broader ecosystem value to help direct effort and finance toward locations where interventions deliver higher environmental returns.

Together, **these capabilities strengthen transparency, reduce uncertainty, and enable scalable funding by linking action to verification and investment-grade confidence.** This whitepaper outlines the market context, the limitations of current approaches, and the strategic rationale for shared data infrastructure as the missing link between coordinated intervention, credible reporting, and measurable outcomes.

Our goal is to **catalyze global dialogue and decisive action on the plastic crisis**, driving systemic change and shaping a future where ocean health becomes a cornerstone of worldwide climate strategies.

6. PROBLEM LANDSCAPE AND MARKET OPPORTUNITY

6.1 BLUE ECONOMY

6.1.1. THE OCEAN: THE PULSE OF OUR PLANET AND THE HEART OF THIS NEW WAVE

The ocean is fundamental to sustaining life on Earth. Covering more than 70% of the planet's surface, it regulates global climate and weather patterns, generates over half of the world's oxygen, and absorbs around 30% of human-produced carbon dioxide according to the United Nations (UN). Beyond its ecological functions, **the ocean underpins the livelihoods of more than three billion people**, particularly in developing nations, **and serves as the cornerstone of the rapidly expanding Blue Economy**.

The World Bank defines the **Blue Economy** as the sustainable use of ocean resources to drive economic growth, improve livelihoods, and create jobs while safeguarding marine ecosystems. Key sectors include fisheries, aquaculture, maritime transport, tourism, and ocean-based renewable energy. According to OECD projections, the ocean economy is expected to more than double in value by 2030, reaching approximately USD 3 trillion.

Despite its critical importance, **the ocean's ability to sustain life and economic activity is increasingly at risk**. Escalating plastic pollution is disrupting natural processes, damaging ecosystems, and jeopardizing future growth. Confronting this **challenge demands urgent, science-driven solutions to strengthen ocean resilience and secure the long-term viability of the Blue Economy.**

Addressing the ocean finance gap is critical to achieving Sustainable Development Goal 14 ("Life Below Water"). The UN estimates indicate that annual climate investment needs could reach approximately USD 8.1 trillion by 2050, with around USD 536 billion required each year to scale nature-based climate solutions. A meaningful portion of this investment must support ocean health. Specifically, achieving SDG 14 by 2030 is estimated to require USD 175 billion in annual financing.

6.2 THE PLASTIC CRISIS

6.2.1 FROM BLUE TO BLIGHT

Despite the potential of the Blue Economy, the ocean is facing a significant challenge: **plastic waste**. The UN estimates that 11 million tons of plastic enter the ocean each year, equivalent to the approximate weight of 2,200 Eiffel Towers all together. **This pollution is not only an ecological disaster but also an economic burden**, costing approximately USD 13 billion annually in damage to marine ecosystems.

Plastic debris poses a threat to biodiversity, with more than 1500 species affected by ingestion, entanglement, and habitat loss, as reported by the International Union for Conservation of Nature (IUCN). Additionally, microplastics are infiltrating the food chain, raising concerns about food safety and human health.

Addressing this crisis requires a multifaceted approach that involves governments, industries, and communities. UP is committed to leading the way with data-driven strategies and fostering community engagement to develop effective solutions.

"Marine plastic pollution represents both an ecological and economic systemic risk."
- UN / OECD

6.2.2 THE CHALLENGES IN DEPTH: ECOLOGICAL AND SOCIOECONOMIC DIMENSIONS

Plastic pollution has become a global environmental and human crisis. **Today, plastic is found everywhere**, from mountain peaks to deep-sea trenches, and projections suggest that by 2050, oceans could contain more plastic than fish by weight. Its impact goes beyond visible debris. Throughout its lifecycle, **plastic leaves a significant carbon footprint;** when burned, it emits carbon dioxide and methane, directly contributing to climate change.

These pressures threaten vital ecosystem services that billions of people depend on. Ocean health is central to global sustainability efforts, particularly SDG 14, which focuses on conserving and sustainably using marine resources. Reducing plastic pollution is crucial to achieving these targets and developing business models that preserve ecological integrity.

The crisis also carries profound socioeconomic implications. In many regions, collecting and selling plastic waste provides income for vulnerable and informal workers.

60%

of global plastic recycling depends on informal workers.

According to the UN, these waste collectors recycle about **60% of all plastic waste worldwide**, often serving as the only functioning waste management system in their communities.

Despite their essential role, they work under largely unregulated conditions, face social stigma, and lack basic protections, exposing them to serious health and safety risks.

Even when **organized through cooperatives**, associations, or NGOs, these groups struggle to access financial resources, formal recognition, and digital tools to measure and monetize their impact. Their contributions are vital to mitigating the plastic crisis, yet they remain undervalued and under-supported.

Together, these ecological and socioeconomic challenges highlight the scale and complexity of the plastic problem, **underscoring the urgent need for solutions that strengthen ocean resilience while empowering the communities** leading waste recovery efforts.

6.2.3. DATA ENHANCES UNDERSTANDING OF OCEANIC COMPLEXITY

Tackling today's environmental and social crises requires a transformative, evidence-based approach. **Data is critical for understanding and addressing complex challenges such as marine plastic pollution.** Yet, significant gaps continue to hinder progress.

One major barrier is the **scarcity and fragmentation of data on the location, movement, and impact of plastic waste.** Scientific assessments consistently point to inadequate monitoring systems, limited data sharing, and the absence of standardized collection methods as key obstacles. Existing digital tools are often insufficient or unevenly adopted, restricting the generation of reliable and comparable insights.

Comprehensive data on marine plastic waste is crucial for understanding the scope of the problem. While digital solutions are increasingly important in environmental management, adoption in this sector remains slow. As a result, **decision-makers often lack the information needed to act effectively.** Policymakers, governments, and conservation organizations often rely on incomplete or outdated data, which impairs their ability to allocate resources efficiently, design targeted interventions, and measure outcomes accurately.

Mapping plastic accumulation and understanding its ecological and socioeconomic impacts are vital for guiding remediation efforts and developing preventive strategies. Without this foundational knowledge, efforts to protect the ocean and build long-term resilience remain limited.

6.3 MARKET FAILURE: WHY EXISTING MODELS DO NOT WORK

6.3.1 STRUCTURAL WEAKNESSES IN PLASTIC CREDITS AND ESG ASSETS

KEY STUCTURAL GAPS

- Undervalue marine recovery
- No real-time traza-bility
- ESG disconnected from operational impact

Plastic credit systems and ESG assets are designed as financial tools to promote environmental progress. However, both fall short of reflecting the true costs and opportunities associated with their intended impact.

Plastic credits, such as those developed by Verra, aim to incentivize waste collection by considering factors like location, waste type, and social impact.

Yet **these frameworks overlook the actual expense of recovering plastic from coastal and freshwater ecosystems.**
Beaches, rivers, and lakes are critical gateways for pollution entering the ocean, but cleanup efforts in these areas remain undervalued. Unlike land-based recovery, aquatic environments pose unique challenges:

Constant movement	*Unpredictable accumulation patterns*	*Degradation from sun and saltwater*

These factors significantly increase operational costs, yet current credit pricing does not differentiate between easily accessible waste and the complex, labor-intensive work required in marine settings.

Moreover, **existing methodologies rarely account for the ecological value of these environments or the biodiversity risks posed by pollution.** Ignoring these dimensions results in credits that underestimate the environmental cost of inaction and the benefits of restoration. **This gap is compounded by the absence of real-time geolocation tracking**: a limitation that prevents accurate cost assessment and hinders the development of data-driven pricing models capable of prioritizing high-impact areas.

A similar challenge exists in ESG investment frameworks. **Many ESG assets aim to reward sustainable practices, yet standardized metrics linking impact to financial value remain limited**. While reporting frameworks have advanced and investors increasingly treat ESG as a financial risk factor, in practice many organizations still fight to fully mer-

ge it within their core economic and operational decision-making. This misalignment reduces incentives for meaningful integration and makes it harder for investors to distinguish between compliance-oriented reporting and genuine performance.

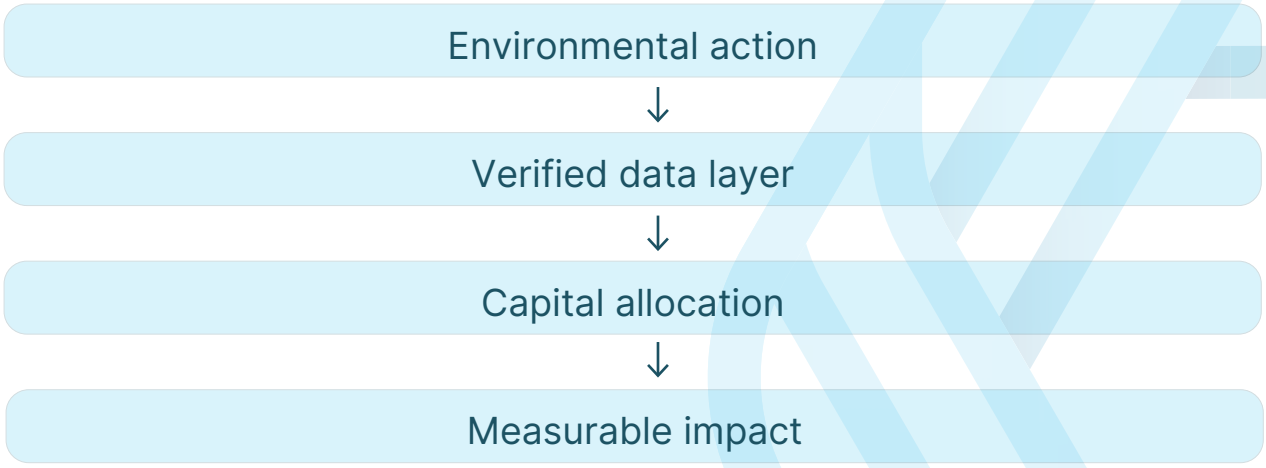
Enhancing the alignment between environmental outcomes and financial incentives is essential for both ESG investments and plastic credits. Clearer valuation methods, standardized metrics, and data-driven pricing models can help these mechanisms deliver measurable environmental and economic value.

6.4 MARKET OPPORTUNITY: WHY NOW

6.4.1 SHAPING THE BLUE ECONOMY WITH DIGITAL SOLUTIONS

UP strengthens the Blue Economy by adding a digital layer inspired by **Regenerative Finance (ReFi)**. By integrating advanced data systems with responsible ocean practices, we help evolve a Blue Economy shaped by technology-driven transparency.

Digital Layer Connecting Action and Capital



While the Blue Economy promotes sustainable ocean resource use, ReFi introduces the digital infrastructure needed to connect environmental action with capital allocation. **Through tools such as traceability frameworks and automated verification, ReFi enables impact to be measured, compared, and trusted at scale**. Applying these principles, UP makes plastic waste collection measurable and auditable, linking operational activity to investment-grade evidence.

As discussed earlier, **SDG 14 remains persistently underfunded** not due to a lack of need, but **due to a lack of credible data demonstrating where investment delivers the greatest impact**. Without consistent, decision-grade information, capital struggles to flow efficiently into ocean restoration initiatives.

By generating reliable, comparable insights into ocean restoration outcomes, UP addresses this structural barrier. Its digital infrastructure reduces uncertainty for funders, strengthens confidence across stakeholders, and enables capital to be directed toward high-impact marine initiatives—unlocking funding pathways that have historically remained closed to the Blue Economy.

6.5 GLOBAL DEMAND FOR VERIFIABLE IMPACT

6.5.1 REAL-WORLD ACCOUNTABILITY

For plastic credits to function as true environmental solutions, they must rely on real-time, auditable data, not estimates. UP achieves this through IoT monitoring combined with AI analytics, ensuring each credit reflects a specific, location-verified recovery event.

IoT tracking captures collection activities across beaches, rivers, and lakes with geospatial evidence, eliminating the need for after-the-fact reporting. AI models map pollution flows, identify areas of accumulation, and guide recovery efforts where the impact is greatest.

Beyond accountability, **this data-driven approach supports the long-term productivity of seas and oceans as economic assets.**

By reducing plastic leakage in high-impact zones, UP's systems help preserve the environmental conditions that underpin coastal livelihoods, fisheries, tourism, and maritime activities. Continuous data feedback enables recovery efforts to be prioritized where environmental improvement translates into measurable economic resilience.

Unlike traditional pricing models, **UP calculates the true cost of marine plastic recovery by integrating logistical, operational, and ecological variables.** This transforms plastic credits from static offsets into high-integrity instruments for marine restoration that align verified environmental outcomes with sustained economic value.

6.5.2 READY-TO-USE ESG ASSETS

UP converts marine plastic recovery data into **ready-to-use ESG** assets that can be applied across private and public decision-making contexts. These assets are built on **verified environmental observations** and structured to meet the requirements of auditability, comparability, and strategic relevance.

> Its digital infrastructure reduces uncertainty for funders.
> Infrastructure enables capital flow.

Mechanisms such as UP's Ocean Notarised Digital Assets (**ONDAs**) capture and structure verified cleanup activities into standardized, auditable data units, which are explained in detail in the value proposition section. **These assets transform environmental performance, which we then translate into decision-grade data for use across organizational and public governance contexts**. This approach shifts ESG from a predominantly declarative practice toward an operational capability grounded in evidence.

For companies, **ESG assets** enable the credible integration of ocean impact into **strategy, risk management**, and long-term value creation. For public authorities, the same evidence base supports planning and intervention frameworks aimed at strengthening the environmental and economic productivity of coastal regions.

CLEANUP
↓
ONDA
(Verified Asset)
↓
ESG REPORTING
↓
CAPITAL

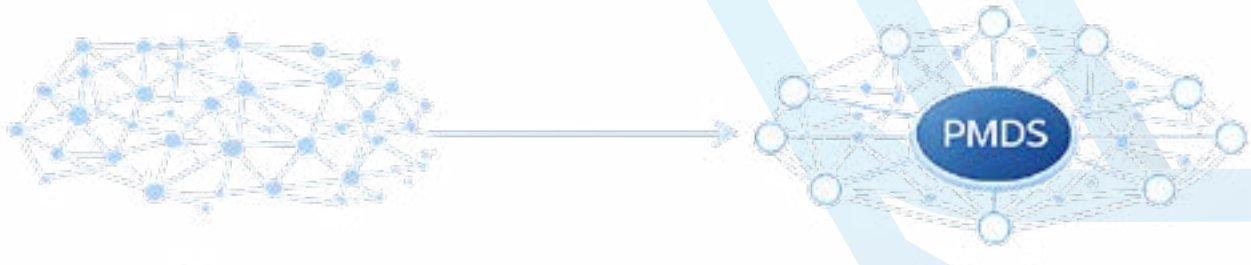
True systemic change requires more than operational transparency; it depends on a shared data backbone that connects citizen participation, corporate action, and public governance. **By structuring ESG assets as interoperable and communicable units, UP establishes a common operational language** around verified impact, enabling coordinated responses that support both environmental resilience and long-term economic stability.

6.5.2 THE MISSING LINK: GLOBAL INTEROPERABLE DATA INFRASTRUCTURE

Plastic credits and ESG assets have advanced transparency at the project level, but their impact remains constrained by fragmented data ecosystems. Marine pollution information is scattered across regions and platforms, creating blind spots that weaken accountability and slow investment.

Closing this gap **requires a unified, interoperable data infrastructure that connects sector specific datasets and secure data exchange among stakeholders**. Such a foundation enables a global intelligence network, providing precise guidance for policy, pricing, and strategic decisions.

UP is building this foundation through its Plastic Monitoring Data Space (**PMDS**), a pioneering framework that connects science, technology, and governance into a single, interoperable environment. The PMDS sets the stage for systemic change, ensuring environmental and social responsibility becomes universally actionable.



Fragmented data ecosystem → Interoperable infrastructure

7. UP'S CORE INNOVATION: OUR VALUE PROPOSITION

We are a science-driven technology company advancing responsible productivity and ocean resilience. **We empower governments, businesses, and institutions to monitor and mitigate marine plastic pollution through our data ecosystem and digital solutions**.

UP provides the digital infrastructure needed to reveal how plastic pollution affects ecosystems, economies, and communities. **This evidence enables smarter decisions and more targeted investment, strengthening the ocean's long-term resilience**. By building shared capacity across public and private actors, UP helps accelerate effective solutions at scale.

This foundation defines our slogan as **Digital Ocean Solutions**. The ocean has long lacked the digital infrastructure required for modern systems to operate with precision, traceability, and shared intelligence. By transforming monitoring signals, field data, and verified recovery activities into interoperable and trustworthy information, **UP connects environmental action with the digital systems that support effective policy, financing mechanisms, and coordinated implementation at scale**. Digital Ocean Solutions reflects our role in establishing a unified, evidence-driven framework that strengthens decision-making, accelerates collective action, and supports long-term ocean resilience.

Our impact is expressed through **four complementary pillars**:

INTERGOVERNMENTAL
Global Governance Through Shared Intelligence

GOVERNMENTAL - BLUE RESILIENCE OS
Neurological Brain for Ocean Governance

UP DIGITAL INFRASUCTURE
Data Ecosystem for Ocean Resilience

COMPANIES
Verified Corporate Contribution to Ocean Regeneration

PEOPLE
Citizen Science and Scientific Evidence for Public Use

7.1 INTERGOVERNMENTAL

Global Governance Through Shared Intelligence

Marine plastic pollution is a transboundary challenge that undermines ecosystems, economies, and societies worldwide. Effective solutions require international cooperation; yet, the foundation for such collaboration has been lacking. Fragmented methodologies, incompatible systems, and isolated datasets have created a digital divide that prevents coordinated action.

UP's **PMDS** closes this gap. It is a **federated data space designed to serve as the backbone of global ocean governance**. Unlike centralized repositories, PMDS operates as a distributed ecosystem where each participant retains full sovereignty over its data while sharing it under common standards and governance principles. This architecture ensures that sensitive information circulates securely among governments, scientific institutions, businesses, and communities, enabling collaboration without compromising control.

7.1.1 WHAT MAKES PMDS UNIQUE?

- **Shared Governance, Guaranteed Interoperability:** Harmonizes diverse monitoring efforts under a unified framework aligned with European standards and global initiatives such as UNESCO's Ocean Data and Information System (ODIS).
- **Federated Architecture:** Data remains decentralized but accessible through a virtual layer that integrates distributed sources into a single analytical environment.
- **Cross-Sector Connectivity:** Governments, researchers, and industries operate on the same intelligence layer, fostering evidence-based policy and scientific diplomacy.
- **Global Standards Compliance:** Built on FAIR principles, it ensures that data is findable, accessible, interoperable, and reusable across borders and disciplines.

Think of it as an airport for ocean data: shared infrastructure, common rules, and seamless interoperability that allow nations to "land" their datasets and take off with actionable insights.

7.1.2 WHY A DATA SPACE IS NECESSARY

Marine plastic pollution is not only an ecological problem; it is a data problem. Four structural barriers have paralyzed global response:

- **Lack of standardized data:** Diverse methodologies and measurements make datasets incompatible and difficult to scale into national policy.
- **Lack of interoperability:** Institutions operate in silos with systems that cannot communicate effectively.
- **Fragmented sources:** Scientific and institutional data are dispersed, uncoordinated and often inaccessible.
- **Global challenge:** Plastic pollution crosses borders. Solutions must be interconnected and collaborative.

This infrastructure overcomes barriers by creating a shared digital system. It lays the groundwork for a regenerative Blue Economy, where governments, businesses, and communities operate on the same trusted information layer.

7.1.3 HOW IT WORKS. MULTICHANNEL DATA PIPELINES

Data flows from multichannel pipelines to produce and an integrated picture of plastic pollution dynamics:

- **UP's digital app** (citizen science + verified waste collection)
- **IoT devices, buoys and sensors:** Deployed in marine and river environments, these devices measure environmental variables, detect microplastics, monitor fish biomass, and collect filtered samples for later polymer analysis.
- **Laboratory Samples:** Coastal water and fish samples quantify microplastic concentrations and polymer types, enabling assessment of microplastic transfer through the food chain.
- **Scientific institutions:** Research centers contribute specialized datasets on microplastic distribution, ecosystem impact, and related contamination.
- **Blue Resilience OS** functions as the core data processing and intelligence engine integrating all system inputs.

Integrated into UP's Digital Measurement, Reporting, and Verification system (dMRV), blockchain ensures an immutable and verifiable record of all data entering PMDS, while IoT networked sensors deliver real-time environmental inputs that reduce manual intervention and increase reliability. AI processes these heterogeneous datasets to support automated classification, quality control, and anomaly detection.

Together, these technologies support consistent assessment of plastic pollution indicators.

7.1.4 INTERNATIONAL STANDARDS ALIGNMENT

The data space is built to operate within established international ocean data frameworks, assuring that the information it produces can be integrated into the global marine knowledge architecture. **UP has joined the Ocean Data and Information System (ODIS)**, **the UNESCO-IOC led federation** that connects distributed ocean data sources through shared standards and metadata conventions.

Through this integration, **records generated by field operations and coastal cleanups are formatted according to ODIS's digital architecture** and published in open, machine-readable structures that can be automatically harvested and indexed alongside other environmental datasets.

Built to

operate within global ocean data frameworks.

ALIGNED WITH:

- ODIS architecture
- FAIR principles
- Interoperable metadata
- Open, machine-readable formats

This alignment enables the data to interoperate with global sources under FAIR principles and to support comparative analysis across regions and disciplines. By contributing to ODIS, the system reinforces international scientific collaboration and advances the objectives of the UN Decade of Ocean Science for Sustainable Development.

7.2 GOVERNMENTAL - BLUE RESILIENCE OS

Neurological Brain for Ocean Governance

Within the framework of global ocean resilience initiatives, countries require dedicated capabilities to translate international intelligence into national action. **While PMDS provides an international gateway for shared situational awareness, each government still needs its own system to act decisively within its jurisdiction**. Marine plastic pollution is more than an environmental concern, it undermines fisheries, tourism, coastal protection, and community wellbeing. Safeguarding these assets demands more than data alone; it requires strategic clarity, operational coordination, and verifiable evidence to guide policy and unlock sustainable finance.

Operational intelligence for national ocean resilience.

Blue Resilience OS delivers this capability. Developed by UP, it is a **cloud-based SaaS platform** that transforms complex environmental and socioeconomic data into actionable intelligence for national planning and resilience. **Acting as the neurological brain for ocean governance**, it integrates diverse indicators, from monitoring networks and scientific institutions to coastal assessments and ocean-dependent sectors, into a single analytical environment.

7.2.1 WHAT DISTINGUISHES BLUE RESILIENCE OS?

Blue Resilience OS stands out because it goes beyond traditional environmental dashboards or monitoring tools. It is **designed as a structural component of national governance, giving authorities a unified, verifiable, and finance-ready intelligence layer** that connects science, policy, and economic planning. Rather than offering isolated features, it provides an integrated operating environment that strengthens coordination across ministries, accelerates evidence-based decision-making, and links national action to international expectations.

- **Integral and Scalable:** Combines monitoring, analysis, planning, and measurement, reporting, and verification in one platform, adaptable from local to national scale.
- **Interoperable:** Connects seamlessly with external systems and actors, ensuring coherence across ministries and regions.
- **Finance-Ready Intelligence:** Embeds digital verification and traceability, enabling governments to demonstrate impact and access blue bonds, resilience funds, and carbon crediting mechanisms.
- **Diplomatic Leverage:** Positions nations as credible actors in climate and biodiversity negotiations through internationally aligned data.

7.2.2 BEYOND DATA COLLECTION. IMPACT MODELING AND DECISION OPTIMIZATION

Blue Resilience OS aggregates data from multiple sources—including **microplastic-filtering buoys, drones mapping coastal waste, tourism and weather APIs, and laboratory-based polymer analysis**—and uses this data to model the impacts of plastic pollution. The system divides marine and coastal environments into dynamic cells, integrating biodiversity, ecosystem services, tourism, health, and socioeconomic indicators. This enables governments to simulate scenarios and prioritize interventions where they deliver the highest ecological and economic return.

For example, **the platform can determine that investing in cleanup efforts in a high-biodiversity reserve yields far greater environmental benefits than in areas with lower ecological sensitivity**, even if operational costs differ. This optimization ensures that every euro invested in plastic collection generates maximum impact for ecosystems and communities.

7.2.3 WHY IS IT VALUABLE FOR GOVERNMENTS?

- **Links marine pollution to national development** by translating environmental indicators into economic and policy-relevant insights.
- **Enables evidence-based** prioritization of interventions and simulation of mitigation scenarios.
- **Creates a verifiable information layer** that unlocks sustainable finance and strengthens governance.
- **Consolidates previously fragmented data streams** into a coherent, real-time dashboard for risk management and long-term planning.

Blue Resilience OS transforms data into decisions. It empowers governments to anticipate risks, mobilize investment, and protect the economic value of their marine resources with confidence. **Where PMDS connects nations globally, Blue Resilience OS gives each country the sovereignty, clarity, and tools to act effectively at home**, turning science into strategy and strategy into measurable impact.

7.3 COMPANIES

Verified Corporate Contribution to Ocean Regeneration

Companies need transparent, auditable ways to demonstrate their environmental commitment. ESG reporting often relies on general disclosures or unverified claims, which limits credibility and weakens the ability to engage customers, regulators, and investors. UP provides a clear pathway for companies to support marine plastic recovery and ocean resilience infrastructure through verified data and digitally secured impact assets.

From generic ESG claims to verifiable impact.
↓
Ocean Notarised Digital Assets (ONDAs)

UP's digital application converts plastic cleanups carried out by Ocean Defenders into structured environmental data and actionable ESG assets. **Central to this system are Ocean Notarised Digital Assets (ONDAs)**, named after the Latin word for waves, which transform cleanup activities into scientifically grounded contributions that companies can fund and integrate into their sustainability strategies.

7.3.1 IT ALL BEGINS WITH MEASURABLE IMPACT: ONDAS

When Ocean Defenders log cleanups in the UP app, each action becomes a verifiable contribution to coastal and marine recovery. Photos, geospatial coordinates, mapped collection routes, and material information are captured to generate key performance indicators such as the Plastic Recovery KPI (kilograms of plastic removed).

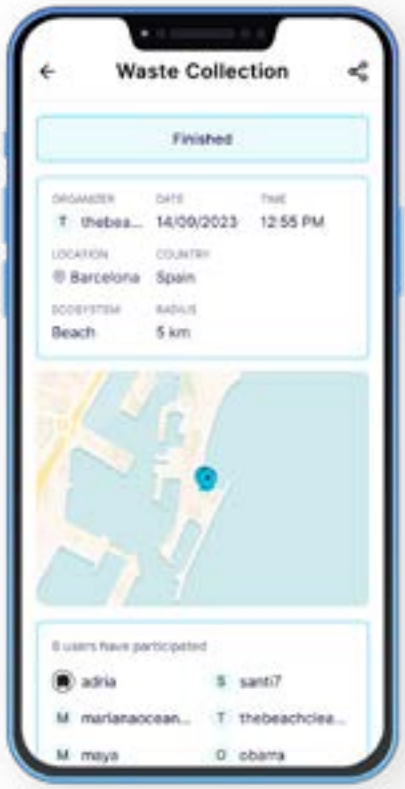
By combining these KPIs into a digital asset, **ONDAs enable companies to support ocean regeneration reliably and demonstrate progress** to customers, regulators, and investors.

To help companies integrate this verified impact into their operations, UP offers the **Become Blue Verification**.

Designed to **support corporate sustainability strategies**, it enables businesses to **align with environmental responsibility policies and simplify ESG reporting** through transparent, ongoing verification of their ocean-related contributions.

7.3.2 FROM ESG ASSETS TO ONDAS

Traditional ESG reporting relies heavily on broad claims and indirect indicators. ONDAs change this by embedding verifiable, auditable KPIs directly into business activity. Sustainability moves beyond a compliance exercise to become a proven contribution. At the same time, **ONDAs function as a new digital language for impact**—translating verified environmental action into **modular, shareable units that can be communicated across dashboards, websites, and social media.** This strengthens credibility while enabling transparent, continuous engagement with customers and stakeholders.



7.3.3 BECOME BLUE VERIFICATION

To **help companies** integrate this verified impact into their operations, UP offers the Become Blue Verification. Designed to support corporate sustainability strategies, it enables businesses to simplify ESG reporting through transparent, ongoing verification of their ocean-related contributions.

VERIFIED | STRUCTURED | REPORTABLE

Through a **monthly verification plan, companies financially support ocean plastic collections and the income of coastal communities carrying them out.** All cleanups linked to their subscription are verified through our system, and the company receives real-time, credible data showing the impact they helped enable.

This gives them transparent, trustworthy information for communication and ESG reporting. **Become Blue turns verified cleanup data into an accessible, reportable asset, strengthening both compliance and corporate credibility.**

How it works

Monthly subscription

↓

Verified cleanups

↓

Real-time impact data.

7.3.4 TECHNOLOGY BEHIND ONDAS

ONDAs are underpinned by UP's dMRV framework, which automates impact validation and addresses long-standing credibility gaps in environmental reporting.

- **Data Capture: Evidence is collected directly at plastic recovery sites using IoT-enabled tools.** This includes geolocated images, GPS tracking, and contextual data such as weather conditions and demographic indicators, ensuring precise, location-specific records.

- **Data Analysis and Validation: AI-driven algorithms quantify and validate collected data,** extracting insights on plastic type, volume, size, and ecosystem impact. This delivers a standardized assessment of environmental outcomes and operational efficiency.

- **Data Integrity and Traceability: All validated data is recorded on a public blockchain**, creating an immutable, tamper-resistant ledger. This guarantees transparency, prevents unauthorized alterations, and ensures long-term trust in reported results.

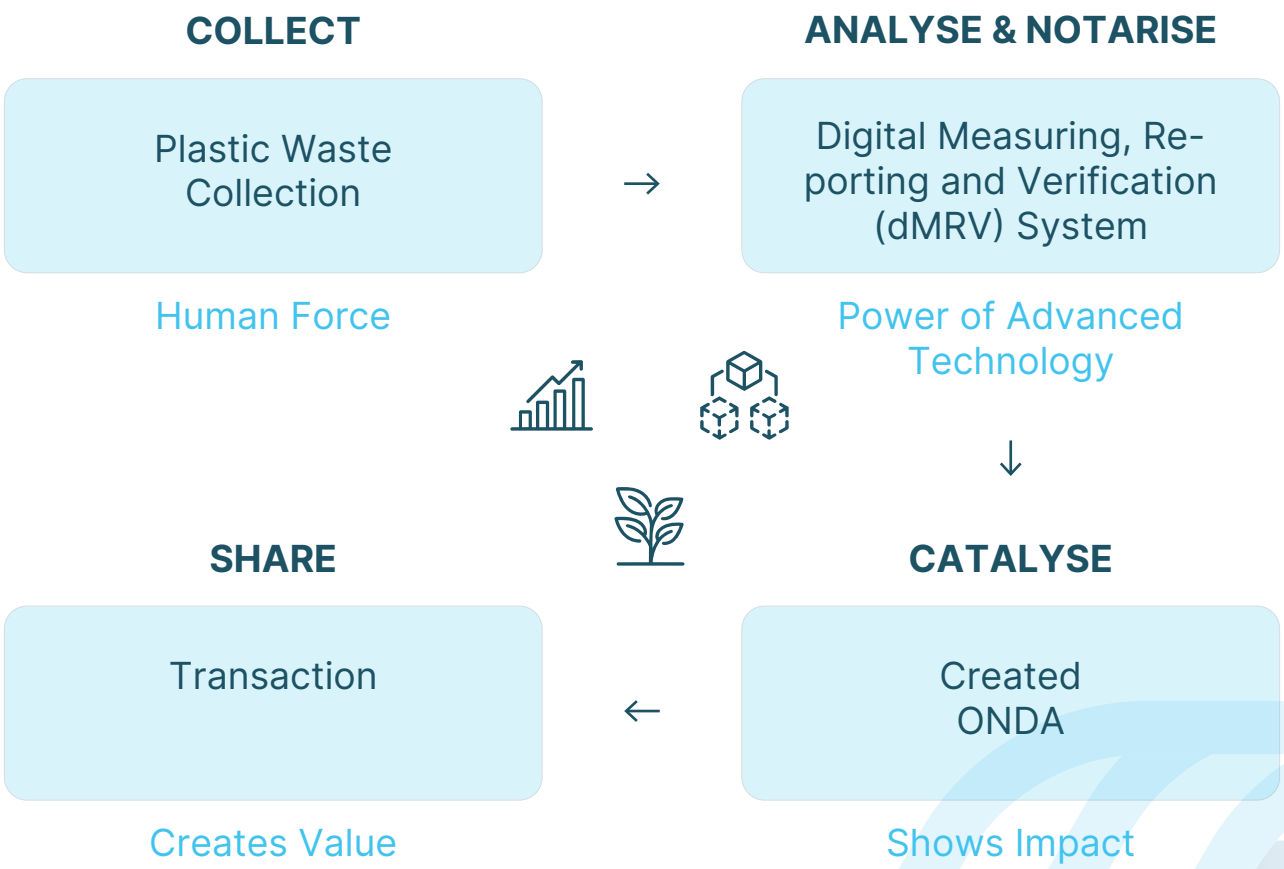
7.3.5 PUBLIC BLOCKCHAIN FOR TRACEABILITY

Public **blockchain technology serves as the foundational layer for ONDA** traceability and integrity. By anchoring ONDAs on-chain, UP establishes robust standards for auditability, cross-border operability, and data reliability.

The selected blockchain infrastructure is designed to scale globally, supporting high transaction volumes while maintaining fast processing speeds, low fees, and strong energy efficiency, critical for managing large-scale environmental data aligned with ocean regeneration goals.

Beyond secure data storage, the **blockchain acts as a digital notary, timestamping actions in real time and generating legally credible records.** This immutable audit trail reinforces trust across regulatory, financial, and institutional contexts.

7.3.6 LIFE CYCLE



- **High-quality data extraction** on plastic waste during cleanups through the use of UP's APP
- **AI and Blockchain Technology ensure:**
  - Auditability (mistakes eliminated)
  - Compliance (risk mitigated)
  - Data immutability (once on chain, no risk of edits)
  - Data Management & Security (data breaches prevented)
  - Ownership (improved customer experience)
- **Data Ownership Exchange**
- **Blue economy** (clean investments towards ocean regeneration)
- **Create Awareness** (learn, and advocate for a bluer future)
- **Contributions to Scientific Research**

7.4 PEOPLE

Citizen science and scientific evidence for public use

Citizen science is transforming how **societies understand** and respond to environmental challenges. It allows people outside traditional research institutions to **contribute meaningful knowledge**, not through laboratory equipment, but through **curiosity, consistency, and participation.**

Over the past decade, this approach has gained **credibility across** the scientific community. Institutions such as NASA and the European Commission have adopted citizen-led initiatives, and research in Environmental Science & Policy (2025) confirms that **well-structured citizen-generated data** can reliably inform policy and guide environmental responses across large geographic areas.

Within **UP's ecosystem**, **this model becomes both a scientific resource and a mechanism of community empowerment. Ocean Defenders**, individuals or organisations who use UP's APP and follow its specialised digital waste-collection protocol, **log each cleanup as a verifiable data point.** Every item collected is recorded with the precision needed to generate ONDAs, turning personal actions into structured environmental intelligence.

The impact goes beyond data. **Each verified log activates a financial contribution directed to local partners dedicated to plastic collection.** This means that participation not only expands geographic coverage and improves data quality, but also channels resources to the people who need it the most. Knowledge, funding, and community mobilisation move together.

In this way, people are not passive observers of ocean degradation, they are active contributors to its regeneration. **Citizen science produces broader coverage, richer datasets, and stronger engagement, while ensuring that local communities benefit directly from global contributions**. At UP, we are building the digital and operational infrastructure that makes this possible. A system that is open, inclusive, and connected to the people who power it.

8. SCIENTIFIC FOUNDATIONS

UP is grounded in rigorous, **scientific research** from leading institutions studying the **sources, dynamics, and ecological impacts of marine plastic pollution**, including studies conducted in collaboration with UP. These investigations provide the empirical baselines necessary to design **robust measurement frameworks** and interpret environmental data with methodological rigor.

Our research partners bring multidisciplinary expertise, spanning environmental sample analysis (water, sediments, and biota), advanced data analytics, and ecosystem-level assessments of plastic pollution impacts. This support is critical for validating monitoring methods, calibrating indicators, and ensuring that field observations and datasets are scientifically credible.

UP translates this knowledge into operational protocols, including standardized procedures for **data acquisition**, **sample processing**, and **analytical workflows**, enabling consistent application across diverse geographic and ecological contexts.

This research foundation informs the development of advanced assessment tools within **UP's platform**, including methodologies for evaluating biodiversity and ecosystem impacts. By doing so, it establishes a traceable connection between plastic removal activities and **measurable ecological and socioeconomic** outcomes.

9. CONCLUSION

Marine plastic pollution is now a material risk to ecosystems and the people who depend on them, including public health, coastal livelihoods, and the long-term productivity of the Blue Economy. The core constraint is not a lack of commitment or activity, but a lack of shared evidence that is comparable across geographies and trusted across stakeholders. Without interoperable data and consistent verification, interventions remain harder to prioritise, outcomes are harder to prove, and financing remains harder to scale.

This whitepaper argues for a practical shift in how ocean resilience is delivered. It proposes that **recovery becomes scalable when action is connected to a common data infrastructure that can verify outcomes, inform public planning, and support credible market participation.** UP was built to enable this shift by linking field activity, monitoring, and reporting into a unified intelligence layer.

UP's ecosystem is designed to work across the full stakeholder chain, from intergovernmental coordination and national planning to corporate participation and community action. Together, PMDS, Blue Resilience OS, Become Blue Verification with ONDAs, and citizen science move marine recovery from isolated initiatives to an operating model that supports accountability, coordination, and investable outcomes.

Impact quality also matters, not only volume. UP's Biodiversity Impact Index strengthens prioritisation by reflecting ecological sensitivity and ecosystem value, helping direct action and finance toward locations where recovery delivers higher biodiversity and resilience returns.

The opportunity ahead is to establish shared standards and interoperable infrastructure that make ocean regeneration measurable and finance-ready at scale. UP invites governments, institutions, companies, and communities to collaborate in building this foundation, accelerating coordinated intervention, and delivering verifiable outcomes for the ocean and the economies that depend on it.

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