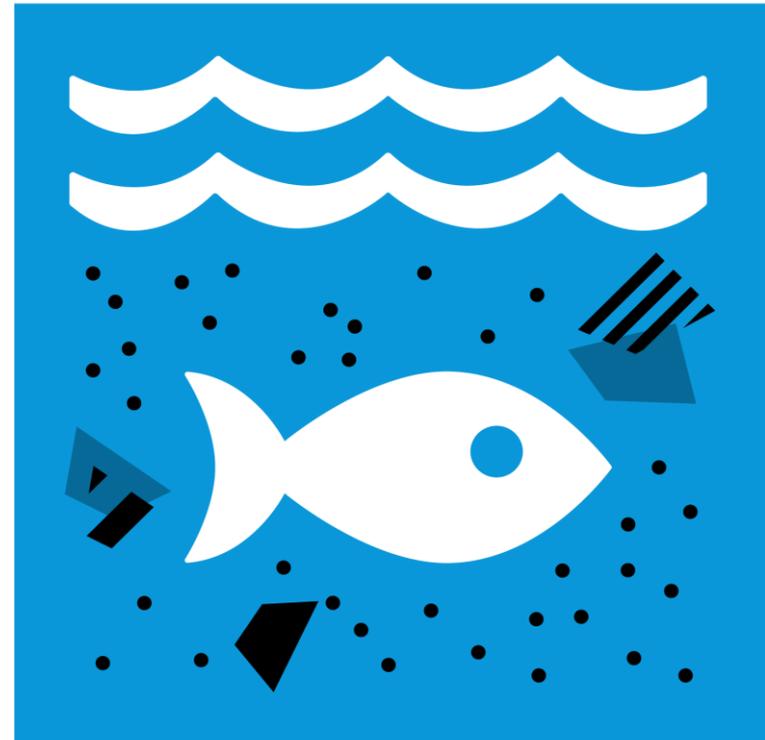# Indicator 14.1.1b

SDG and Environment Statistics Unit - UNEP

TARGET 14·1

REDUCE MARINE POLLUTION

SDG Target 14.1 and Indicator 14.1.1

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Target 14.1:

"By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution"

Indicator 14.1.1:

"Index of coastal eutrophication and floating plastic debris density"

Indicator 14.1.1b:

"Plastic debris density"

UNEP is the custodian agency for this indicator

Introduction

- It is estimated that 1.15 to 2.41 million tonnes of plastic are entering the ocean each year from rivers. More than half of this plastic is less dense than the water, meaning that it will not sink once it encounters the sea.

- The stronger, more buoyant plastics show resiliency in the marine environment, allowing them to be transported over extended distances. They persist at the sea surface as they make their way offshore, transported by converging currents and finally accumulating in the patch.

Introduction

Primary Microplastics in the Oceans, IUCN

CONSIDERED SOURCES

YEARLY WORLD CONSUMPTION AND TYPE OF LOSS

| SOURCES	WORLD CONSUMPTION (KTONS / YEAR OF PLASTIC)	INTENTIONAL LOSS	REFERENCES
PLASTIC PELLETS	257,000	NO	Plastics Europe (2007)
SYNTHETIC TEXTILES	42,534	NO	FAO/ICAC (2013)
TYRES	6,431	NO	ETRma (2010)
ROAD MARKINGS	588	NO	Grand View Research, Inc. (2016)
MARINE COATINGS	452	NO	Coatings world (2012)
PERSONAL CARE PRODUCTS	42	YES	Leslie, H.A. (2015)

The main sources of marine plastic are land-based, from urban and storm runoff, sewer overflows, beach visitors, inadequate waste disposal and management, industrial activities, construction and illegal dumping. Ocean-based plastic originates mainly from the fishing industry, nautical activities and aquaculture.

Introduction

- Growing scientific and public awareness is fueling global concern regarding the impact of plastic ingested by marine species and the accumulation of plastics in coastal and remote areas of oceans (in trash vortices or gyres).

Zero Waste Hierarchy

Best use

Reduce and conserve materials
Refuse — Return — Reduce toxics — Design out waste — Reduce consumption and packaging

Encourage cyclical use of resources and shift incentives to stop wasting

Manufacturers design products for sustainability and take-back

Reuse
(retain value & function)

Recycle
Inorganics | Organics

Regulate disposal

Worst use

Adopted by ZWIA board
March 2013

- Private and public initiatives, such as the volunteer beach cleanups and campaigns for removing beach debris, represent the major source of information concerning the amounts and types of marine litter.

- It would also accelerate the conceptualisation of new technology, materials or products to replace plastics.
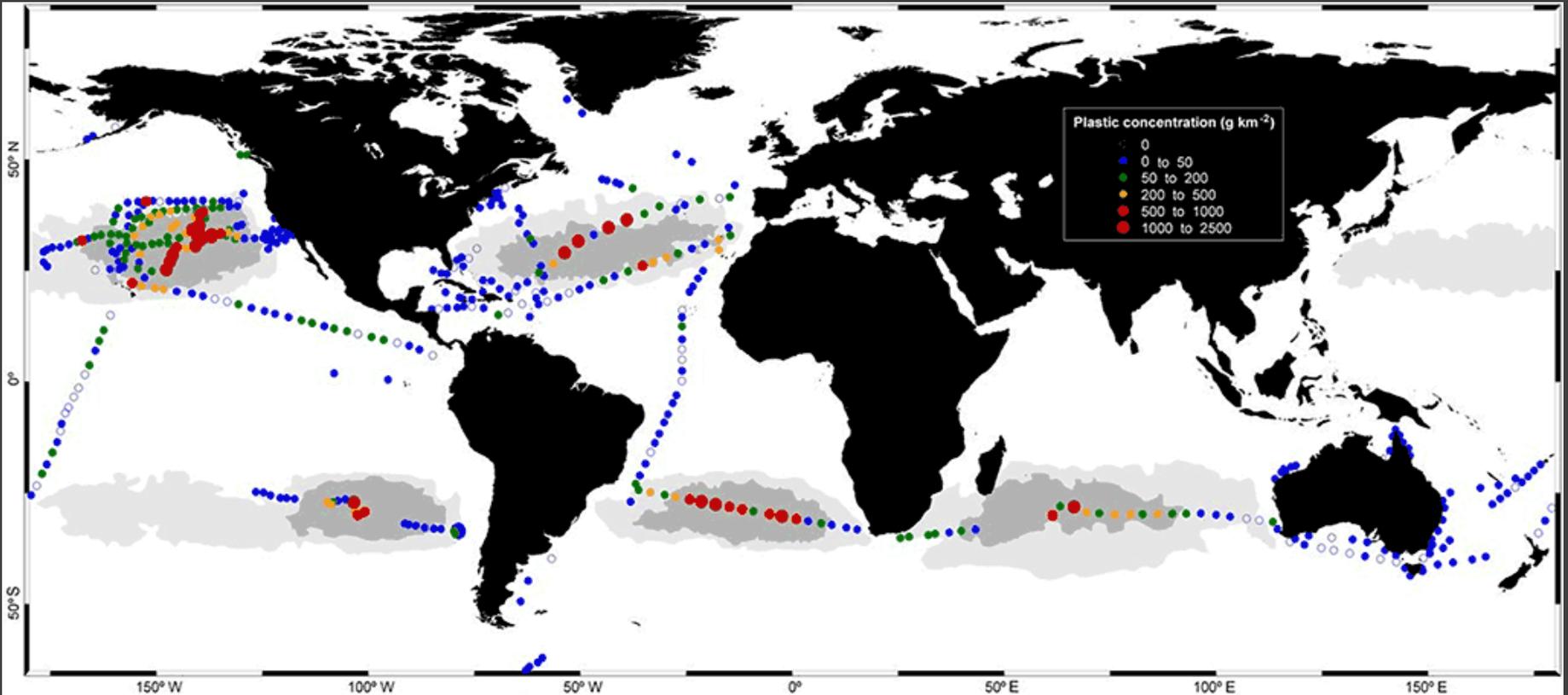
SOURCE: Cozar et al., Proceedings of the National Academy of Sciences, July 15, 2014 vol. 111 no. 28 10239-10244

Introduction

Global map of ocean plastic concentrations - Measurements of plastic concentrations without correction by wind conditions (non-corrected dataset). Color circles indicate mass concentrations (legend on top right). The dataset includes average concentrations in 851 sites (3070 surface net tows). Low estimate of plastic load was derived from this dataset

Why is this SDG Important?

- Plastic pollution is the most widespread problem affecting the marine environment. It also threatens ocean health, food safety and quality, human health, coastal tourism, and contributes to climate change.

- According to UNESCO's Intergovernmental Oceanographic Commission (IOC-UNESCO) there are also four main types of indicators for marine litter:

1. Plastic debris washed/deposited on beaches or shorelines (beach litter),

2. Plastic debris in the water column,

3. Plastic debris on the seafloor/seabed,

4. Plastic ingested by biota (e.g. sea birds).

Definition

- **Eutrophication** – excess nutrient loading into coastal environments from anthropogenic sources, resulting in excessive growth of plants, algae and phytoplankton.

- **Coastal Zone** – national Exclusive Economic Zone (EEZ) (200 nautical miles from the coast) as outlined by the United Nations Convention on the Law of the Sea.

- **Marine litter** – any persistent, manufactured or processed solid material which is lost or discarded and ends up in the marine and coastal environment.

Limitations

It is assumed that countries would use the data to actively make decisions, but as oceans are transboundary, it makes this decision-making complex.

Methodology — Approach

Level 3 is about supplementary indicators

Level 1: Globally available data from earth observations and modelling

Level 2: National data which will be collected from countries (through the relevant Regional Seas Programme, where applicable (i.e. for countries that are a member of a Regional Seas Programme)

Monitoring parameters for marine plastic litter to track progress against SDG indicator 14.1.1b

Monitoring parameters (and methods)	Level 1	Level 2	Level 3	Reporting Frequency
Plastic patches greater than 10 meters*	X			Annual
Beach litter originating from national land-based sources	X			Two years
Beach litter (beach surveys)		X		4 years (aligned with Regional Seas)
Floating plastics (visual observation, manta trawls)		X		
Water column plastics (demersal trawls)		X		
Seafloor litter (benthic trawls (e.g. fish survey trawls), divers, video/camera tows, submersibles, remotely operated vehicles)		X		
Beach litter microplastics (beach samples)			X	
Floating microplastics (manta trawls, e.g. Continuous Plankton Recorder)			X	
Water column microplastics (demersal plankton trawls)			X	
Seafloor litter microplastics (sediment samples)			X	
Plastic ingestion by biota (e.g. birds, turtles, fish)			X	
Plastic litter in nests			X	
Entanglement (e.g. marine mammals, birds)			X	
Plastic pollution potential (based on the use and landfilling of plastics)			X	
River litter			X	
Other parameters related to plastic consumption and recycling			X	
Health indicators (human health and ecosystem health)			X	

Methodology — Level 1

Plastic patches greater than 10 meters

- Satellite-based global data products are the source of the statistical data for this indicator. (NASA and ESA)
- Multi-spectral satellite remote sensing of plastic in the water column is currently only possible for larger elements (more than 10m) and under good atmospheric conditions (no clouds)

Beach litter originating from national land-based sources, plastic in the sea column and floating plastic and plastic on the sea floor (average count of plastic items per km2)

- Monitoring is done through beach surveys following standardised monitoring protocols or guidelines.
- Using a global model of marine litter using OceanParcels v2.0, a state-of-the-art Lagrangian Ocean analysis framework to create customizable particle tracking simulation using outputs from ocean circulation models.

Methodology — Level 1

- It is important to consider the timing of surveys in order to properly plan effective surveys.

- Two main types of surveying beaches include:
  1. **Rapid assessment surveys** - best conducted in response to natural disasters, to build a baseline for future surveys and/or to identify beach litter hotspots
  2. **Routine shoreline monitoring**
     - The average count of plastic items can be computed for each area sampled.
     - A geospatial model is recommended in order to estimate the density across the coastline and to establish a national average.

Data

- Data sources – Satellite data, Global models, national government.

- Data Collection – through Regional Seas Programme, NOAA, GEOBluePlanet, Global Nutrient Management System (GNMS)

- Data will be available for all member states

- The number of parties considered to have submitted post-2010 NBSAPs that take the Strategic Plan for Biodiversity (2011-2020) into account is regularly updated as well.

- Beach litter data from Citizen Science were reported in February **2021.**

- In situ data will be collected directly from countries later this year.

- Data processing will be handled by UN Environment Programme and partners.

Example – Step by step guide

SDG Indicator 14.1.1: Floating Plastic debris density

Proxy indicator: Beach litter

Methodology: Beach litter surveys following the UN Environment/IOC-UNESCO operational guidelines

Step one: Identify the national authority responsible for gathering data and reporting on marine pollution and the agency/ organisation responsible for implementing beach litter surveys.

Step two: Conduct beach litter surveys following the UN Environment/IOC-UNESCO operational guidelines

Example – Step by step guide

Key questions and monitoring parameters that beach litter monitoring programmes should address are:

Monitoring questions	Monitoring parameters
Are litter management/mitigation strategies effective?	Litter quantity (counts/weight) and change through time
What are the sources and activities leading to production of marine litter?	Litter categories (indicator items of certain types of uses), disaggregated by gender where possible
Is there a threat to marine biota and ecosystems?	Litter categories (indicator items that may present specific risks to wildlife)

Example – Case Study (Fiji and Colombia)

Fiji: Potential to capitalize on existing beach clean-ups

- Fiji does not currently have a national monitoring programme for marine plastics. Beach clean-ups do take place in the country; however, these events tend to be organised locally and data are not generally collected. *A future national monitoring programme could build on these local beach clean-ups by integrating them into the step-by-step methodology for the beach litter proxy SDG indicator.*

- Some national and regional data are also available for microplastic concentrations in surface waters, sediments and organisms. These microplastics data are gathered using NOAA methodologies for marine samples.

Example – Case Study (Fiji and Colombia)

Colombia: Focus on microplastics

- Colombia is not currently monitoring marine plastics at the national level. However, microplastics data are being collected in six pilot stations from *in situ* sediment, water and fish samples. These data are understood to feed into the national marine and coastal water quality indicator.

Example – Case Study (Kenya)

Global model of marine litter using OceanParcels v2.0

Using an example of the plastic which ends up on Kenya's beaches. What can be noted is that 11% likely originated from Kenya, 60% likely came from countries in Africa and 29% likely came from outside the region. This model can be produced annually and updated as better waste emissions data becomes available for countries.

Global model of marine litter using OceanParcels v2.0

Using an example of the plastic which ends up on Kenya's beaches. What
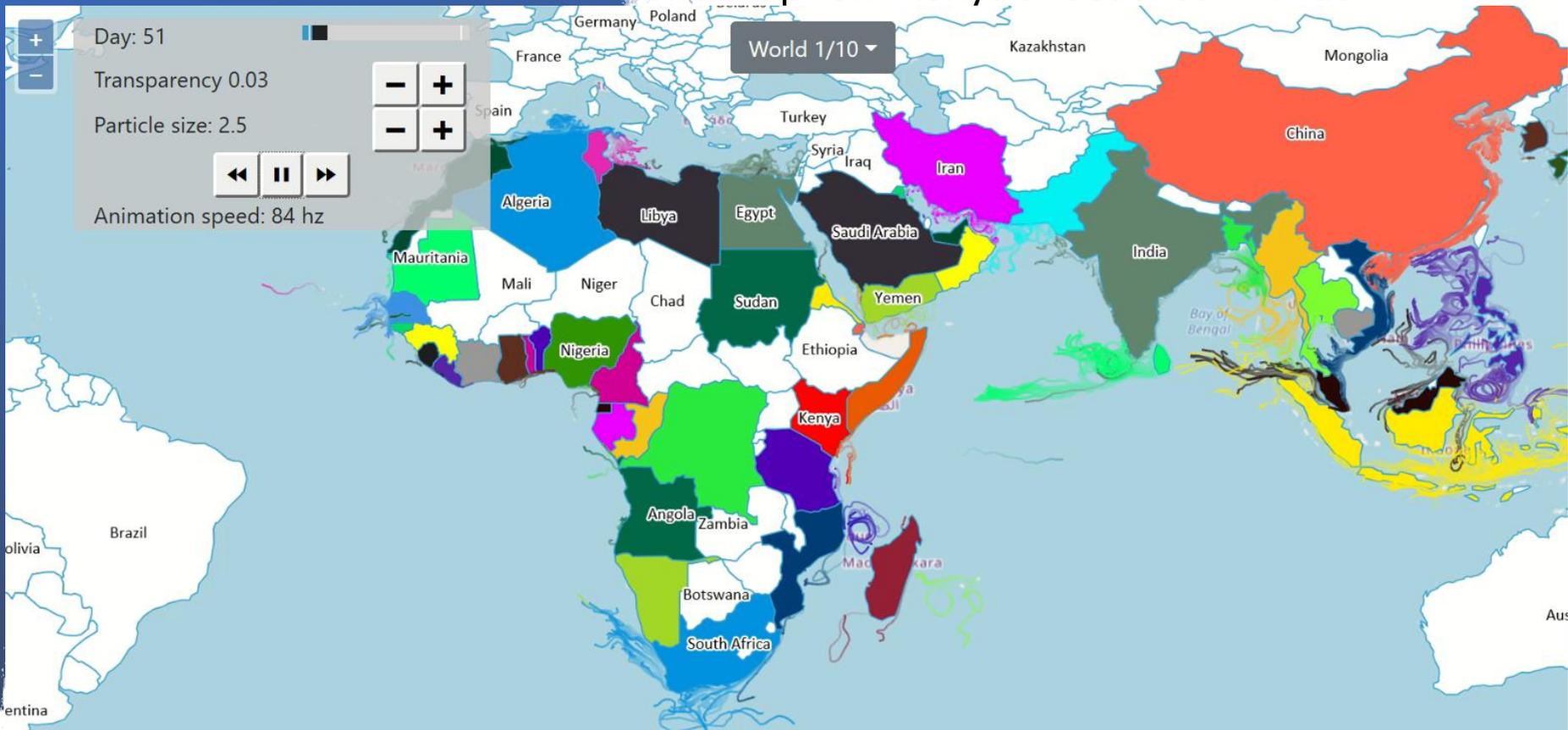
Summary

- **Beach litter** is the core parameter that all countries should monitor and report on. Where in-country capacity or opportunities exist to conduct more extensive marine litter monitoring, countries can also conduct surveys of floating plastics, plastics on the seafloor or microplastics.

- There is an urgent need to increase public awareness about the adverse effects of plastic pollution on marine ecosystems and resources.

- Involving stakeholders will help in creation of action plans.

- The GESAMP 2019 guidelines will provide key information for the development of a methodology for this agreed SDG indicator, which may combine in situ data and modelling (surface water circulation).

Thank you !

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