



Stopping plastic leakage into South Africa's waterways and the ocean

Peter Manyara | 27 July 2021

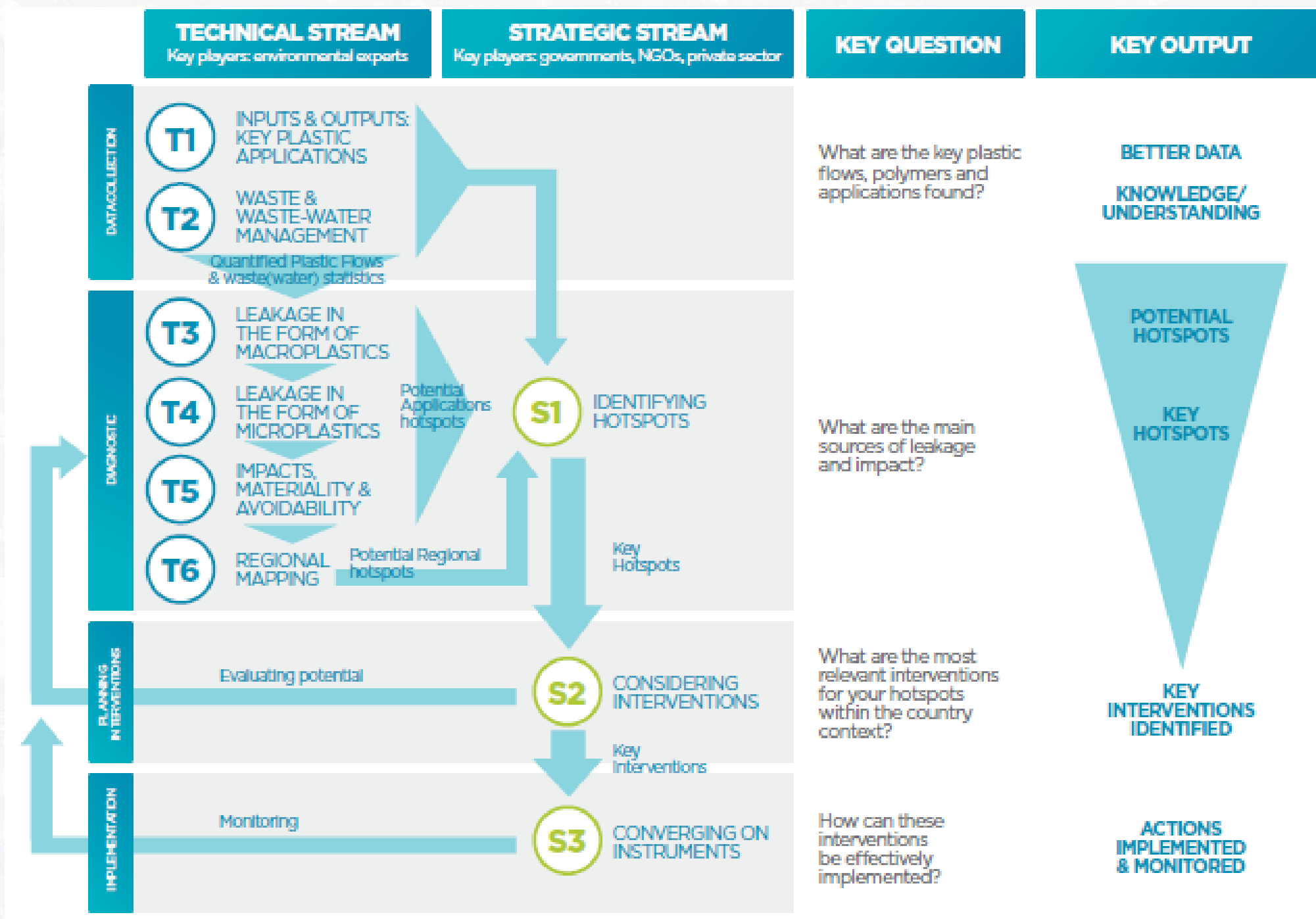
WRC/Rhodes University/UCEWQ WEBINAR:

MICROPLASTICS AS ENVIRONMENTAL STRESSORS: RISK COMMUNICATION AND COMMUNITY ENGAGEMENT



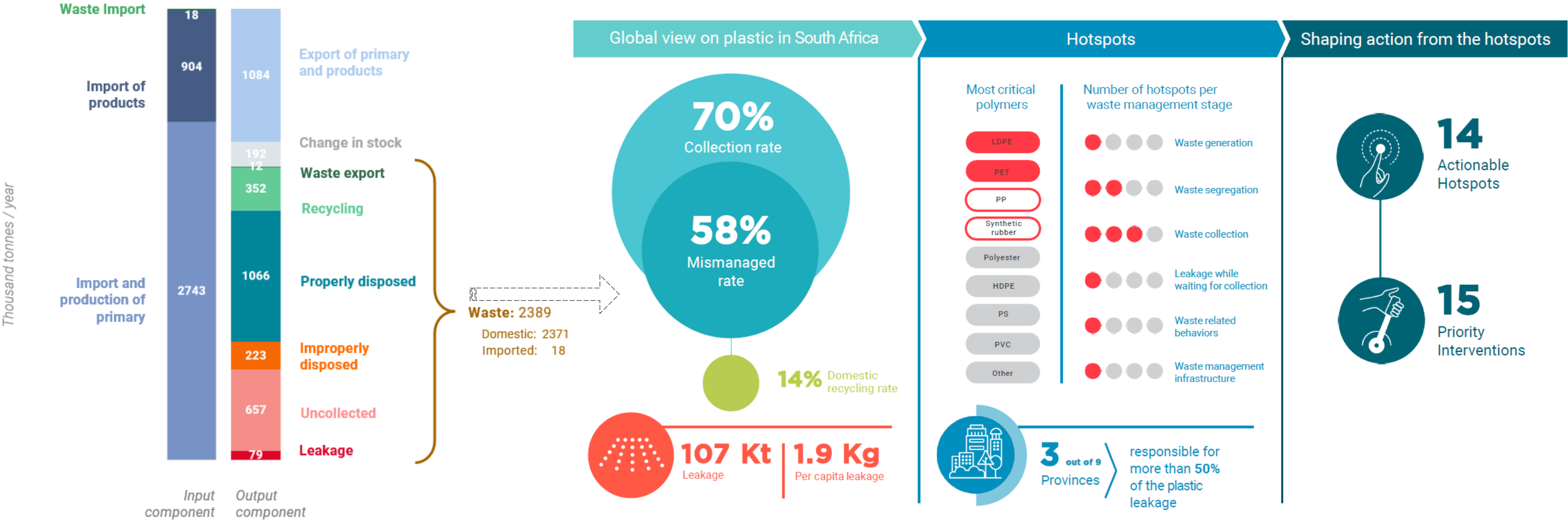
Life Cycle Initiative

The project is being implemented with the technical expertise of Quantis and EA – Shaping Environmental Action



URL: <https://plastichotspotting.lifecycleinitiative.org/>

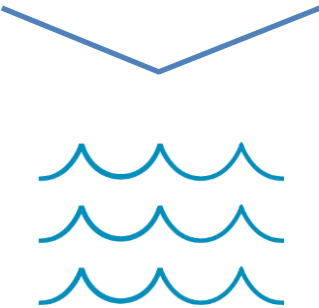
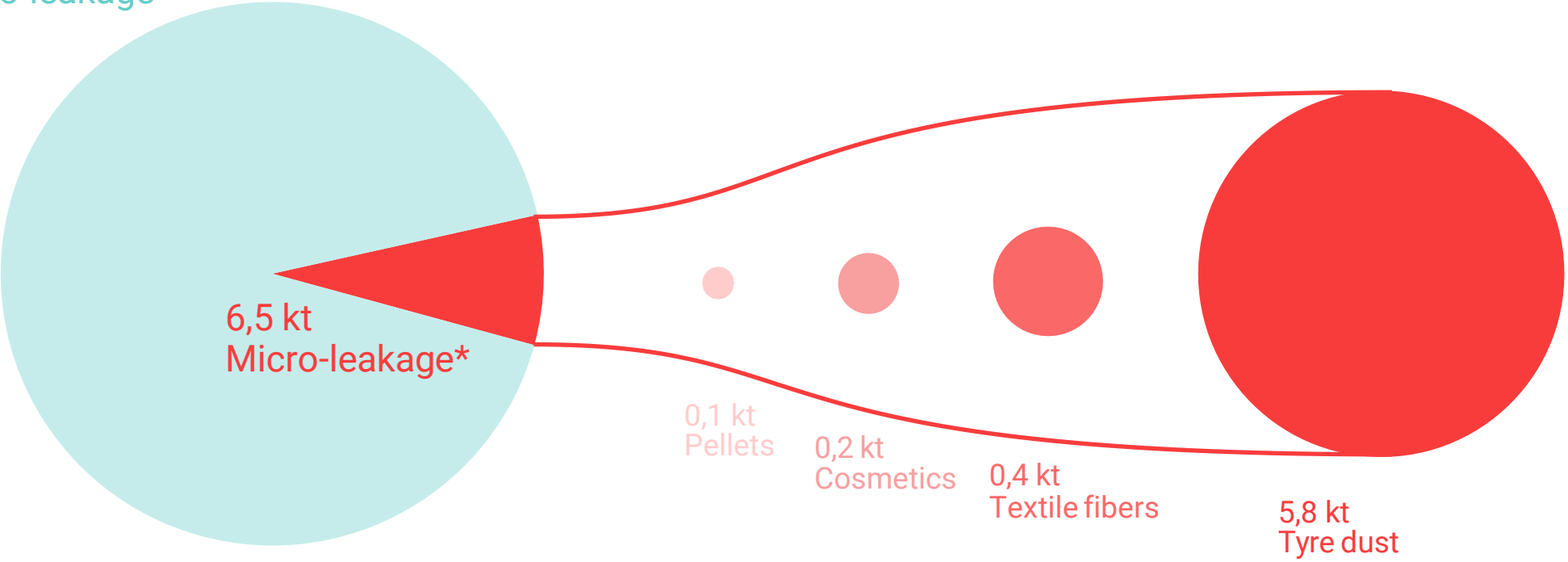
COUNTRY PLASTIC MATERIAL FLOW [2018]



MACRO-LEAKAGE VS MICRO-LEAKAGE [2018]



100,5 kt
Macro-leakage



TO WATERWAYS
AND OCEANS:

107 kt



Key take-aways

- **Micro-plastic leakage accounts for 6% of the overall country leakage.** This is mostly driven by tyre abrasion.



Limitations

Recycling has not been considered as a source of leakage although informal practices may generate leakage of microplastics. No data was found on this aspect.



More details
available in
Appendices

* The methodology used to calculate micro-plastics leakage is based on the Plastic Leak Project (2019)

OPEN BURNING: A ROUGH ESTIMATE



Key take-aways

- **Open burning** of mismanaged plastic waste in South Africa poses significant risks for human health (due to the release of noxious chemical substances such as dioxins and particulate matters) and directly contributes to climate change.



Limitations

Although we do not have specific data on burning, we suggest a rough estimate of how much plastic could be polluting the air by using the assumptions made in the *Breaking the Plastic Wave* report (Lau et al., 2020): 60% of uncollected plastic waste and 13 % of plastic waste at dumpsites are burnt on average worldwide. In the case of South Africa, it would translate into having 38% of the total plastic mismanaged ending up polluting the air through open burning.



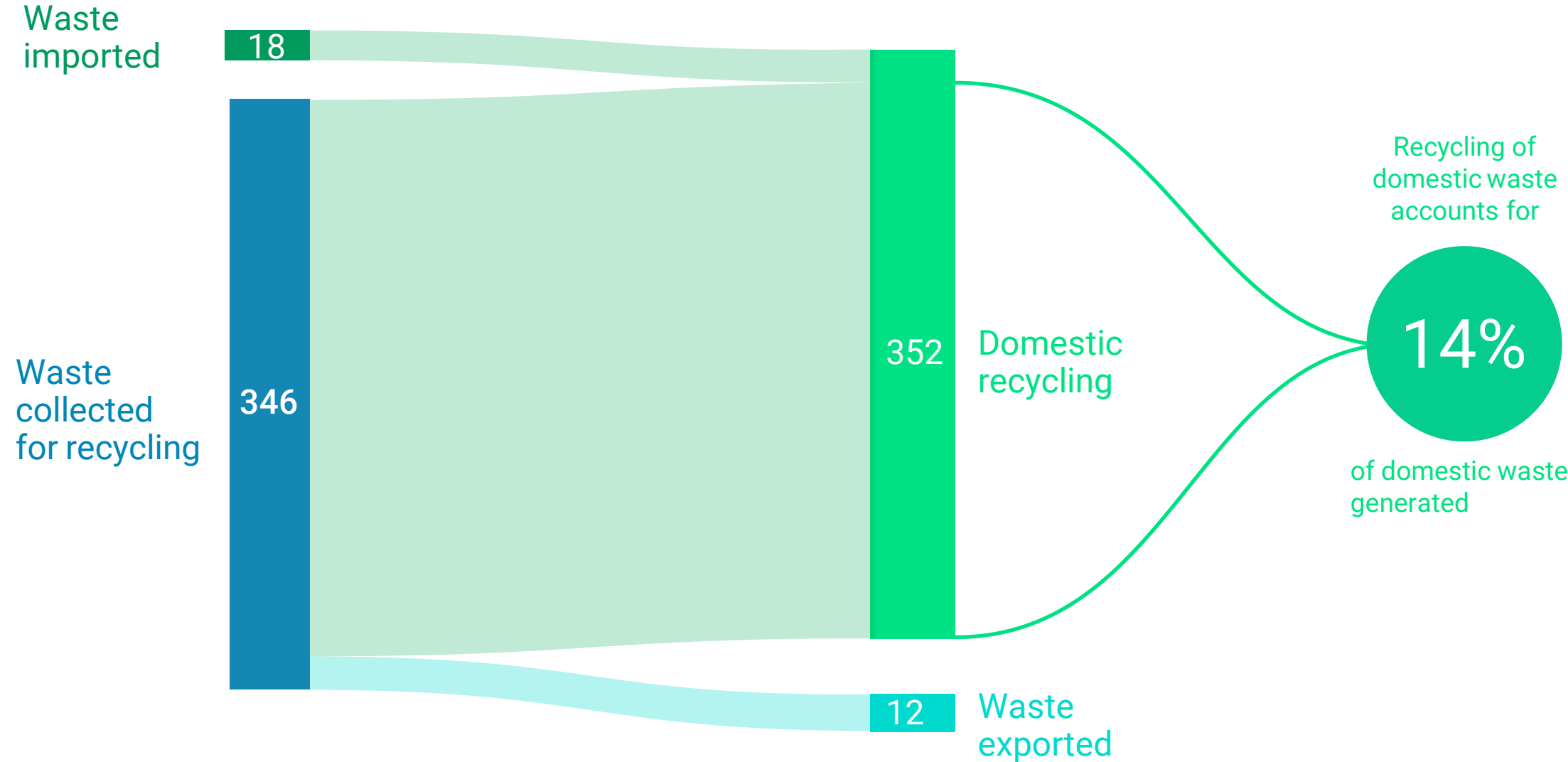
Unlocking limitations

Investigate open burning practices and conduct field studies to estimate the amount of mismanaged plastic waste that is burned.

DOMESTIC RECYCLING AND TRADE OF WASTE



Quantities in thousand tonnes



Key take-aways

- Only 14% of the domestically generated plastic waste is eventually recycled.



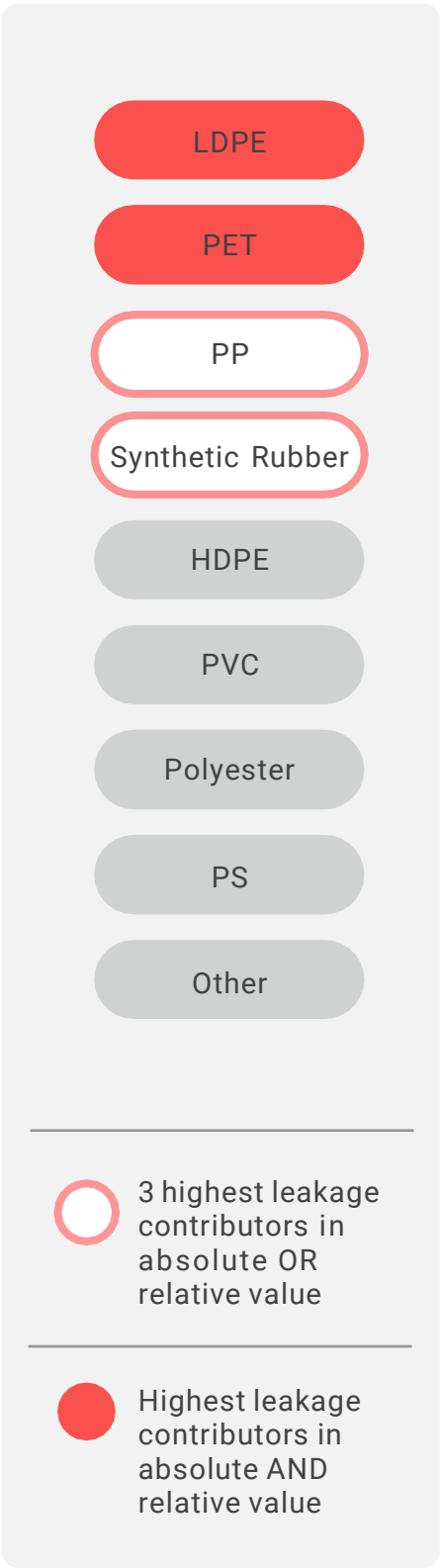
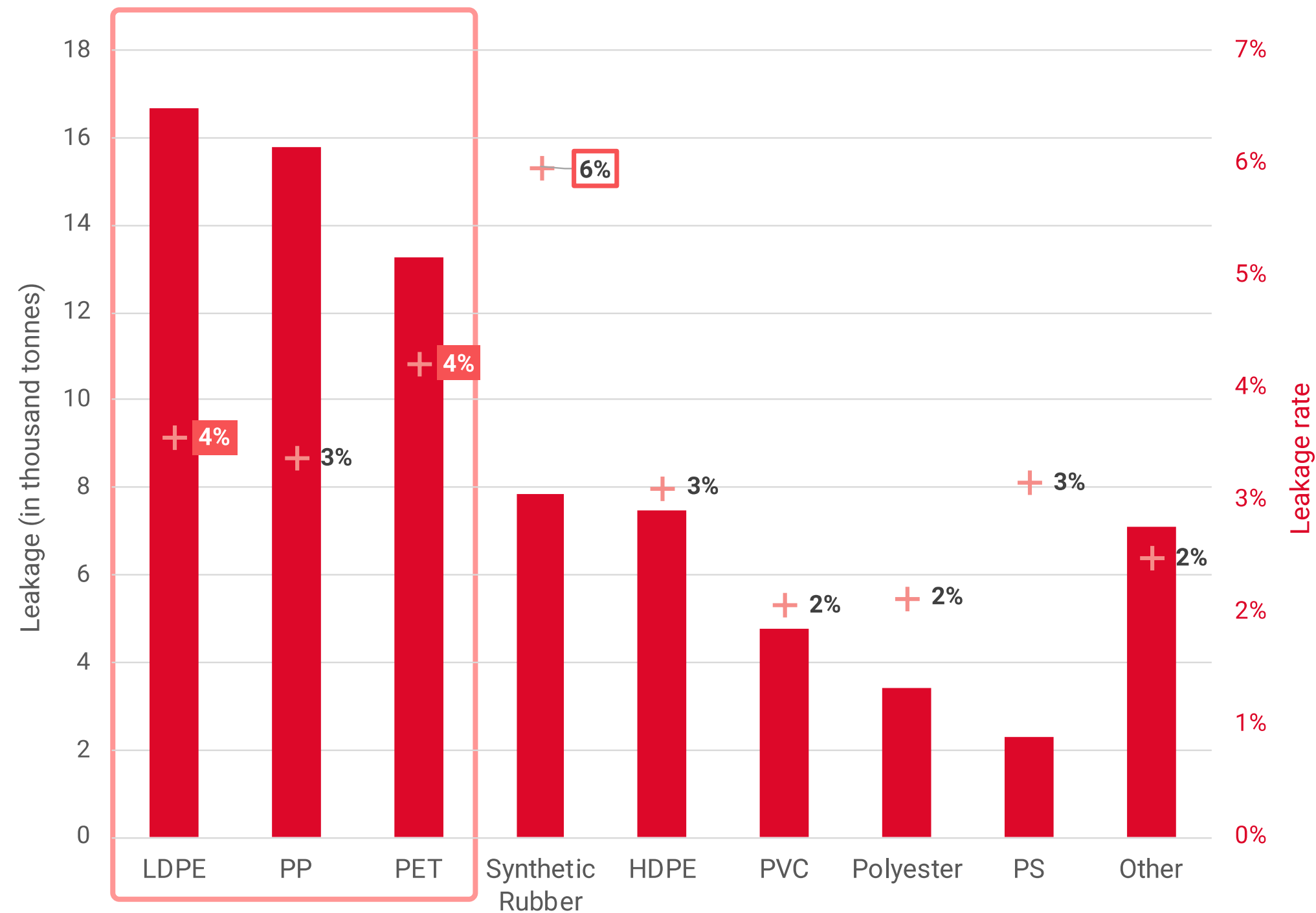
Learnings

In 2018, South Africa recycles 352 kt of plastic waste (15% of a total 2389 kt of plastic waste), from which 18 kt come from imported waste. The remaining 334 kt of recycled plastic waste come from domestically generated waste. Consequently, almost all recycled plastic comes from domestically generated plastic waste.

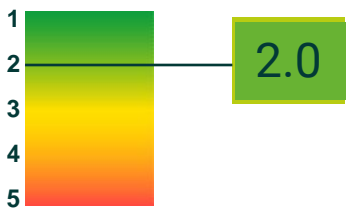
PLASTIC POLLUTION

HOTSPOTS

POLYMER HOTSPOTS [2018]



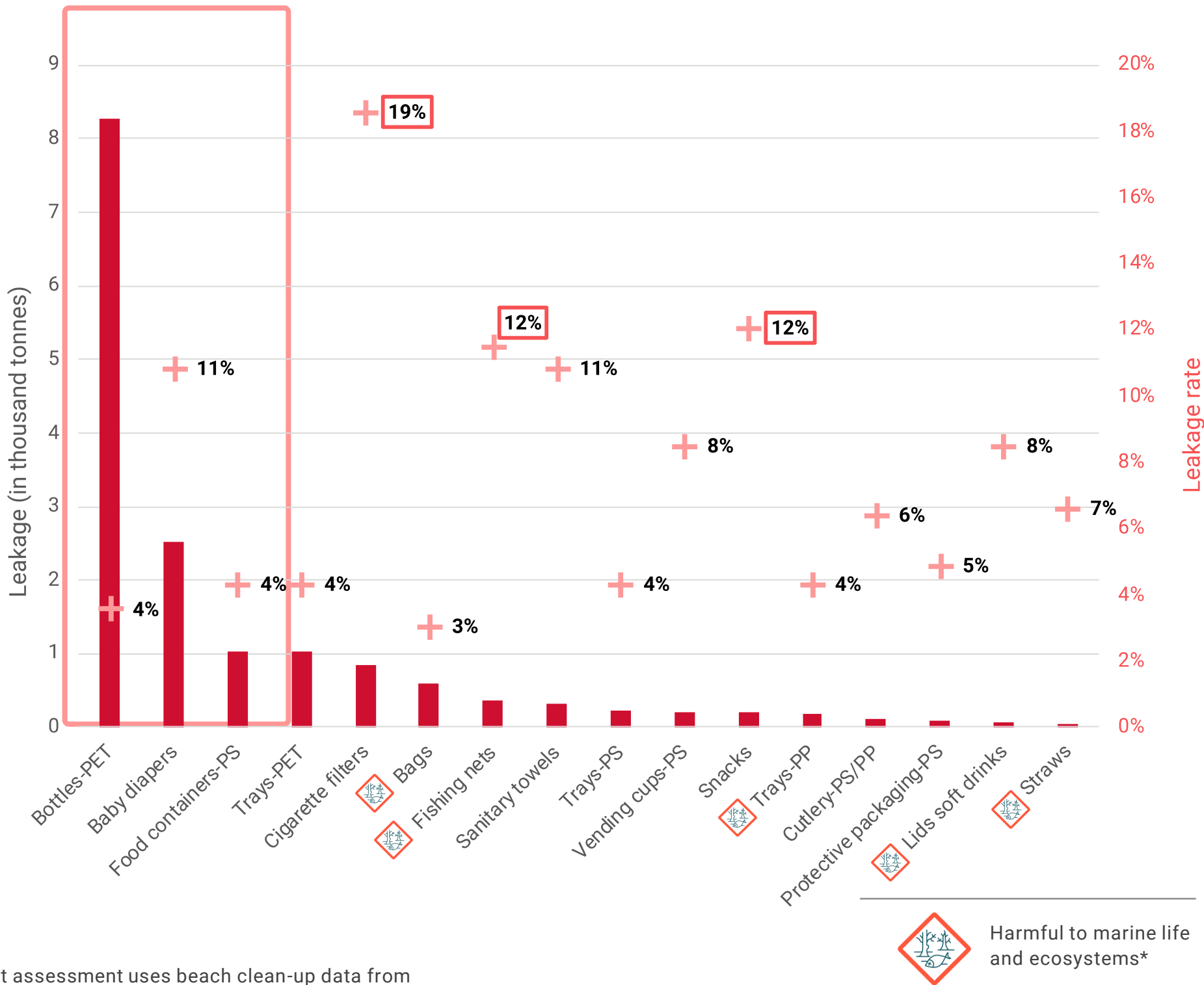
Quality Score



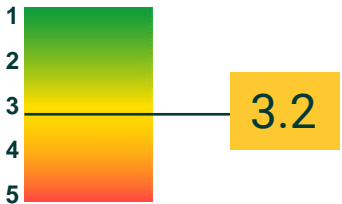
Key take-aways:

- **LDPE** is the top contributor in absolute leakage (17 kt), with a leakage rate of 4%.
- **PP** and **PET** follow with 16 kt and 13 kt of leakage respectively. PET has a leakage rate of 4%.
- Although **Synthetic Rubber** ranks lower in absolute leakage (8 kt), it has the highest leakage rate with 6% of its generated waste leaks into the oceans and waterways. Micro-plastics from tyre abrasion are an important driver of leakage for this polymer.

APPLICATION HOTSPOTS [2018]



Quality Score



Key take-aways

- Within known products, **PET bottles** are the top contributor in absolute leakage (8 kt), although it has one of the lowest leakage rate (4%).
- **Baby diapers** and **PS food containers** rank respectively 2nd (2,5 kt) and 3rd (1 kt) in absolute leakage.
- Although **cigarette filters** rank lower in absolute leakage (1 kt), almost 1/5th of its waste generated tends to leak into the oceans.
- **Fishing nets** and **snacks** have a relatively high leakage rate (12% for both).

Bottles - PET

Baby diapers

Food containers - PS

Cigarette filters

Fishing nets

Snacks

Bags

Sanitary towels

Trays - PS

Vending cups - PS

3 highest leakage contributors in absolute OR relative value

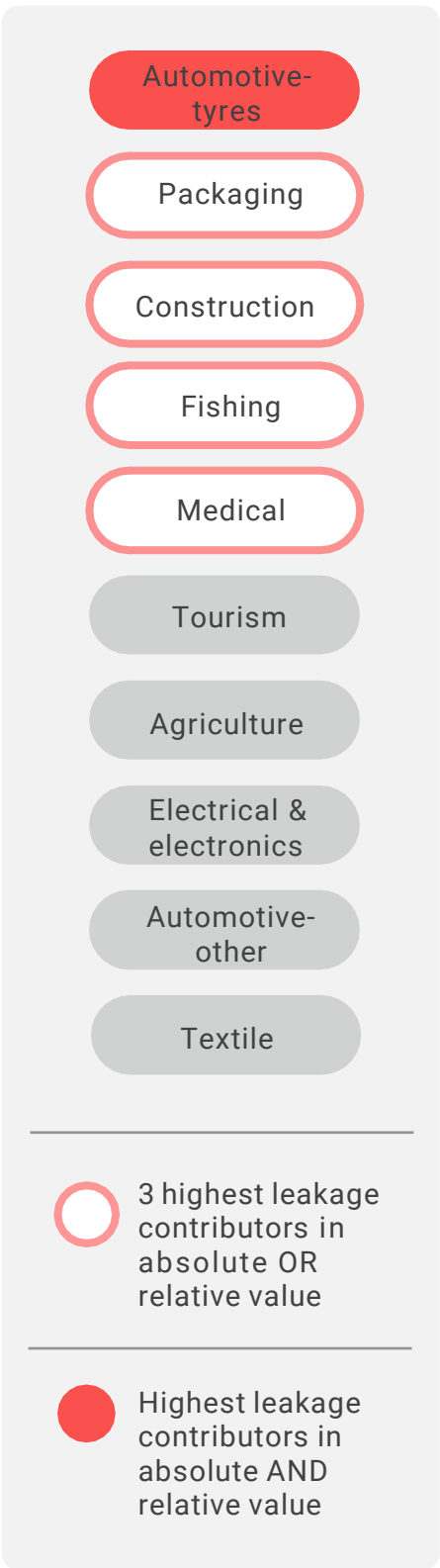
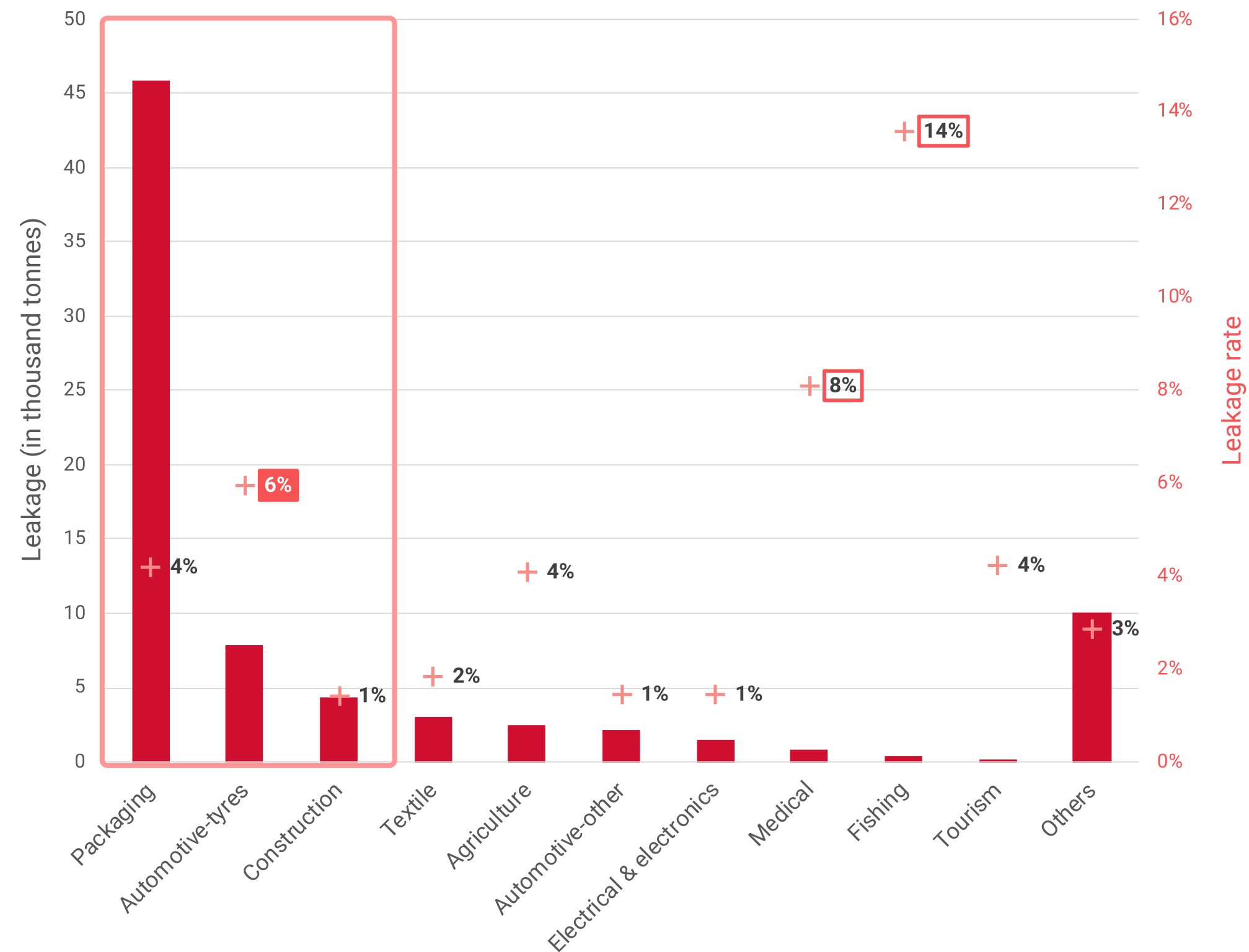
Highest leakage contributors in absolute AND relative value



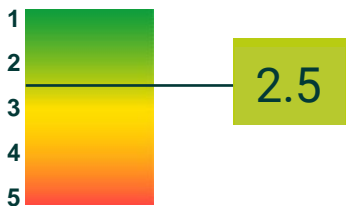
Harmful to marine life and ecosystems*

* The impact assessment uses beach clean-up data from Ryan, P.G. (2020) and Ocean Conservancy (2019)

SECTOR HOTSPOTS [2018]



Quality Score



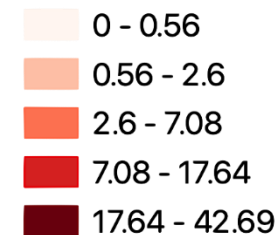
Key take-aways

- The packaging sector** contributes to almost 60% of the total plastic leakage with 46 kt of packaging waste leaking into oceans and waterways.
- Automotive tyres** are the 2nd highest contributor to plastic leakage in absolute value (8kt), especially due to microplastics from tyre abrasion.
- Fishing and medical sectors** have a low contribution in absolute leakage but have high leakage rates (respectively 14% and 8%).

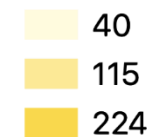
REGIONAL LEAKAGE: MAP AND INTERPRETATIONS



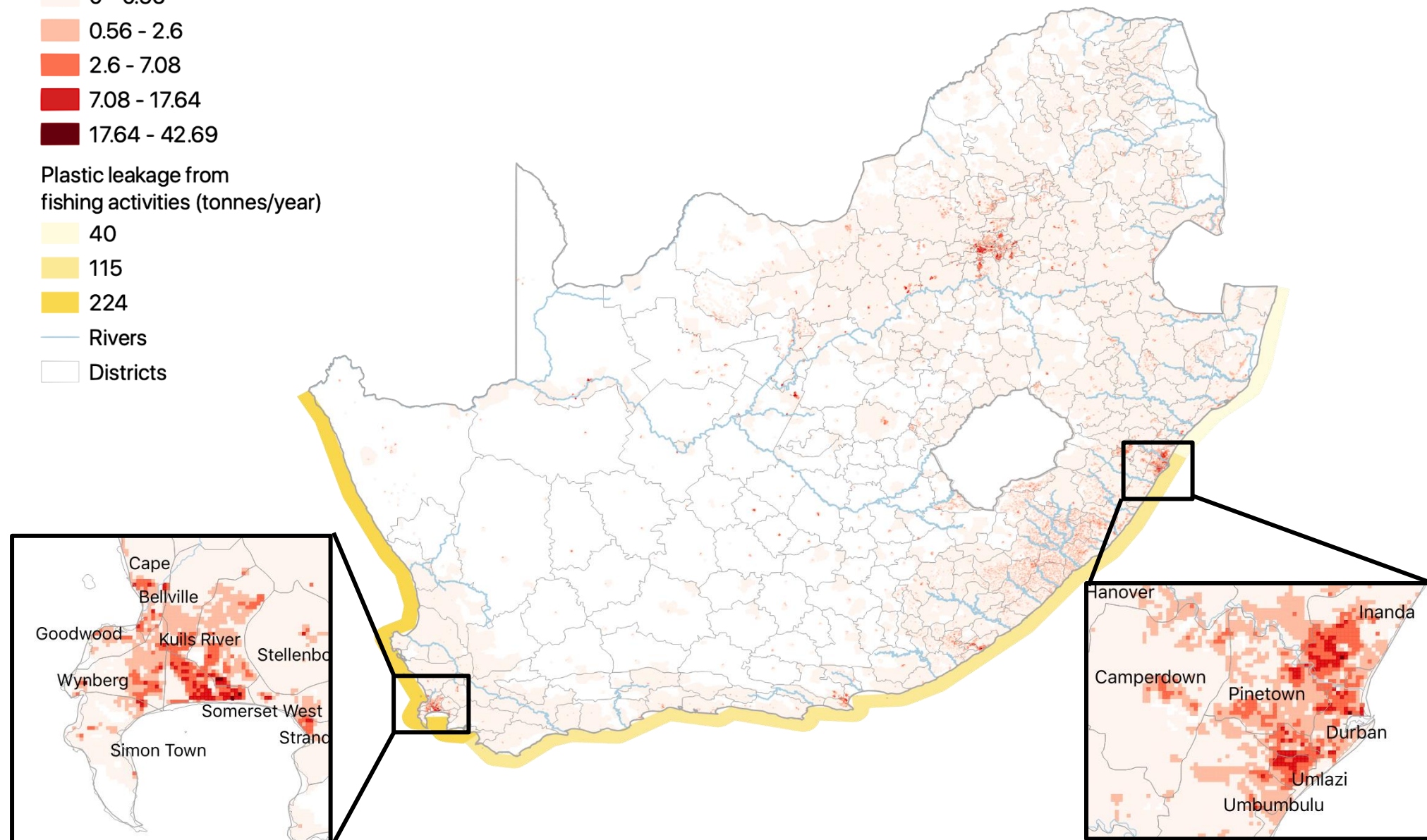
Plastic leakage
(tonnes/year/km²)



Plastic leakage from
fishing activities (tonnes/year)



— Rivers
□ Districts



More details
available in
Appendices



Key take-aways

- Annual leakage of mismanaged waste: 71'801 tonnes.
- Annual leakage from mismanaged/lost at sea fishing gears and from overboard litter: 379 tonnes.



Learning

- Except for Gauteng, populated areas are usually located close to a waterway or the coast. This will increase the possibility of transfer to the marine environment
- There is a leakage hotspot due to mismanaged/lost at sea fishing gear and overboard litter located on the west coast (234 tonnes/year), hosting 54% of the ports identified in the analysis.

WASTE MANAGEMENT HOTSPOTS



SOURCE	WASTE GENERATION	Plastic waste import	Plastic waste export	Plastic waste per capita generation	Share of plastic in waste stream
	WASTE SEGREGATION	Segregation of compostable waste	Segregation of recyclable plastics	Segregation by the informal sector	Public infrastructure availability
COLLECTION	WASTE COLLECTION	Formal collection of municipal waste	Formal collection of industrial waste	Value of recycled plastics	Value of non-recycled plastics
	LEAKAGE WHILE WAITING FOR COLLECTION	Design of waste bins	Frequency of collection	Climatic conditions	Other (e.g. animals)
	WASTE RELATED BEHAVIOURS	Littering driven by cultural habits	Littering due to a lack of public waste bins	Frequency of fly-tipping	Frequency of illegal burning
END-OF-LIFE	WASTE MANAGEMENT INFRASTRUCTURE	Share of waste in dumpsites	Share of waste in unsanitary landfills	Informal recycling	Recycling capacity
	POST-LEAKAGE MANAGEMENT	Frequency of city cleaning and sweeping	Frequency of waterway cleaning	Frequency of coastal clean-up	Frequency of other clean-up activities
	WASTE WATER MANAGEMENT	Management of run-off waters	Waste water collection	Waste water treatment efficiency	Fate of WWTP sludges

- Negative contribution to the leakage
- Neutral contribution
- Positive contribution
- Not assessed



Key take-aways

- Share of plastic in waste stream is high (18%).
- Waste separation at household level is low in many provinces.
- Slumping growth and international secondary market context drive recyclable plastic prices down, while plastics are still flooding the South African market.
- Lack of public waste bins, especially in low income areas (including informal settlements) drives littering behaviours.
- Extreme meteorological events are common in South Africa and drive plastic leakage.
- Some municipal sweeping teams push waste into drainage systems and waterways for the sake of simplicity. This increases the leakage and can lead to clogging and floods during extreme rain events.

*For more details and justifications, check tool T4.1



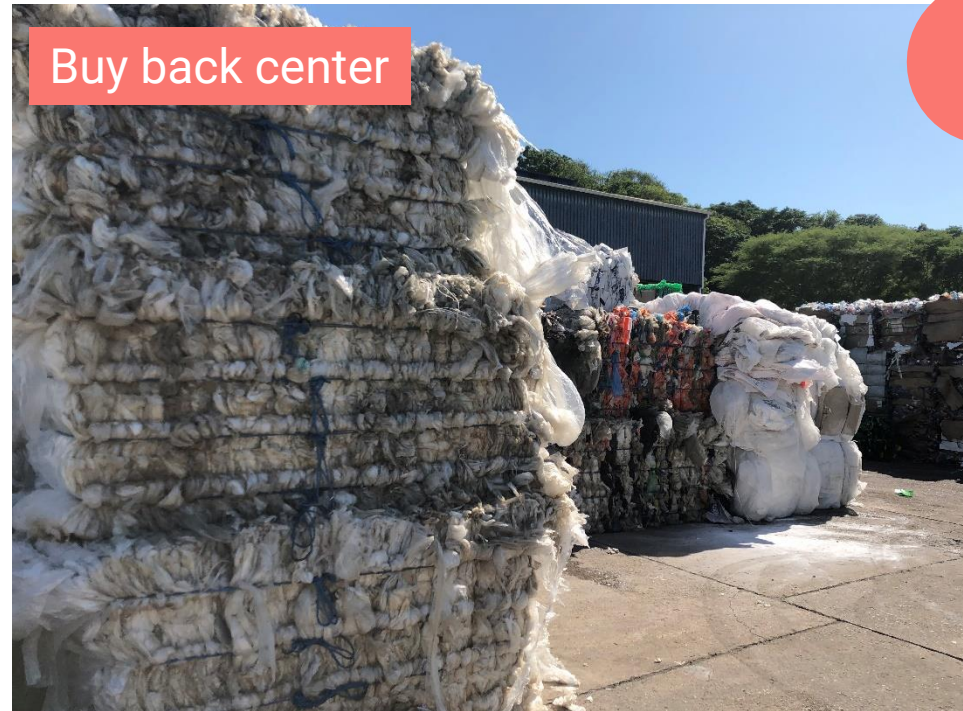
1

Transfer stations



3

Buy back center



2

Waste pickers on landfills



4

Unsanitary landfill



SHAPING ACTION



14
Actionable
Hotspots

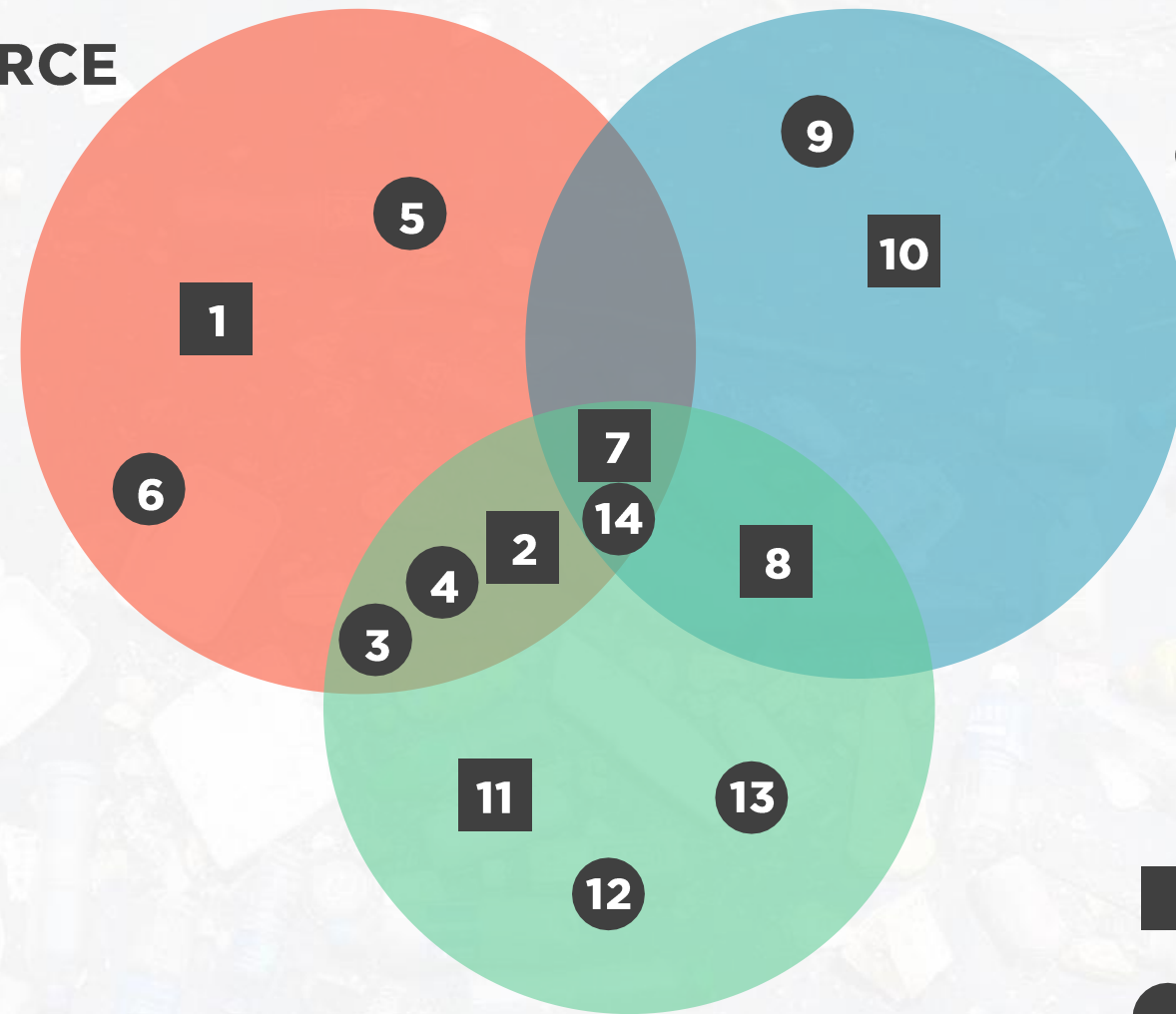


15
Priority
Interventions

SOURCE

COLLECTION

END-OF-LIFE



GENERIC (All plastics)
SPECIFIC (Specific plastics)

Prioritisation of interventions

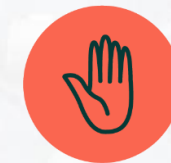


- I02: Clean beaches and/or polluted areas
- I04: Increase recycling capacity for domestic plastic waste (PP)
- I05: Increase recycling capacity for domestic plastic waste (LDPE)
- I07: Increase recycling capacity for domestic plastic waste (PET)
- I19: Reduce demand for, and use of, single-use, especially on-the-go, plastics
- I29: Avoid producing / importing plastic objects that do not benefit from a recycling solution in the country
- I36: Promote design of material or process that substitute plastic by other material based on life cycle assessment
- I37: Promote design of material or process that favour reuse of plastic objects (e.g. deposit scheme)
- I38: Promote design of products to be less harmful if leaked to the environment
- I42: Reduce the number of dumpsites and unsanitary landfills
- I45: Plan more frequent waste collection prior to the rainy events
- I46: Plan more frequent waste collection in areas prone to plastic leakage (taxi stations, informal settlements, ...)
- I48: Increase plastic segregation at household level
- I49: Increase plastic segregation in public space (sorting waste bins)
- I57: Ensure collection of discarded tyres
- I59: Ensure plastic waste has enough value to cover collection costs (for all polymers)
- I75: Reduce losses from non-sanitary landfills and dumpsites (from wind and flooding)
- I79: Ensure proper use of existing sorting infrastructure
- I81: Increase density of waste bins in rural areas
- I83: Increase density of waste bins in specific areas prone to leakage



Learning

Points are randomly distributed within the designated box to avoid overlapping. Each box on this 9 facets grid corresponds to a couple low/low or low/medium or low/high, etc. Only the facet in which the point falls into should be accounted for, not its relative position to points nearby.



Limitations

The list of interventions results from the hotspot analysis and it is currently based on the author perception. A final version of the interventions should be elaborated through a multi-stakeholder consultation process.



Unlock button

Set up a workshop for a multi-stakeholder process and repeat the interventions selection procedure.

PRELIMINARY PRIORITY INTERVENTIONS LIST



[INTERVENTION CLASS]	[PRIORITY INTERVENTION]	[CODE]
SUSTAINABLE PRODUCTION	Avoid producing / importing plastic objects that do not benefit from a recycling solution in the country	I29
	Promote design of material or process that favour reuse of plastic objects (e.g. deposit scheme)	I37
SUSTAINABLE CONSUMPTION	Reduce demand for, and use of, single-use, especially on-the-go, plastics	I19
WASTE COLLECTION SYSTEMS	Reduce the number of dumpsites and unsanitary landfills	I42
	Plan more frequent waste collection prior to the rainy events	I45
	Plan more frequent waste collection in areas prone to plastic leakage (taxi stations, informal settlements, ...)	I46
	Ensure plastic waste has a enough value to cover collection costs (for all polymers)	I59
	Increase plastic segregation at household level	I48
	Increase plastic segregation in public space (sorting waste bins)	I49
	Ensure collection of discarded tyres	I57
WASTE INFRASTRUCTURE	Ensure proper use of existing sorting infrastructure	I79
	Increase density of waste bins in rural areas	I81
	Increase density of waste bins in specific areas prone to leakage	I83
RECYCLING	Increase recycling capacity for domestic plastic waste (PP)	I04
	Increase recycling capacity for domestic plastic waste (PET, LDPE)	I05, I07

Knowledge creation: Database, mapping, expertise

Awareness raising: businesses, citizens, waste sector

Capacity building: partnerships

Innovation: R&D, social, tech for fisheries, microplastics and waste

Economic: incentives, informal sector, investment, taxes

Policy/regulatory: EPRs, bans, enforcement, municipal bylaws, trade, standardization, monitoring



Closing (Take-home) message!

Are we overemphasizing
recycling in closing
the plastic leakage tap?





THANK
YOU

 [@IUCN_Plastics](https://twitter.com/IUCN_Plastics)



www.iucn.org/theme/marine-and-polar/our-work/close-plastic-tap-programme



Peter Manyara
Regional Coordinator, MARPLASTICCS
Eastern and Southern Africa
peter.manyara@iucn.org