Marine Debris Management, policy and regulation:
Tackling a transboundary problem with multiple approaches

Britta Denise Hardesty

OCEANS AND ATMOSPHERE
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CSIRO Marine Debris Research Program

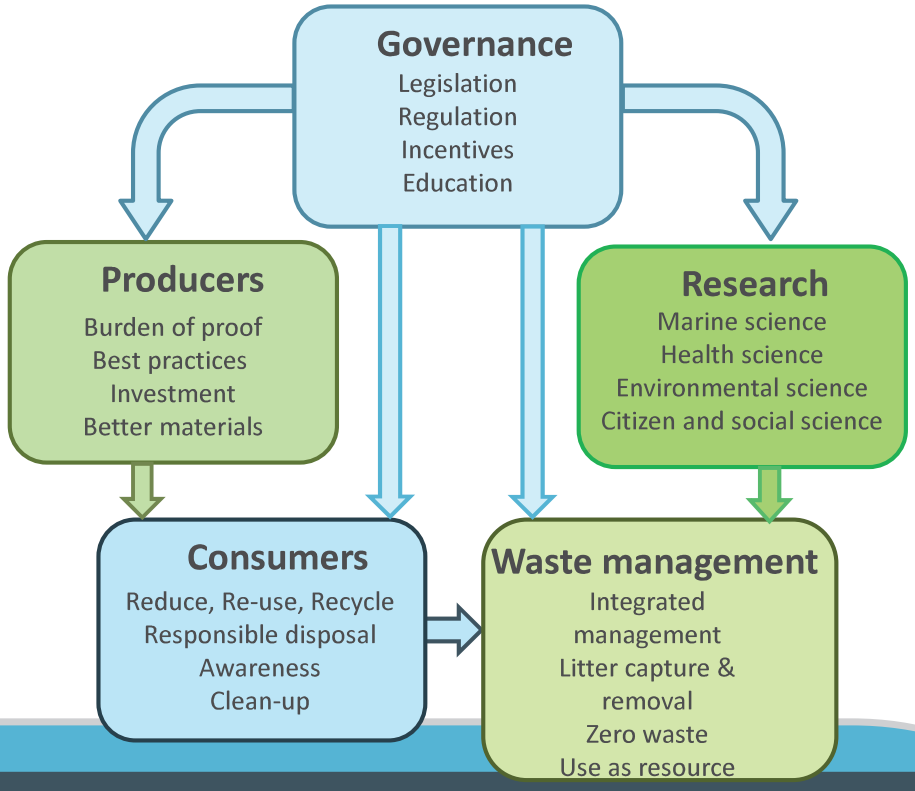
FOCUS

12+ years of work; 65+ pubs/reports
www.csiro.au/marine-debris

Engagement

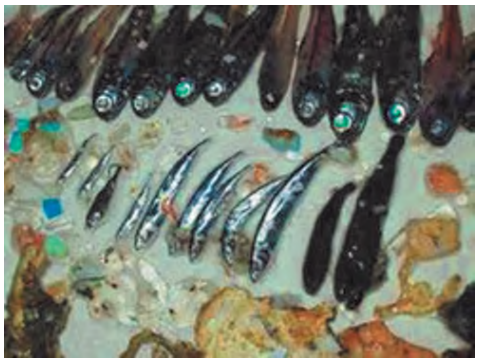
- 8,000+ citizen scientists from Schools, Educators, Volunteers and Industry Leaders
- Content for schools, linked to national curriculum
- Engagement w/ government and industry on effective, affordable solutions

Trans-boundary problems need integrated responses



Worm et al. 2018

What do we know about plastic impacts?



- Economic (tourism & fisheries)
- Navigation hazard
- Invasive species transport
- Wildlife entanglement & ingestion
- Chemical/toxicological impacts
- Well-being/community

Where does plastic pollution come from?

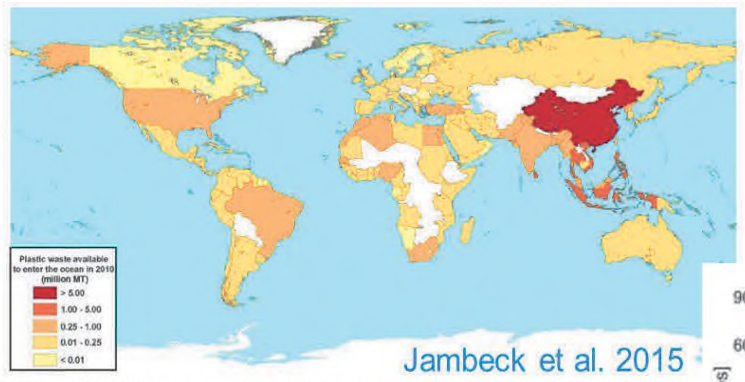
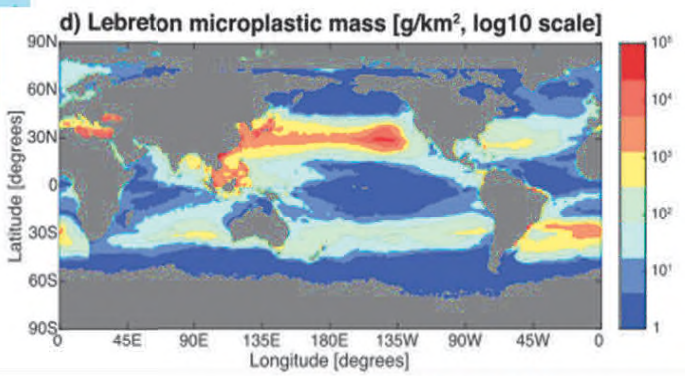


Fig. 1. Global map with each country shaded according to the estimated mass of mismanaged plastic waste [millions of metric tons (MT)] ge in 2010 by populations living within 50 km of the coast. We considered 192 countries. Countries not included in the study are shaded white.

Concentrated in

- Gyres
- Coastal areas

~ 250,000 tons (surface)



van Sebille et al. 2015

3 Main Questions

1) What is the relationship between **debris in the marine environment and debris** from **nearby** sites?

2) Are there **identifiable sources** and **pathways** through which debris reaches and moves to the coast?

3) What **investments** in facilities, policies, outreach, etc. will help reduce waste in the environment?

‘If you measure it, you can manage it’

Understand it - Design for it

Participate in it - Influence it

Use it - Circularize it (reuse)

What drives debris loads?

Urbanization

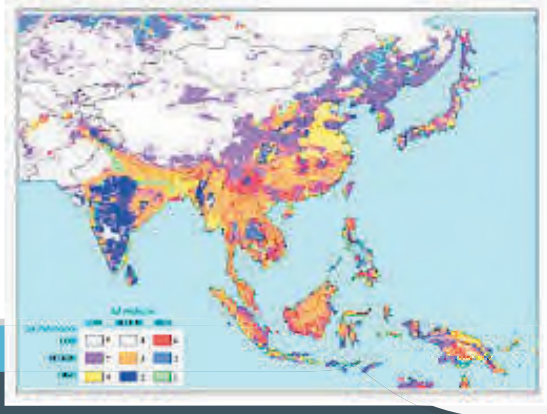
- Distance to public transport, nearest road
- Regional and local population
- Regional and local road density by type

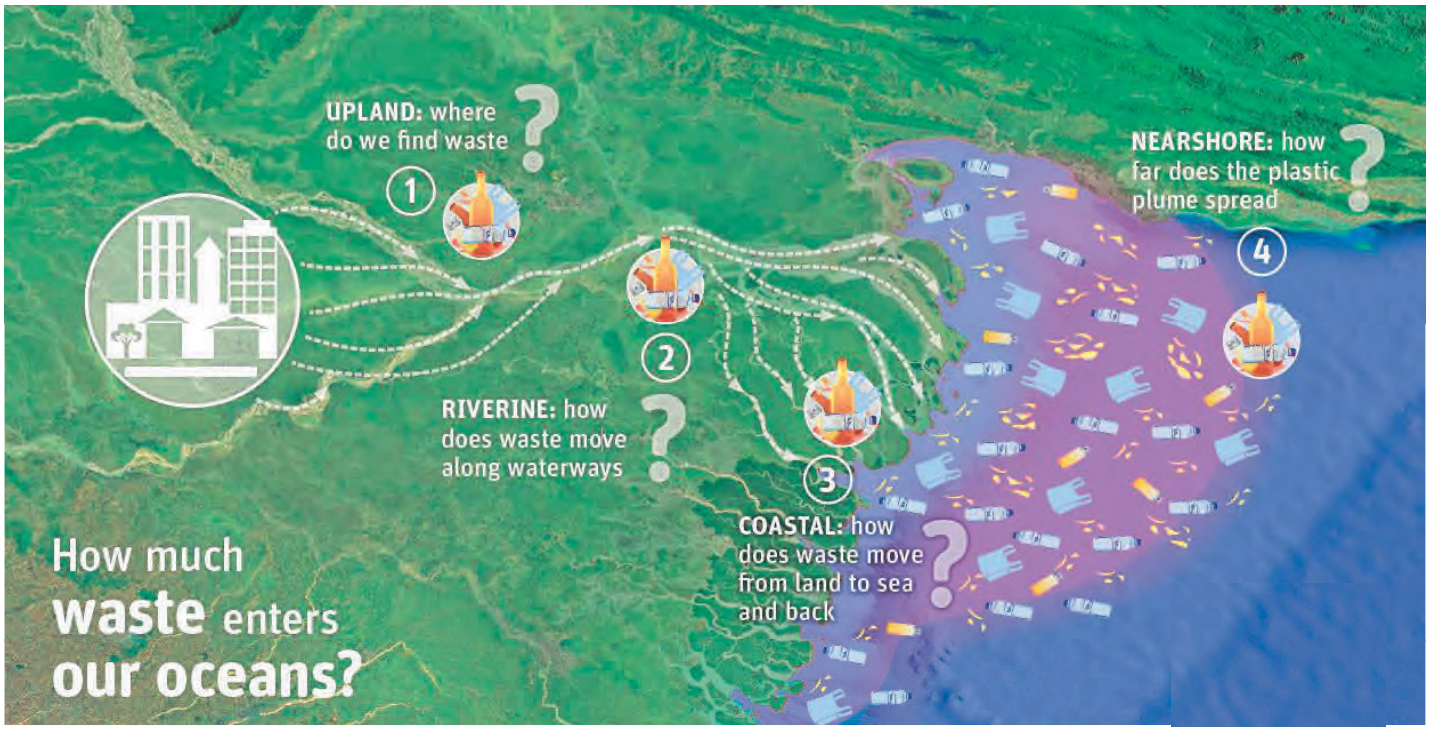
Land use

- Reserves, Agriculture, Housing, Water, etc.

Socio-economics

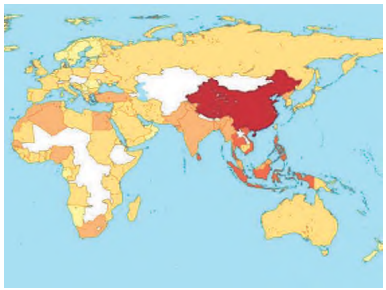
- Economic advantage/disadvantage
- Education and employment levels
- Economic resources



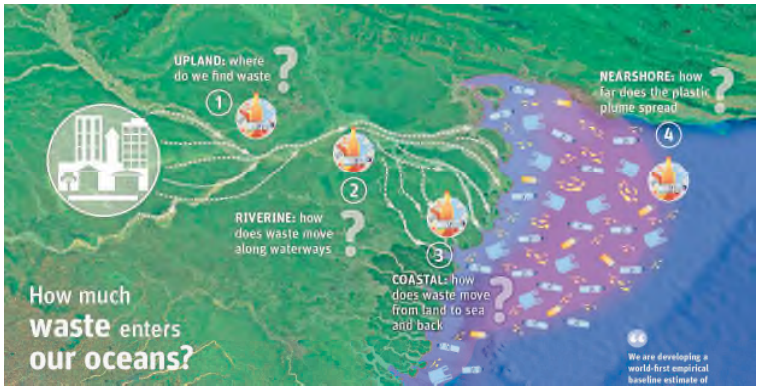


Approach: Statistically robust sampling for INLAND, COASTAL, RIVER, AT-SEA sites

Global Plastic Leakage Project



Goal: estimate loads on land, drivers of leakage, and plume from unmanaged (plastic) waste

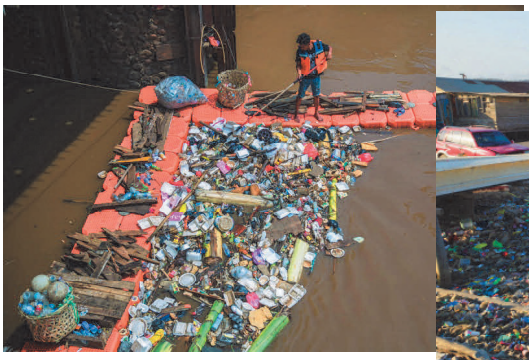


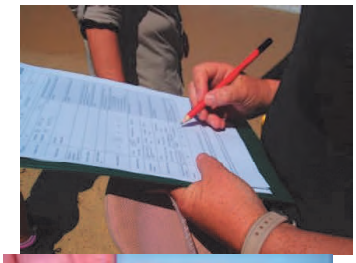
- **Peru**
- Philippines
- **South Africa**
- **Sri Lanka**
- Thailand
- United States
- Chile
- Ghana
- **Kenya**
- **Seychelles**
- Mauritius
- Nigeria
- Australia

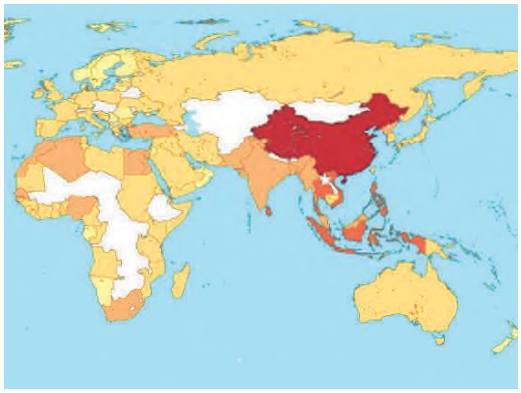
Country Partners

- **Bangladesh**
- **China**
- **Korea**
- **Taiwan**
- **Vietnam**
- Brazil
- India
- **Indonesia**
- Malaysia
- Pakistan

Global Plastics Leakage Project







Objectives

1. Validate estimates of pollution
2. Identify hotspots for loss
3. Investigate drivers
4. Global baseline (+national/regional)
5. Measure successes/change

Opportunities for success:

- Target sites with high debris load sites (hotspots)
- Employ incentives, enforcement, education in areas of socioeconomic disadvantage
- Social context is key for low-cost debris/litter reduction
- Cost-benefit analysis and optimisation of investments (e.g. litter traps in waterways)
- Extend analysis for national picture to evaluate how well policies work

What do we do?

Where do we do it?

What to measure?

WHY?

baseline

Springboard for policy development (& evaluation), national monitoring and a global baseline

Partnerships

Thank you

CSIRO Oceans and Atmosphere
Britta Denise Hardesty
Principal Research Scientist
t +61 3 6232 5276
e denise.hardesty@csiro.au