

# Booms, Bins and Bags: the B<sup>3</sup> solution to the BIGA problem!

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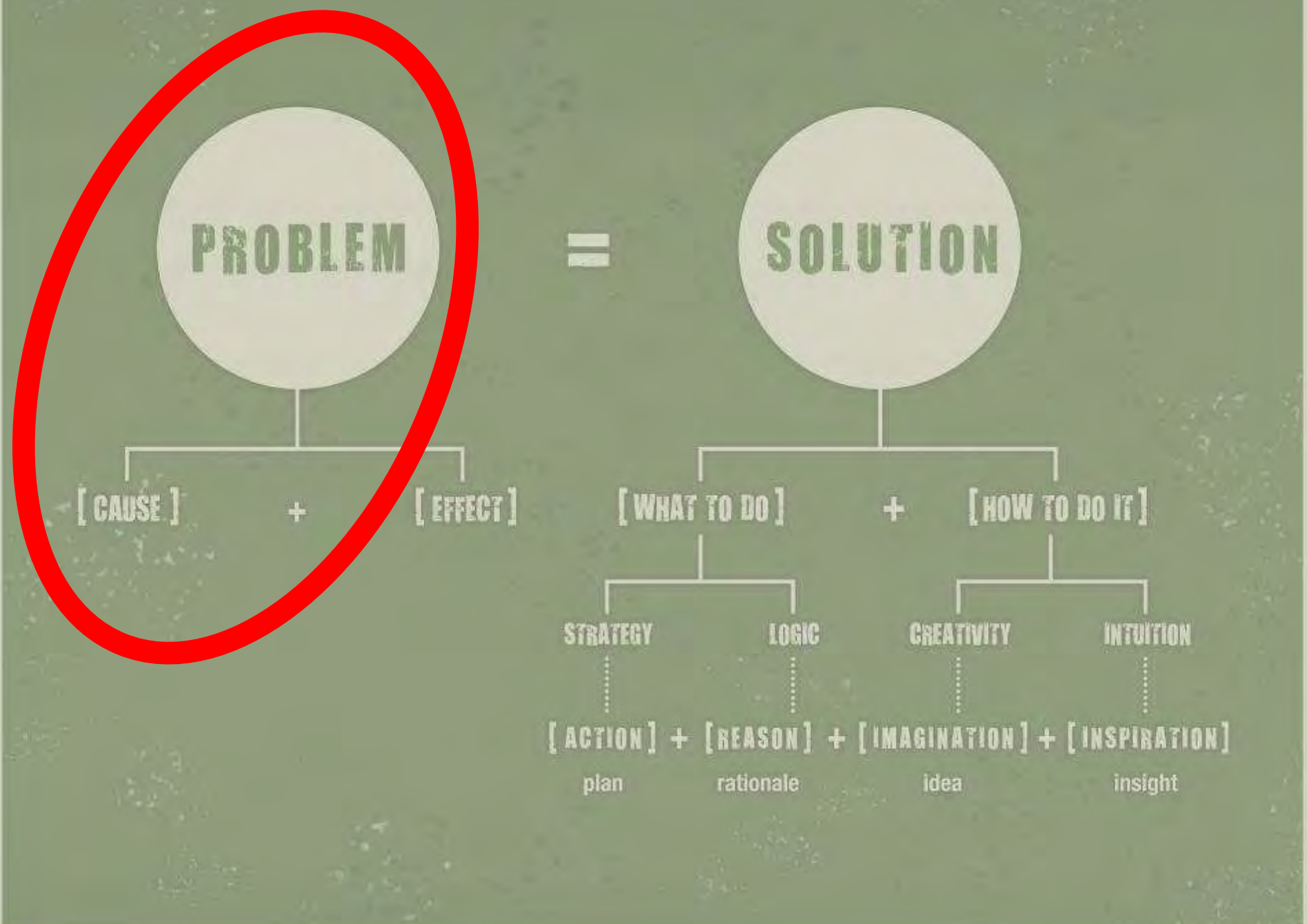
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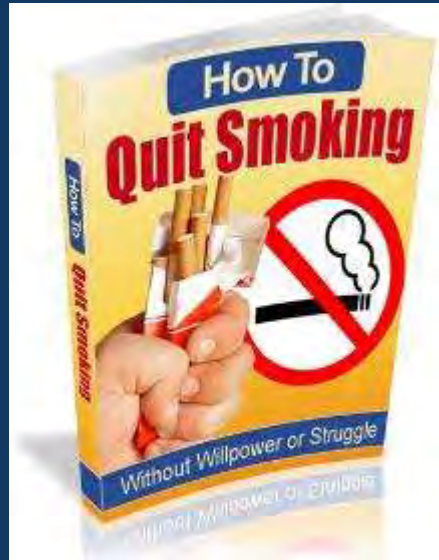


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**A BIGA**  
**problem!!!**

# Book, Ideas and General knowledge don't lead to ACTION



+



+



**BIGA**







**Chris Jordon**

Image depicting  
2 million  
plastic  
beverage  
bottles, the  
number used  
in the US  
every 5  
minutes



# Why do we litter?

- ❖ Do not feel responsible for public areas like streets and parks.
- ❖ A habit
- ❖ Outside their own neighborhood; trash = someone else's problem.
- ❖ **Believe someone else - a maintenance worker or responsible neighbor - will pick up after them / provides jobs**
- ❖ If an area is clean, people are less likely to litter.



This



Leads to  
This



WHY ARE YOU LITTERING?

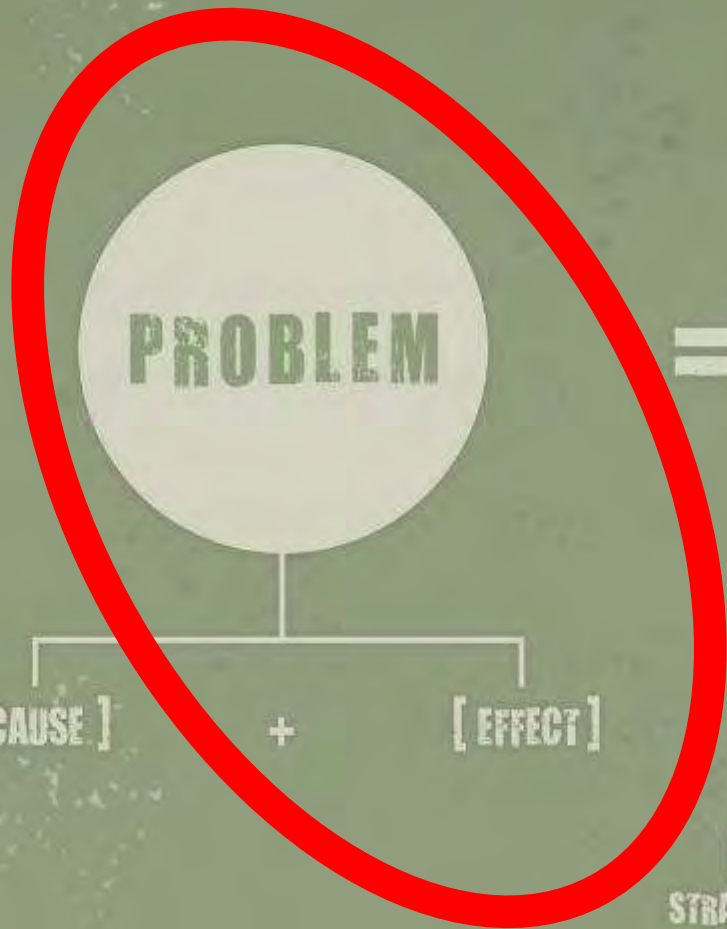
- I'm Stupid
- I don't care about my city
- Mummy still cleans up after me
- All of the above

Powered by  
Solid Development

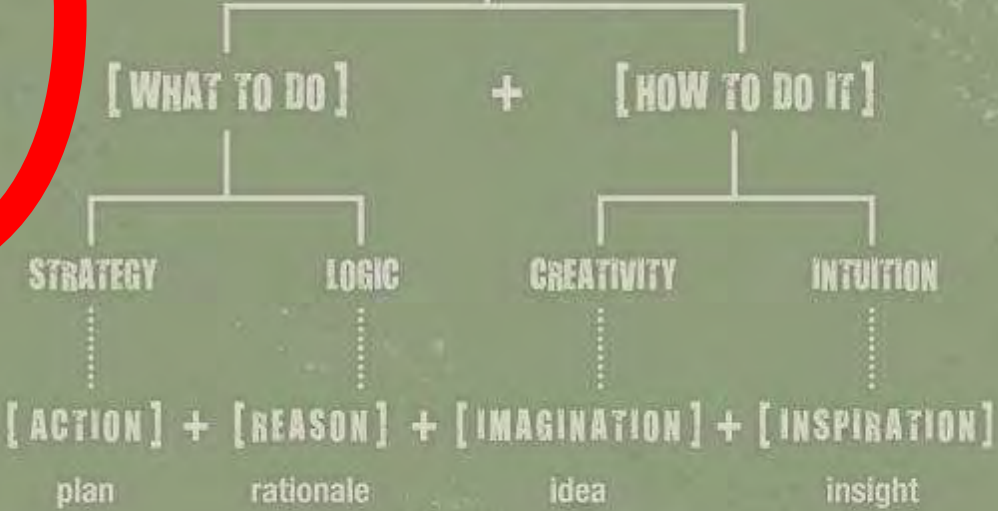


# Other issues in South Africa?





=













*Jean Treasfon*









**± 200 000 visitors in 4 days to Durban's beaches**  
**Top 5 tourism attraction**  
**Huge income potential for province**







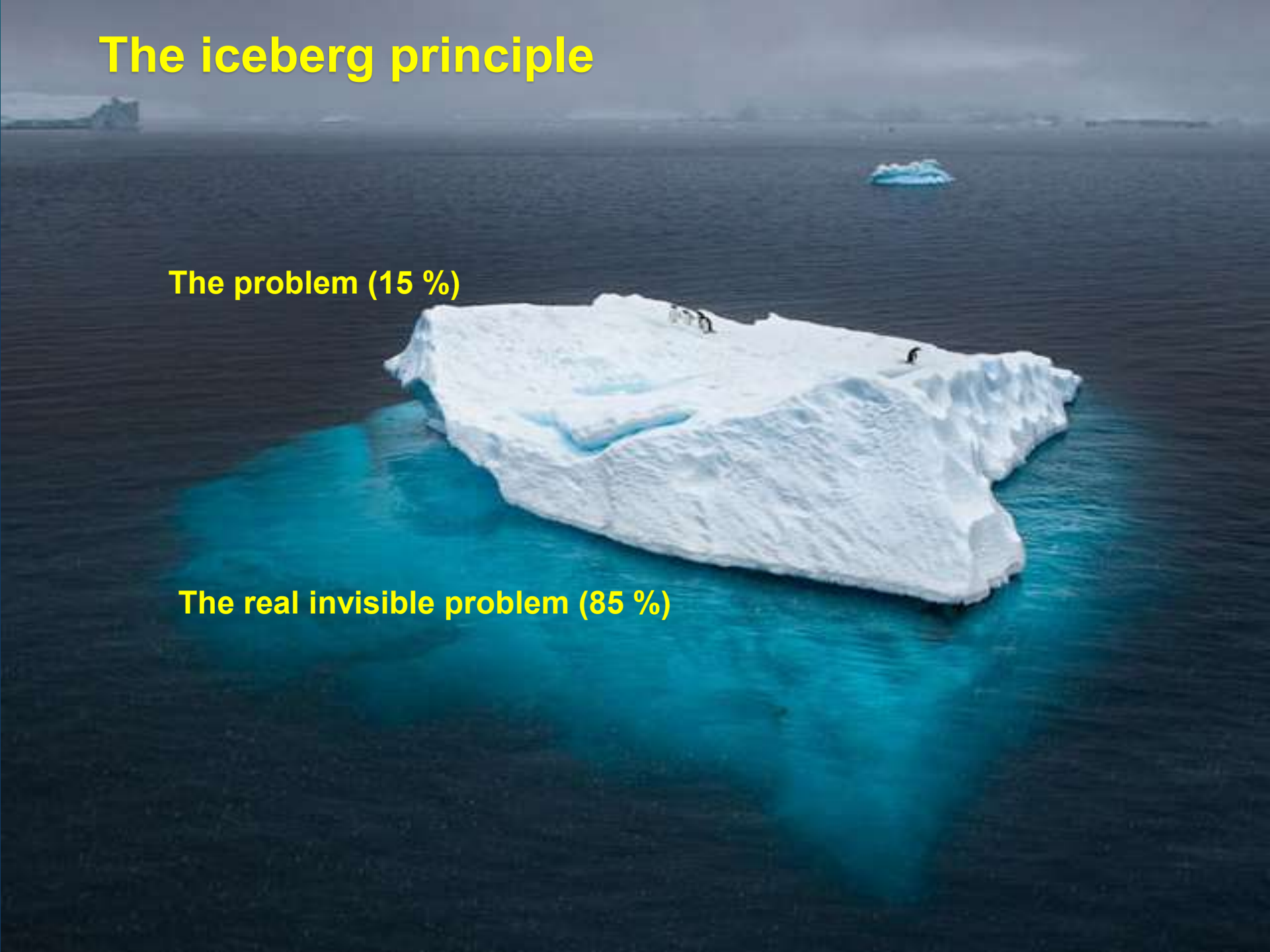
3 metric tons of plastic enters the ocean every 15 seconds



# The iceberg principle

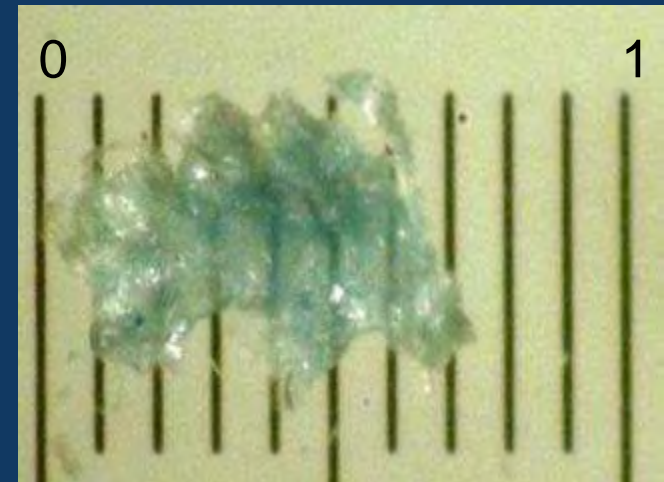
**The problem (15 %)**

**The real invisible problem (85 %)**





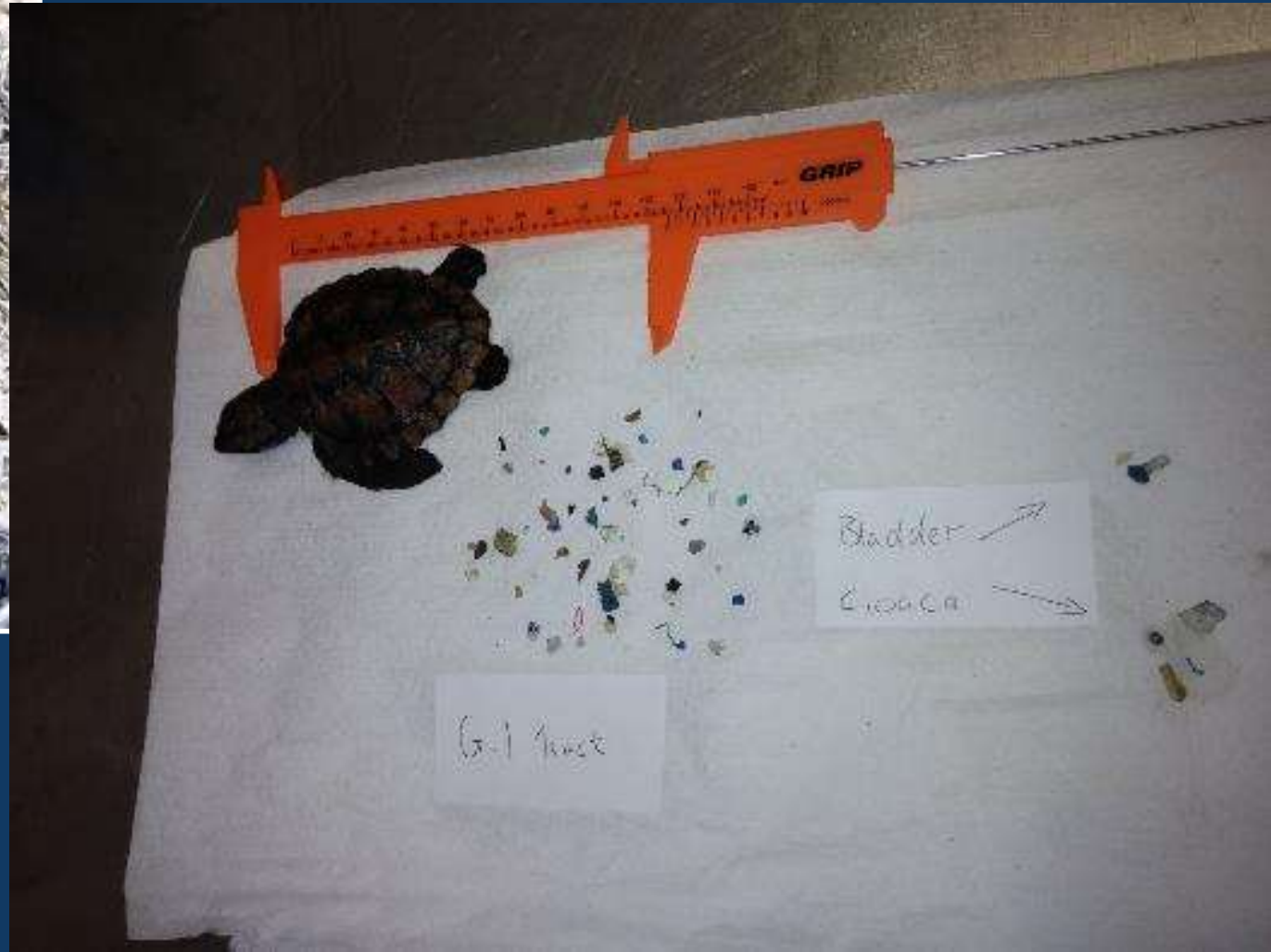
UV + mechanical forces



**Microplastic**



# Ingestion of plastics



# Bio-availability

## Results

- **Salinity** - No effect if it floats it floats
- **Micro-plastic type** - Small Micro-fibres remain suspended the longest > large micro- fibres > Small micro-beads > >

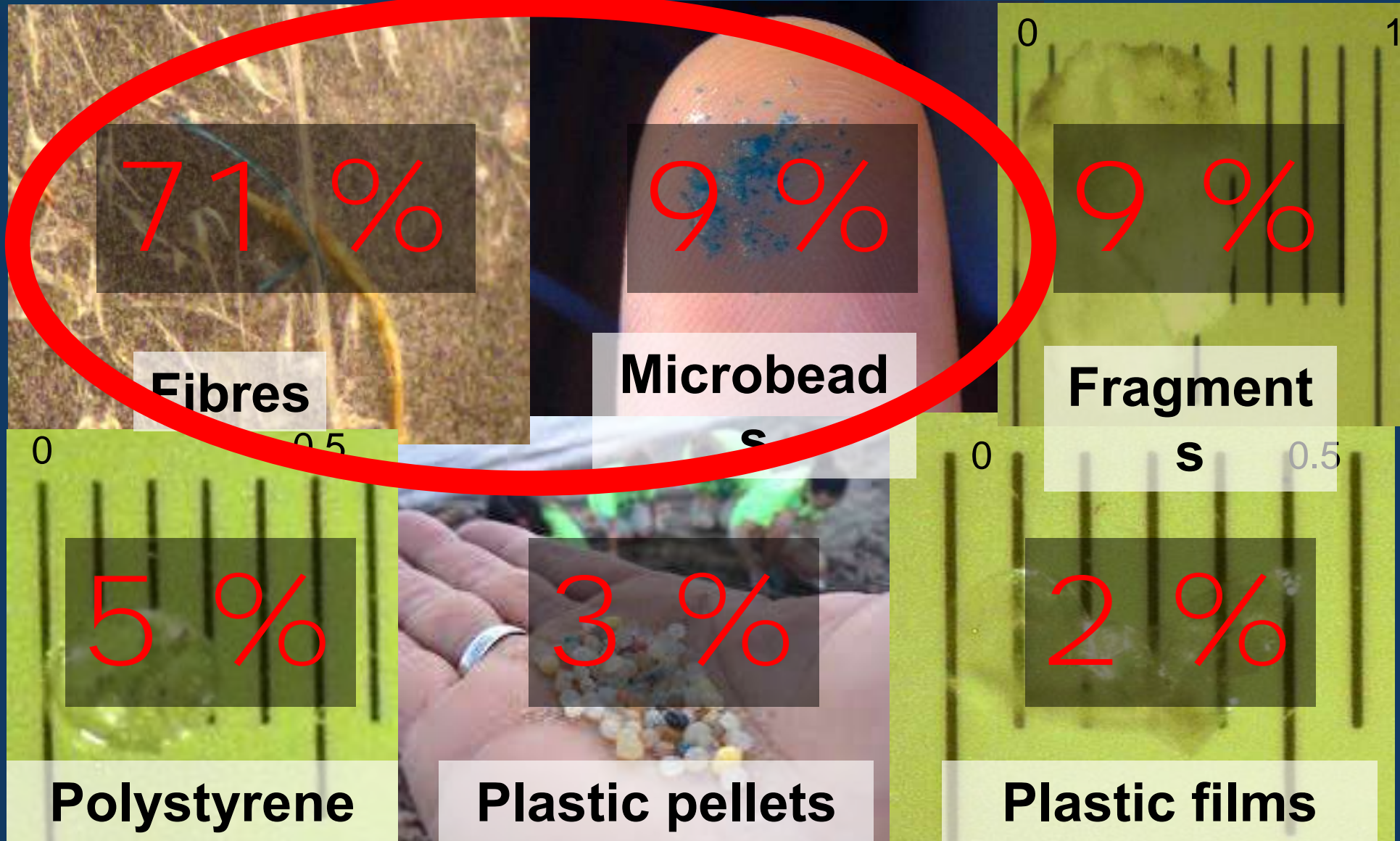




# Durban's Sediment Results

Clarkson, Buitendick & Brown 2013

Scale: mm



# Filter-feeders likely to ingest microplastic particles in nature





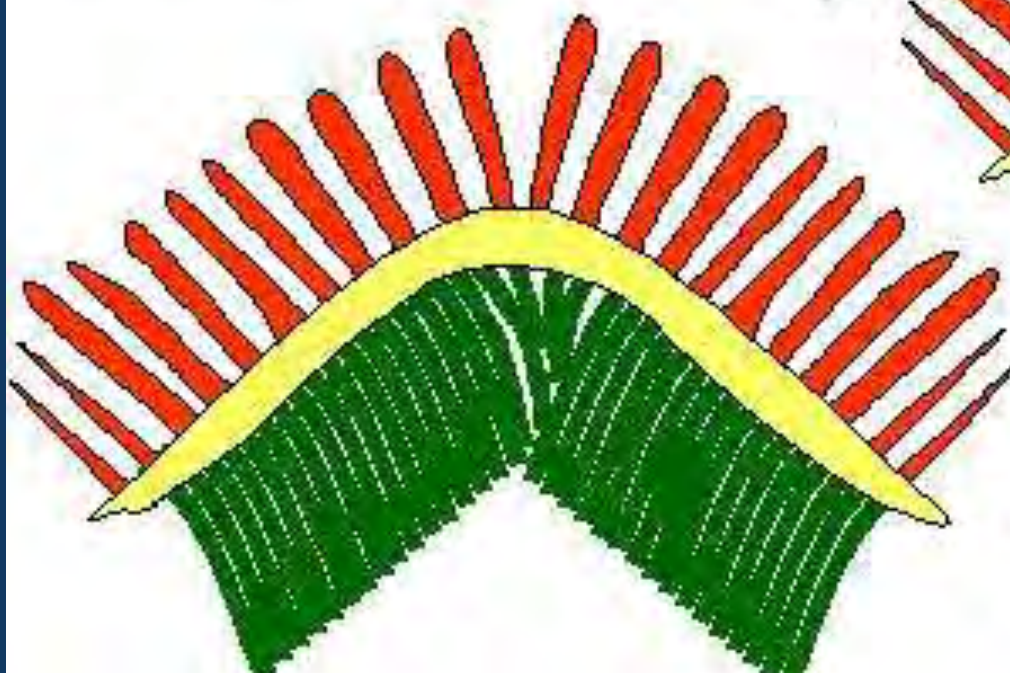
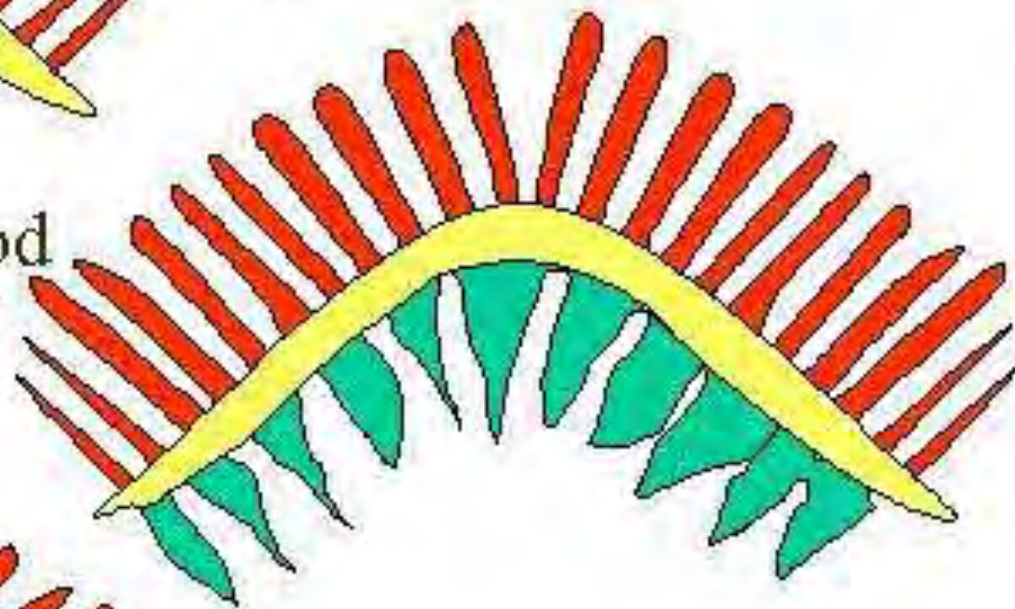
# Gill Rakers



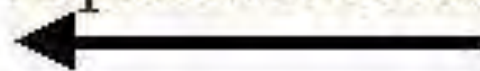
A fish that eats big food



A fish that eats medium food



A planktivorous Fish



# The most depressing slide in this presentation!

320 /L

Wilson's wharf  
❖ micro fibres  
❖ 57 particles.cm<sup>3</sup>

Beach  
Plastic fragments  
❖ 91 particles.cm<sup>3</sup>



2 - 3 X



69 % of *Trachus* (Maasbanker)

70 % of *Mullet*

❖ All 16 species

1 in 5

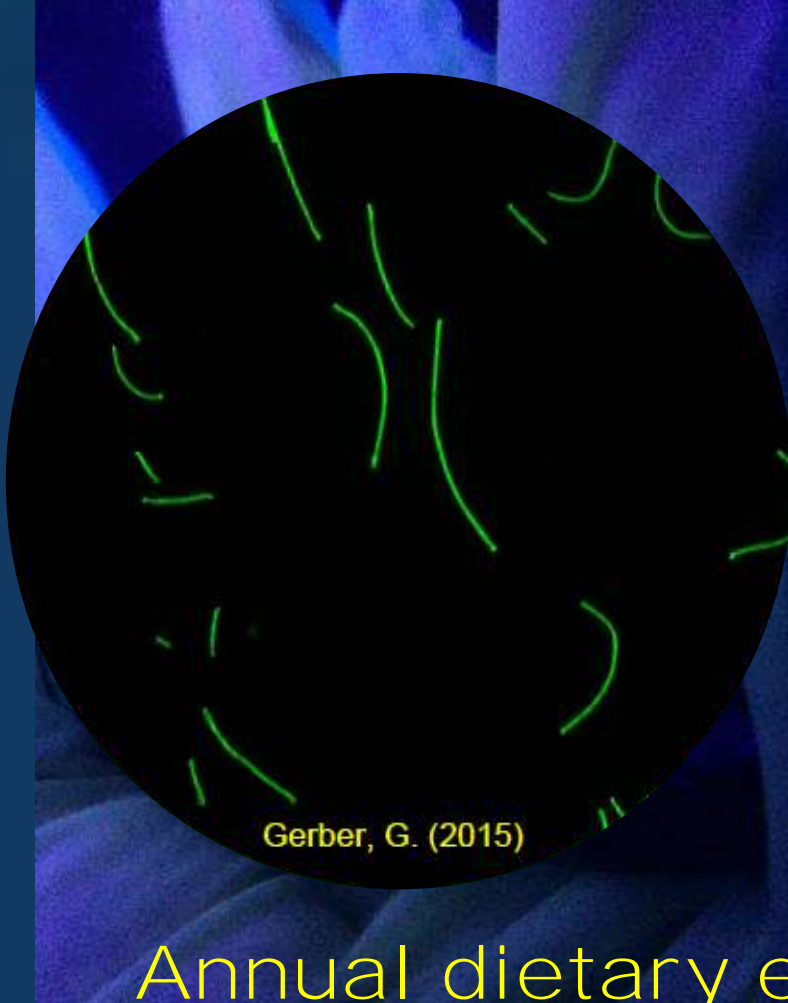
6





# Mussels

Gemma Gerber 2015 Hons and MSc



Gerber, G. (2015)

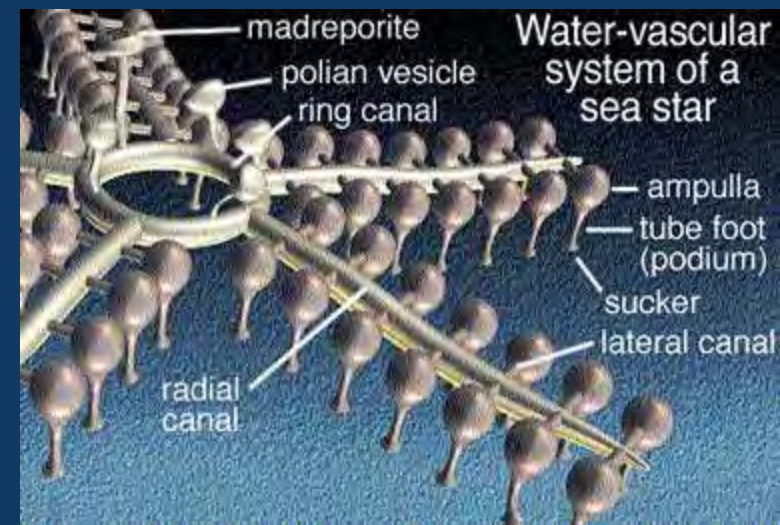
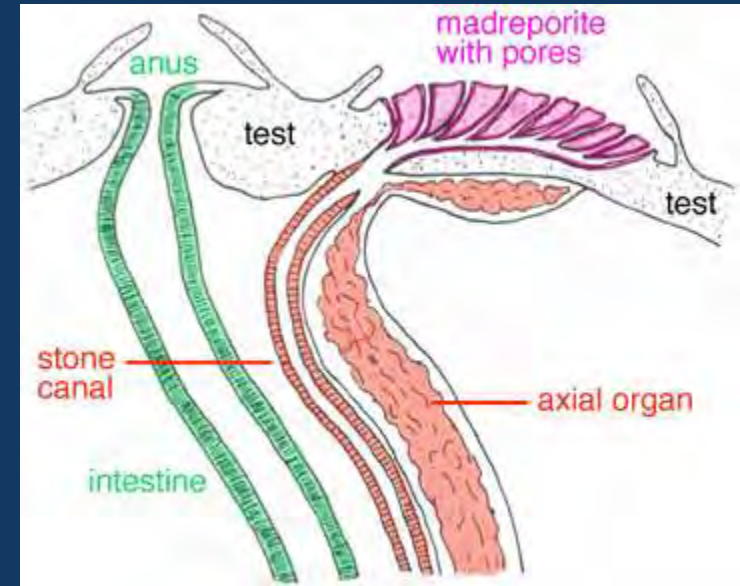


Annual dietary exposure for European shellfish consumers can amount to 11,000 microplastics per year

Van Cauwenberghe & Janssen, 2014

# Echinoderms

Thembani Mkhize 2015 Honours  
Bianca Tree 2016 Honours

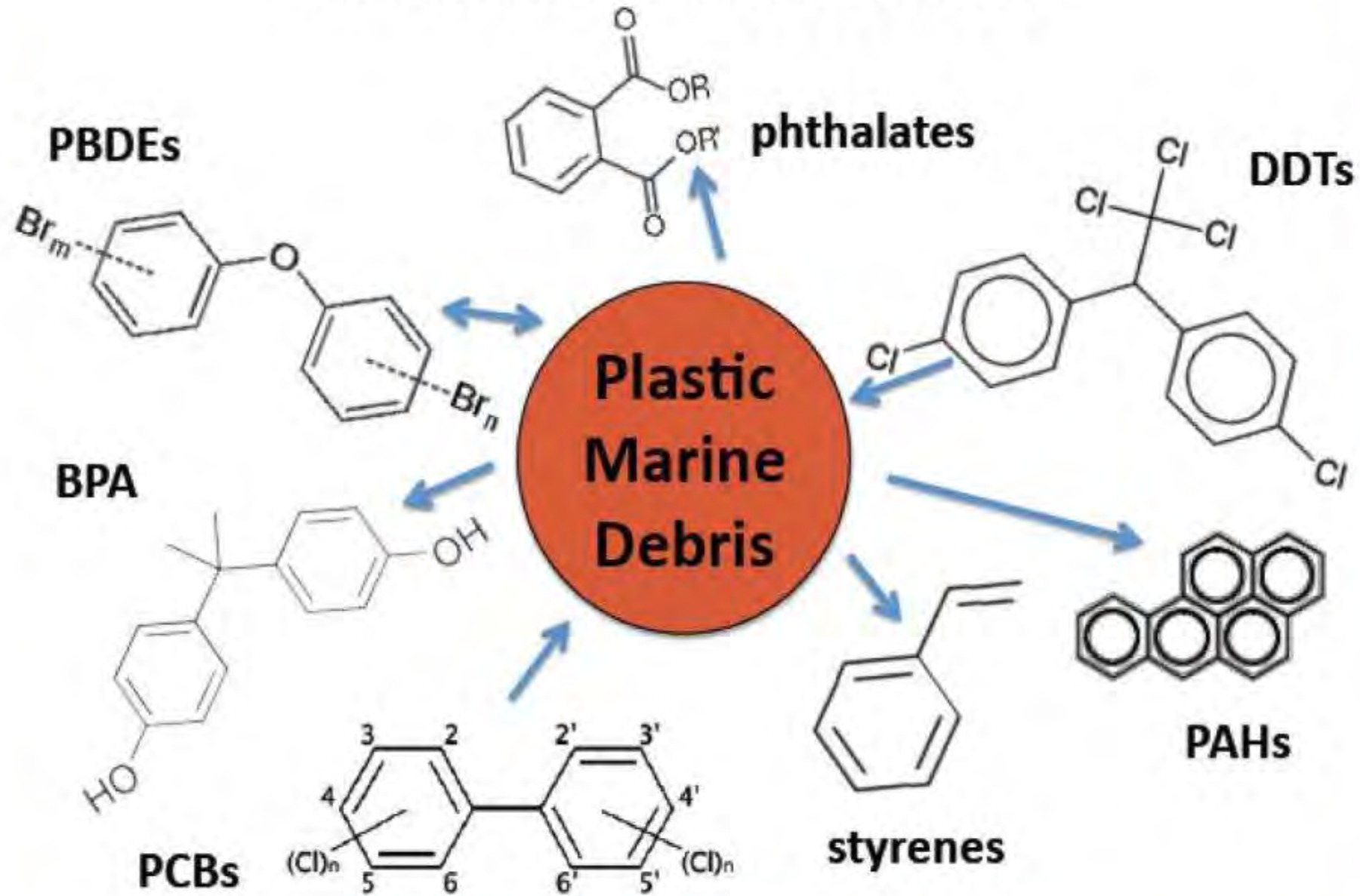






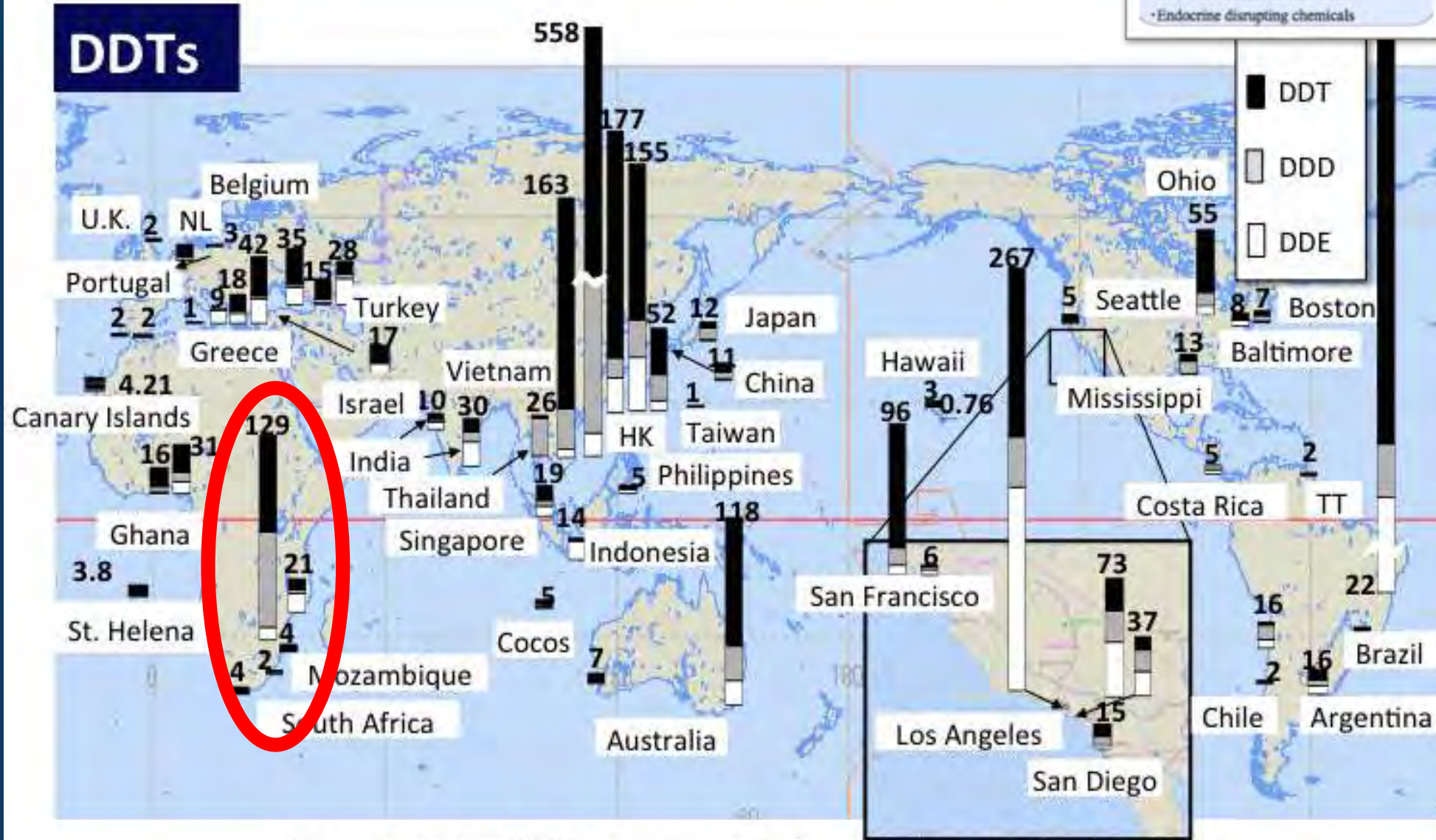
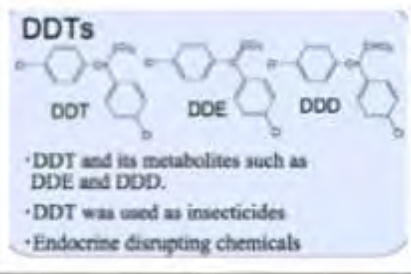
- May alter their productivity as important ecosystem engineers
- Health risk to urchins
- Risk to humans (consumed for *umami* – sea urchin roe)

# “Cocktail” of Toxicants





# International Pellet Watch

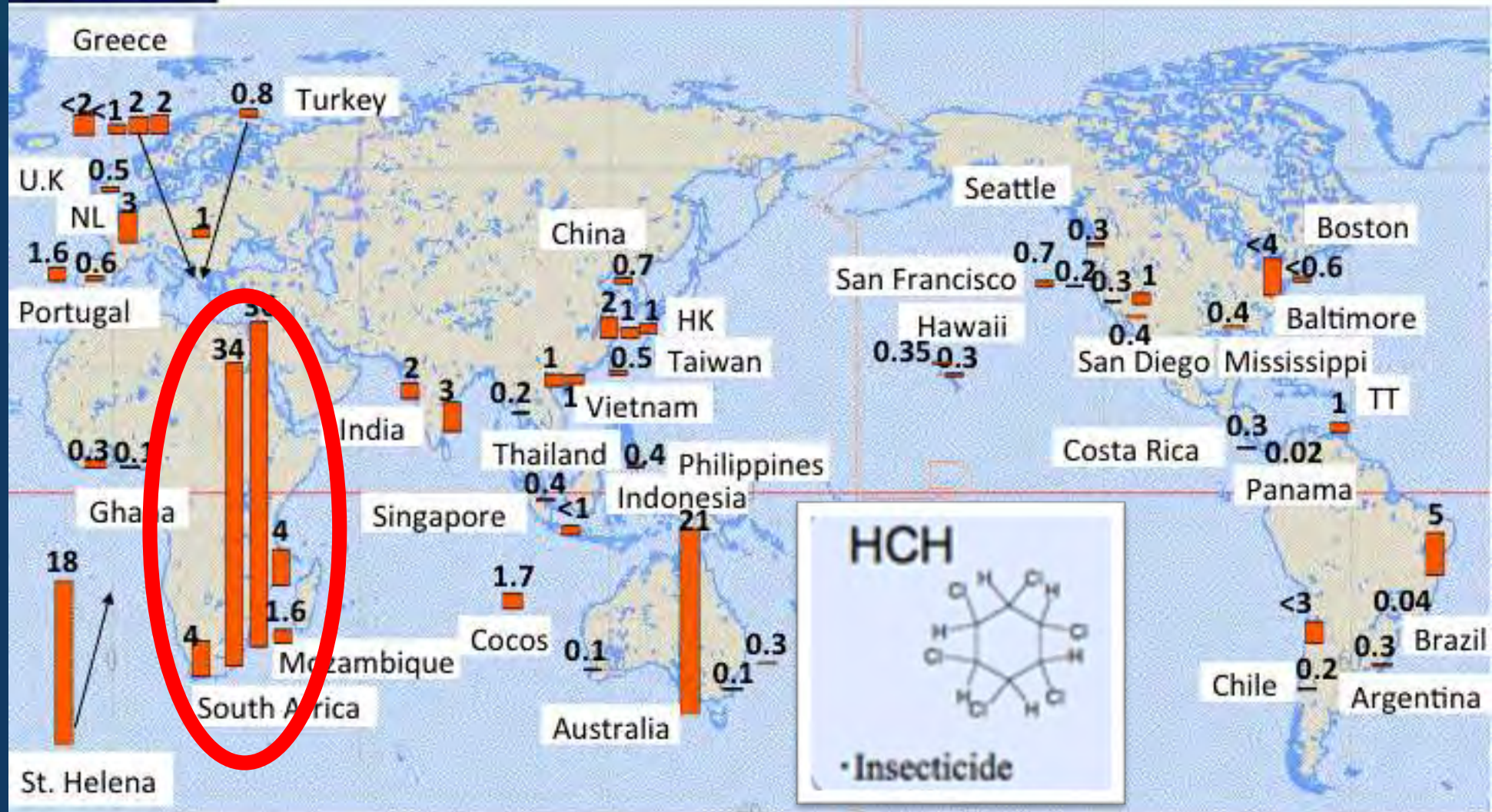


Concentration of DDTs in beached plastic resin pellet (ng/g-pellet)



# International Pellet

## HCHs



Concentration of HCHs\* in beached plastic resin pellet (ng/g-pellet)

\*sum of  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$  isomers





=



[ CAUSE ]

+

[ EFFECT ]

[ WHAT TO DO ]

+

[ HOW TO DO IT ]

STRATEGY

LOGIC

CREATIVITY

INTUITION

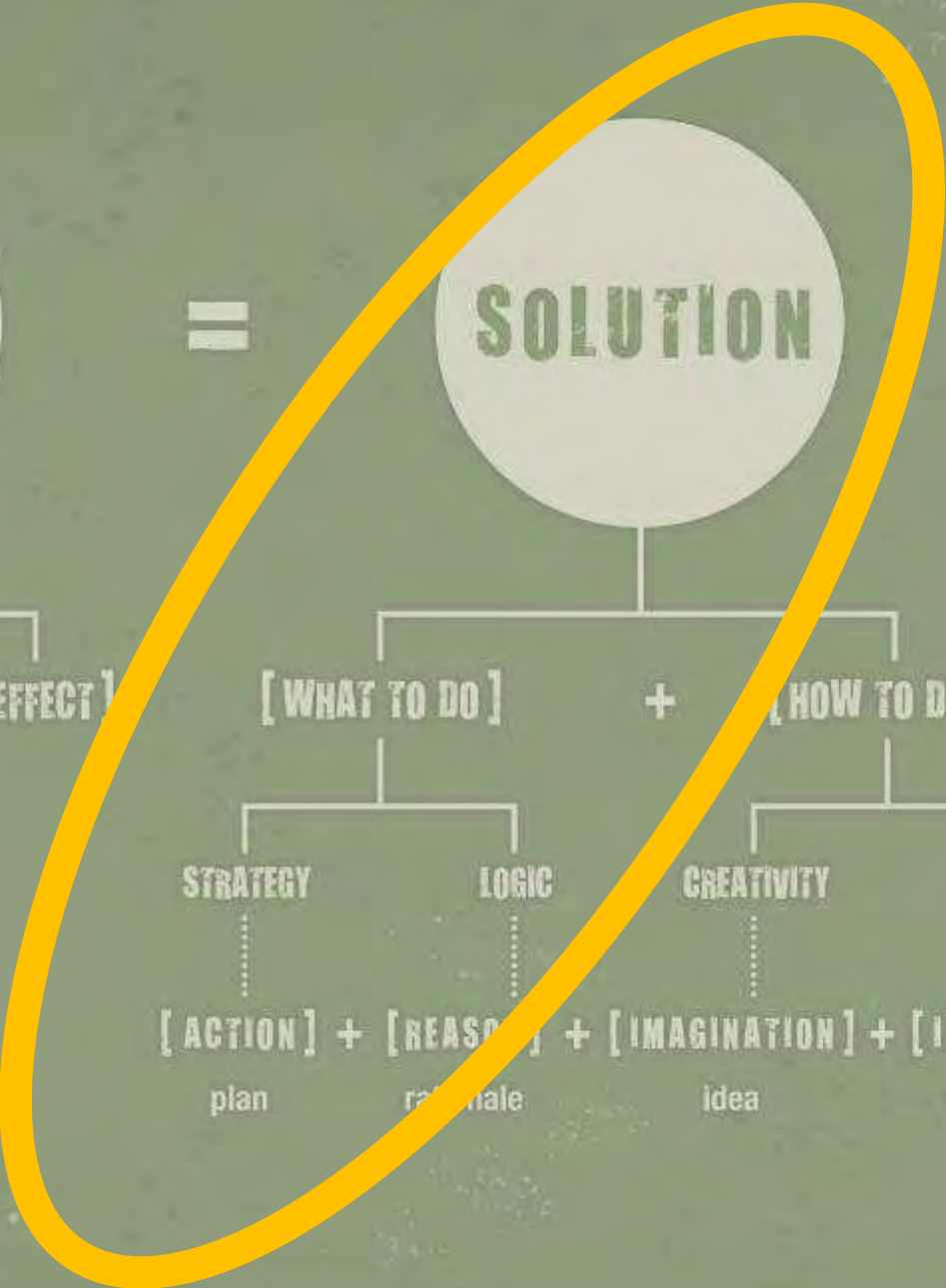
[ ACTION ] + [ REASON ] + [ IMAGINATION ] + [ INSPIRATION ]

plan

rational

idea

insight





**Jul - 27 200 bags**  
**Aug - 61 300 bags**  
**Sep - 13 200 bags**

**1 ton of plastic  
a day from the  
Durban mile**

- From the beach sand areas only and excludes promenade area.
- Excludes all organic debris and other large pieces of debris removed
- Excludes litter removed by DUCT and Leich contract.







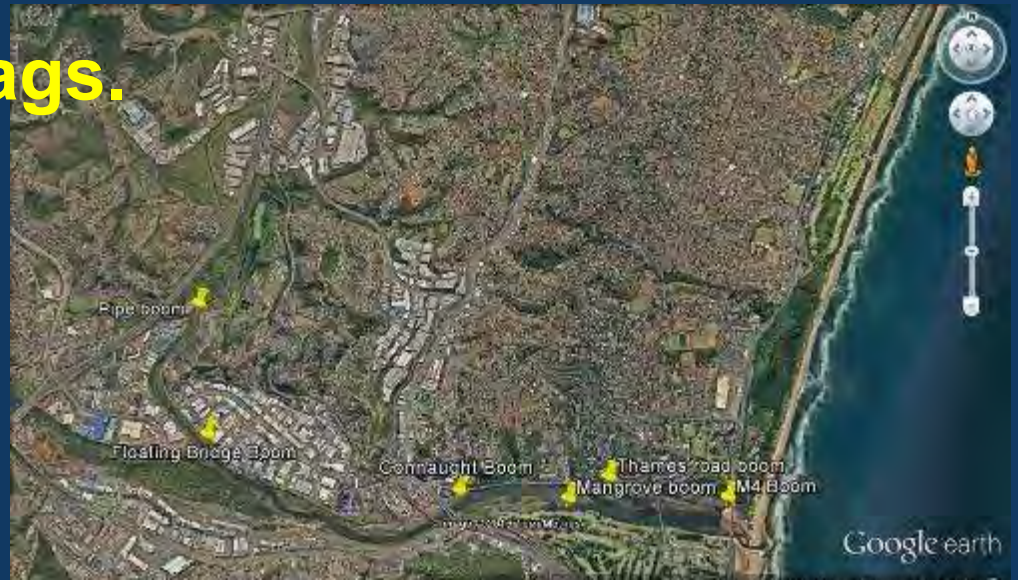








- About **300 bags** for **100 man hours** in a month with little rainfall.
- With a rainfall episode of between 20 - 40mm, took **9 person days** at 5 hours work per day.
- Debris were cleared in 4 days.
- About **2 Tons of PET**
- **180 hours to fill 1300 bags.**





**± 2.1 kg per person of ....**





± of 1.1 kg per child in 30 mins







“It is very concerning to see this amount of rubbish here today. We hosted a massive clean-up last month and there was also one held on 8 June for [World Oceans Day](#). **There also haven't been any major rains.** While we hope the rains come I shudder to think how much waste will be washed down with the rains,” said Johnson,

“support for the initiative had dwindled”



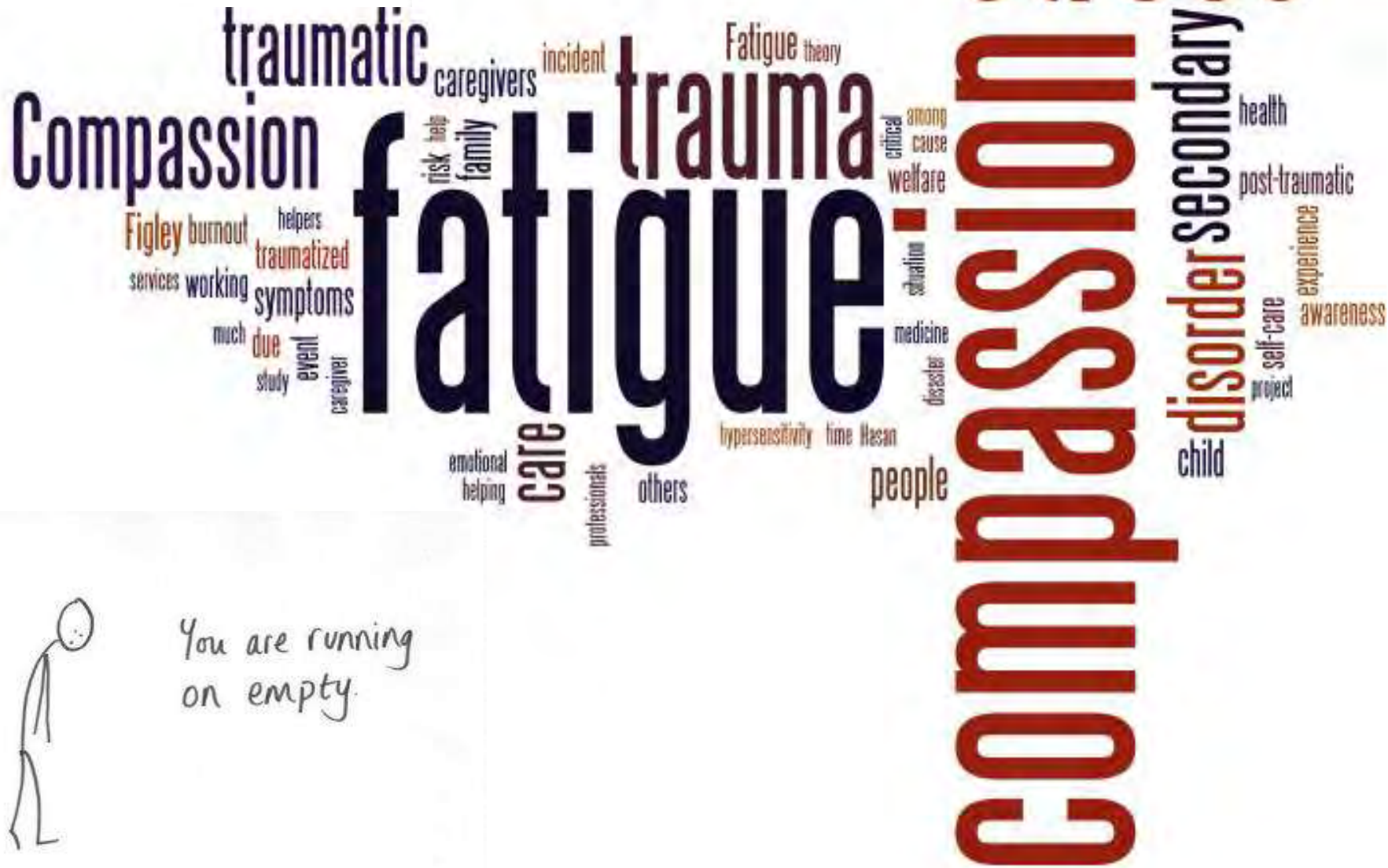
**NB**

**“Battle against Blue Lagoon litter continues”**





And over time  
you feel you've  
got nothing left  
to give.



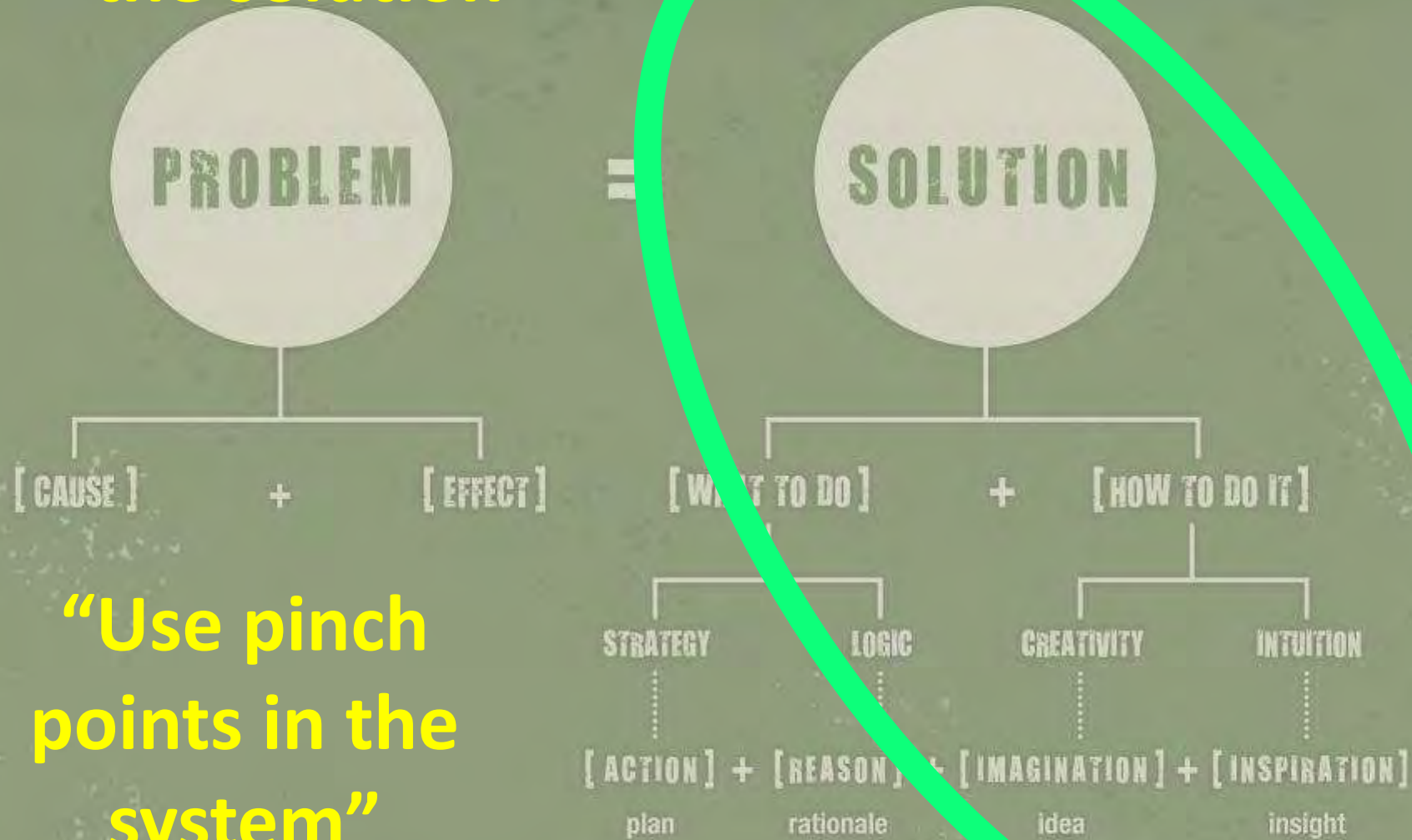
You are running  
on empty.



**CONSERVATION**  
YOU ARE DOING IT WRONG.



“See the problem as the solution”



“Use pinch points in the system”

Sam Peterson

# Tackling Mngeni River pollution



September 16, 2016

Just weeks after the Durban beachfront was ravaged by pollution from the unseasonal mid-winter rains, a ground-breaking project funded by the Paddle For The Planet initiative held last year will soon see the implementation of the Booms, Bins and Bags project aimed at preventing pollution in the Mngeni River from reaching Blue Lagoon and the KZN coastline.

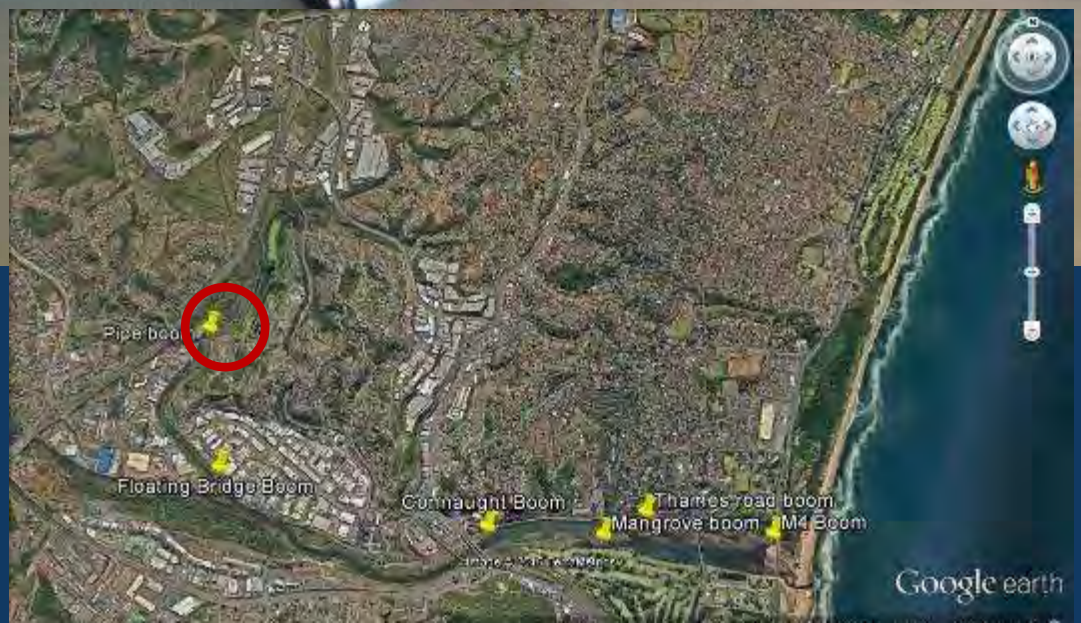
Paddle for the Planet is a global paddling relay that unites paddlers, creates awareness and is a movement for conservation. The goal is to have simultaneous paddling events happening sequentially, at a specific time, in every time zone and in each country around the world, uniting paddlers of any type of paddling craft through the Global Relay. In addition to raising awareness Paddle for the Planet raised R60 000 in donations, which has been entirely ploughed into the pioneering pollution control project on the Mngeni estuary.













**24 Hours  
10 mm rainfall**





# Booms, Bins and Bags: the B<sup>3</sup> solution to the BIGA problem!





**Booms, Bins and Bags: the B<sup>3</sup>  
solution to the BIGA problem!**

**DON'T  
CELEBRATE  
JUST YET!**





# How do we use contaminated plastics?

- Energy recovery through waste-specific technologies –
  - Pyrolysis
  - Syngas generation
  - Plasma arc systems
  - Depolymerisation
  - Homogenisation, etc.
- Plastics to oil conversion



## The ALPHA 10 unit

- Continuous recycling system
- Convert waste oil that is at solid point, waste plastic and rubber to liquid fuel, synthetic liquid gas and carbon black (99.9) .
- 2 persons to operate
- NO secondary pollution
- Cost ZAR 6.5 million
- ROI 6 mths
- Fuel oil sold at normal rate of paraffin



### HOUSEHOLD PLASTIC WASTE (FOOD WRAPPING BAG · PLASTIC BAG...ETC)

Plastic: PP or PE / Weight: 1000g

Material



Produced Oil



Result

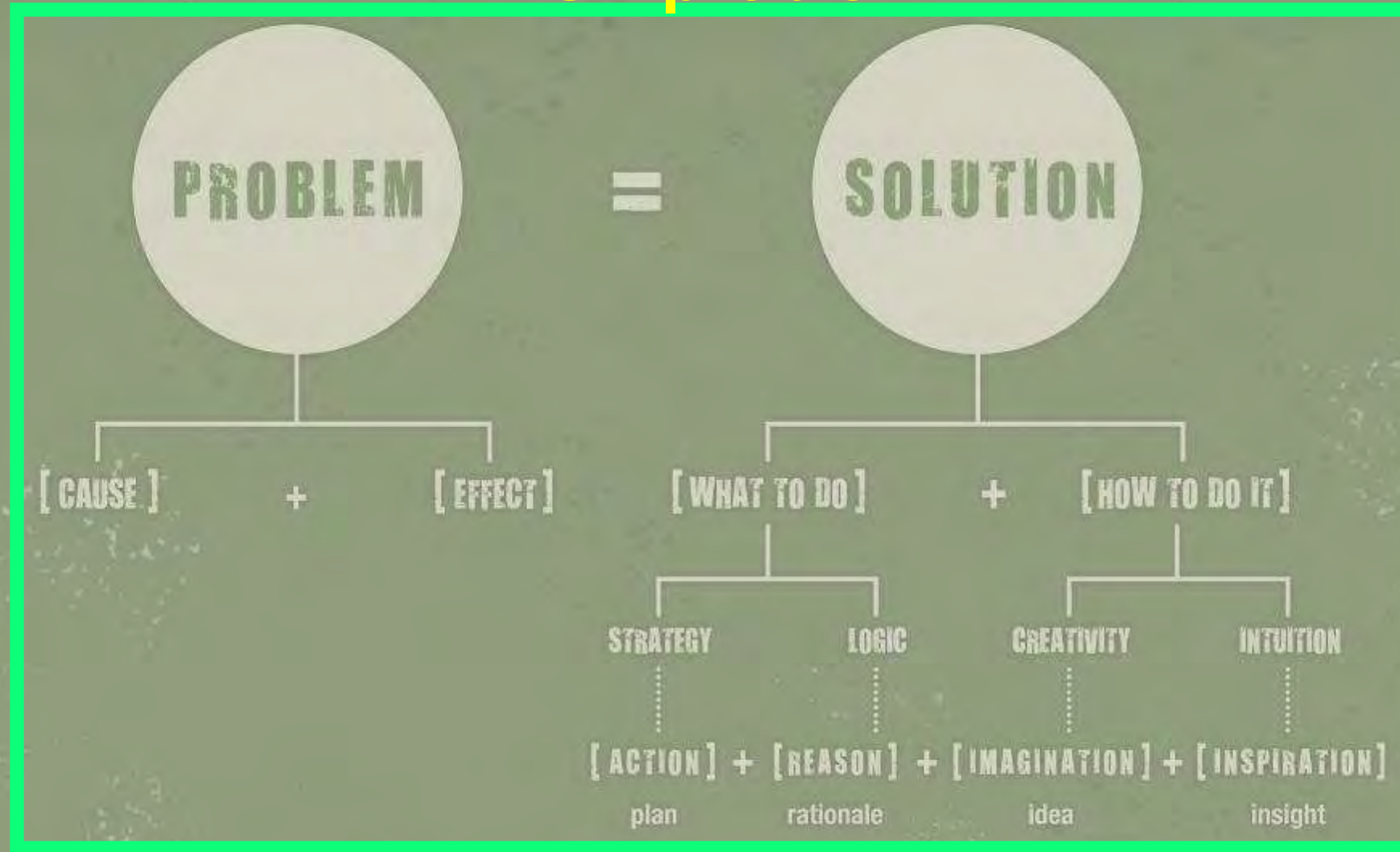
Produced  
Oil: 820g(1080ml)  
Oil Ratio: 82.0%  
Residue,Hydrocarbon  
Gas: 64g



# Booms, Bins and Bags and the ALPHA 10: the B<sup>3</sup> solution to the BIGA problem!



# Booms, Bins and Bags: the B<sup>3</sup> solution to the BIGA problem!





# Thank you

**PADDLE  
FOR THE  
PLANET**



**Roxy's**  
Scuba School



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