Analysis of the contaminant “**microplastics**” in marine and freshwater ecosystems in the World Heritage Site Cocos Island National Park, Costa Rica

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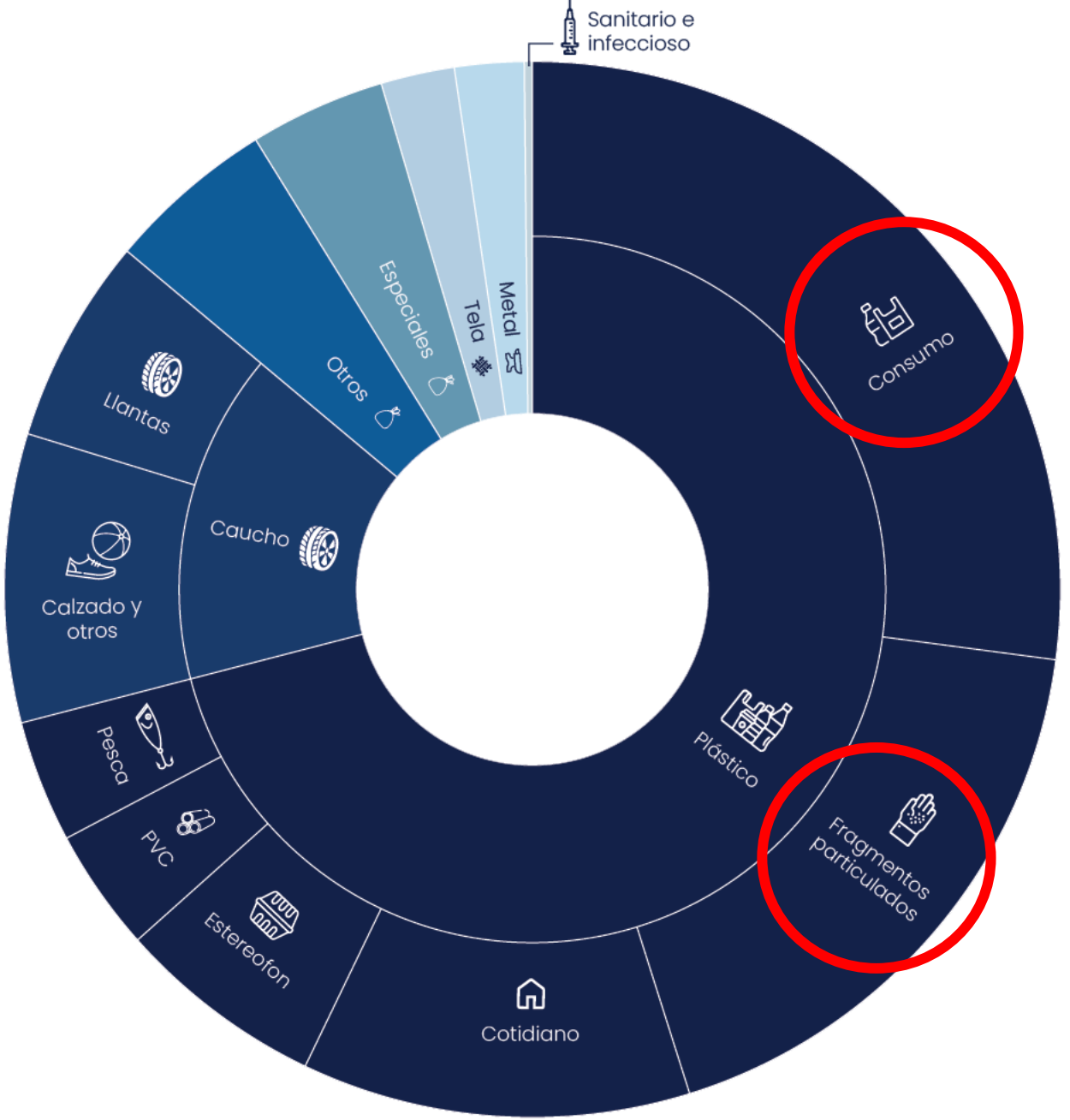
SETAC Latin America 15th Biennial Meeting
Montevideo, 2023

Contents

Composition of marine costal debris in Costa Rica



Graphic by Conservation International in the project Feet in the sand, eyes in the sea, 2022.

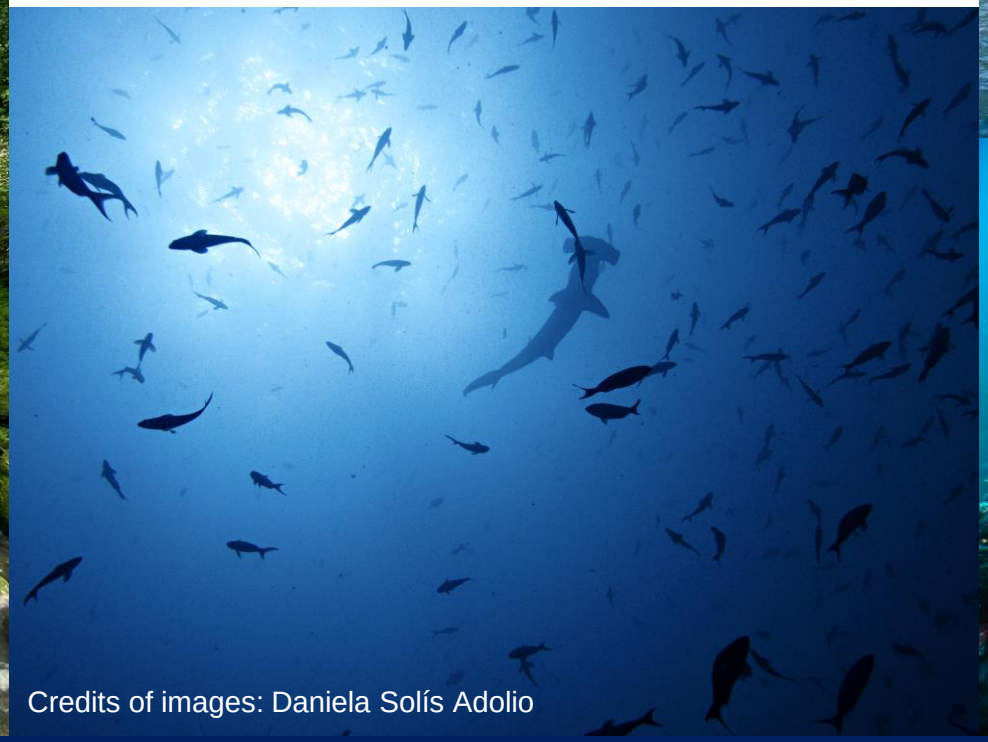
Microplastics

- Impacts on human health (respiratory system, chemical toxicity, endocrine system).
- Impacts on organisms (absorption of chemical pollutants, starvation, alteration in the reproductive cycle).
- Alterations in the ecosystem (plasticene), etc.

Obtained from Loganathan, Y & Jacob K, Moni. (2023).

Coco´s Island National Park:

World Heritage



Credits of images: Daniela Solís Adolio

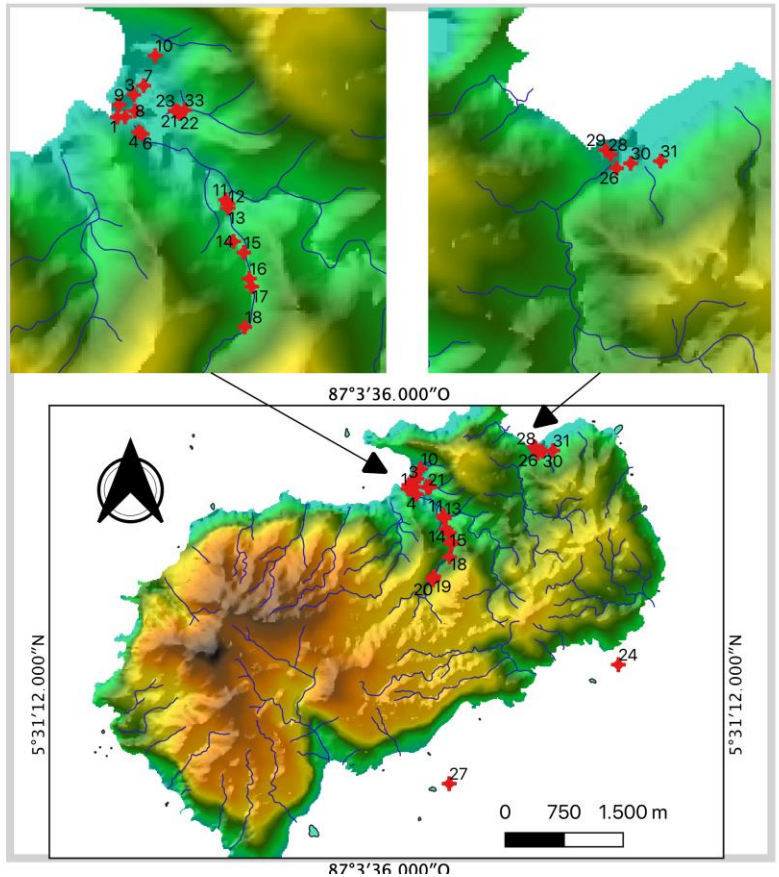
Coco´s Island National Park

- The island is **24 km²** and it is the summit of a seamount on the Coco Volcanic Cordillera that was formed 2 m.y. ago
- Oceanic island with the world's largest extension of tropical rainforest, it also has **abundant fresh water**.
- Hotspot of diversity
- The largest marine protected area in Costa Rica
- The **largest uninhabited island in the world**.

Phase I (2018)

Are MPs in the marine and/or freshwater ecosystems of Cocos Island?

Sediment and organism samples (fish and crustaceans)



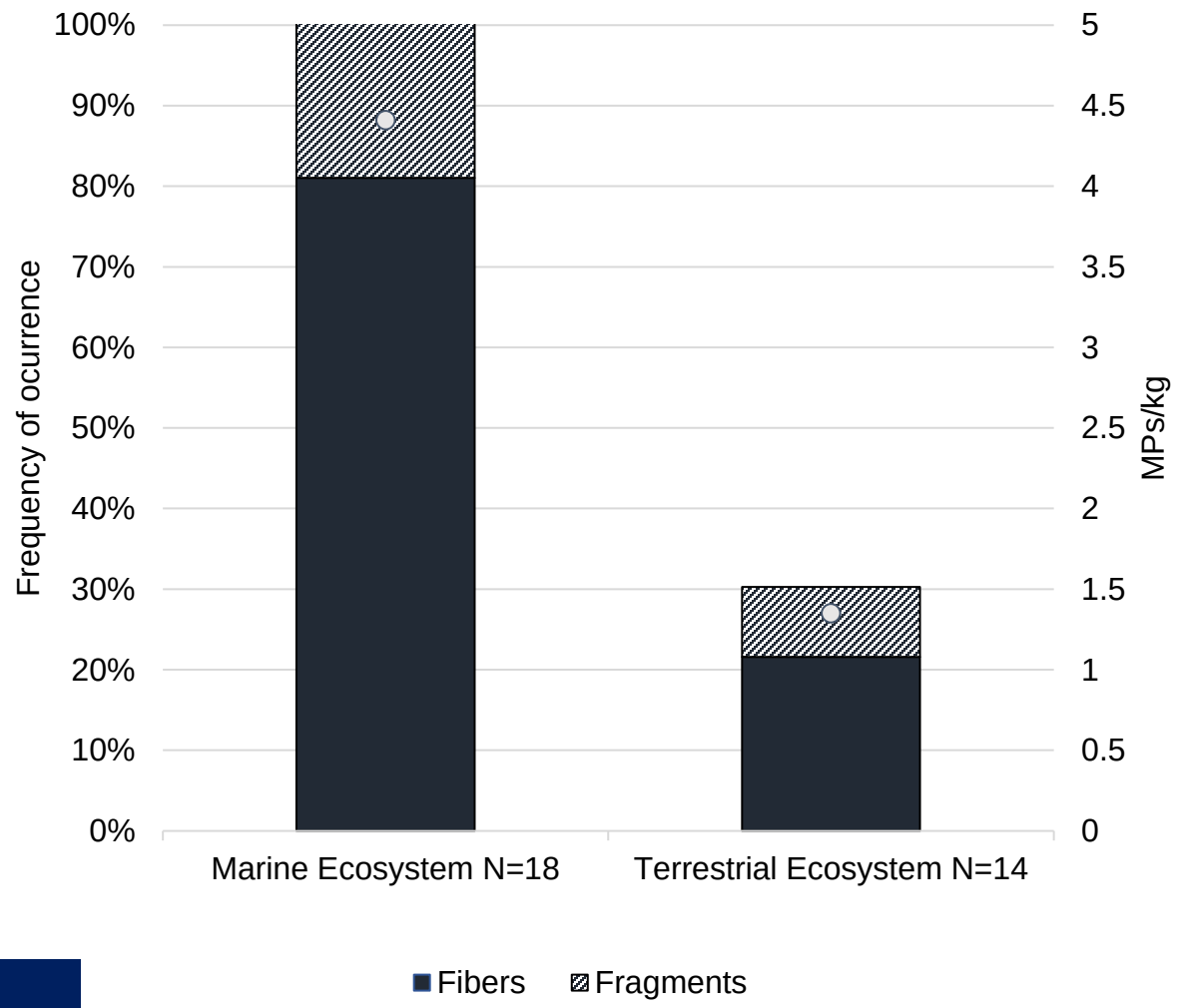
Ubicación de los puntos de muestreos de microplásticos
Proyección WGS84
Fuente:
Datos propios
ITCR2014
Proyecto:
FAICO_LEMACO_UNA
Preparado:
Hannia Vega
Noviembre, 2020

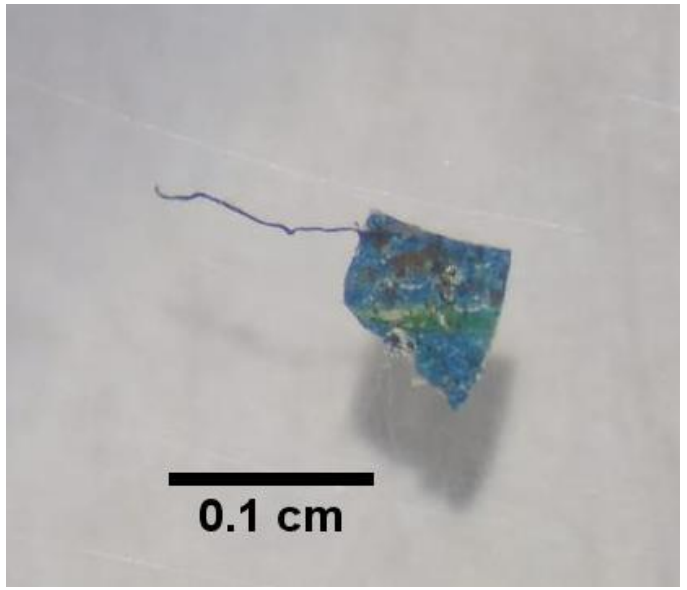
Simbología

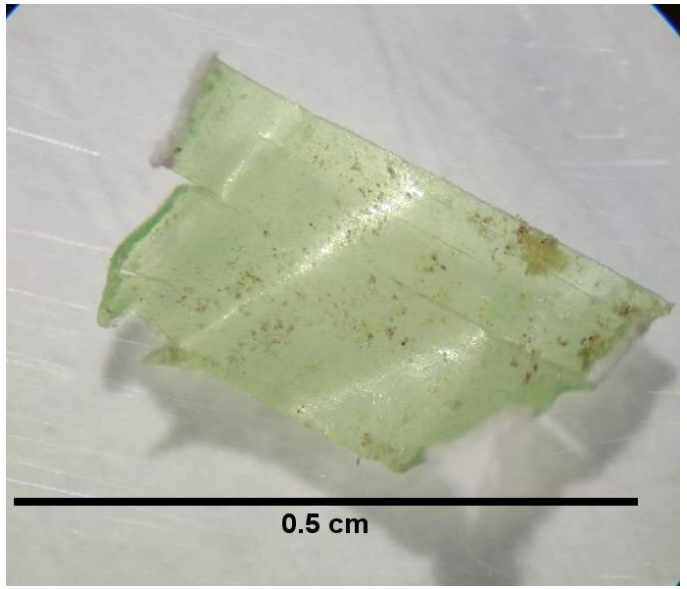
Altitud (m)
0
70
155
240
320
400
490
576

ID	Sitio
1 - 10.	Bahía Wafer
11 - 20.	Río Genio
21 - 23.	Riachuelo
24	Alcyone
25	Manuelita
26	Chatam somero
27	Juan Bautista
28 - 31.	Bahía Chatam
29	Bahía Chatam
32	Río Chatam
33	Agua potable Villa Beatriz

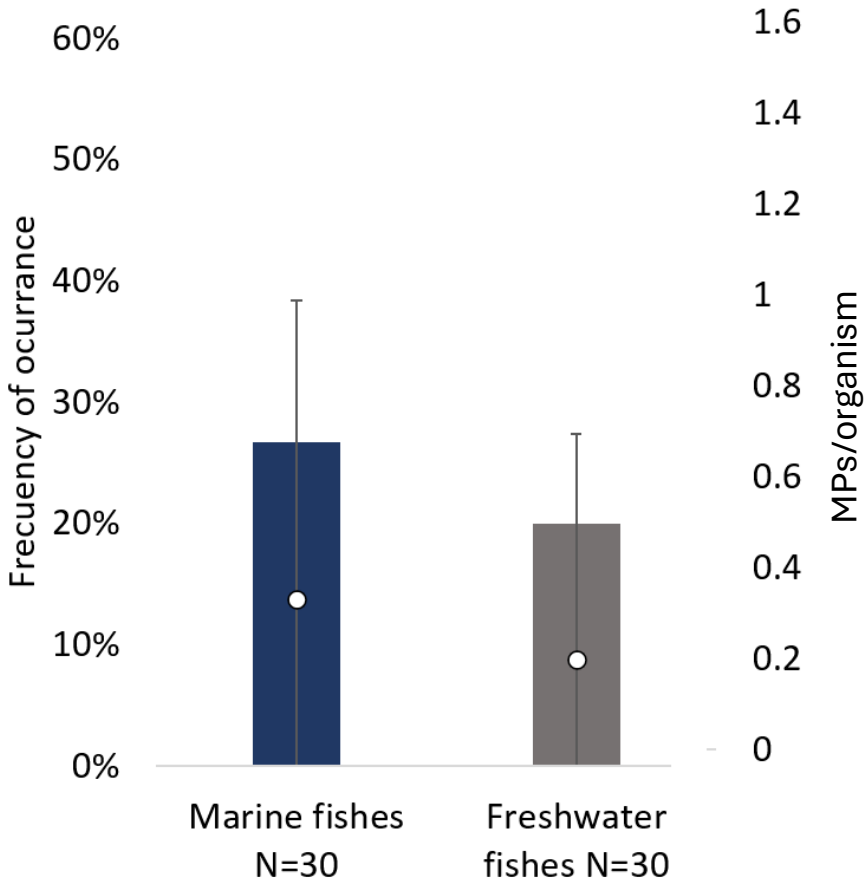
Results: Sediments (2018)



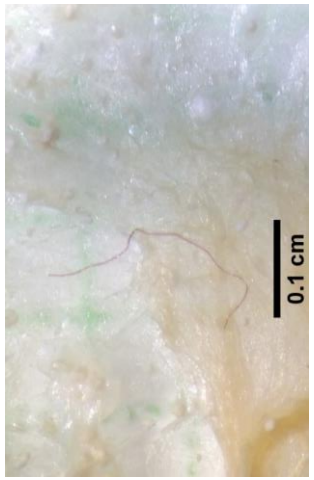




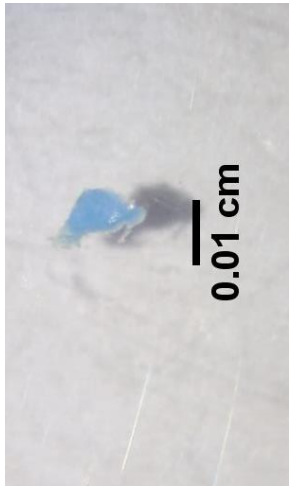
Results: Fishes (2018)



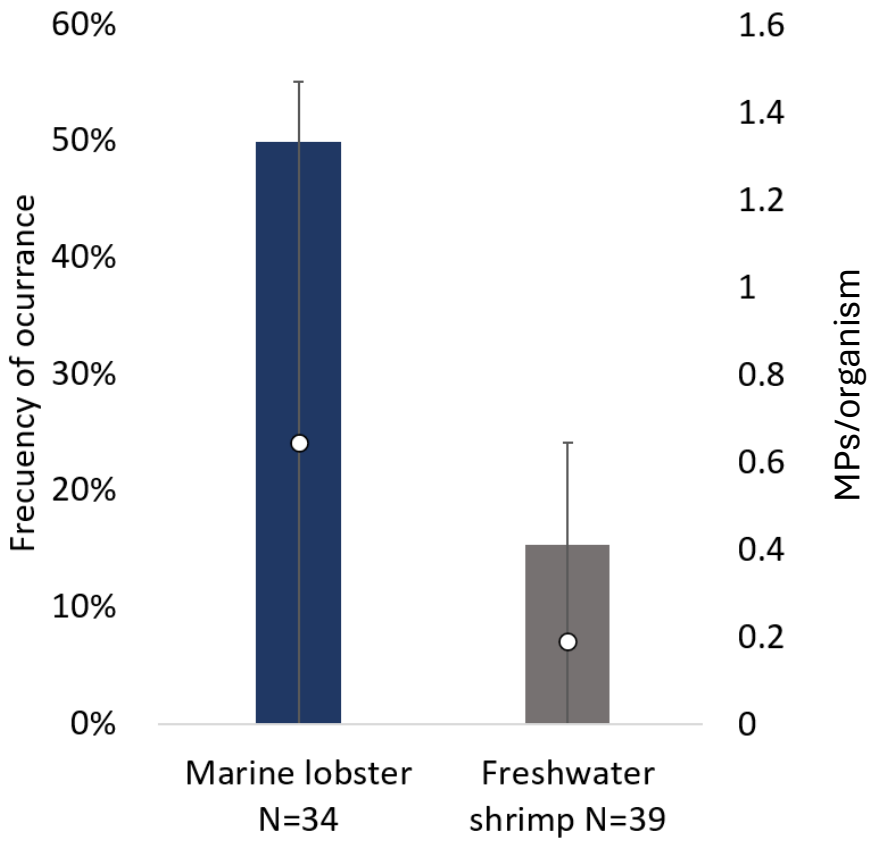
Marine fishes: *Lutjanus jordani*



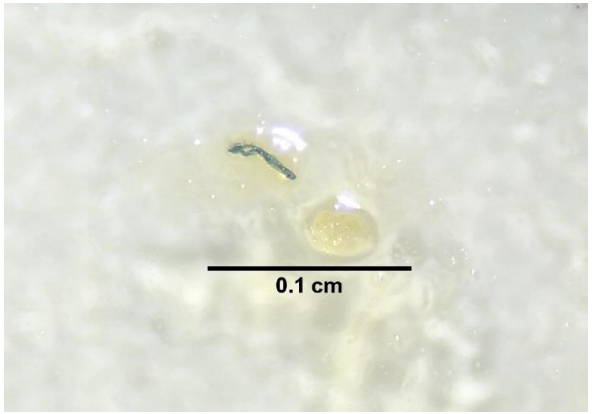
Freshwater fishes: diverse species



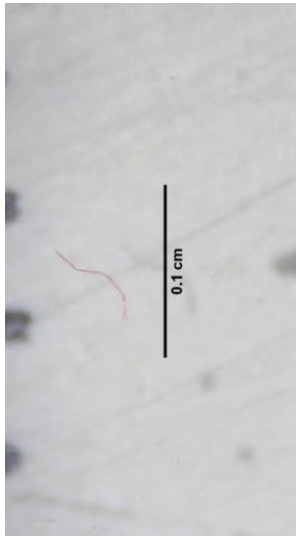
Results: Crustaceans (2018)



Lobsters: *Panulirus gracilis and Panulirus penicillatus*



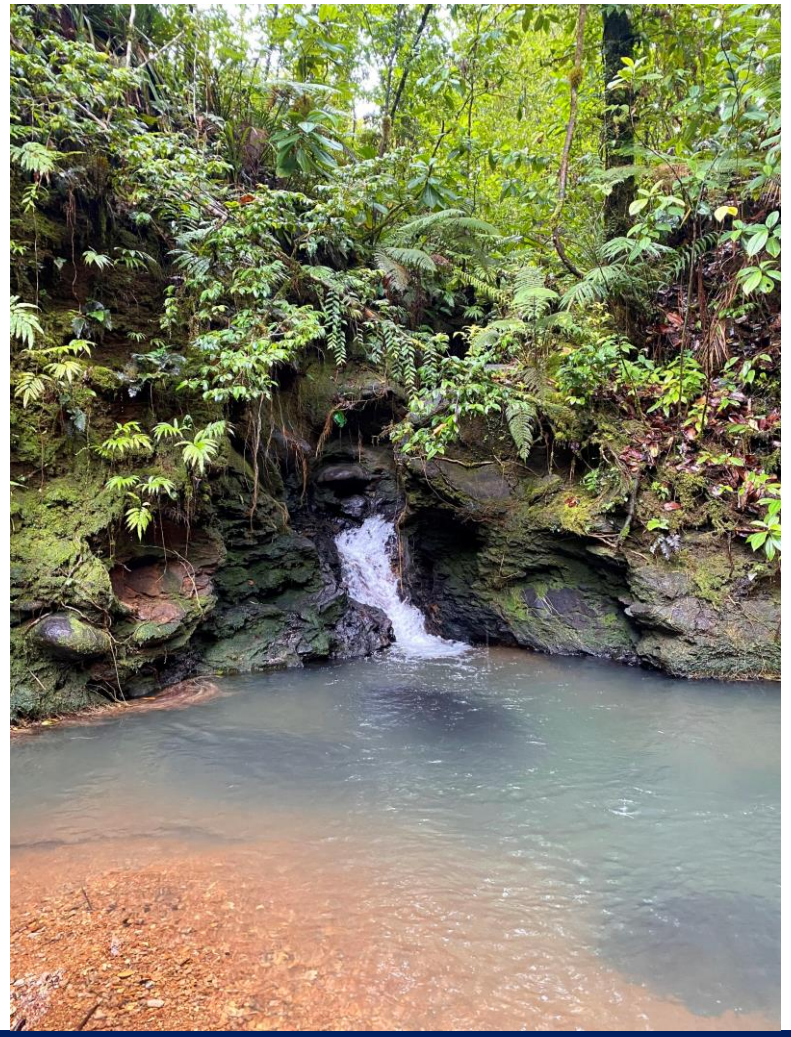
Shrimps: *Macrobrachium sp.*

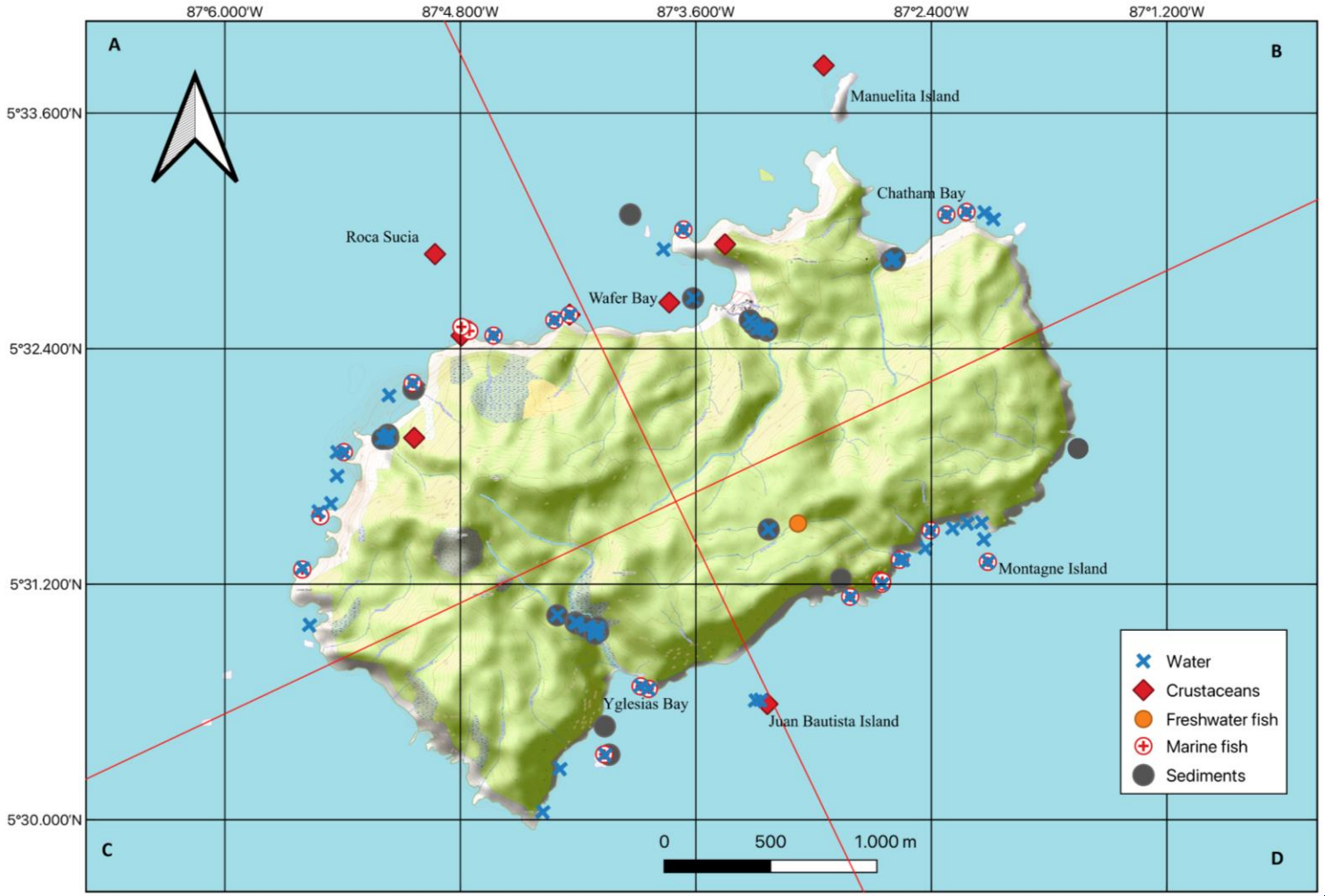


Phase II (2022)

The MP are associated with human activities or is it evenly distributed around the island?

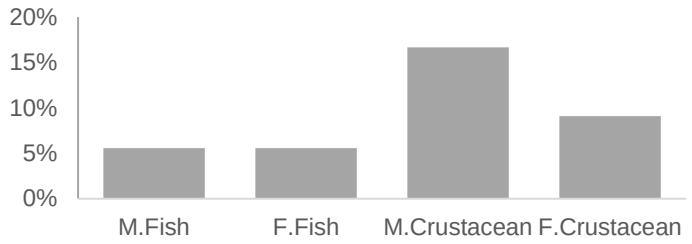
Water, sediment and organism samples (fish and crustaceans)

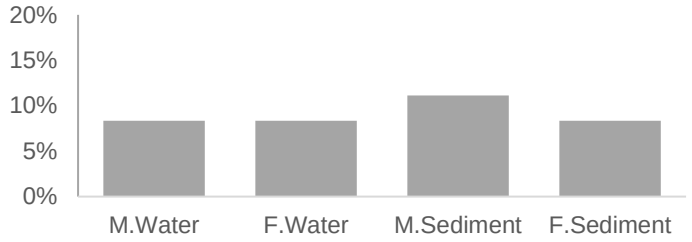




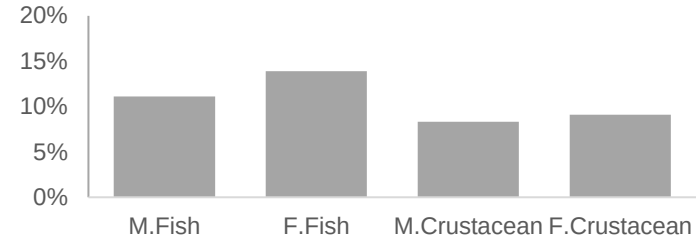
Microplastics in Cocos Island, Costa Rica

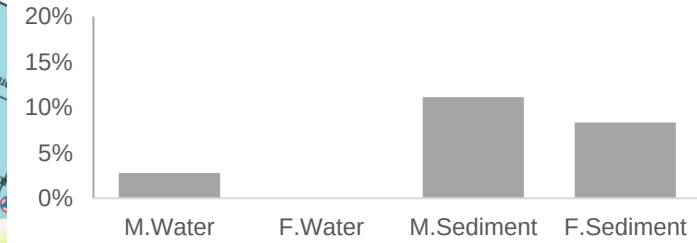
A



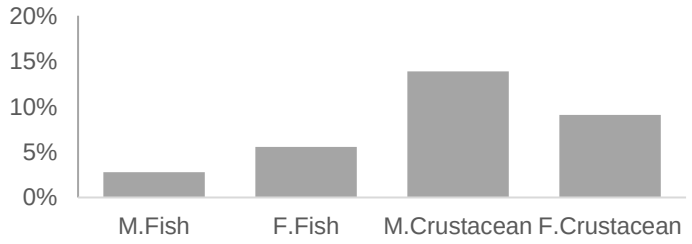


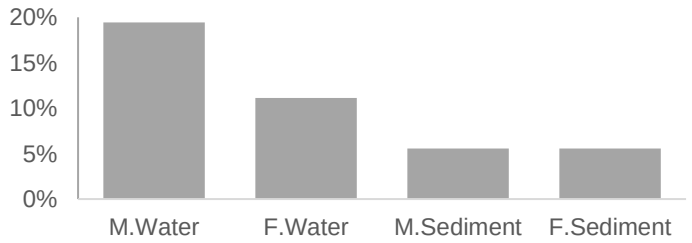
B





C





D

No significant difference between the abundance of MPs per samples between quadrants with Kruskal Wallis (95%)

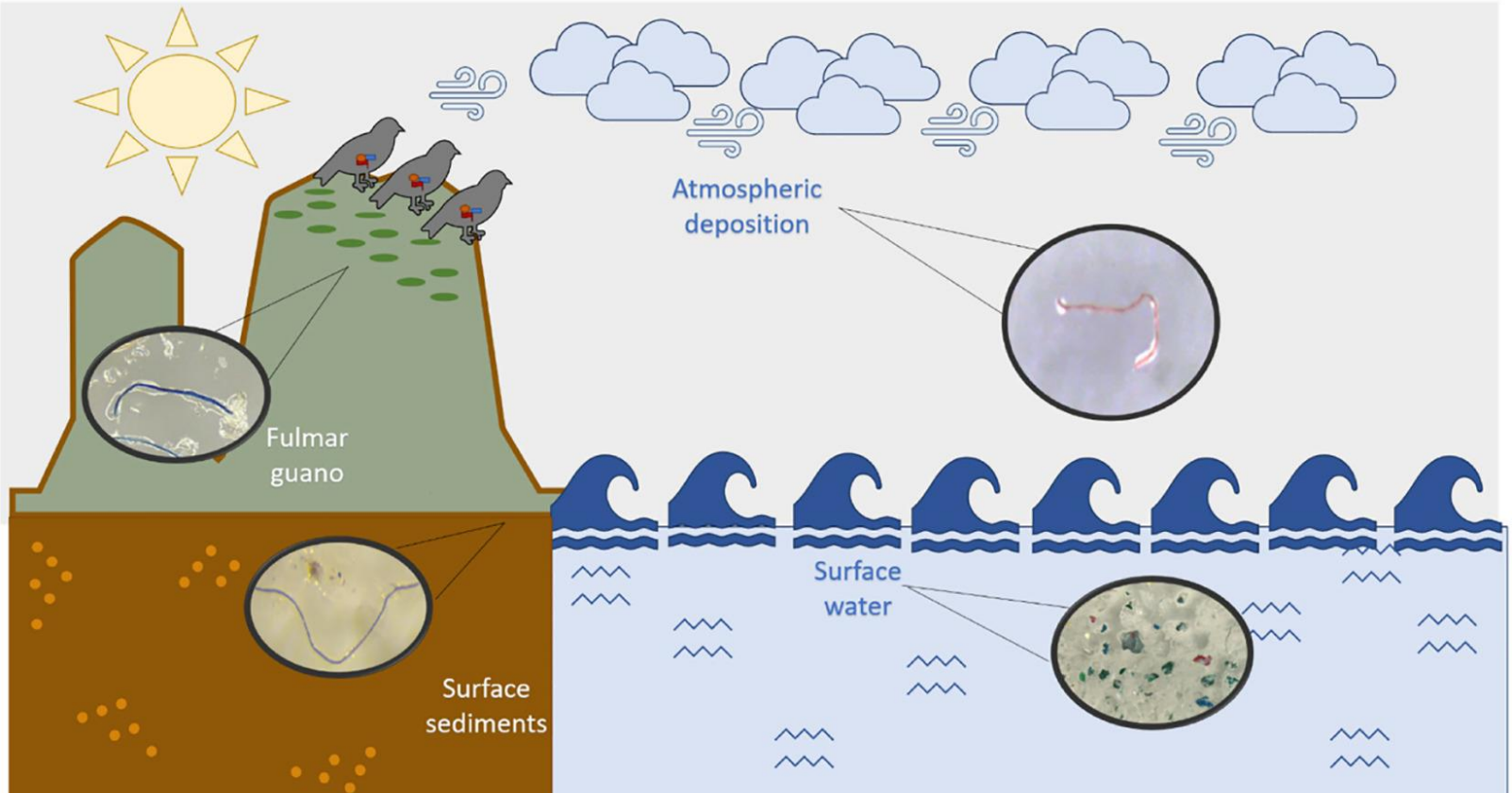

Image obtained in isladelcoco.org

Microplastics in Cocos Island, Costa Rica

Where could they come from?

- Precipitation
- Atmospheric deposition
- Birds as vectors


Credit of image: Daniela Solís Adolio



Phase III: 2023

Possible sources and abundance of MPs associated with natural cycles

Rainy season
June - November
• Precipitation (mL) • Sea surface water and at 10 mtrs depth (L)

Dry season
December – May
• Atmospheric deposition (passive sampling) • Bird droppings • Sea surface water and at 10 mtrs depth (L)

Conclusions


Credits of image: Daniela Solís Adolio

- Oceanic island ecosystems, such as the PNIC, are vulnerable to plastic pollution.
- MPs are a significant threat to the planet.
- The biggest challenge for the project: physicochemical characterization
- National indicator of macroplastics

Thanks

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Credits of image:
Daniela Solís Adolio