



Monitoring marine litter and microplastics in the South Atlantic



•Dr. Andres H. Arias



Professor Universidad
Nacional del Sur, Bahía
Blanca, Argentina

Marine Scientist Instituto
Argentino de
Oceanografía (IADO),
Bahía Blanca, Argentina

aharias@iado-conicet.gov.ar



MICRO PLASTICS



The term was coined on May 7 2004 to describe fragments of plastic measuring as small as a millionth of a metre

2024 international context

- the UN Plastics Treaty moves closer to finalization and ratification
- objectives of the UN Decade of Ocean Science for Sustainable Development, particularly Challenge 01: “To end marine pollution of all kinds, including plastic and nutrient pollution”. The Ocean Decade provides a framework for concerted global action to address the challenges facing our ocean, emphasizing the importance of collaborative efforts and scientific innovation.

the need for ocean monitoring, including bioindicators, becomes increasingly clear.



Richard Thompson first noticed microplastics washed up on the beach in 1993 and his research has focused on them ever since. University of Plymouth



Oceanic monitoring in South America: Scientific Networks

Argentina: SEPIA (Science for Plastic Impacts)
sepia.argentina@gmail.com

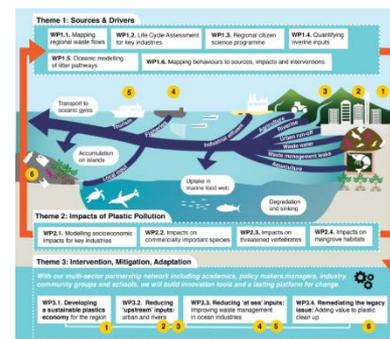


SEPIA
SciEnce for Plastic Impacts Argentina

Chile: SPLACH (Scientific Alliance for Plastic Pollution in Chile)
splachresearch@gmail.com
Webpage: <https://www.splachresearch.com/>



Peru-Ecuador-Colombia: Pacific Plastic Science to Solution
<https://www.pacificplasticsscienceetosolutions.com/es/news/>



Oceanic monitoring in South America

Scientific Networks

America

Argentina: SEPIA (Science for Plastic Impacts)

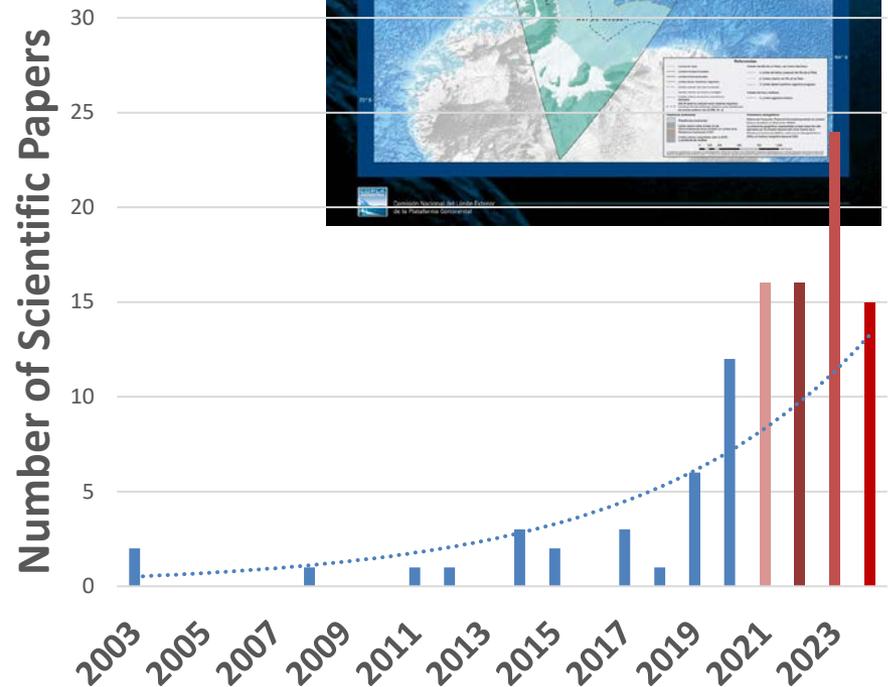
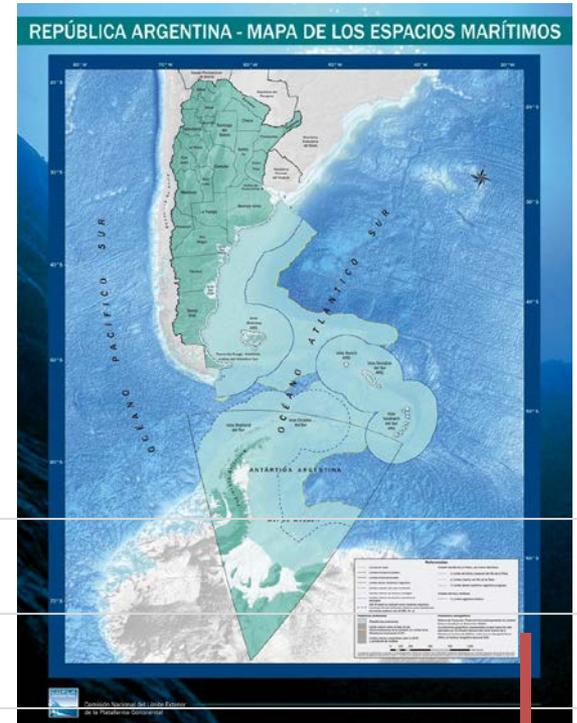
sepia.argentina@gmail.com

Continental area: ~2.8 million km².

Platform area: ~6.5 million km².

Marine coastal system ~6000 km length, to which must be added ~11500 km of coasts of Antarctica Argentina, Malvinas and South Atlantic Islands

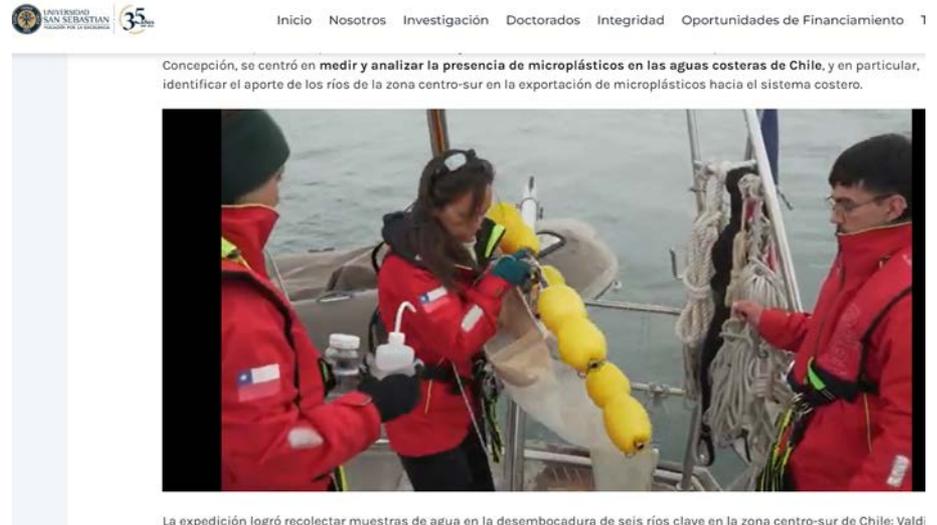
75 papers up to date, with about 25 in coastal and marine environments



Oceanic monitoring in South America

Scientific Networks

Chile: First expedition 2024. Concepcion and Bio Bio Region (marine region)



<https://investigacion.uss.cl/2024/07/01/contaminacion-por-microplasticos-en-las-costas-chilenas-primeros-hallazgos-de-la-expedicion-centinela-i/>

Oceanic monitoring in South America

Scientific Networks

South America multinational network:

REMARCO (Research Network of Marine-Coastal Stressors in Latin America and the Caribbean)

plataforma@remarco.org

Webpage: <https://remarco.org/en/>



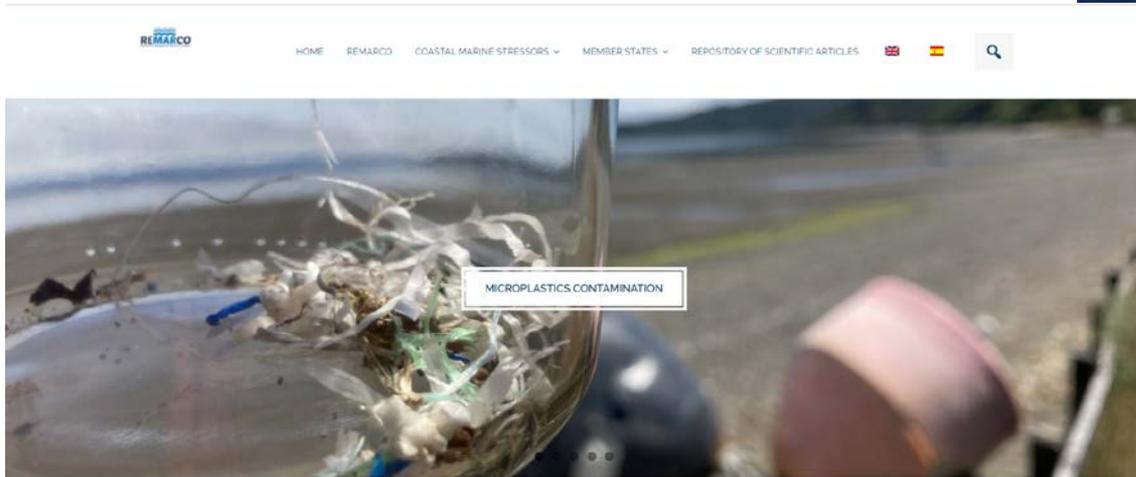
MICROPLÁSTICOS

Instituciones

FLORACIONES ALGALES NOCIVAS



Acceso a Plataforma



.org

Plataforma

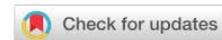
Ocean monitoring programs using bioindicators in South America

- we conduct a horizon scan on the global state of plastic pollution monitoring programs using bioindicators for plastic ingestion. We identify what species are used, the plastic size classes they monitor, and the ecosystem compartments they surveil.



From the journal:
Environmental Science: Advances

Monitoring plastic pollution using bioindicators: A global review and recommendations for marine environments



[Matthew Savoca](#), [Neil A Abreo](#), [Andres H Arias](#), [Laura Baes](#), [Matteo Baini](#), [Elisa Bergami](#), [Susanne Brander](#), [Miquel Canals](#), [C. Anela Choy](#), [Ilaria Corsi](#), [Bavo De Witte](#), [Camila Domit](#), [Sarah Dudas](#), [Emily M Duncan](#), [Claudia E Fernández](#), [Maria Cristina Fossi](#), [Ostin Garcés Ordóñez](#), [Brendan J Godley](#), [Daniel González-Paredes](#), [Victoria González Carman](#), [Bonnie M Hamilton](#), [Britta Denise Hardesty](#), [Sang Hee Hong](#), [Shirel R Kahane-Rapport](#), [Lauren M Kashiwabara](#), [Mariana Baptista Lacerda](#), [Guillermo Luna-Jorquera](#), [Clara Manno](#), [Sarah E Nelms](#), [Cristina Panti](#), [Deigo J Pérez-Venegas](#), [Christopher K Pham](#), [Jennifer Provencher](#), [Sara Purca](#), [Harunur Rashid](#), [Yasmina Rodríguez](#), [Conrad Sparks](#), [Chengjun Sun](#), [Martin Thiel](#), [Catherine Tsangaris](#) and [ROBSON G SANTOS](#)

<https://pubs.rsc.org/en/Content/ArticleLanding/2024/VA/D4VA00174E>

Abstract

Ocean monitoring programs using bioindicators in South America

Bioindicators are vital for assessing the spread and impacts of plastic pollution in the food chain, understanding how ingested plastic affects individuals and populations, and evaluating the effectiveness of legislative measures in addressing these impacts.

- **These monitoring programs and research groups could provide the foundations for a future, country-wide plastic monitoring plan while taking advantage of preexisting field logistics. **Shared protocols would be needed, and additional base level funds furnished.****

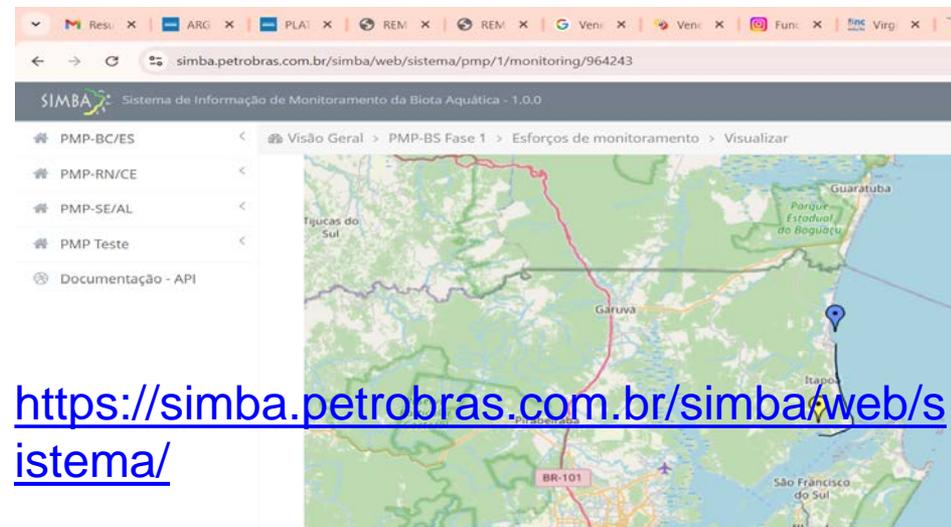


South Atlantic

bioindicators

In Brazil

- **Beach Monitoring Program (PMP)** of stranded megafauna (seabirds, sea turtles, and marine mammals) was established in 2009, expanding to reach more than 3,000 km of coastline in 2015. In connection with PMP, the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) has required all necropsied individuals analyzed through that program to be assessed for plastic ingestion.
- Although the expansion of PMP makes it highly interesting as a potential building block for a future regional plastic ingestion monitoring program, the PMP has some limitations due to data architecture (see Stefanis et al. 2024 for details) and the lack of a formal standardized protocol for data collection regarding plastic interactions.



<https://simba.petrobras.com.br/simba/web/sistema/>

In Uruguay: the non-governmental organization (NGO) Karumbé has been monitoring plastic ingestion by green turtles (*Chelonia mydas*) since 2005^{55,56}. The organization systematically monitors an average of 120 turtles annually, including both dead and live animals, using established procedures and standard methodologies to assess incidence levels, as well as the characterization and quantification of ingested plastics > 1 mm^{55,56}.

<https://www.karumbe.org/#/>



Las líneas de pesca de nylon se transforman en trampas mortales
Cientos de tortugas mueren o pierden las aletas

Acciones para ayudar a las tortugas

- Si te quedo la línea totalmente enganchada, córtala lo mas cerca del anzuelo
- No dejes líneas abandonadas, llévatelas contigo
- Si enganchas una tortuga corta la punta del anzuelo y sácalo
- Si la tortuga se trago el anzuelo no intentes sacarlo porque se va a desgarrar el estómago. Comunícate con nosotros porque precisa rehabilitación

 Karumbé: 099917811
098614201


www.karumbe.org

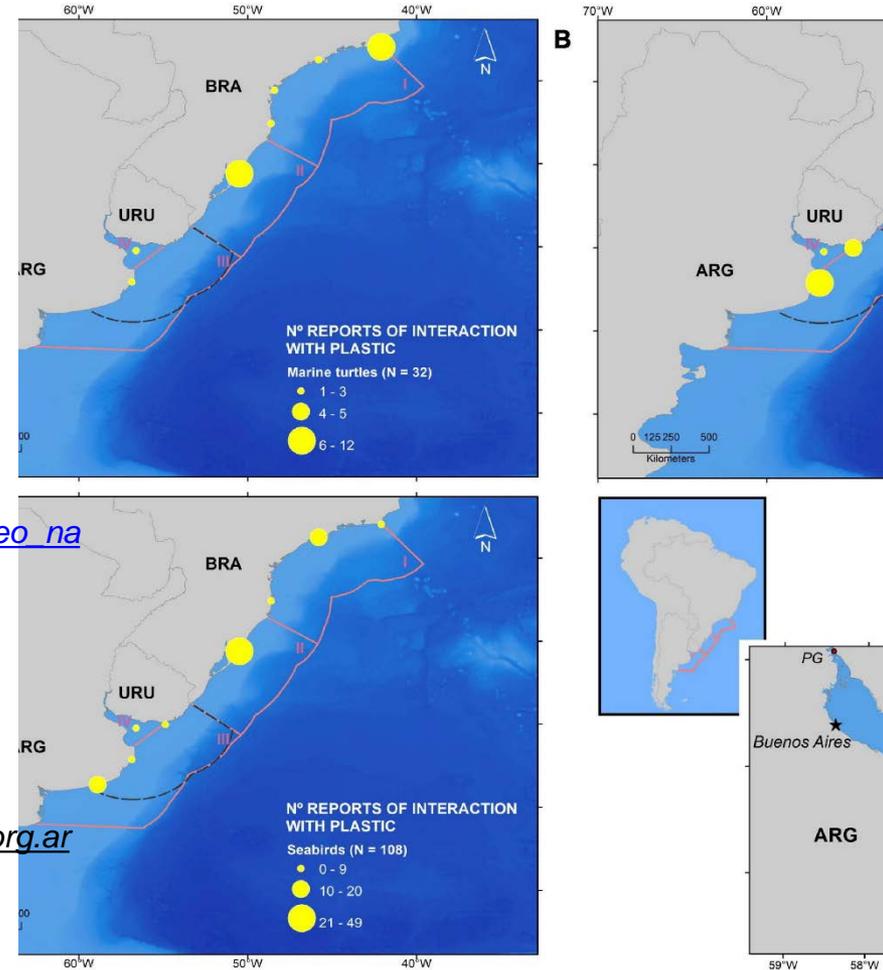
South Atlantic

bioindicators

In Argentina, at least five monitoring programs are led by local NGOs or government agencies, most of which began in the last decade. They focus on the occurrence of either micro, meso- or macroplastic on shorelines and in the neritic marine environment, and their primary goal is to establish a baseline and identify trends.

- *Instituto de Conservación de Ballenas (ICB)*. https://www.argentina.gob.ar/sites/default/files/monitoreo_nacional_de_microplasticos_costeros.pdf
- *Club de Ciencias de la ciudad de Puerto Madryn*
- *Global Penguin Society*. <https://www.globalpenguinsociety.org/>
- *Fundación vida silvestre* <https://www.vidasilvestre.org.ar>
- *Mundo Marino* <https://www.mundomarino.com.ar/>
- *Proyecto SUB* <https://www.proyectosub.org.ar/>

V. González Carman, P. Denuncio, M. Vassallo, M. P. Berón, K. C. Álvarez and S. Rodríguez-Heredia, *Front. Mar. Sci.*, , DOI:10.3389/fmars.2021.699100.



Distribution of reports on the interaction of charismatic species of **(A)** marine turtles, **(B)** mammals, and **(C)** seabirds with plastics in the Warm Temperate Southwest Atlantic.

Suggested criteria for ocean monitoring

- In addition to counts, **studies should ideally report shapes** (i.e., morphology), **sizes including minimum detection limit, polymer types, and mass**; however, estimating mass for items smaller than mesoplastics may be impracticable, and particle counts may be used instead
- If polymer type or shape are important management questions, then monitoring programs need to be designed to capture these metrics (e.g., polymer types are being considered within the UN plastics treaty framework)
- To identify trends and assign risk, monitoring studies need to report ingestion data beyond the frequency of occurrence (e.g., selectivity, rate of ingestion, egestion, effects on organism health) whenever possible.

Suggested criteria for ocean monitoring

- **Where resources are limited, even monitoring once every several years can yield important findings. Ecologically and economically, monitoring coastal and epipelagic areas is easier comparatively to more inaccessible systems such as the oceanic, meso- and bathypelagic zones.**
- **Harder-to-monitor ecosystems or those predicted to be at high risk should be prioritized for baseline assessments, whereas it is likely that only systems (and species) that are relatively easy to sample —either because of accessibility, abundance, or both—are candidates for long-term monitoring.**



• **Dr. Andres H. Arias**
aharias@iado-conicet.gov.ar
+5492916487315