

MICROPLASTICS

From Knowledge to Action through Transdisciplinarity

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@ Marine Sciences For Society



HM Government



Workshop: Marine plastics: a review of impacts and solutions. May 18th 2017

Why transdisciplinarity?

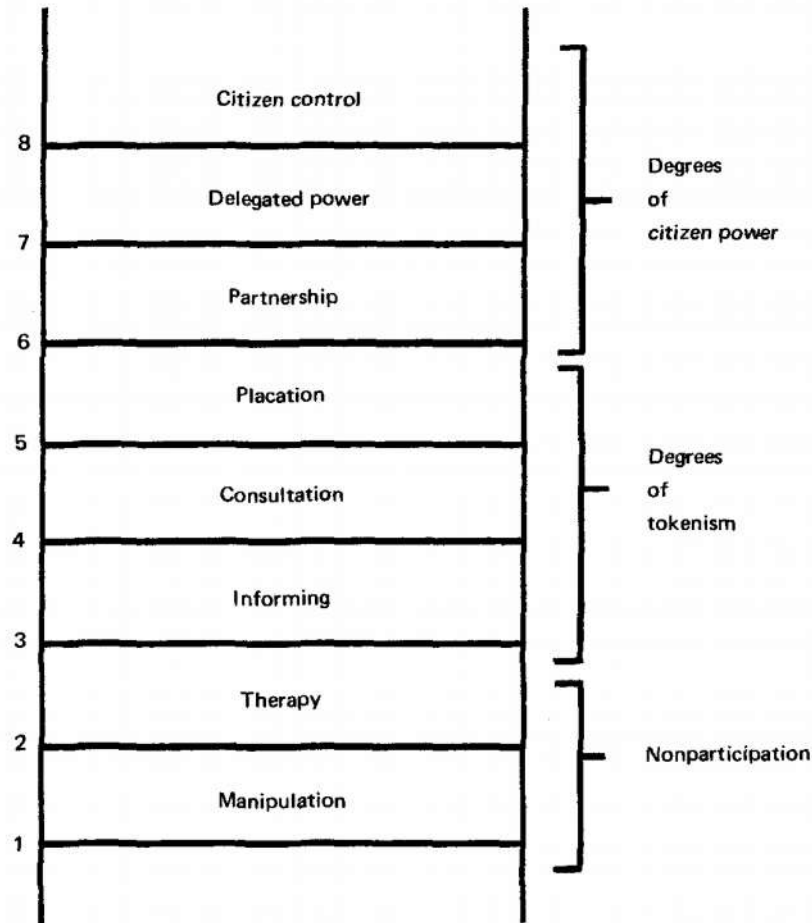


FIGURE 2 *Eight Rungs on a Ladder of Citizen Participation*

Arnstein, 1969
Ladder of Participation

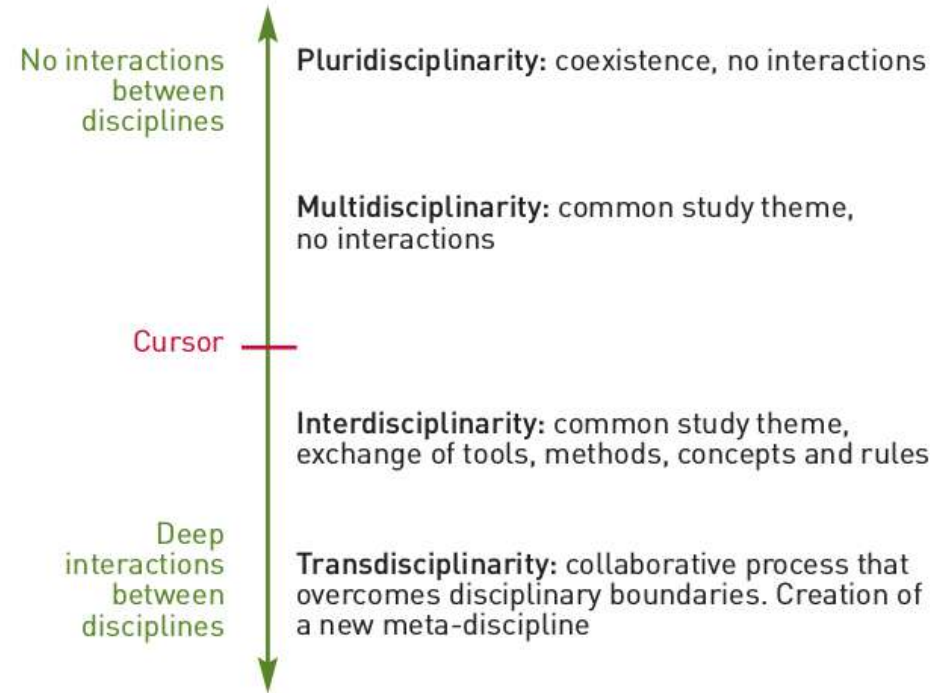


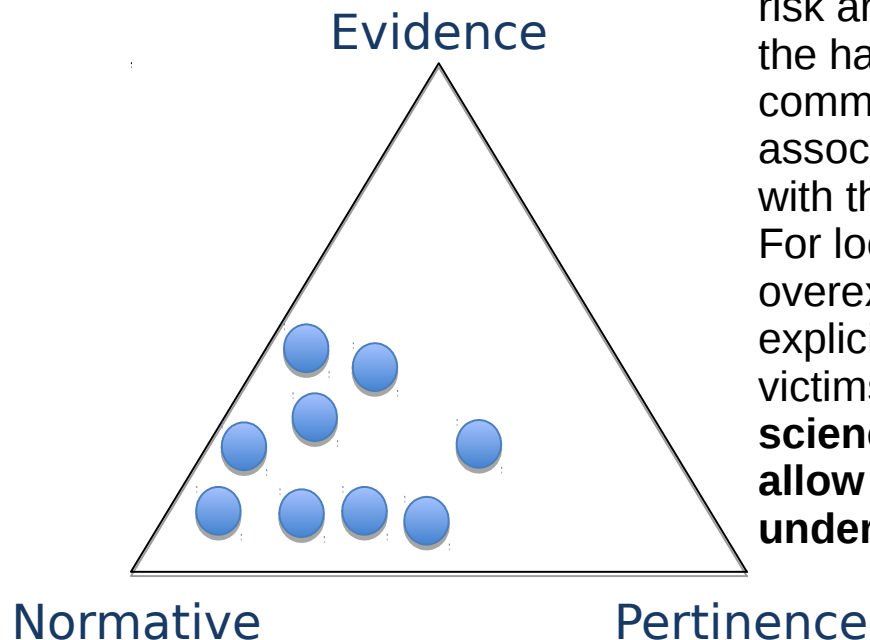
Figure 1. Four levels of cross-disciplinary interaction. The interactions between disciplines can be classified according to four points on a scale, along which researchers have to explicitly place their cursor. Source: Inspired by Klein (1996) and Jakobsen (2004)

Blanchard 2010
Dissipating the fuzziness around interdisciplinarity: the case of climate change research

Transdisciplinarity to encourage citizen participation and empowerment

Transdisciplinarity for the pleasure of seeing the world as one

- Attitudes/Actions be the results of a balance between three dimensions
 - Material constraints
 - Moral constraints (Values)
 - Understanding of the way the world functions
- These constraints will appear under the guise of
 - Pertinence claims
 - Normative claims
 - Evidence claims



"The knowledge used to frame risk belongs to the world of individual and collective experience; **values and norms occupy most of the cognitive space when framing risk**. There is very little consideration of science-based knowledge.

It appears first and foremost that stakeholders' perceptions of risk are driven by considerations that have very little to do with the hazards and associated probabilities outlined by the scientific community. For local stakeholders, risk management is mostly associated with the ability to make decisions that are compatible with the core values of the affected communities.

For local communities, if a solution is to be found for overexposure to risk, it lies in better risk governance rooted in an explicit taking into account of the values expressed by potential victims. In more general terms, it is of critical importance that **science production takes place through processes that allow for continual interactions with those at risk and an understanding of their values.**" (Vanderlinden et al., 2017)

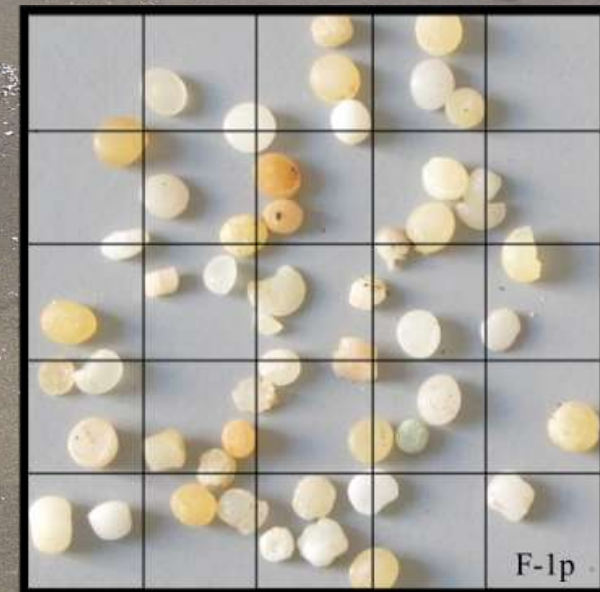
How transdisciplinarity? the MICRO network

This story began in 2008: Lanzarote, Famara beach



50cm

F-1All



F-1p

5cm

zoom 10

What can we do to truly solve the problem?



Contents lists available at [ScienceDirect](#)

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul



Baseline

Protected areas in the Atlantic facing the hazards of micro-plastic pollution: First diagnosis of three islands in the Canary Current



Are papers enough to solve the problem? definitely not...

What can we do to truly solve the problem?

Share efforts;

Establish common methodologies;

Move from “research team-centered” approaches to “community-centered” approaches;

Work WITH and FOR communities;

...collaborate, collaborate and collaborate.

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Abandoned plastic: risks and consequences



More than a third of "accidental" deaths in sea turtles are due to ingesting plastic. Beyond this, many others become fatally enmeshed in netting or plastic sheets.



Birds of all kinds become trapped in nets, bundles, and other plastic snares. Ingesting plastic is also lethal for birds, and for all animals.

Cetaceans and other marine mammals are victims of our dependence on plastic. When these magnificent creatures confuse plastic with food, they are unable to digest it, so it accumulates inside them and kills them by blocking their digestive system.

Oceans have absorbed the waste of humanity for centuries. Currently, plastics make up more than 60% of the debris that accumulates on beaches and coastlines.



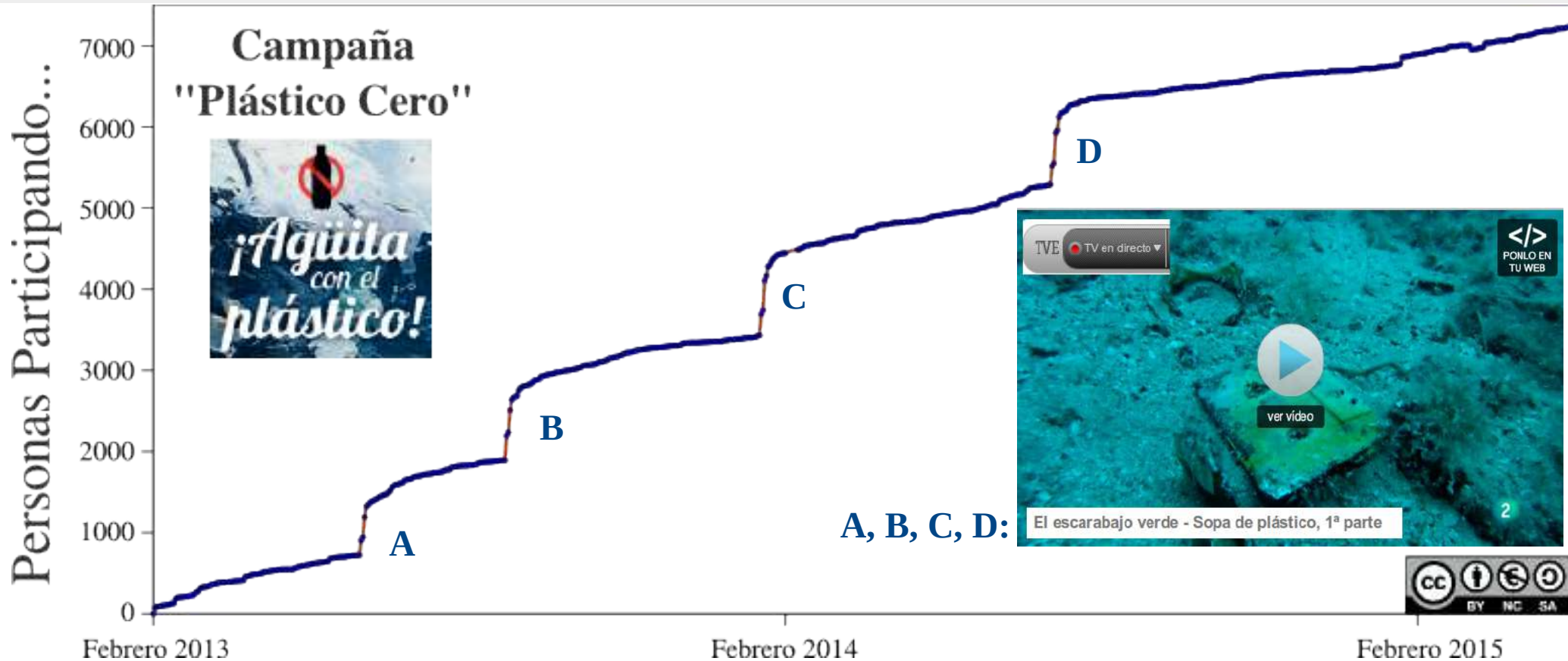
Origin, types, uses and toxicity

In 1869, Wesley Hyatt created the first plastic: celluloid. Now there are more than twenty basic categories of polymers and over 17,000 different varieties of plastic, which makes recycling them difficult. Approximately 4% of all consumed oil and gas becomes the primary material for creating plastics and another 4% is used to generate the energy needed for plastic production.

Resin codes	1	2	3	4	5	6	7
	PETE PET	HDPE PEAD	PVC V	LDPE PEBD	PP	PS	OTROS
	Polyethylene Terephthalate	High density polyethylene	Polyvinyl chloride	Low density polyethylene	Polypropylene	Polystyrene	Others
Everyday Items							
Useful life	1 hour	1 hour	15 hours	1 hours	30 minutes	10 minutes	1 week
Degradation	10 years	100 years	100 years	500 years	1000 years	50 years	50-100 years
Toxicity	A study published by Saido Katsuhiko's team in 2009 shows that plastics like polystyrene [PS] start to break down at 30°C, producing highly toxic monomers. Plastic is not an inert material; components such as Bisphenol A [BPA] cause			hormonal disruption associated with breast cancer [López-Carrillo et al., 2010], and phthalates can disrupt the hormonal development in babies [Swan et al., 2009].			



In 1950, approximately 3,000,000 metric tonnes of plastic was produced. By 2012, annual production rose to over 280,000,000 metric tonnes. This is the situation today...



DIARIOSLANZAROTE.COM 24 DE MAYO DE 2013

REPORTAJE

La Isla: Porción de tierra rodeada de plástico por todas sus partes

SAUL GARCÍA

Juan Baztan es oceanógrafo y coordinador de 'Marine Sciences For Society', que a su vez es una red internacional de investigadores y centros de investigación de todo el mundo que colaboran para que se abra paso el conocimiento y para mejorar el diálogo entre las disciplinas de las ciencias del mar y el conjunto de la sociedad. Hace cuatro años comenzó un pequeño lento de estabilización en Lanzarote y La Graciosa "al servicio de un territorio y su gente". Según él, lo más importante de que poco a poco se trabaje en equipo y la colaboración entre los agentes locales y los investigadores, así que se diseñó una lista de aspectos que abordará entre una decena de actores del territorio. La última eran los residuos, pero es en la que se ha acabado centrando, y más concretamente en el plástico.

"El plástico es un problema muy complejo que supera al individuo —dice Baztan—, y puede resolver la situación glo-

bal del planeta". Hace unos años el plástico no estaba en nuestras vidas y ahora parece imprescindible, pero tiene consecuencias muy graves. Para empezar es muy difícil deshacerse de él, siempre vuelve. Los plásticos son fríasntesibles, se degradan con los rayos UV y se descomponen en pequeños trozos. Esos trozos no solo liberan agentes tóxicos, sino que, como rechazan el agua, crean una película de aire que atrapa otros tóxicos (metales pesados, etc.). Resucitando mucho, no sólo ensucian el mar sino que también llegan al estómago de las peces y se incorporan a la cadena trófica.

Dice Baztan que los límites del planeta "los hemos transgredido hace tiempo" y el plástico está fuera de esos límites. "Hay una conexión entre los elementos, los actos tienen consecuencias y lo que echas aquí llega a Fuerteventura o al no al Sahara, o a Cabo Verde, o vuelve dentro en tiempo", asegura. De igual manera, se ha comprobado que a las costas canarias llegan residuos de plástico, grandes y pequeños,

desde Brasil, Cuba, Florida... El mar se está convirtiendo en el gran vertedero del planeta. Así que esta investigación es, hiciera una pregunta: ¿y en el océano cuánto plástico hay? Pues hay una referencia, la "Havada" "isla de plástico" o "Sopa de plástico" del Océano Pacífico, de la que dice Baztan que es un problema que se ha tratado mal, y cuyos análisis arrojan datos que van desde los cinco gramos de plástico por kilómetro cuadrado hasta los mil. El caso es que enero de este año, acompañado de otro investigador, Baztan decidió hacer un muestreo en esta costa y recorrieron a pie Lanzarote, Fuerteventura y La Graciosa. Analizaron cuatro decenas de 50 centímetros por 50 centímetros de la línea de marea (no de la marea más alta) en 225 playas, para comprobar los plásticos depositados y obtener una primera aproximación para enseñar cuánto plástico se queda en la mar. Antes de obtener los resultados ya se dieron cuenta de que algunas playas que

estaban muy lejos de núcleos urbanos "estaban hechas una pena", pero cuando los analizaron vieron que en basseras playas, al menos más de diez, hay concentraciones de más de 100 gramos por cada cuadrado. La, lo que multiplica los resultados de la "Sopa de Plástico". "Empresarios a representar los datos y dijimos: ¡Madre mía!", dice Baztan.

Agüita con el plástico Timeline Recent Admin Panel

Campana CERO PLÁSTICOS de Lanzarote Reserva de la Biosfera

¡Águila con el plástico!

Agüita con el plástico

3,349 likes · 144 talking about this

Update Page Info Liked

Community

Campana "Plástico Cero". Lanzarote Reserva de la Biosfera

Photos Likes







COASTAL ZONES

SOLUTIONS FOR THE 21ST CENTURY

Paperback, 356 Pages; Published: June 2015
Imprint: Elsevier ISBN: 978-0-12-802748-6



Chapter 11

Protected Shores Contaminated with Plastic: From Knowledge to Action

Juan Baztan^{1,2}, Bethany Jorgensen^{3,2}, Jean-Paul Vanderlinden^{1,2},
Sabine Pahl⁴, Richard Thompson⁴, Ana Carrasco⁵, Aquilino Miguez⁵,
Thierry Huck^{6,2}, Joaquim Garrabou⁷, Elisabetta Broglio^{7,2},
Omer Chouinard^{8,2}, Céline Surette^{8,2}, Philippe Soudant⁹, Arnaud
Huvet¹⁰, François Galgani¹¹, Ika Paul-Pont⁹

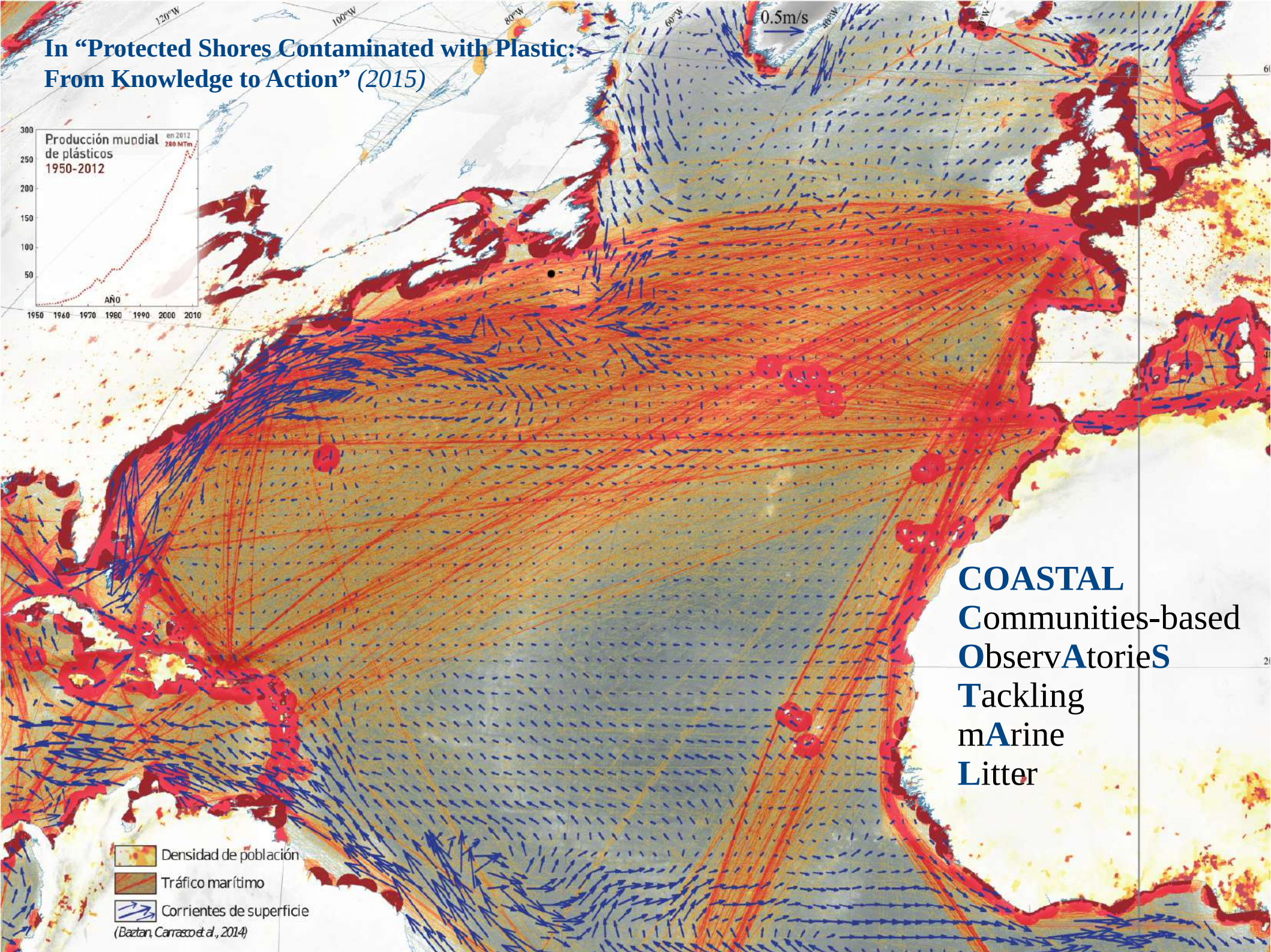
¹Université de Versailles Saint-Quentin-en-Yvelines, Guyancourt, France; ²Marine Sciences for Society, www.marine-sciences-for-society.org; ³The University of Maine, Orono, ME, USA; ⁴Plymouth University, Drake Circus, Plymouth, UK; ⁵Observatorio Reserva de Biosfera, Cabildo de Lanzarote, Arrecife, Spain; ⁶UBO-CNRS-LPO, UFR Sciences F308, Brest, France; ⁷Institut de Ciències del Mar, CSIC, Barcelona, Spain; ⁸Université de Moncton, Moncton, NB, Canada; ⁹IUEM, CNRS/UBO, Laboratoire des Sciences de l'Environnement Marin, Plouzané, France; ¹⁰IFREMER, Centre de Brest, Laboratoire Physiologie des Invertébrés, Plouzané, France; ¹¹IFREMER, Centre de Corse, Laboratoire Environnement Ressources PAC/Corse Imm Agostini, ZI Furiani, Bastia, France

Foreword

“Overall, the book provides innovative approaches by which coastal communities around the world may address their coastal zone management issues through inclusive governance that is inspired by multidisciplinary science and active, meaningful intersectoral stakeholder Engagement.”

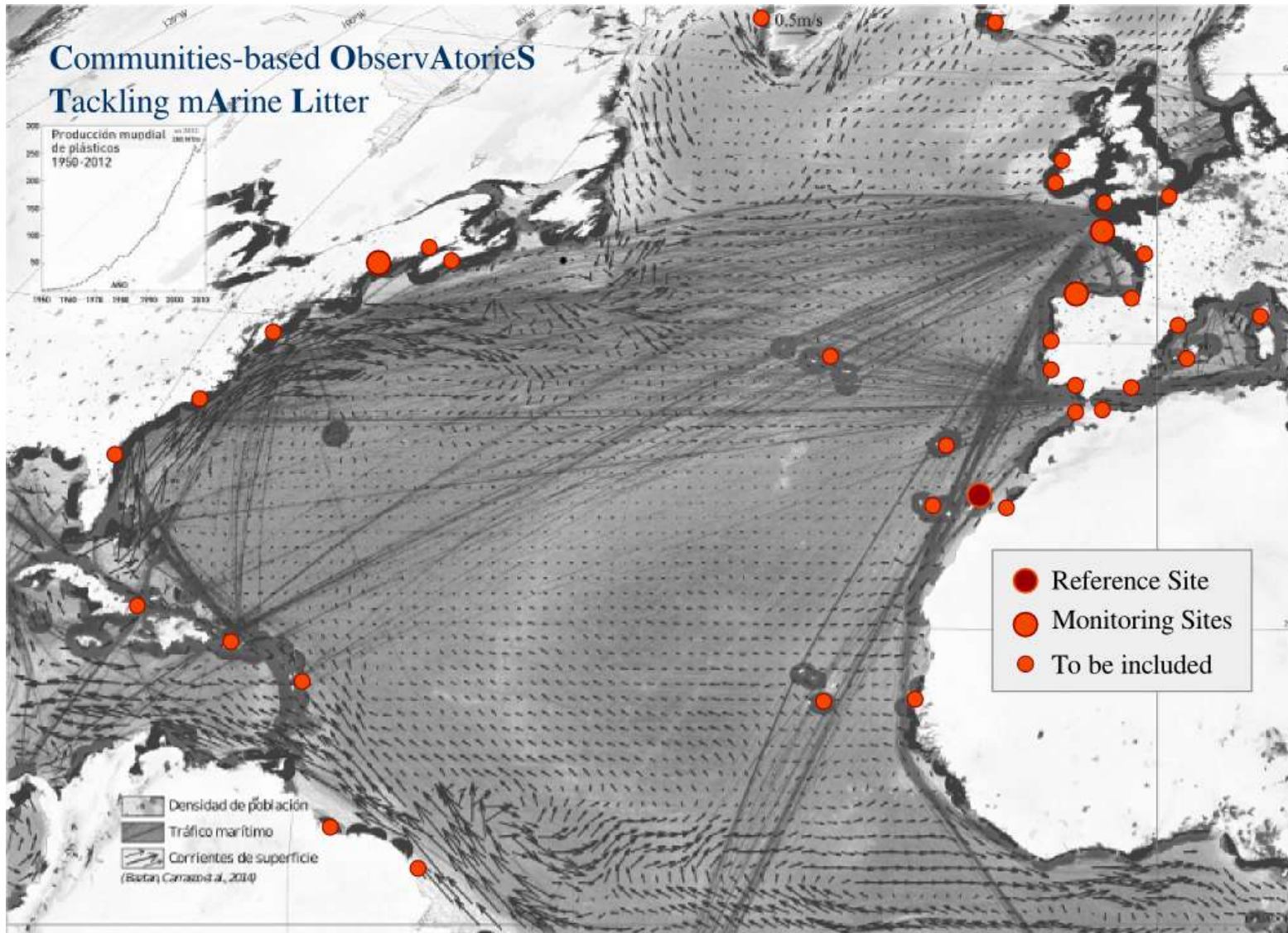
Wendy Watson-Wright, PhD

In "Protected Shores Contaminated with Plastic: From Knowledge to Action" (2015)



COASTAL
Communities-based
Observatories
Tackling
marine
Litter

- Densidad de población
 - Tráfico marítimo
 - Corrientes de superficie
- (Bazan, Carrasco et al., 2014)



The observations are available on the CSIC citizen science platform, Seawatchers:

* **Spanish** version:

<http://www.seawatchers.org/projecte-8.php?idioma=es>

* **English** version:

<http://www.seawatchers.org/projecte-8.php?idioma=en>

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After years of common efforts and learning, in August 2015 coastal communities began sampling along vulnerable and/or protected areas in the Atlantic-Mediterranean system.

The reference site is the Biosphere Reserve of Lanzarote, Famara beach*, where the present initiative began in 2008.

The first four monitoring sites are:

Famara (Lanzarote, Spain)*

Lóngara (Lugo, Spain)

Lostmarc'h (Bretagne, France)

Popham (Maine, USA)

Additional areas will begin participating in 2017, and they include members of the Biosphere Reserve network and other vulnerable areas interested in joining this effort.

The objective is to work with affected communities to collaboratively build understanding around questions like:

Where does this pollution come from?

What routes does it travel to get here?

How can we solve the plastic pollution problem?

The work is based on the implementation of a network of participative observatories created through collaboration between affected communities, involved researchers and governing administrations.

seawatchers



PHOTO	DATE	GARBAGE	OBSERVER	SEE
	21/March/2015 (16:00)	Micro Plàstic	Pablo Ruiz	See
	17/March/2015 (10:00)	Macro Plàstic	Agüita con el Plástico	See
	25/February/2015 (11:00)	Micro Plàstic	José Javier Barceló Sarria	See
	25/November/2014	Macro Plàstic	Quim Garrabou	See
	21/November/2014 (12:00)	Macro Plàstic	Oscar Pauner Ramirez	See
	16/November/2014 (18:00)	Macro Plàstic	LENKA JUSKANICOVA	See

HIGHLIGHTS

Plastic 0



Macro Plàstic

Agüita con el Plástico

Comments by the researcher

Muchas gracias Sandrine por la imagen. Es fundamental contar con observaciones como esta de lugares tan remotos. La bahía de Ugak en Alaska es un lugar relativamente protegido de los flujos globales, la cantidad de restos vegetales bien conservador nos indican que los aportes vienen principalmete de la tierra y, siguiendo ese razonamiento, los restos de plásticos que vemos en la foto podrían venir de los campamentos/refugios /granjas/aldeas más cercan@s.

En la vecina ciudad de Anchorage hay en este momento, y hasta el 7 de septiembre 2014, una interesante exposición sobre los plásticos, os dejamos el enlace: <http://www.anchoragemuseum.org/galleries/gyre/>

Muchas gracias por la

MAP

Plastic Zero

Google

Imagery ©2015 NASA

MICRO 2016

Fate and Impact of Microplastics in Marine Ecosystems: From the Coastline to the Open Sea

International Conference, Lanzarote, Spain 25 - 27 May 2016

MICRO 2016 is an initiative of the Lanzarote Biosphere Reserve within the UNESCO MAB programme and the network of scientists Marine Sciences For Society.

Lanzarote, May 2016

MICRO 2016
was a great
collaborative experience



Hosted by: 

Under the patronage of UNESCO

See you in Lanzarote for **MICRO 2018** 19-23 Nov. 2018

Let's move from common values to better transdisciplinary approaches
to better answer the question:

Which sciences do we want for which society?

MLTDM # is a joint programme led by:

*. Marine Sciences For Society, contact: Juan Baztan**

. CEARC-UVSQ, contact: Jean-Paul Vanderlinden

. Le théâtre du Grain, contact: Lionel Jaffrès

Thanks !

**European
Maritime
Day**

Poole 2017

** speaker May 18th 2017: juan.baztan@uvsq.fr*

