



**European Marine Board Expert Working Group**

***Advancing Citizen Science for Coastal and Ocean Research***

***Dr Jane Delany, European Marine Board Working Group on Citizen Science  
Head of Dove Marine Laboratory, Newcastle University, UK***

***CARLOS GARCIA SOTO, Vice-President of the EMB***

# Citizen Science?

Involvement of non-professional scientists in the systematic collection, analysis or interpretation of scientific data, and testing of natural phenomena.

Recording observations ; collecting data in the field  
Analysing/interpreting data in some way  
Contributing to the writing of manuscripts

Participating/assisting in experiments  
Sharing expertise '*lay-expertise*'



# Why *Marine* Citizen Science?

Scale of Marine Ecosystem and the extent of our reliance on it

Disproportionately impacted by anthropogenic activity

80% of anthropogenic-driven energy has been absorbed by oceans

Unprecedented habitat and species loss

# What is the problem?

- Policy becoming more complex with large datasets required to assess many impacts on ecosystems over long timescales
- Funding is limited, so new cost-effective ways of obtaining & processing data are needed
- Citizen science has potential to add to *marine* evidence base, but need assessment of utility



# Challenges for marine citizen science:

- Marine Environment – mostly inaccessible
- Intertidal:
  - species richness and taxonomic hurdles
  - accessibility means '*false sense of security*' and a plethora of recording projects that attempt too much and return little
  - sacrificial sampling required (sediment shores)
- 'Open' system – propagule exchange
- **Real and perceived perceptions of inaccessibility**
- **Perceptions of scale and feelings of powerlessness**  
(Jefferson et al 2014 ; McKinley and Fletcher, 2012 ; Rose et al 2008)
- **Speed and extent of climate change impact greater in marine systems than in terrestrial**
- **Changing landscape of marine management**



# THE EMB POSITION PAPER

- 1- To identify the **common factors of successful** citizen science programmes
- 2- To assess the types of **marine data that are amenable to collection** or analysis by non-specialists, without compromising quality
- 3- To provide **recommendations on best practices** for incorporating citizen science into marine research projects, e.g. engagement, retention, meeting expectations of both volunteers and scientists
- 4- Based on the findings, to provide **overall recommendations**. What is needed to support citizen science in a marine context into the future?

# Case Studies in Marine Citizen Science in Europe

PLANKTON PLANET Capturing

our Coast

SECCHI DISK

Ocean Sampling Day Posidonia

Network

OCCHIO ALA MEDUSA

CITCLOPS

CoastWatch



Secchi  
SECCHIDISK.ORG



Types of data amenable to CS

Models of CS in terms of level of volunteer input to project design



# The Role of Technology in Marine Citizen Science

Technology has the power to allow citizens to contribute meaningfully to data collation from **an otherwise remote and inaccessible environment.**

- Dive computers capturing sea surface temperature
- Sensors on yachts and surf boards
- Apps to capture water colour, chlorophyll
- Drones

Mobile phone technology facilitates rapid return of species records or environmental variables remotely

Online crowd-sourced analysis facilitates engagement with inaccessible deep sea, polar sea and open ocean data sets

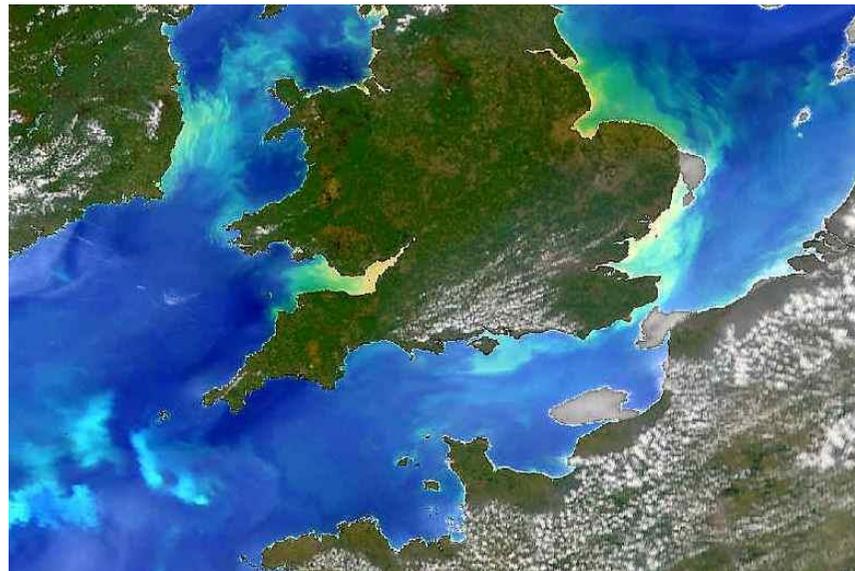


# Marine Citizen Science & Earth Observations

Citizen data offers significant possibilities for supporting remote sensing operations by aiding in the identification of temporal patterns that are not covered by more precise remote sensing data (sun synchronous).

Water temperature measurements from Citizen Scientists comply well with in-situ systems and may support quality control of space-borne observations

Sporadic events such as algal jellyfish blooms, mass mortalities and strandings or oil spills can be detected by Citizen Scientists where no space-borne data are available



# Marine Citizen Science: driving Marine Citizenship

Interactive, hands-on approaches of engagement can be transformative

Serves to overcome feelings of 'powerlessness' and inaccessibility wrt the marine environment

Participation and co-enquiry is about speaking and listening to volunteers on their own terms

It engenders ownership, gives a voice about change and responsibility for solutions to influence their welfare

It is empowering because it reflects the values and agenda of the individual, and increases control

Through awareness, and a new motivation to enact change, Marine Citizen Science can serve as a vehicle through which marine environmental policy is enacted



# Co-enquiry and sharing expertise

Evidence base for policy development and management strategy is strengthened from a diverse array of sources

There exists a wealth of expertise relating to the natural world, observations of phenomena and species interactions, amongst users of the marine environment

Valuing different perspectives and different forms of expertise is key to good Citizen Science.



## Short-term Action Areas

Understanding  
wider benefits

Driving good  
practice

Building  
competencies

Cultivating Ocean  
Literacy

## Long-term Action Areas

A European MCS  
Platform

Better funding  
opportunities

Improved data  
management

Supporting marine  
policy

**POSITION PAPER: recommendations**

# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 1 - Driving Best Practice at European Level

Develop guidelines to ensure that Marine CS initiatives are properly developed, managed and evaluated.

- Ethics and baseline requirements
- Appropriate volunteer training and support
- Tractable task design, clear objective setting
- Adequate and accessible data capture infrastructure
- Guidelines on data quality and robustness
- Engagement and retention
  
- Advice on how, *where appropriate*, to design the project to ensure it is policy relevant
  
- Details of channels for citizens to access initiatives in bottom-up approaches



# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 2 - Cultivating Ocean Literacy

Improve awareness of the importance and power of Marine Citizen Science.

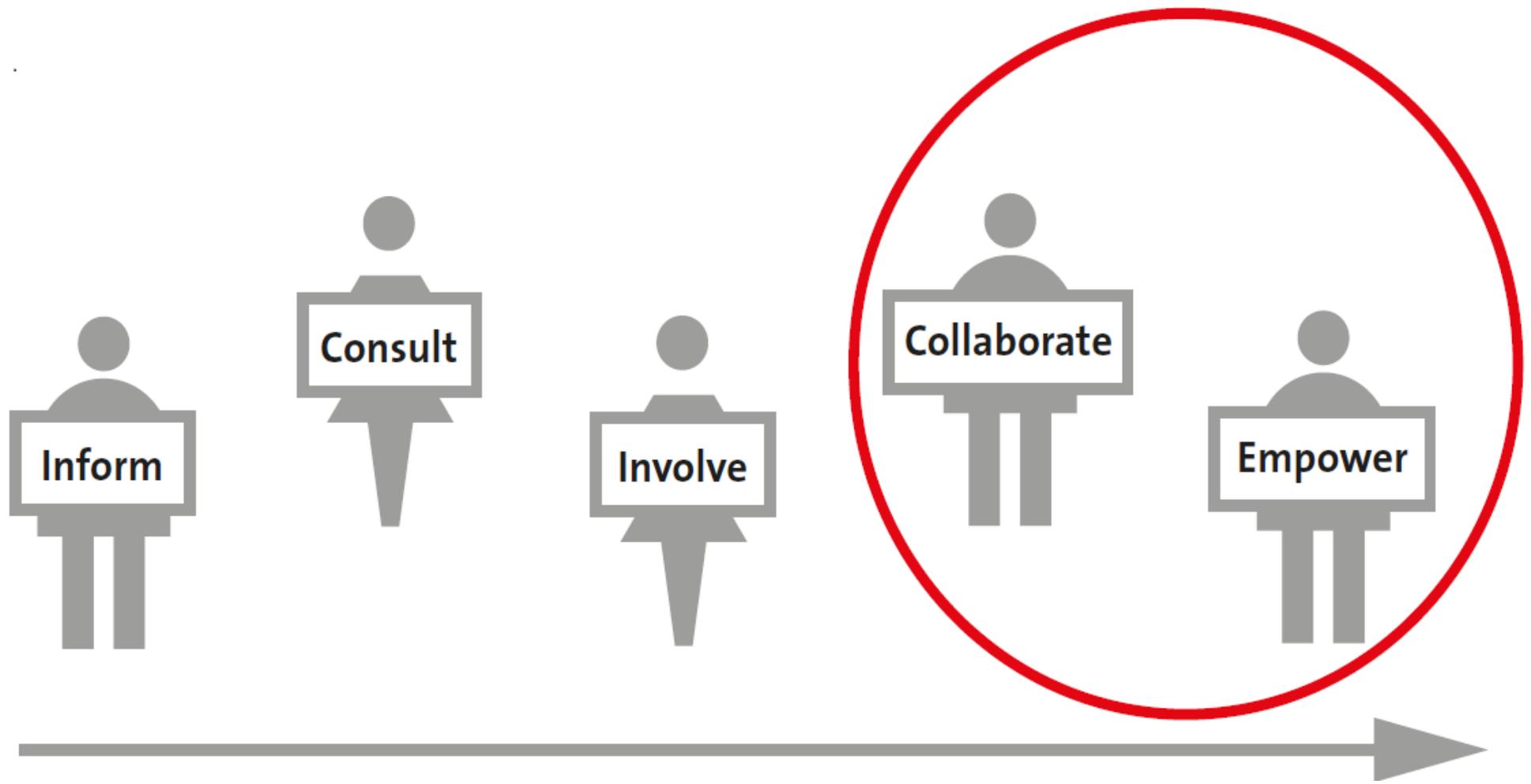
Citizen Science has the potential to demystify science, to engage all in the scientific process, to equip all to contribute meaningfully.

Significant gaps in awareness of the threats to the marine environment exist; engagement and co-enquiry can yield better outcomes that are directly embedded in common goals.



# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 3 - Understanding the Wider Benefits of Citizen Science for Society, Inclusivity, Democracy, Citizenship, Marine Science Research and Policy



# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 4 - Building Competencies across Multiple Disciplines

These include expertise in:

- Expertise in Citizen Science to facilitate research scientists to engage better in such initiatives
- Mediation between the marine science and policy communities
- Social science research tools to understand the societal impact of such initiatives
- Understanding of alternative funding models
- Dedicated cutting-edge data storage and management
- Digital and social media for outreach and education



**Overall recommendations of the document:  
8 Strategic Action Areas**

**5. Longer term: Launching a European Marine Citizen Science Platform**

A neutral space for scientists, citizens and policy makers to come together for discussion.

Report on project outcomes and successes; promote the image of Marine Citizen Science.

Provide technical support, tools and facilities to initiatives across Europe.

Coordination and Support Action (CSA) would act as a vehicle to establishing a European Marine Citizen Science Platform.

Links to European Citizen Science Association (ECSA) and existing national hubs and platforms

<http://connectocean.com/ConnectOceanExpeditions>



# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 6 - Facilitating Efficient Management of Citizen-Generated Data

Foster compliance with international data and metadata standards.

Create data storage and archiving solutions to ensure general access to the data by all, as well as current and future capacity.



# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 7- Empowering Citizen Science to Support Marine Policy

Ensuring legislative instruments provide for citizen science data inclusion ; opportunities to embed this while policy and monitoring frameworks still emerging

Marine policy instruments should give due consideration to behaviour at the level of the individual, as a vehicle through which marine environmental policy is implemented

Exposing the scientist and the policy maker to the views and perspectives of wider society

Ensuring due recognition for the contribution of Citizen Science data, so that it gains status



# Developing European Marine Citizen Science: 8 Strategic Action Areas

## 8 - Better Funding Opportunities

Ensure that EU, regional and national funding mechanisms for research incorporate ways in which Citizen Science initiatives can be funded.

Additionally, explore alternative funding mechanisms for Citizen Science, including crowdfunding and philanthropy.



## Thank you for listening!

**Chair:** Carlos Garcia-Soto & **Co-Chair** Gro Van der Meeren

**Contributing Authors:** Julia Busch, **Jane Delany**, Christine Domegan, Karin Dubsy, Géraldine Fauville, Gabriel Gorsky, Karen von Juterzenka, Francesca Malfatti, Gérald Mannaerts, Patricia McHugh, Pascal Monestiez, Jan Seys, Jan Marcin Węśławski, Oliver Zielinski

**Editors:** **Jane Delany**, Niall McDonough, Veronica French and Paula Kellett

**Reviewers:** Martin Thiel (Universidad Católica del Norte, Chile), Muki Haklay (University College London, UK), Ferdinando Boero (Università del Salento, Italy)



### **REFERENCE WITH FULL AUTHORS:**

Garcia-Soto, C., van der Meeren, G. I., Busch, J. A., Delany, J., Domegan, C., Dubsky, K., Fauville, G., Gorsky, G. von Juterzenka, K., Malfatti, F., Mannaerts, G., McHugh, P., Monestiez, P., Seys, J., Węśławski, J.M. & Zielinski, O. (2017) Advancing Citizen Science for Coastal and Ocean Research. French, V., Kellett, P., Delany, J., McDonough, N. [Eds.] Position Paper 23 of the European Marine Board, Ostend, Belgium. 112pp. ISBN: 978-94-92043-30-6

### **DOWNLOAD:**

[http://marineboard.eu/sites/marineboard.eu/files/public/publication/EMB\\_PP23\\_Citizen\\_Science\\_web\\_3.pdf](http://marineboard.eu/sites/marineboard.eu/files/public/publication/EMB_PP23_Citizen_Science_web_3.pdf)

# European MARINE BOARD

Advancing Seas & Ocean Science

## EUROPEAN MARINE BOARD:

The European Marine Board was established in 1995 to facilitate enhanced cooperation between European marine science organizations towards the development of a common vision on the strategic research priorities for marine science in Europe.

In 2017, EMB represents **33 Member Organizations from 19 European countries.**

