

4TH GEO

# BLUE PLANET SYMPOSIUM

4-6 July 2018 – Toulouse, France



CENTER FOR

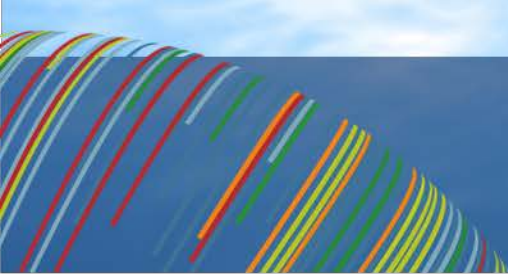
**COMMUNITY  
AND CITIZEN SCIENCE**

## Lessons for engaging the public in conservation: Synthesis across coastal and marine citizen science projects

**Heidi L. Ballard**, Assoc. Professor and Faculty Director  
School of Education and Center for Community and  
Citizen Science, University of California, Davis, CA, USA

\*[hballard@ucdavis.edu](mailto:hballard@ucdavis.edu)

**John Cigliano**, Cedar Crest College, Pennsylvania, USA



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Heidi Ballard, Faculty Director

Ryan Meyer, Executive Director

**Graduate Collaborators/ Student  
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Amanda Lindell, Meg Pannkuk (MS), Sarah  
Ludwick, Cristian Galindo, Chris Jadallah

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Public participation in scientific research

Community-based participatory research

# Citizen Science

Participatory action research

community science

volunteer monitoring

“Scientific research that involves members of the public in one or more stages of the scientific process”

# Marine Citizen Science Projects



earthdive



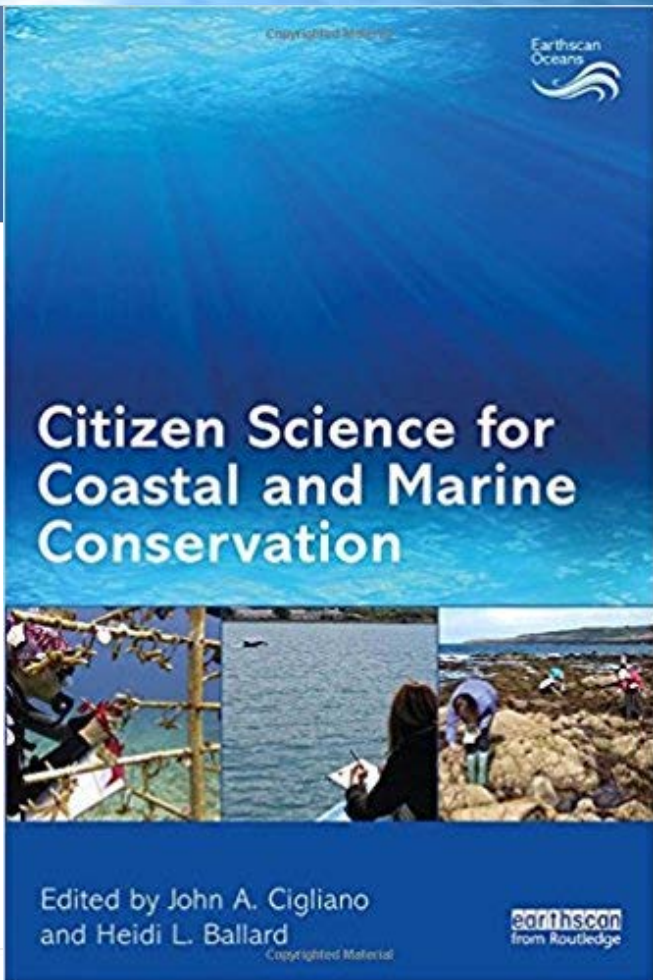
wild whales  
b.c. cetacean sightings network



# Models of Citizen Science

	Contributory	Collaborative	Co-created
Define a question/issue	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Gather information	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Develop explanations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Design data collection methods	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Collect samples	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analyze samples	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Analyze data	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Interpret data/conclude	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Disseminate conclusions	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Discuss results/inquire further	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

(From Bonney et al. 2009, Shirk et al. 2012)



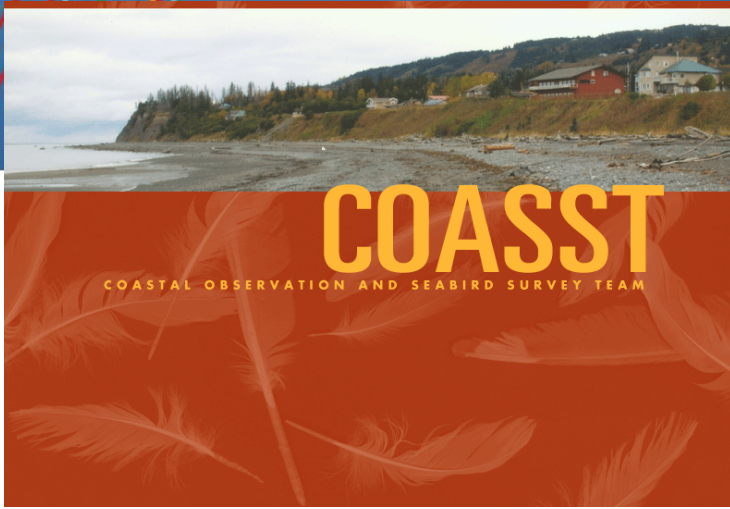
# Case Studies

1. Tracking change in seabird populations – Northwestern USA
2. Climate change, mangroves and coastal systems – Kenya
3. Invasive non-native species reporting – UK
4. Impacts of vessel traffic and whale watching – CA, USA
5. Marine litter – International and Chile
6. Citizen science informing marine protected areas – CA, USA
7. Eelgrass monitoring and restoration – Maine, USA
8. Community based coral reef monitoring – Micronesia
9. Intertidal monitoring by teachers and youth – CA, USA
10. Snorklers and divers monitor Queen Conch - Belize

# Example of a Collaborative Project: Assessing Queen Conch Populations in Belize







*By collaborating with citizens, natural resource management agencies and environmental organizations, COASST works to translate long-term monitoring into effective marine conservation solutions.*





*Reef Environmental Education Foundation is a grass-roots organization that seeks to conserve marine ecosystems by educating, enlisting and enabling divers and other marine enthusiasts to become active ocean stewards and citizen scientists.*

# Synthesis Areas for Citizen Science Projects

- Conservation issue and context in which the case is situated
- Project objectives, methods, quality control/quality assurance procedures
- Explanation of how participants are involved in scientific monitoring or research
- Evidence of whether and how the project met its conservation goals
- Benefits, limitations and challenges of citizen science for conservation and for participants

# Circumstances under which citizen science is effective for marine and coastal conservation

## Key Conservation Issues and Questions

- ...When data is needed over wide spatial and/or temporal scales, and/or hard to reach areas
- ...When data is needed to provide a baseline to which future anthropomorphic or other perturbations in the system can be compared, providing early warning systems for managers.
- ...When citizen science projects can explicitly link science to on-the-ground stewardship and decision-making (ecological restoration, natural resource management, and policy).

# Circumstances under which citizen science is effective for marine and coastal conservation

## Key Audiences and Stakeholders

- **Recreationists** – people with an interest, and/or stake in the health of coast and marine systems who may not depend on the ocean for livelihoods.
  - People who live near or frequently visit the beach
  - Snorklers and divers
  - Ecotourists
- **Fishers and other Coastal Resource Users**
- **Youth** – teachers, schools, out-of-school programs, families



# Key considerations for designing marine and coastal citizen science programs: Effective strategies and approaches

## Ensuring Data Quality

- Intensive **in-person training** of participants before they can submit data to the project – this is in contrast to many citizen science projects that simply provide resources online
- **Train-the-trainer** model
- Online guides with **video instructions**
- **Supervision** by professional scientists
- **Data verification** procedures using geo-located, time-stamped photos
- Provide **feedback** to participants to improve accuracy

# Key considerations for designing marine and coastal citizen science programs: Effective strategies and approaches

## Recruiting, retaining, and engaging participants

- Address participants' motivations, interests, and needs
- Reach out to the specific audiences or communities who've shown interest in the topic of the project
- Develop deliberate and equitable partnerships between scientists and community-based organizations for long-term commitment to the project
- Communicate HOW participants' data is being used and making a contribution to conservation goals they care about

# Key considerations for designing marine and coastal citizen science programs: Effective strategies and approaches

## Logistics and Safety of Participants

- Assess and **design around the volunteers** – don't have them do something they aren't ready for
- Consider accessibility for volunteers, and protect habitat from snorklers/ divers





# Key considerations for designing marine and coastal citizen science programs: Effective strategies and approaches

## Technology and Crowd-Sourcing

- **Smartphones** transmit verifiable photos - eliminate need for supervision of volunteers in the field
- **App development** has become easier to adapt apps for specific projects
- **Data visualization** platforms allow participants to explore datasets
- Many projects don't use devices – consider potential participants and their **access to tech**

# Key considerations for designing marine and coastal citizen science programs: Effective strategies and approaches

## Collaboration, Communication, and Building Trust

- **“Manage expectations”** to explain the ways and realistic timeframe in which information from the project will inform conservation actions (Sewell and Parr, Ch. 4).
- Provide **“data stories”** that show how project data is informing research and management, updates on interesting findings (Parrish et al., Ch. 2).
- Build on **local ecological knowledge**, participants’ own inquiry and questions, when you can
- Continually **revise and improve** your citizen science program!

## Lessons for the future of marine and coastal conservation, and the role of citizen science?

- **Place Matters** - Connecting people to their place increases sense of responsibility and stewardship over those places, more likely to enact pro-environmental behaviors (Kudryavtsev et al. 2012).
- **Collaborate and Partner Across Sectors** – Make sure essential roles are filled for successful citizen science project:
  - Project coordination, volunteer recruitment and coordination, training or education materials, QA/QC, data management and storage, data analysis and visualization, Super volunteers can help!
- **Learning and knowledge** – Participants can learn science content and skills, but also can contribute local knowledge and expertise – volunteers aren't blank slates.

# Conclusions

- **Participation and Power** – Our cases illustrate how sharing power and voice in scientific research, and conservation, can **benefit the research, the ecosystems, and the public.**
- **Not a silver bullet** - Coastal and marine citizen science can be a unique and effective approach to addressing conservation science questions, but should **be thoughtfully designed and applied to carefully evaluated situations.**





# Thank you!

- Questions?

Contact: Heidi L. Ballard

Assoc. Professor, School of Education and Faculty Director, Center for Community and Citizen Science, University of California, Davis, CA, USA

\*hballard@ucdavis.edu

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