April 5, 2023

California Fish and Game Commission

Dear Commissioners,

We at the California Academy of Sciences Center for Biodiversity and Community Science, and the UC Davis Center for Community and Citizen Science would like to call attention to the enormous success of the MPA program in supporting community science over the last ten years, and urge you to sustain and build on this world-leading track record. Robust support of recommendation 14 (and related recommendations) from the DMR report Table 6.1 (see attached list of recommendations relevant to community science) will allow the State of California to cement its role as a leader in community science as key to marine protection.

Beyond involvement in MPA community science projects, our two organizations have been involved globally in building the field of community science. We study it from a variety of perspectives, including the outcomes for science, the environment, and for the people and communities that work on these projects together. We work with universities, community groups, museums, schools, government agencies, non-profits, Tribes, and funders. Based on our broad experience across many different partnerships, contexts, and environmental issues, we can say that what has been happening with California's MPAs with respect to community science is unique and very exciting in terms of its scale, its breadth, and its impacts.

More than **80,000 people** participated in MPA citizen science over the last 10 years. These participants spent well over **half a million volunteer hours** contributing to MPA research and monitoring. And that's just the state-funded work. At least 70,000 more people were involved in ocean and coastal citizen science, without funding from the MPA program. That's **more than 150,000 people doing meaningful, impactful science in California's oceans!**

We know that integration of long-term biodiversity monitoring data with crowd-sourced community science data can provide the highest possible quality inferences on the abundance and distribution of species; in other words, the insights gained were strongest when community-collected and standardized survey data were combined. Monitoring data can help to pinpoint biases in citizen science data while citizen science data can help to fill gaps in the sparse coverage of monitoring data. The continued collection and integration of both these data sources is the best approach to generate timely and reliable estimates of biodiversity change at scale. There is huge potential in the model-based integration of large-scale but noisy crowd-sourced community science observations with standardized but spatially, temporally, and/or taxonomically limited professional monitoring data

What does all of this mean for California, and the MPA program? Participants collected critical data that could not be gathered in any other way, but they did more than that. Some were involved in other parts of the research process. Many learned more about California's MPAs, and some became part of MPA outreach and education efforts in their own communities. More than 100 organizational partners worked

together to make these community science programs possible. That's an incredible coordination effort, and it also represents a large amount of organizational capacity that has oriented itself around the MPA program — a major benefit to state partners.

We know that tens of thousands of Californians and visitors to California are directly contributing to the science needed to manage MPAs, but there is still plenty we don't know. Who were these volunteers? Demographic data is unfortunately not available in almost all cases. There is much we could learn about the current and potential role of community science in **reaching new communities**, and including wider audiences in MPA activities.

How have participants benefited from their work on MPA community science? What do they want to see in the next ten years of MPA implementation? What do they see as their part in this broader project? We know very little about these **human dimensions questions**.

We do know that **community science and community-collected data are critical** to meet many goals of the DMR, but the potential of these data has not been fully realized. We also know that community science projects require **different kinds of support** in order to inform MPA management, and deliver benefits across all four pillars of the MPA program.

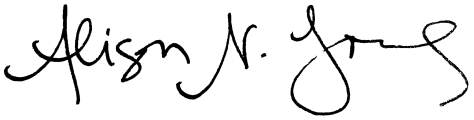
We are ready to help MPA Partners build on the success of community science for MPAs. Attached to this letter, please find:

1. a brief overview of our two organizations,
2. a one-page summary of a DMR report on the first decade of MPA community science, and
3. a list of DMR recommendations with strong connection to community science.

Sincerely,

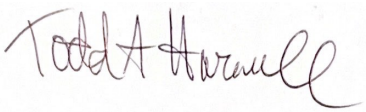
Ryan Meyer, Ph.D
Executive Director
Center for Community & Citizen Science
University of California, Davis

Rebecca F. Johnson, Ph.D



Alison N. Young

Co-Directors
Center for Biodiversity & Community Science
Co-Directors, Thriving California
California Academy of Sciences



Todd A. Harwell, Ph.D.
Researcher
Center for Community & Citizen Science
University of California, Davis

About Us

For many years, the teams at the UC Davis Center for Community and Citizen Science and the California Academy of Science Center for Biodiversity and Community Science have been collaborating, while also pursuing our own individual projects in support of MPA-related community science.

The Center for Community and Citizen Science, based at the UC Davis School of Education, helps scientists, communities, and citizens collaborate on science to address environmental problems as a part of civic life. The Center was founded in 2016 and engages on and off-campus partners to advance research, practice, and dialog on community and citizen science. Our research examines community science topics such as individual and community benefits; conservation outcomes, learning and pedagogy; and diversity, equity, inclusion, and justice. Our research-based programs support many kinds of partners, including university students, scientists, educators, youth, NGOs, and government agencies.

Members of our team have been supporting, researching, and writing about community science in California's MPAs for more than a decade. Most recently, we submitted two reports for consideration the MPA Decadal Management Review. Learn more at http://education.ucdavis.edu/ccs

The California Academy of Sciences Center for Biodiversity and Community Science connects people to their local nature and each other while simultaneously collecting data critical to science and management. We accomplish these goals through a variety of programs, which scaffold collecting biodiversity observations using the iNaturalist platform with in-person community science field experiences. Our team also works to translate these community-collected data into management and policy outcomes and is building the tools needed by decision-makers. The Center for Biodiversity and Community Science has delivered a broad range of innovative projects since 2012, reaching tens of thousands of people and collecting millions of species occurrence records throughout California and beyond.

For 7 years we have run Snapshot Cal Coast, an annual 2-3 week campaign to collect a "snapshot" of biodiversity along the entire California coastline. We've engaged with the MPA Collaborative Network and partner organizations to mobilize over 17,000 people – residents of and visitors to California – in making over 277,000 observations of more than 7500 species along the California Coast. Recognizing the value of these data, the California Ocean Protection Council and Resources Legacy Fund have provided us funding to determine how best to turn community-collected iNaturalist data into actionable insights for decision-making, resulting first in the Dynamic Observatory of Coastal Biodiversity, and now a second project supporting the development of an Early Warning and Forecasting System, building upon the work of the Observatory of Coastal Biodiversity, to not only track biodiversity change along the coast, but to also identify climate-vulnerable species and places on the coast, and forecast potential future change by including environmental data.

Impacts and Opportunities for Community Science in Marine Protected Area Implementation

Community science, which refers to engagement by members of the public, to conduct research-based investigations, monitoring activities, or data collection and interpretation, has played a prominent role in MPA implementation and monitoring in the State of California for more than a decade. California's MPA Monitoring Program has included support for many different community science projects. **Looking at 10 MPA monitoring projects that received baseline and/or long-term funding from the State, community science efforts involved:**

84,000 Participants

476,000 Volunteer hours

528 Monitoring sites

100 Partner organizations, agencies, institutions and groups

Beyond the 10 baseline and long-term monitoring projects, there are more than 60 additional community science projects conducting research and monitoring along the California coast. Between 2010 and 2020:

29 of those additional projects involved > 70,000 participants working with over 200 organizational partners.

21 projects collected data inside MPAs in California.

12 projects provided participants with information about MPAs.

> 150,000 people participated in coastal and ocean community science in California, in the last decade!

Opportunities and Recommendations

There is still plenty we don't know.
Who were these volunteers? Demographic data is unfortunately not available. There is much we could learn about the current and potential role of community science in reaching new communities, and including wider audiences in MPA activities.

How have participants benefited from their work on MPA community science? What do they want to see in the next ten years of MPA implementation? What do they see as their part in this broader project? We know very little about these human dimensions questions.

We do know that community science data are useful. We also know that community science projects require different kinds of support in order to inform MPA management, and deliver benefits across all four pillars of the MPA program.

Let's strengthen and broaden the engagement and impacts of community science in MPAs over the next 10 years, by following through with recommendation #14 from the Decadal Management Review:

Develop a comprehensive community science strategy for MPAs and better utilize community science to supplement core monitoring programs.

UCDAVIS Center for Community and Citizen Science

Read more at: https://bit.ly/DMRCCS

DMR recommendations related community and citizen science.

There are many DMR recommendations (in Table 6.1) that relate in some way to community science. Those listed below have particularly strong links. Annotations *in italics* give some context.

3. Build tribal capacity to participate in MPA management activities.

3b. Better incorporate tribal-led ecological monitoring into the broader MPA Monitoring Program and adaptation of the MPA Monitoring Action Plan.

It is certainly not the case that all tribal science and monitoring is community science. However, any broad strategy for community science must carefully consider and account for a tribal role. Tribes and tribal members are already extensively involved in MPA community science.

6. Include and fund more diverse researchers and stakeholders in research and monitoring projects that directly contribute to the MPA Monitoring Program.

a. Develop and implement a strategic plan informed by underrepresented and diverse user groups to increase the diversity of community science participants.
b. Expand coordination between core monitoring programs and other partners to build trust and merge different types of knowledge with science-based information.
c. Explore innovative approaches to engage the fishing industry in MPA research and management.

This highlights the potential for community science to increase diversity of those involved in MPAs. It also highlights the need for support for community science, and support for a bridging function that better connects community science to other parts of the MPA Program.

12. Invest in improving understanding of the human dimensions of MPAs and develop a human dimensions working group and research agenda.

a. Improve collection of demographic data of ocean users and visitors to the California coast.
b. Collect participant demographics in volunteer community science and outreach programs and assess participant benefits, motivations, and engagement patterns.

Community science is a major contributor to our current understanding of ocean and coastal human activities. We can also learn a lot more from community science participants.

14. Develop a comprehensive community science strategy for MPAs and better utilize community science to supplement core monitoring programs.

a. Evaluate the effectiveness and applicability of current community science programs involved in MPA monitoring.
b. Create clear frameworks on regional and statewide scales for the intended use of community science from project onset.
c. Invest in more centralized data management for community science programs.
d. Improve coordination between existing community science programs and identify opportunities for new programs.