Bringing Data to Decisionmakers: Building Capacity Among Citizen-initiated Efforts
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The Clean Water Act directs National Estuary Programs (NEPs) to periodically document environmental trends and conditions. For MassBays, an NEP encompassing three bays and 47 sub-embayments along 1100 miles of Massachusetts coastline, this represents a massive undertaking that is beyond the reach of an individual program. We have traditionally relied on sister government agencies to provide us with information about water quality, habitat condition, and species status. Government-led monitoring programs, however, are focused on regulatory need, and over time have encompassed a narrower set of parameters and geographic range. MassBays has turned to citizen monitoring carried out by community-based environmental organizations for help. Indeed, nonprofit, citizen-led efforts are the primary source of current water quality and pathogen data for most of our region. Our goal: to bring volunteer-generated data?“which in many cases have been inaccessible to decisionmakers?“to bear on policy and management decisions. In return, we are providing direct and in-kind support to these partners. In response to MassBays' solicitation for input, program coordinators called for organizational capacity-building and opportunities to share resources. MassBays' new Citizen Monitoring Coordinators' Network, launched in 2016, helps nonprofits meet their own goals for long-term monitoring. We are connecting organizations with scientists who can help them formulate their own questions and approaches to answering those questions (transforming monitoring efforts into scientific ones); facilitating equipment exchange, and joint training for volunteers; providing training in communicating results to local and state decisionmakers; and helping to secure funding to sustain long-term programs and jump-start lapsed ones.

Toward a Definition of Indigenous Citizen Science in Kenya
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We conceptualize Indigenous Citizen Science as a practice of scientizing and learning through everyday activities and duties. With the Mbeere people of the Mt. Kenya region as our indigenous community paradigm, we report on a two-year multi-method study that incorporates indigenized approaches. Data is collected via 1) field observations 2) individual accounts of lived experience 3) talking circles 4) online survey on a Mbeere community Facebook group 5) content analysis of websites & social media. In addition to a grounded theory approach, we analyze the data using measures that have been used by previous seminal studies to typify citizen science: what motivates participation; where is funding sourced; who defines the research questions and how; what data is collected; how is it synthesized and disseminated; who owns the findings, and how are findings reused. Research findings suggest that while the Mbeere people do not perceive themselves as research partners in projects that are led by universities, NGOs and government agencies; community members are defining and conducting everyday citizen science as part of a daily effort to steward their own environment. Examples include village-level monitoring and management of water; and experimentation with factors that impact on an indigenous cash crop, miraa. Based on findings, we define indigenous citizen science as integral to local everyday life; and recommend ways to incorporate everyday scientizing into STEM learning environments in Kenya. Such a development would support the government’s intention to indigenize citizen participation in scientific research for environmental solutions that respect local livelihoods and worldviews.
Understanding the Role of Place in Citizen Science and Conservation Decision Making

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Many citizen science projects are place-based - built on in-person participation and motivated by local conservation. When done thoughtfully, this approach can transform humans and their environment. Despite such possibilities, many projects struggle to meet decision-maker needs, generate useful data to inform decisions, and improve social-ecological resilience. Here, we define leveraging the 'power of place' in citizen science, and posit that doing this improves conservation decision making, increases participation, and improves resilience. First, we explore 'place' and identify five dimensions: social-ecological, narrative and name-based, knowledge-based, emotional and affective, and performative. We then thematically analyze 134 case studies drawn from CitSci.org (n=39), The Stewardship Network New England (TSN-NE; n=39), and Earthwatch (n=56) regarding: (1) use of place in materials (as one indication of leveraging place), (2) intent for use of data in decision-making, and (3) evidence of such use. We find that 89% of projects intend for data to be used, 46% demonstrate no evidence of use, and 54% provide some evidence of use. Moreover, projects used in decision making leverage more ($t=4.8$, $df=117$; $p < 0.001$) place dimensions ($x=3.0$; $s=1.4$) than those not used in decision making ($x=1.8$; $s=1.2$). Given these findings, we present a framework for leveraging place in citizen science projects and platforms and recommend approaches to better impart intended outcomes. We discuss place in citizen science related to relevance, participation, resilience, and scalability and conclude that effective decision making as a means towards more resilient and sustainable communities can be strengthened by leveraging place in citizen science.

Blurring the Boundaries Between Outdoor and Online Citizen Science: Lessons Learned from the Orchid Observers Project

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Orchid Observers is an innovative collaboration between amateur naturalists and museum scientists that has combined two of the principal forms of citizen science: field-based ecological observation and online image-based classification. The project investigates how one of the greatest socio-scientific challenges of our time, climate change, is affecting the UK's much loved and ecologically important orchid populations. It aims to build a long-term record of flowering times from two distinct datasets: contemporary field observations and historical museum specimens. From 2015-16 the project invited people from across the UK to find and photograph orchids in the wild and to then upload these images to the Zooniverse platform, where they were identified and classified by online participants. Other online activities included transcription and extraction of flowering time data from thousands of historical specimens, extending the time series to almost 200 years. Combining outdoor and online citizen science in this way was a highly experimental approach. It brought together two distinct communities ?"field-based amateur naturalists and online citizen scientists ?" and two very different datasets, with unknown social and scientific outcomes. In this talk we overview the approaches that we have taken, challenges that we have encountered, successes, failures and unanticipated findings. We summarise social research investigating the experiences of the citizen scientists involved, including how the two communities interacted, and patterns of communication and knowledge sharing. We finish by highlighting key lessons learned and reflect on their relevance and value to the wider field of citizen science.