

## Expanding Our Outreach, Increasing Our Impact: New Directions in Save The Bay's Community-Based Restoration Program

Silas Ellison, Save The Bay, sellison@savesfbay.org  
Kenneth Rangel, Save The Bay, krangel@savesfbay.org  
Rachelle Cardona, Save The Bay, rcardona@savesfbay.org  
Katy Zaremba, Save The Bay, kzaremba@savesfbay.org  
Donna Ball, Save The Bay, dball@savesfbay.org

Tidal marshes provide critical habitat for wildlife and perform important ecosystem services, such as water filtration, carbon sequestration, and buffering coastal communities from sea level rise. However, only 10% of the bay's original tidal marshes remain in their natural state. Over the past five years, Save The Bay has recruited over 29,000 volunteers to join in the region-wide effort to restore this vital habitat and combat the anticipated impacts of climate change, installing over 93,000 plants and removing approximately 238,000 pounds of non-native weeds from the upland transition zone of tidal marshes. Our community-based approach allows us to educate the public and build a sense of stewardship for bay ecosystems, along with meeting restoration objectives.

In 2016, changes to our educational and corporate partnerships have allowed us to expand our impact even further. We made particularly strong advances in our engagement with low-income communities: of the 2,182 students that attended our education programs in 2016, approximately 60% reside in low-income communities, up from just 20% in 2015. Additionally, the number of students participating in multi-day educational programs increased by 39% to 496 in 2016, substantially increasing the number of students who receive in-depth experiences with habitat restoration and tidal marsh ecosystems.

We also expanded our capacity to facilitate very large restoration events with corporate partners. In June 2016, we hosted 369 summer interns from Facebook at a volunteer event at which approximately 3,360 pounds of non-native weeds were removed in a single day. We have also continued to maintain and grow a 5+ year partnership with Ernst & Young, LLP, hosting over 100 volunteers at our restoration sites every year. These partnerships have allowed us to accelerate progress towards achieving our restoration goals, and also cultivate voices in the community advocating our policy initiatives in support of bay ecosystems.

**Keywords:** Community-based restoration, environmental education, tidal marsh  
**Poster Topic** Citizen Science

## **“Otter Spotter”: Use of Citizen Science to Document the Recovery of North American River Otters (*Lontra canadensis*) in the San Francisco Bay Area**

Megan Isadore, The River Otter Ecology Project, [megan@riverottterecology.org](mailto:megan@riverottterecology.org)

Terence Carroll, The River Otter Ecology Project, [terence@riverottterecology.org](mailto:terence@riverottterecology.org)

Historically extirpated from much of the SF Bay Area, river otter populations are in recovery. Despite ecosystem restoration actions across the Bay Area, resource managers have had little information about current numbers or range. Because they are apex carnivores that directly benefit from restoration and likely affect outcome of recovery actions focused on endangered species, an understanding of their presence/absence is warranted. Presence and “hot spot” areas are also needed by agencies responsible for oil and other spill response. Due to their charisma and dependence upon healthy watersheds, river otters can help achieve awareness and public support for wetland restoration and watershed conservation.

During 2012 the River Otter Ecology Project launched a citizen-science initiative to solicit river otter sightings from the SF Bay region. With the launch of this web-based portal, we initiated outreach and media efforts to train the public on river otter identification and to encourage reporting. We believe multi-pronged outreach, inspires increased appreciation of the importance of healthy watersheds.

We have found that river otters commonly utilize a range of aquatic habitats, including coastal, riverine, lake and pond in all Bay Area counties except San Francisco and San Mateo. It appears that otters are expanding their range to the south through the East Bay, but have not moved into coastal San Francisco, San Mateo or Santa Cruz counties.

As a potential keystone species impacting SF Bay Area aquatic habitats, we strongly prioritize i) a widespread baseline population assessment utilizing non-invasive genetic techniques, and ii) an assessment of the role otters play in local aquatic food-webs, particularly given the extent of restoration activities taking place across the SF Bay Area targeting recovery of protected species. We encourage conservation managers to employ otters’ popularity in outreach and education to demonstrate the benefits of healthy wetlands and watersheds.

**Keywords:** citizen science, ecosystem restoration, *Lontra canadensis*, SF Bay, species recovery

**Poster Topic** Citizen Science

## Art Aids Environmental Education at a Shoreline Landfill

Susan Moffat, UC Berkeley, moffat.susan@gmail.com

**Problem:** The public has a relatively low level of knowledge about the dynamic ecosystems of the Bay and of its history.

**Approach:** “Love the Bulb” uses participatory art to illuminate the past and educate people about local ecosystems. We present art, music, performance, and environmental education events at the uncapped construction debris landfill known as the Albany Bulb. The site has long been home to informal sculpture made from found materials including rebar, driftwood and concrete. By bringing together interdisciplinary scholars and makers from fields ranging from archaeology to studio art to choreography to biology, Love the Bulb is building a community that is educating not just traditional environmentalists, but people in the arts and other disciplines about the history that led to large-scale filling of the Bay and the subsequent emergence of novel ecosystems. We are laying the groundwork for scientist-artist collaborations and citizen science projects that incorporate artistic production.

Through participatory oral history and mapping, we are revealing both the destructive past and the resilience of nature. Through monthly activities that include making art objects out of debris, planting native plants, and observing the dynamic ecosystems at the landfill, our project brings new publics to conversations about habitat protection and public space. Love the Bulb is part of the California Institute for Community, Art and Nature, a project of the Earth Island Institute. It is associated with the UC Berkeley Global Urban Humanities Initiative.

**Results:** New audiences, including those primarily interested in art, have explored the natural systems at the site. By creating objects such as ephemeral sculptures, participants learn about the dynamism of both natural systems and the human-nature interaction.

**Conclusions:** At a site challenged by complex management issues, highlighting and valuing a tradition of artistic creation results in greater environmental awareness than erasing the site’s history.

**Keywords:** arts, education, landfill, resilience, mapping, oral history, culture, parks, management

**Poster Topic** Citizen Science

## Citizen Science at Lake Merritt: Past, Present and Future

Katharine Noonan, Lake Merritt Institute, ktnoon@aol.com

Damon Tighe, iNaturalist.org, damontighe@gmail.com

Andrea Pineda, Rose Foundation New Voices Are Rising, Skyline High School,  
andrea.ap.pineda@gmail.com

Alan Manzanarez, Rose Foundation New Voices Are Rising, Skyline High School,  
alan.manzanarez@metwest.org

Elina Rios, Chabot Space and Science Center, erios@chabotspace.org

Andrew L. Chang, Program Leader - Tiburon Marine Invasions Research Lab Smithsonian Environmental  
Research Center, ChangAL@si.edu

James Carlton, Williams-Mystic College, Smithsonian Environmental Research Center,  
jcarlton@williams.edu

Lake Merritt is a microcosm of the larger San Francisco Bay estuary. Therefore, the efforts of ordinary citizens, guided by the scientific community, to observe and document its inhabitants are bound to yield insights into how the estuary ecosystem functions and responds to increasing environmental changes. Here we review and introduce Citizen Science studies at Lake Merritt, past, present and future.

**PAST:** The science of marine biological invasions began with Citizen Science. According to Andrew Cohen, “(it) began in the early 1960s, when the staff of the Rotary Nature Center guided Oakland teenager Jim Carlton into a project on the life of Lake Merritt.” Mentored by scientists at the California Academy of Sciences in San Francisco, Carlton became a world expert while in high school and established San Francisco Bay as the most invaded estuary in the nation. He returned with Andrew Chang in fall 2016 to see how the community had changed in 50 years.

**PRESENT:** Today, citizens can contribute to real scientific research using their smartphones. iNaturalist.org is an online community of amateur and professional naturalists that has hosted three citizen science projects focused on Lake Merritt. A recent project, “Lake Merritt Citizen Monitoring Study” is organized with the goal of continuing Carlton’s study of Lake Merritt’s aquatic community. The extreme rainfall of 2017, created the opportunity to pursue a new line of inquiry -- how the recently well-described community at the Lake recovers from last winter’s atmospheric river events.

**FUTURE:** DNA sequencing has become a great tool for identifying organisms and elucidating lineages between organisms. A “Barcode the Lake” project proposes to use a Citizen Science approach to generate data down to a genetic level on the organisms of Lake Merritt. It will also build transferable STEM skills and field identification skills in participants from the community.

**Keywords:** Lake Merritt, Citizen Science, iNaturalist, STEM, DNA sequencing, invasive species

**Poster Topic** Citizen Science