Citizen Science for Natural Resource Management: Does participation foster awareness and stewardship?

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### Changes in Attitudes and Behaviors (*Preliminary findings*)

<table>
<thead>
<tr>
<th>Since starting to volunteer collecting data....</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Neither agree nor disagree, not sure, no opinion</th>
<th>Somewhat Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My attitudes towards the resource I'm monitoring have changed</td>
<td>30%</td>
<td>35%</td>
<td>20%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>My attitudes towards the environment have changed</td>
<td>15%</td>
<td>33%</td>
<td>35%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>I have changed the way I make decisions that may affect the resource I'm monitoring</td>
<td>19%</td>
<td>25%</td>
<td>37%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>I have changed the way I make decisions that may affect the environment</td>
<td>13%</td>
<td>25%</td>
<td>44%</td>
<td>7%</td>
<td>11%</td>
</tr>
</tbody>
</table>

n = 158 *Subsection of survey responses*
Are you currently involved with environmental research or management efforts beyond volunteer data collection?

45% Already Involved
55% Not Involved

How likely are you to become involved in natural resource management issues beyond volunteer data collection in the future?

- 20% Very likely
- 39% Somewhat likely
- 10% Not sure, no opinion
- 18% Somewhat unlikely
- 13% Very unlikely

Of those who responded “not involved”

n = 152 *Subsection of survey responses
Using Citizen Science to Identify Sevengill Sharks

Crowdsourced Data

2016 AOP CS Symposium
• Inspire ocean-related citizen science
• Engage in baseline studies and monitoring
• Share data with researchers and scientists
Wildbook for Sevengill Sharks

- Web-based, user friendly method of logging of Encounters

- Non-invasive methods of tracking sharks
  - Shark tagging is considered invasive

- Mark-Recapture population modeling

- Photo ID process:
  - Identifying individual Sevengills by the unique freckling pattern
  - International database of hundreds of photos and video
  - Blog and historic videos on http://sevengillsharksightings.org/

- Freckling patterns are successfully analyzed using a pattern recognition software
Identifying Individual Sharks

Researcher Identifies Individual Sharks

- Create 4-point boundary
- Marks each freckle within boundary
- Submits points to scientific algorithm
- Review results
- Associates prior image/encounters
Mission Bay Pollution Survey

Presented by: Laura Coleman
Pilot Study

Sail Bay: Eel Grass

Mission Bay Channel: Rocky Bottom
Goals

1. Determine the type and abundance of trash underwater in Mission Bay.

2. Evaluate how the removal of trash changes the underwater biodiversity.
Moving Forward

• Build database using CitSci.org

• Recruit more divers

• Communicate survey plans with lifeguards and MB Commission
Los Cerritos Wetlands Bird Counts Birds Matter!
Mary, write fast....
Event Stats

Totals

1072 observations

282 species

37 people
Jan 2010 – July 2014
38 observations
~ 2 per observer

Aug 2014 – present
817 observations
~ 10 per observer

Stats
- Totals: 2812 Observations
- 33 Species
- 469 People

Image 1: Starfish in a tide pool
Image 2: Starfish close-up
Map: Distribution of observations along the West Coast of the USA

Let’s find your whales

Submit Images >
Humpback Migration, 2004  234 individuals mapped

Western Pacific  Central Pacific  Eastern Pacific
Arrows connect sightings but do not represent actual migration routes.

Whale sighting

SOURCE: SPLASH (STRUCTURE OF POPULATIONS, LEVELS OF ABUNDANCE, AND STATUS OF HUMPBACKS).
IMAGE BY NASA
DAVID E. CHANDLER AND NANCY W. SCHNEIDER.
NGM MAPS
Fran is the daughter of CRC-9019, Big Fin, born in 2005. Information based on Cascadia Research catalog and database including contributions by collaborating researchers. She has been frequently seen in Monterey Bay, California (and is known by some as Marina, so named for frequenting the shores of Marina del Rey), and often winters in Guerrero, Mexico. Fran was named by Ferd Bergholz for his late wife.
Sand Crab Monitoring as a Way to Engage the Community About Ocean Health

Taylor Spesak
Catherine Hoffman
Heal the Bay & Santa Monica Pier Aquarium

Acknowledgments: Jessie Altstatt (LiMPETS), Jose Bacallao, David DeFrenza & the Los Angeles Academy of Arts and Enterprise, Candice Sunderland, Jenn Swart, Alys Arenas, Travis Legget, Jackie Cannata, & the numerous other citizen scientists who have helped us collect data!
Why Heal the Bay & Sand Crabs?

1. How do the populations of ocean organisms reflect changes in ocean water quality and ocean health?

2. How can we connect the community to the importance of a thriving ocean?

- Modified protocol from LiMPETS
- Sand crabs are important and prevalent
What Are We Finding?

Demographics

- Abundance, sex, and size.

Environmental Impacts

- Rainfall linked to water quality.
Where Can We Go from Here?

- Connect ocean & watershed health indicators to sand crab populations.
- Increase community involvement
  - Appreciate the value of onlooker effects.
Citizen Science Along the L.A. RIVER

William Preston Bowling - Special Projects Manager
Aquarium of the Pacific – February 20th, 2016
Los Angeles River Fish Study

• There is abundant fish life in the River
• During 4 sampling events 1,214 fish were caught
• Mosquito fish and tilapia were most prevalent
• Almost undetectable levels of mercury and PCBs

Download at www.FoLAR.org
Citizen Science
FoLAR's Fishing Line Recycling Program

Attention, Anglers!
Please recycle used fishing line...
Our wildlife depends on it!

Fishing on the L.A. River is limited to the Designated Recreation Zones ONLY!!
For more information contact FoLAR at 323-223-0585

Help keep wildlife safe!
Urban Tides Community Science Initiative

Linda Chilton    Education Programs Manager
Holly Rindge    Communications Manager
Yearlong effort to photo document tidal lines, erosion and flooding

Images are used by scientists, city planners and community members

Partnership with scientists, educators, students, aquaria, nonprofits, municipalities

Individual participation, or incorporated into existing programs:
- Beach clean ups
- Beach monitoring
- Beach maintenance
- Scouts, birding, etc.
It’s Your Coastline & Your Observations Matter

~

Visualizing today’s risks enables us to:

• Identify vulnerable locations and people

• Provide critical data to help ground truth and calibrate models

• Set priorities for planning and resources

• Further the dialogue about how we can adapt to rising seas
How it works

• Join the Urban Tides database: https://getliquid.io
• Download app for iPhone
• Using app, snap and upload photos directly into the database
• May also upload photos via computer
• Data required with the photo:
  – Latitude & Longitude
  – Date & Time
  – Orientation (facing south, west, etc.)
• Urban Tides website: http://bit.ly/100arhl
Catalina Conservancy Divers: Lessons Learned for Volunteer Based Monitoring

Dirk Burcham
WIES-Catalina Conservation Divers

Thomas W. Turney
WIES-Catalina Conservation Divers
Catalina Conservancy Divers Overview

1. Formed in 1991 as a support group of the Catalina Island Conservancy. In 2014, the Catalina Island Conservancy terminated the Catalina Conservancy Divers activities.

2. Now the group is affiliated with the University of Southern California and is called WIES-Catalina Conservation Divers. Our work continues.

3. Conducted four Marine Monitoring Projects at Catalina Island.
   - Key Species Monitoring 1995 – 2007. 97 Surveys conducted.
   - Sea Temperature Monitoring 1992 to the Present.
   - Sea Urchin Census 1991 to the Present. 108 surveys conducted to date.
   - Kelp Census 1991 to the Present. 251 surveys conducted to date.

4. Data from CCD monitoring has been used in a number of publications.
   - Magazine Articles – 1
   - Poster Presentations at Professional Symposia – 4
   - Presentations at Professional Symposia – 7
   - Published Papers - 8
Lessons Learned

1. Have a clear idea of what is the product of your efforts, who is your end user and what is the contribution that you are making. Is there an organization or constituency that will value your data and use it in their work?

2. Usually, people are good at executing the front end of a project (logistics, volunteer recruitment, data collection, etc.) and tend to underestimate the resources necessary to accomplish the back end of a project (data storage, analysis, report preparation, etc.).
Lessons Learned

3. Regularly communicate with your Volunteers on the project’s progress/accomplishments. This will help to maintain their motivation and participation.


5. If you will rely on institutional support, carefully evaluate that institution’s commitment to support the project in the long haul.
Reef Check California

How scuba divers become expert citizen scientists

Jan Freiwald, Colleen Wisniewski, Erica Felins

Reef Check California

Citizen Science Symposium

Aquarium of the Pacific, Long Beach 2016
SCUBA Citizen Science Monitoring

- Rocky reef & kelp forest monitoring program
- 90+ sites and surveys annually statewide
- 250+ participants/year
- MPA monitoring since 2007
Reef Check Training

Classroom and Underwater Training

• 73 indicator species ID Test
• Task-Loaded Scuba Tests
  • Tiered qualifications

Surveys

• Standardized Protocol
  • Supervision and Quality Control
Keys to Credible Citizen Science Data

- High program-entry prerequisites
- Tiered approach to certification
- Strict data quality control
- Public data
- Data comparisons

Volunteers can be trained to high standards!
Visualizing Sea Turtle Surfacing Data

Heidi E. Ziegler, PhD
Volunteer with the Los Cerritos Wetlands Sea Turtle Monitoring Project
20 Feb 2016

Aquarium of the Pacific and the Marine Conservation Research Institute
Citizen Science Symposium

Los Cerritos Wetlands
San Gabriel River
AES Power Plants

Green Sea Turtle
(Chelonia mydas)

“Endangered” on the IUCN Red List of Threatened Species
What we know:

- Green sea turtles are naturally found in estuaries and wetlands, as well as open ocean habitats.
- Green sea turtles have been seen in the San Gabriel River.

What we are doing:

- Track turtles to provide population information:
  - Now and after the power plants close
  - Now and after restoration Los Cerritos Wetlands habitat

Questions we want to answer:

- How many green sea turtles live in the San Gabriel River?
- How can we help green sea turtles? (aid in their conservation)

Number of sea turtle sightings

Observing yields data

Copyright © Heidi E Ziegler 2016
Each month,
Same stations,
Same time

Overlaying data on a map illustrates results more clearly
On average …
We see about 29 turtles (at 10 sites total)

Annual average (Jan, June 2013-2015)

CHANGE HAPPENS

We hope for the better …

Long-term monitoring programs are powerful tools to help scientists track ecosystem performance. Effective data visualization aids in getting the message out.
FROM BASELINE DATA COLLECTION TO ON-GOING RESOURCE MANAGEMENT:

12 YEARS OF ENGAGING THE COMMUNITY IN CITIZEN SCIENCE ALONG THE SAN DIEGO RIVER

Shannon Quigley-Raymond
River Ecosystem Manager
The San Diego River Park Foundation
shannon@sandiegoriver.org
619-297-7380
Volunteer Based Citizen Science Efforts

• RiverWatch Water Quality (2004)
• RiverBlitz (2008)
  – Invasive non-native plants
    • EDRR (2014)
  – Trash monitoring
  – Homeless encampments
• Bioassessment (2009)
• Headwaters amphibian monitoring (2015)
• Headwaters Stream Assessments (2016)
The River Experts

- Palm tree and encampment correlations
- *Pistia stratioides* genetic analysis
- Causal analysis – Conductivity data
- Sulfur budget of SDR (SRBs SOBs)
- Watershed mitigation projects
- Species of special concern

Over $1,100,000 in grant funding to SDRPF for projects such as:

- Invasive species removal
- Dissolved oxygen improvement
- Trash removal
Citizen science is research conducted by nonprofessional and/or amateur scientists, under the guidance of scientists and using scientific protocols.

The data provided by citizen scientists through the River Park Foundation’s programs is valuable and extensive, allowing us to create and advance a work plan to promptly address issues.

Data is collected by volunteers through:

**River Blitz:** Volunteer teams are led by a trained captain, and collect data using handheld GPS units, digital cameras and data forms (such as sample below). Comprehensive surveys are conducted in April and October, with additional interim surveys conducted by the Park Watch and River Rescue Assessment Team volunteers.

**RiverWatch:** Volunteer teams collect water quality data using an electronic sonde, field forms and nutrient test kits. RiverWatch monitoring follows strict protocols (QA/QC procedures).

Data used in this report was collected by volunteers during our October 2015 River Blitz survey and monthly RiverWatch water quality monitoring for Water Year 2015 (October 2014-September 2015).

To view complete data on trash, invasive plants, and full water quality reports, please visit our Online Information Center:

www.sandiegoriver.org/online_info_center.html
Community HABWatch Program

Linda Chilton    Education Programs Manager
Holly Rindge    Communications Manager
Harmful Algal Bloom Watch

• Volunteer monitoring network created by scientists and informal educators

• Monitor local coastal ecosystems; educate the public

• Water samples collected and evaluated for harmful algae by volunteers; scientists monitor findings

• Training and new data portal ensure accessible, quality data

More info:
http://dornsife.usc.edu/uscseagrant/habwatch/
Why it Matters

Strengthening relationships between scientists and the community

Helps researchers:
• More eyes on the water = early detection & rapid response

Helps partners:
• Contribute to scientific research
• Become coastal stewards
• Become better informed about HABs; ocean literacy
• Reach audiences; more educated public about HABs
HABWatch Participants

Get involved! Contact:

Linda Chilton, lchilton@usc.edu
Erica Seubert, erica.seubert@gmail.com