Utilizing Citizen Science as a Platform for Measurable Change

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Water Monitoring Team

Citizen Scientists collecting water quality data around Galveston Bay
Water Monitoring Team

Volunteers measure:

- Temperature
- Dissolved oxygen
- pH
- Salinity
- Transparency
- Depth
- Field Observations
- Fecal indicator bacteria

www.galvbay.org/watermonitors
Initial Data Uses

Data uses:

• Establish baselines and trends
• Education
• Problem screening
• Support planning efforts
• Best Management Practices
• Non-regulatory
• Nearshore data
Creating a Monitoring Plan

Phase 1: Build the Foundation
1. Identify data uses/purposes
2. Identify monitoring questions
3. Identify data users/decision makers
4. Identify information needs of decision makers

Phase 2: Generate Data
What, when, where, how to collect data

Phase 3: Turn data into Information
1. Data summary and Analysis
2. Interpretation, Conclusions, Recommendations
3. Communication and Delivery

Monitoring Plan created via Webinar Series: Monitoring That Guarantees Results, CO Parks & Wildlife & River Network
## Creating a Monitoring Plan

### Monitoring question: 1 of 1: What are the current water quality problems in Galveston Bay and Clear Lake?

**Will be answered by:** Water quality has been analyzed at various marinas and cities, communicated to marina managers, city officials and/or HOAs.

<table>
<thead>
<tr>
<th>Id</th>
<th>Decision Maker</th>
<th>Decision Made</th>
<th>Info Needed</th>
<th>Information Product</th>
<th>Action Plan Steps</th>
</tr>
</thead>
</table>
| B1  | Marina managers and owners            | Marinas decide to implement management practices that increase DO and decrease bacteria inputs/concentrations in the marina, making marinas healthier and more appealing for both human and animal use. BMPs include adding a pump-out station or encouraging use of existing station, encouraging marina users to report pollution or illegal dumping. | - General water quality parameters measured at regular intervals  
- Info delivered to decision makers in the format they need  
- WMT volunteers provide validity and analysis of data | Community marketing campaign (pump-don't dump, GBAN). Add info to Pump-don't Dump | - Identify marinas and contact information to share water quality data with  
- Identify what info decision makers need: format of data, frequency received  
- Conduct analysis and interpretation on data, as needed to deliver data |
| B2  | City officials, Homeowner associations | Cities implement outreach to residents about decreasing pollutants. Infrastructure assessment when necessary by cities. Decreased pollution will increase appeal of city/neighborhood to potential residents, increase quality of life, protect the people who live there. | - Water quality parameters are measured at cities around Clear Lake/Galveston Bay. | Community marketing campaign: potential new campaigns based on new info. info added to existing campaigns (CIG, GBAN, Scoop the Poop, etc.) | Identify cities and communities for all areas where monitoring is occurring. ID groups and contact information for each city/community.  
- Conduct analysis and interpretation on data, as needed to deliver data |
Creating a Monitoring Plan

### Logic Model: GBF Water Monitoring Team

**Situation:** GBF Citizen Science Water Monitoring Team:

<table>
<thead>
<tr>
<th>Inputs (what we invest)</th>
<th>Outputs</th>
<th>Outcomes (Impact)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- volunteers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- time (training, monitoring)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- money</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities (What we do)</th>
<th>Participation (Who we reach)</th>
<th>Short Term (Learning)</th>
<th>Medium Term (Action)</th>
<th>Long Term (Conditions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- trainings</td>
<td>- WQ monitors (community members)</td>
<td>- Citizen engagement and ownership with protecting Galveston Bay</td>
<td>- Citizens choose to change behavior to improve WQ and reduce runoff, based on GBF outreach efforts &amp; WQ data</td>
<td>- Communities around Galveston Bay have changed behaviors to reduce bacteria &amp; other pollutants entering Galveston Bay</td>
</tr>
<tr>
<td>- facilitation</td>
<td>- stakeholders (i.e., marinas, municipalities)</td>
<td>- Increased knowledge of current WQ conditions in the nearshore of Galveston Bay</td>
<td>- Marinas and cities (aka stakeholders, partners) implement management practices and outreach campaigns that improve or maintain adequate water quality</td>
<td></td>
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<tr>
<td>- WQ monitoring</td>
<td>- citizens who use data</td>
<td>- Increased understanding of bacteria conditions in the nearshore of Galveston Bay</td>
<td>- Galveston Bay users are more informed of WQ and recreational risks</td>
<td></td>
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<tr>
<td>- data management &amp; analysis</td>
<td>- GBF staff and partners</td>
<td></td>
<td>- WMT fosters relationships &amp; partnerships with stakeholders</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>External Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>- WQ Monitoring provides accurate portrayal of WQ at that location and time</td>
<td>- Natural impacts on water quality</td>
</tr>
<tr>
<td>- Human activities have impact on WQ</td>
<td>- Community culture and connection to Galveston Bay</td>
</tr>
<tr>
<td>- Communities &amp; partners will have vested interest in changing behaviors to improve water quality, when educated</td>
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</tbody>
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The purpose of the Logic Model is to show how your actions are connected to your long-term goals. This is a communication tool to connect your outputs to your outcomes and maintain integrity.
Overview of Monitoring Plan

• Shift from Input & Output focus to Outcomes focus

• Short term outcomes: *Learning*
  • Focus on increased citizen engagement and increased knowledge

• Mid term outcomes: *Action*
  • Focus on taking action and behavior change
  • ID’d decision makers and partners begin to change BMPs and take action

• Long term outcomes: *Conditions*
  • Focus on long term trends and visible change
Making the Data Public

www.galvbay.org/watermonitors
Initial Successes

• Understanding our niche

• Inclusion of data in other regional watershed communication materials
  • Galveston Bay Report Card

• Improved messaging to public
  • Justifying data precision & accuracy
  • Data use and limitations
  • Conversations at Monitoring Locations

• Consistent, long-term data
  → improved planning for future data collection
Continued Successes

- Salinity levels for resource management
  - GBF oyster gardening
  - Water hyacinth management
  - Cause of fish kills
- Citizen Scientist liaisons
- University & community research
- Regional Watershed Protection Plans
- Influencing Best Management Practices
- Increasing awareness of public health risks
Questions?

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