Laying the groundwork for effective citizen science collaborations in management contexts

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1. Program infrastructure can support effective projects
2. A Fishery Management Council is testing a program approach
3. Collaborating with resource users as data collectors requires specific program components

US Federal Fisheries Management - South Atlantic Fishery Management Council Insights

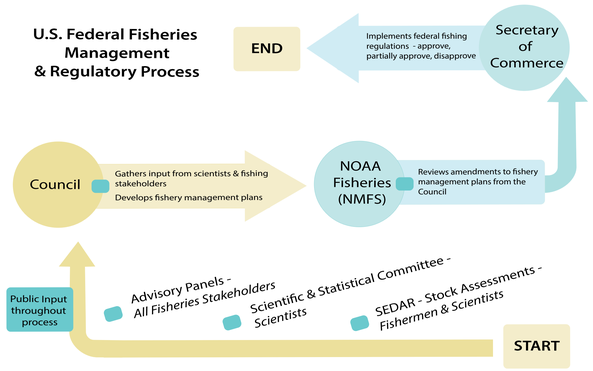
Data Challenges

Data challenges of ensuring adequate science to support its fisheries management program

- limited resources
- high number of managed species
- a complex and highly variable ecosystem
- result: data shortcomings and scientific uncertainties

Why Citizen Science May Be a Solution

- fishermen interested in helping to increase scientific knowledge and 'fill the gaps'
  - access to fishermens' vessels, observations, and on-the-water skills
  - years of historical fisheries knowledge (local ecological knowledge)
- scientists, managers, and fishermen open to increased research collaborations for timely and responsive data collection



Public Participation & Engagement: The Council Process

The Council process is driven from the ground up with opportunity for stakeholder input throughout the management process in a very formal way.

How could citizen science lend itself to and enhance this process?

Data Collection: Fitting the Puzzle Pieces Together to Fill Data Gaps

The science that drives policy is primarily compiled through existing data collection programs. Supplementing existing programs (below) with citizen science-generated data would improve the decision-making process by engaging stakeholders in a meaningful way in shaping the science that is driving the Council policies.

Existing Data Collection Programs:

Fishery Dependent
Data collected by fishermen using standardized reporting system

Fishery Independent
Data collected by scientists using scientific sampling design

Cooperative Research
Research project designed by scientist and data collected in collaboration with fishermen

NEW: Citizen Science

Project designed by fishermen and scientists to meet a specific data need or gap to be directly used in policy and management.

Improving Management Through Collaborative Science: Building a Program to Support Fishery Citizen Science Projects

Built on a Citizen Science Framework Document

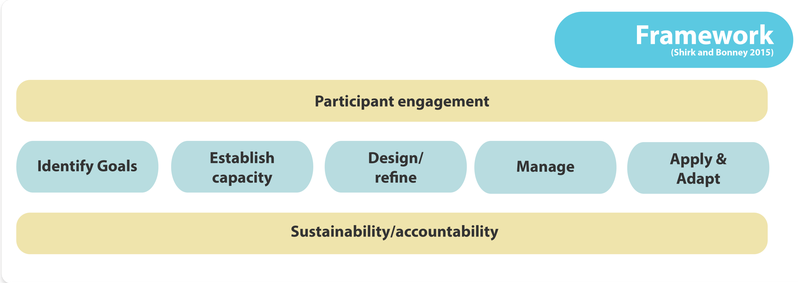
- Informed organizing committee and stakeholder meetings

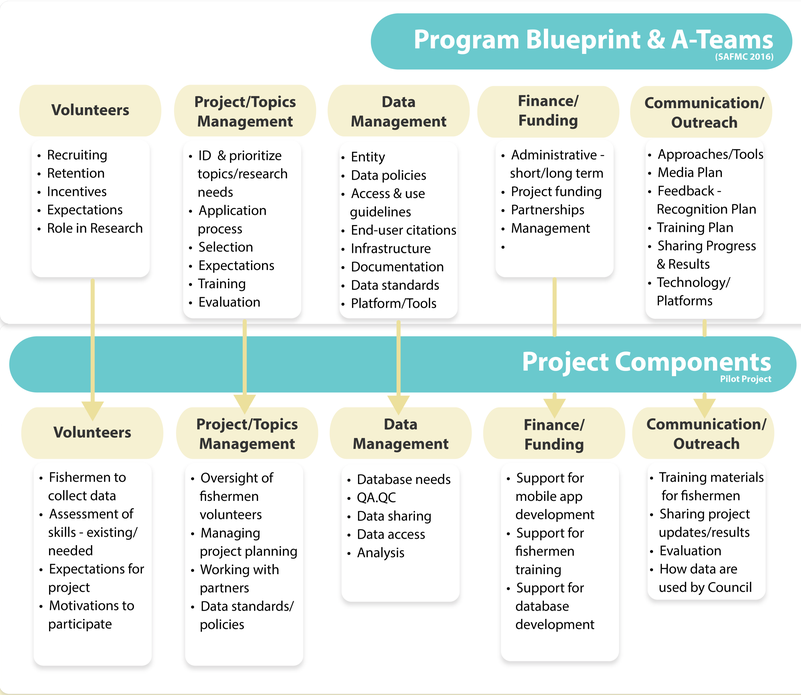
Established a Council Program Blueprint & A-Teams

- Blueprint outlines program administration and oversight
- Emphasis that program and project success relies on:
  - Engaging all stakeholders - scientists, managers, & fishermen
  - Improving perceptions about data collected by fishermen for use in science & management decisions

Pilot Project Components

- Testing the Program Blueprint
- "A-Teams" developing project components to put in place all of the pieces necessary for each project's needs





Fishery Citizen Science Pilot Project: Testing the Program Framework

FOCUS: Characterizing discards (fish that are thrown back by fishermen) of Scamp Grouper (Mycteroperca phenax) in federal waters of the South Atlantic U.S.

Methods & Approach:

- recruit and train fishermen volunteers as citizen scientists
- fishermen provide supplementary data on discards using a mobile app
- data would be used in an upcoming stock assessment

Applicability for Citizen Science:

Fishermen recognize the importance of discard losses in stock assessments and have expressed interest in providing information that would reduce assessment uncertainty.

- addresses a need identified by fishermen and scientists
- fills a known data gap for difficult or expensive to access information
- data desired are relatively simple to collect
- data do not require costly equipment or specialized skills to collect
- project is scalable
  - take place over a wide geographic area
  - include fishermen from all sectors
  - provide useful information within a short period of time with minimal start-up lag

Project Needs:

The project has identified some initial ideas on what might make the project successful to be considered under the Program (see Project Components Figure).

References
Shirk, J. and R. Bonney. 2015. Citizen Science Framework Review: Informing a Framework for Citizen Science. Cornell Lab of Ornithology, Ithaca, NY.
South Atlantic Fisheries Management Council (SAFMC) Citizen Science Planning Workgroup. 2016. SAFMC Citizen Science Program DRAFT Blueprint Proposal.
Http://safmc.net/citizen-science-initiative/

Acknowledgments
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Photo credits: SAFMC, Greg McFall/Gray's Reef National Marine Sanctuary

The Cornell Lab of Ornithology

Laying the Groundwork for Effective Citizen Science Collaborations in Management Contexts:
Citizen science that aims to inform management decisions requires attention to infrastructure: the social and organizational systems that determine how knowledge is sought, shared, brokered, and utilized. *Can larger programmatic frameworks set expectations for stakeholder engagement, establish procedures for data usage, and facilitate timely project development in response to pressing management needs?*

For many years the South Atlantic Council has been grappling with the challenge of ensuring adequate science to support its fisheries management program despite inadequate resources, a high number of managed species and a complex and highly variable ecosystem. Fishermen have offered to collect samples, provide their vessels as research platforms, and record their observations to help increase scientific knowledge, and the Council has recognized the potential for citizen science to "fill the gaps" of data shortcomings and mitigate scientific uncertainties. Recognizing the desire of constituents to get involved and the need to have well designed sampling protocols to ensure that information collected through such efforts is relevant and meets scientific standards for use in decision-making, the South Atlantic Council is developing a comprehensive Citizen Science Program.

Public Participation & Engagement - The Council Process: The Council process is driven from the ground up with opportunity for stakeholder input throughout the management process in a very formal way. But the science that drives policy is primarily compiled through existing data collection programs - fishery dependent, fishery independent, and cooperative research. Fishermen are largely missing from this data collection "equation."

Data Collection - Fitting the Puzzle Pieces Together to Fill Data Gaps: Currently, a combination of fishery dependent and fishery independent data collection programs provide fishery landings and fishing effort data that is used by the Council in developing management and policy. Resources are limited to support expansion of these programs and not all data that are needed to make management decisions are collected under these programs. Supplementing these programs with citizen science-generated data would improve the decision-making process by engaging stakeholders in a meaningful way in shaping the science that is driving the Council policies.

Improving Management Through Collaborative Science -Building a Program to Support Fishery Citizen Science Projects: Informed by a Framework for Citizen Science developed through research for the US Fish & Wildlife Service (Shirk & Bonney 2015), the Council established a Blueprint to help set expectations for stakeholder engagement, establish procedures for data usage, and facilitate timely project development in response to pressing management needs (SAFMC 2016). The Blueprint outlined recommendations for program administration and oversight, and named five "A-Teams" to review each project that is proposed and to put in place all of the pieces necessary to support each project's needs. The Council advisory team emphasized that project success would require particular attention to engaging all stakeholders (scientists, managers, and fishermen) and improving perceptions about data collected by fishermen for use in science and management decisions

Pilot Project – Characterizing Discards of Scamp Grouper: This project will recruit and train fishermen volunteers as citizen scientists to provide supplementary data on fish they release during their regular fishing activities using a mobile app. Data collected for the project would be used in an upcoming stock assessment for Scamp grouper.This project addresses a need identified by fishermen and scientists. It fills a known data gap, collecting information that is proven difficult, or cost prohibitive, to gather through other existing data collection programs. The data desired are relatively simple to collect and do not require costly equipment or specialized skills to collect. As a result, the project can take place over a wide geographic area, include fishermen from all sectors, and provide useful information within a short period of time with minimal start-up lag. In addition, fishermen increasingly recognize the importance of discard losses in stock assessments and have expressed interest in providing information that would reduce assessment uncertainty. Initial ideas on what might make the project successful have been identified (see the Project Components Figure).

More Information and References: http://safmc.net/citizen-science-initiative/
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