

A Snapshot of Indicator Programs' Challenges and Lessons Learned

Summary of Interviews with Nine Indicator Programs

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INTRODUCTION

In preparation for the 2011 Ecosystem Health Indicators Conference, hosted by the Communication Partnership for Science and the Sea (COMPASS) and the Massachusetts Ocean Partnership (MOP), MOP contracted with the Urban Harbors Institute (UHI) of the University of Massachusetts Boston to conduct interviews with nine indicator programs to determine how to shape the conference to best meet the needs of the programs. This conference is responding to a need identified by regional indicator programs to convene and share the details of their programs and discuss potential ways to work together, specifically in the areas of indicator measurement, data acquisition, and communications. It also responds to one of the action items from the 2010-2012 Work Plan of the Northeast Regional Ocean Council (NROC) Ocean and Coastal Ecosystem Health Committee.

The programs selected for interviews were chosen to represent the different ways that indicators can be used, including: (1) to track the progress of and/or to inform management efforts; (2) to track the state of the environment; and/or (3) to track a specific sector of the environment or of management. Additionally, the programs represent indicator efforts at various stages of development, and program selection was heavily weighted to include programs in the region extending from the Long Island Sound to the Gulf of Maine/Bay of Fundy in order to gather regionally relevant information. The team also interviewed a few well-established programs from outside this region, envisioning that they might have valuable insight on indicator measurement, data acquisition, and/or communications. The following programs were interviewed:

Within Workshop Region:

Gulf of Maine Council Ecosystem Indicator Partnership (ESIP)
Massachusetts Ocean Management Plan (Coastal Zone Management)
Coalition for Buzzards Bay
Piscataqua Region Estuaries Partnership (PREP)
Long Island Sound Study
Narragansett Bay National Estuary Program

Outside Workshop Region:

State of the Lakes Ecosystem Conferences
Surfrider Foundation State of the Beach*
Chesapeake Bay Program
(*Surfrider's State of the Beach program is national in scope and includes information both within and beyond the focus region)

In general, the interviews collected information from the indicator programs on the following topics:

1. Indicator Program Initiation (reason(s) for developing the indicator program, etc.)
2. Indicator Program Design (indicator selection, data collection, etc.)
3. Program Implementation and Adaptation (barriers to program implementation, indicator adaptation)
4. Indicators as Evaluation Tools (use of indicators in evaluating management plans/the state of the environment, etc.)
5. Communication and Reporting of Indicators (communication methods, target audiences, etc.)
6. Collaboration between Indicator Programs (levels of collaboration occurring between programs, barriers to program collaboration, etc.)
7. Programs' Lessons Learned (lessons learned by the indicator programs)

The following report summarizes key points from the interviews which can be used to inform the development of the 2011 Ecosystem Health Indicators Conference. *Please note: the information in this report came directly from the program interviews and may not be applicable to all indicator programs.*

KEY POINTS FROM INTERVIEWS

1. INDICATOR PROGRAM INITIATION

Indicator programs were largely initiated to track the state of the environment in order to develop reports on the status of the environment and/or to inform a management plan.

- **Informing a Management Plan:** Several indicator efforts were created to inform management plans. The degree to which the indicators directly relate to the management plan – both in terms of monitoring the success of a plan and directing its adaptation – vary, with some indicator programs directly linking the indicators to management efforts, and others making a more loose connection between the indicators and management efforts. For example, when asked if a program designed its indicators to address ecosystem-based management, some programs said that they did, while others said that they designed their indicators to gather information about the ecosystem with no real tie to management.
- **Tracking the State of the Environment:** In some cases, management plans called for indicators to track the state of the environment or aspects of the environment. In other cases, indicator programs were developed to provide information about environmental trends, but did not directly relate to or evaluate any specific management plan. These indicator programs were generally developed as a way to respond to a need or an observation. For example, one program started in part as a way to gather baseline data about a specific area, recognizing that it was in relatively good condition, but that pressures were increasing.

2. INDICATOR PROGRAM DESIGN

Selecting Indicators - The process for selecting indicators was unique for each indicator program, but many used similar methods to arrive at their current indicators, including: stakeholder processes, reviews of other programs, consultations with experts, application of screening criteria, and developing questions for the indicators to answer.

- **Input from Stakeholders:** Almost every indicator selection process involved gathering input from stakeholders such as scientists, academics, resource managers, NGO staff, members of the general public, and people from the private sector. The number of stakeholders involved varied, with some including more than 100 stakeholders. The method of stakeholder involvement also varied and included meetings, written comments, and the opportunity to comment through a wiki.
- **Review of other Indicator Programs and Literature on Indicators:** Many indicator programs reviewed literature on indicators, with several referring to frameworks such as the Driver, Pressure, State, Impact, Response framework (DPSIR). Additionally, other indicator programs were also consulted for ideas on selecting indicators. (Chesapeake Bay and Puget Sound were among some of the more frequently cited programs.)
- **Consultation with Expert Committees or Workgroups:** In many cases, expert committees or workgroups were asked to help select the indicators by either nominating indicators or selecting indicators from a list already compiled. Experts were also useful in identifying data sources and interpreting data.
- **Use of Screening Criteria:** Some programs also used screening criteria to select their indicators. Criteria included relevance of the indicator; feasibility of obtaining data; response variability; ability to interpret data; quality of data; presence of a cause and effect link; appropriateness at the regional level; and applicability to targets, thresholds, and standards.
- **Development of Questions:** In a few cases, the process for selecting indicators involved first developing questions, then selecting indicators to answer those questions. Sometimes, those questions were closely linked to the goals of the management plans.

Data – All indicator programs interviewed obtain data from outside sources to measure their indicators, while a few also gather new data to fill in data gaps. Acquiring *all* the necessary data to measure indicators is one of the greatest challenges for most indicator programs. Some of the roadblocks to obtaining all necessary data include: difficulties in accessing existing data, cost of either purchasing or gathering data, inability to fill data gaps, and insufficient staff time.

- Acquiring Existing Data to Measure Indicators: All programs interviewed rely on data from outside sources to varying extents, with two relying *exclusively* on outside sources for data. Several programs were also able to cite others who rely on their programs' data for management and enforcement purposes. While acquiring data from outside sources provides an alternative to expending a program's own resources to obtain similar data, using data from outside sources has its own set of challenges:
 - Differing Time and Space Scales for Data: Many indicator programs rely on data gathered from outside sources, and thus the space and time scales for the data may not perfectly match the indicator programs' needs. Time scales were particularly problematic in terms of (1) linking monitoring results to a cause (e.g., one program mentioned that water quality data collected monthly does not capture cause and effect of variations in water quality; however, they are unable to change these scales of data because of their need to capture historic trends) and (2) collecting data on a different time scale than the program's reporting schedule (e.g., in some cases, data are only collected every three or five years, though indicator reporting cycles may be every two years. One large indicator program attempted to address this problem by developing guidelines for their data providers. One of those guidelines was to collect data in such a way that it could be reported on a "water year" cycle (September to August, for example), thus removing the challenge of trying to analyze data collected at different time intervals).
 - Differing Data Collection Methods: Data can be collected in a number of different ways. Differing data collection methodologies have been problematic for several programs – especially regional programs that rely on data from multiple states or countries. As with differing time and space scales, programs could work around the differing methodologies, though often with diluted results. For example, one program draws data from both the US and Canada, and must deal with differing data collection methodologies. For some of the program's indicators, different data sets can be combined and analyzed jointly; but for other indicators, the data cannot be combined and they can only report general trends.
- Gathering New Data to Measure Indicators: Once data gaps are identified, some programs have been successful in acquiring the resources necessary to gather new data. Methods for gathering new data were often developed in consultation with stakeholders who also had a use for the data. Insufficient staff time and a lack of funding were noted as two barriers to gathering new data.

3. PROGRAM IMPLEMENTATION AND ADAPTATION

Program Implementation –Both funding and volunteer efforts play an important role in the implementation of most indicator programs.

- Funding: All programs identified funding as a challenge, though the impact of funding issues on the programs varied. For example, five programs have funding sufficient to at least cover the cost of staff time; however one of those program's funding of staff time is not consistent.

Some programs identified the need for funding to implement new monitoring for emerging issues; for indicators that are measured infrequently (once every ten years...); and/or to maintain a monitoring program that was coming to an end. Only in one case was funding used to purchase data from someone who already collected it. Funding *variability* was also mentioned as a challenge because it prevents consistency within the programs. Some programs are looking at ways to increase collaboration in order

to address funding-related data issues such as filling data gaps. Others have stopped or scaled back their printed materials, in part to save money. Funding is also useful for leveraging support from partner organizations.

- **Volunteers:** Many programs cited the crucial role that volunteers play in their indicator effort – in terms of collecting data, providing data, reviewing data, etc. Importantly however, one program pointed out that funding must be sufficient to pay for the staff to at least maintain interest and momentum among volunteers.

Adaptation of Indicators - Nearly every indicator program reported that they have adapted or are thinking about adapting their indicators. Adaptation includes modifying, adding, and/or deleting indicators.

- **Reasons for Adapting Indicators:** These included having to address new issues (environmental and/or managerial); the availability of new data; the expansion into new geographic areas; the availability of new funds or the loss of existing funds; the need to better communicate the state of the environment/management; and the desire to shed light on emerging issues.
- **Challenges to Adapting Indicators:** When indicators are adapted, programs often struggle with comparing new indicator results with past indicator results, therefore making it difficult to identify trends. For example, if data from new fish-counters are added, how do you compare that larger data set to previous data sets?
- **Process for Adapting Indicators:** The process by which programs make changes to their indicators varies from having a largely internal informal process to having a very formal process by which experts and stakeholders have a structured opportunity to comment. The timing of adapting indicators also ranges from making changes on an on-going basis to adapting indicators once a formal review has been completed every few years.

4. INDICATORS AS EVALUATION TOOLS

Indicators were generally used to evaluate the state of at least one aspect of the environment, to assess the impacts of management activities, and/or to inform indicator adaptation, either internally or for other programs. One program was unique in that part of its indicator program specifically assesses the availability and adequacy of data.

- **Impacting Management Decisions:** Indicators seem to influence internal and external management decisions in two ways: the *data* are used to measure against targets/goals, and the data are used to develop *educational materials* that seek to influence management. Specific examples of how indicators can be used to influence management include:
 - Comparing water quality data to Total Maximum Daily Load targets
 - Using information about the availability and quality of data to encourage a state to improve its water quality monitoring program
 - Increasing the “target number of acres of wetlands restored” by monitoring the progress of wetland restoration efforts
- **Challenges with Understanding the Impact of Indicators:** Because most programs are not able to track those who download reports or access data, it is difficult to know exactly how indicators influence management activities and who is using indicator information for what purpose(s). Additionally, it can be difficult to know how much influence indicators have on a management decision given the myriad of other factors often impacting that decision.

5. COMMUNICATION AND REPORTING OF INDICATORS

Indicators can be communicated in several formats, and programs looked to examples from other programs and considered target audiences to determine how their indicators would be presented.

- **Communication and Reporting Formats:** Most indicator programs presented their data in some type of written report, and some used tools to communicate their findings (e.g. arrows that indicate trends; grades; colors (green, red, yellow); barometers; and the number of points up or down compared to a past score for an indicator). Fact sheets, informational posters, press releases, and presentations were also used. The idea of issuing grades was raised by one program as being potentially problematic in that it conveyed too much of an opinion/policy position. In some cases, stakeholder input was obtained to determine the most effective reporting methods for indicators. In one case, an outside review was conducted on communication methods, and recommendations were made on how to more effectively communicate indicators to target audiences.
- **Reaching Target Audiences:** Indicator reports were generally developed for the following audiences:
 - Managers –internal to the indicators program and/or managers from other programs (7 of the programs interviewed identified this target audience)
 - Public (6 programs)
 - Policy/decision makers (5 programs)
 - Science community (2 programs)
 - Advocacy groups and/or NGOs (2 programs)
 - Partners (1 program)
 - Top-level administrators (1 program)
 - The EPA (1 program)

Given the broad range of audiences and varying abilities to comprehend the data, several programs noted that it was difficult to effectively reach all target audiences without over-simplifying the material. Also, programs noted that by presenting reports and data online, it can be difficult to know exactly who is using the data/reports and whether audiences would prefer different information. In one case, to ensure that information reaches the target audience, specific meetings are arranged with all stakeholder representatives to directly convey the indicator results (which were tailored for each meeting) and answer any questions. A further complication is that some datasets are proprietary and cannot be listed online.

- **Levels of Detail when Communicating Indicators:** Considering the different interests among target audiences, a number of indicator programs found it difficult to provide varying levels of detail when reporting on indicators. Several programs mentioned the benefit of utilizing online resources, where users could “dig” for greater detail on an individual basis. Technical reports were also developed to provide greater levels of detail for those interested.

6. COLLABORATION BETWEEN INDICATOR PROGRAMS

Varying levels of collaboration and communication (primarily to obtain data) occur between indicator programs. In general, increased collaboration and communication on a regional scale could be useful to most programs.

- **Collaborating for Data Purposes:** Several indicator programs already network with others to gather and report data; however increased collaboration can be useful for various purposes, such as obtaining data that is difficult to acquire from another organization and/or difficult to gather in the field; addressing data gaps; and reporting indicators.
- **Regional Collaboration:** Collaboration on a regional scale may help to identify regional trends; improve data sharing, collection, and interpretation; identify new relevant pieces of information; and expand the indicator audience/user community while also increasing the visibility of regional issues. Collaboration

on a regional scale may also identify regional trends that can be addressed through new management activities, and may help to reduce potential confusion of different messages coming from different indicator reports.

- **Barriers to Collaboration:** There are several barriers to collaboration, including a lack of formal commitments between programs to collaborate; a lack of staff or funding to make collaboration a priority; and differences among program goals, objectives, and geographic scopes. Also, some indicator programs are reluctant to collaborate with programs that have certain advocacy positions.

7. PROGRAMS' LESSONS LEARNED

The indicator programs were very forthcoming with what they felt were their strengths and weaknesses, and several offered observations/lessons learned, from which other programs may benefit. Since indicator programs often have different goals, it should be noted that an observation that may benefit one program may not be useful to another. Observations and lessons learned can be organized by the following topics:

Data-

- Good data is critical for a successful indicators program. Without useful data (meaning accessible data collected at appropriate time and/or space scales using sound methodologies), it is difficult for programs to report on indicators in a meaningful and consistent way
- While data gaps present challenges for indicator programs, the existence of data has improved over time
- Programs should align the assessment period with data acquisition timeframes
- Expanded monitoring is required to focus and measure the success of protection and restoration activities
- Given the variations on space/time scales, data collection methodologies, data formats, etc., data interpretation can be very difficult
- Programs often have difficulty locating data, as well as identifying data sources
- Data collection should be integrated into the management program from the very beginning

Communication and Reporting-

- Establish key measures for reporting and use those measures consistently
- Report ecosystem health separate from restoration efforts
- Provide context for indicators (with goals and commitments from all partners)
- Present indicators as “% of a specific program goal achieved” rather than presenting number of miles, acres, etc. This will allow for the comparison of indicators from year to year and has led to the development of indices
- Any indicator is a visualization of data and should be reported objectively to have wider audience appeal (audience can use the data to advocate as they see fit)
- Programs may create great products, but those products may be used less than anticipated

Indicator Selection-

- Programs should avoid rushing through the indicator selection process, though some deadlines can be helpful to keep programs from searching at great lengths for the “perfect” indicators
- Programs shouldn't attempt to force the indicators into the DPSIR framework

Collaboration between Indicator Programs-

- Establishing good relationships between programs will help with data acquisition

- Programs should engage stakeholders, especially stakeholders that gather data and operate within the planning area. This provides the program with an enhanced understanding of the planning area, and also works to prevent criticism down the road

CONCLUSION

The indicator programs interviewed in preparation for this conference represented programs of various sizes in different stages of development with a wide range of priorities. Despite their differences, these programs share several challenges including acquiring and interpreting data, effectively communicating indicators to target audiences, and making the best use of available resources. Many programs stated that they are in some stage of redeveloping at least part of their indicator programs, and several programs expressed an interest in communicating with others to identify ways in which they can collaborate to address their challenges.