

Using Social Data in NPS Management

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Introduction

As noted in our preceding article, effective management of nonpoint source (NPS) water pollution requires addressing both environmental conditions and the decisions people make that impact the environment. Efforts to improve water quality by changing behavior will have to consider people's awareness, skills, attitudes, capacity, or constraints related to water quality improvement. Monitoring indicators for the social dimensions of water quality projects, like monitoring indicators of environmental conditions, gives us valuable information about how well our strategies are working.

The challenge in using this information comes in trying to figure out what to measure, how and when to measure it, and how to apply those measurements to water quality projects. In response to this challenge, and in cooperation with federal, state, and local partners, our project team has developed a system to integrate social data into planning and evaluation of nonpoint source water quality efforts. The system uses social data to help focus planning efforts and to generate "social indicators" as interim measures of progress towards intended "social outcomes" and goals. Using this system helps people who are addressing NPS pollution understand interim accomplishment measures of projects, assess effectiveness of multiple projects across a region, and find opportunities to improve future efforts. We call the system SIPES – the Social Indicators for Planning and Evaluation System.

Through the USDA-CSREES Great Lakes Regional Water Program, Cooperative Extension researchers and educators have coordinated this

partnership between USEPA, the six state NPS programs in the Great Lakes Region/USEPA Region 5 (Minnesota, Wisconsin, Michigan, Illinois, Indiana, and Ohio), and land grant universities. State NPS programs in the region are using social indicator data to document progress toward NPS water quality improvement goals. Social indicators are part of an ongoing effort among state water quality agencies and USEPA to evaluate and improve their NPS programs. SIPES was developed for USEPA Region 5 to provide standardized, regionally comparable and consistent social data that will complement other data already used by state programs. While undergoing pilot testing and refinement, SIPES offers a model for others addressing social dimensions and developing interim measures of progress for their NPS programs.

The System Logic

The logic behind social indicators is that water quality problems have accumulated over many decades and may well take decades to amend. Rather than measuring progress solely through changes in environmental indicators (like coliform counts, nitrate levels, and total suspended solids), or administrative indicators (like materials developed, meetings conducted, and funds expended) that say little about actual impact, social indicators for NPS provide information about people's behaviors and factors that influence them. Changes in these factors often precede water quality change. As summarized in the preceding article, previous research suggests that there are many factors that can influence an individual's decision to adopt a given environmental or conservation practice. Which of those factors are most salient

for a specific decision will depend on the nature of the practices being promoted, individual characteristics, and local context. Effective planning and management must take these factors into account. Programs must be developed based on knowledge of environmental conditions as well as knowledge of target audiences and contextual factors that influence their behavior.

Broadly then, social indicators are measures that describe the capacity, skills, awareness, knowledge, values, beliefs, and behaviors of individuals, households, organizations, and communities. For the purposes of NPS management, social indicators provide information about awareness, attitudes, constraints, capacity, and behaviors that are tied to water quality improvement and protection. By measuring these indicators over time, project managers can develop incentive, educational, and assistance programs, target their activities, and assess whether their efforts are accomplishing changes expected to improve and protect water quality.

For example, confirming that awareness and attitudes are changing and behaviors are being adopted in a watershed is one way that projects can demonstrate progress toward water quality goals. Social indicators provide consistent measures of social change within a watershed and can be used by managers at local, state, and federal levels to estimate the impacts of their efforts and resources. Figure 1 illustrates the link between social indicators and eventual improvement of water quality.

Using social indicators complements existing planning and implementation processes supported by state and federal NPS programs (for example, USEPA's *Handbook for Developing Watershed*

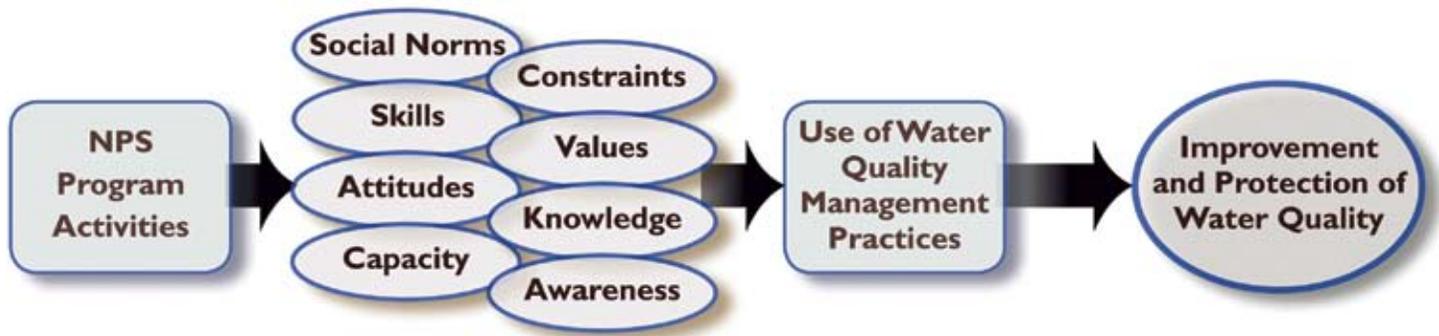


Figure 1: Conceptual model of social indicators and water quality.

Plans). Primary users are NPS projects funded through grants from state NPS programs. With SIPES, we intend for state NPS programs to consult with individual projects to determine the expectations for each project using the system. A project's goals and target audience will influence the social indicator collection process and methods. The system is designed to produce consistent information while being flexible for local needs.

System Components

In order to be useful and accessible to project staff, and relevant for project planning, implementation, and evaluation, we developed SIPES to include several key components.

A manageable set of indicators that can be measured at multiple points in time. The social indicators developed for SIPES are numeric measures derived from responses to questionnaires completed by target audiences and project staff. A list of "core" social indicators, along with specific project goals and intended outcomes for each type of indicator, are included in Table 1. This core set was selected to provide a manageable number of indicators that address important components of the behavior change process. These indicators will help project staff focus and evaluate their efforts toward several important intended outcomes: (1) increased awareness of relevant technical issues and/or recommended practices in critical areas; (2) changed attitudes to facilitate desired behavior change in critical areas; (3) reduced constraints to behavior change; (4) increased capacity to leverage resources in critical areas; (5) increased capacity to support appropriate practices in critical areas; and (6) increased

Table 1. Goals, Intended Outcomes, and Core Social Indicators for NPS Management.

GOAL: INCREASED TARGET AUDIENCE AWARENESS

Awareness Outcome 1: Increase awareness of relevant technical issues and/or recommended practices of the target audience in critical areas

- Indicator 1: Awareness of consequences of pollutants to water quality
- Indicator 2: Awareness of pollutant types impairing water quality
- Indicator 3: Awareness of pollutant sources impairing water quality
- Indicator 4: Awareness of appropriate practices to improve water quality

GOAL: CHANGE TARGET AUDIENCE ATTITUDES

Attitudes Outcome 1: Change attitudes to facilitate desired behavior change in critical areas

- Indicator 1: General water-quality-related attitudes
- Indicator 2: Willingness to take action to improve water quality

GOAL: REDUCE TARGET AUDIENCE CONSTRAINTS

Outcome 1: Reduce constraints to behavior change

- Indicator 1: Constraints to behavior change

GOAL: INCREASE ORGANIZATIONAL CAPACITY

Capacity Outcome 1: Increase capacity to leverage resources in critical areas

- Indicator 1: Resources leveraged by grant recipient in the watershed as a result of project funding (including cash and in-kind resources)

Capacity Outcome 2: Increase capacity to support appropriate practices in critical areas

- Indicator 2: Funding available to support NPS practices in critical areas
- Indicator 3: Technical support available for NPS practices in critical areas
- Indicator 4: Ability to monitor practices in critical areas

GOAL: INCREASED TARGET AUDIENCE ADOPTION OF NPS MANAGEMENT PRACTICES

Behavior Outcome 1: Increase adoption of practices to maintain or improve water quality in critical areas

- Indicator 1: Percentage of critical area receiving treatment
- Indicator 2: Percentage of target audience implementing practices in critical areas
- Indicator 3: Ordinances in place that will reduce nonpoint source stressors

adoption of practices to maintain or improve water quality in critical areas.

The set of social indicators in Table 1 is not comprehensive, and other social indicators can also provide additional useful information for planning, implementing and evaluating NPS projects.

Effective tools and methods for collecting social data. Among the biggest challenges in collecting information from people is determining what questions to ask and how to ask them. SIPES relies on questionnaires that can be used in surveys or interviews and provides templates that use consistent question formats to capture social indicator data while enabling project-specific customization of pollution sources, management practices, constraints, and communication channels. The questionnaires reflect principles of sound instrument design and are structured to collect information consistent with the indicators in Table 1. Projects can also add locally relevant questions.

Other tools developed with SIPES provide help for evaluating specific implementation activities (for example, landowner workshops and newsletters) and for collecting contextual information that influences project development and implementation. For example, there is a set of structured questions project staff and other key stakeholders can use to identify external factors influencing their project.

Accessible tools for managing and analyzing social data. Processing and using the information collected from people generally requires some sort of database and set of analytical tools. A central component of SIPES is a Web-based Social Indicators Data Management and Analysis (SIDMA) tool. SIDMA helps project coordinators organize, analyze, report, and visualize social indicators related to water quality improvements. SIDMA is accessible by project staff through an interactive Website and will eventually integrate with other existing systems already in use for tracking and reporting NPS data in the region.

SIDMA includes several helpful features (Table 2). A “survey-builder”

Table 2. Features of the SIDMA Tool.

Survey builder	Provides survey questions to be selected and adapted for use by a watershed project
Geographic information and mapping tools	Provides watershed boundaries and population data
Data input screens and database	Use to input and store responses from questionnaires and other social indicator data
Data analysis tools	Use to generate descriptive and inferential statistics from survey data
Mechanism for reporting social indicator data	Use to report required social indicator data to USEPA Region 5
Report writing tools	Provides assistance for communicating social indicator data

allows project staff to construct pre-project and post-project questionnaires using question structure and phrasing consistent with other projects across the region; the survey is generated in a format that project staff can mail or use as the basis for a telephone, in-person, or (if appropriate) e-mail survey. SIDMA also allows projects to enter survey responses directly online and provides data analysis and data export functions. The SIDMA tool, developed through the Institute for Water Research at Michigan State University, will also enable regional compilation and analysis for social indicators.

Guidance for collecting and using indicator data. The process of collecting and using social data is not necessarily intuitive to resource managers trained in natural sciences. In order to make this process as clear as possible, our team created a handbook with information and instructions on each component involved in using social SIPES. The instructions are organized around seven steps that begin with reviewing existing plans to be clear about environmental problems, causes of those problems, human sources contributing to the issue, and desired changes that people should make. The handbook provides details for navigating each step in the SIPES process, outlined in Figure 2.

Testing and Future Applications

This effort to create a system for using social data in NPS management is currently in a three-year pilot-test phase, which will involve multiple NPS projects in each of the region’s six states. (The following article on Indiana’s Eagle Creek Reservoir describes one of the pilots.) Pilot projects will use detailed protocols for documenting issues related to staff capacity to use the system, level of assistance provided during implementation, costs, and other questions of interest. We hope to learn how well the system works and whether or not it can be sufficiently “free-standing” to allow projects to use it with limited additional assistance. During the testing and refinement phase, pilot projects will have access to support and technical assistance from the regional project team. Long-term support needs will be identified and documented through this pilot phase. While the system has its limitations, SIPES offers a helpful starting point for addressing some of the challenges facing NPS programs. Although access to SIDMA is only available for pilot projects in this six-state region, much of the system and its supporting components can be reproduced for other areas through development of common instruments, protocols, and reporting formats. As we continue to learn from its application for lakes and watersheds in the Upper Midwest, we hope the system sparks



Figure 2. Steps for integrating social indicators into planning and evaluation.

similar efforts for related conservation issues and continues to provide helpful insights for integrating the social dimension into lake and watershed management.

Note

This project reflects efforts of the Regional Social Indicators Team. For more information about the system (SIPES), the development team, the SIPES handbook, and the CSREES Great Lakes Regional Water Program, please visit <http://www.uwex.edu/ces/regionalwaterquality/Flagships/Indicators.htm>. 