



MEMORANDUM

To: Mark Tedesco, John Whitler, Tristan Peter-Contesse, Jeremy Martinich, and Julie Rose, U.S. EPA; Sarah Deonarine, NY DEC; Antoinette Clemetson, NY Sea Grant; Jennifer Pagach and Mark Parker, CT DEP; and Juliana Barrett, CT Sea Grant

From: Susan Asam, Marybeth Riley-Gilbert, and Liz Strange, ICF International

Date: April 25, 2011

Re: Recommendations to LISS for Development of Pilot Projects to Monitor Climate Change

Background and Purpose

ICF International (ICF) and the U.S. Environmental Protection Agency (EPA) are working with the Climate Change Workgroup (Workgroup) of the Long Island Sound Study (LISS), a partner in EPA's Climate Ready Estuaries (CRE) Program, to: (1) review and synthesize information on climate change drivers and responses in Long Island Sound (LIS) [*completed*]; (2) develop a prioritized list of indicators for monitoring climate-driven change [*completed*]; and (3) prepare recommendations on elements of a final monitoring plan. The information produced by these activities will be included in a document by LISS describing their approach for monitoring climate change, entitled *Sentinel Monitoring for Climate Change in the Long Island Sound Region of New York and Connecticut*.

The last activity associated with the third and final task is to develop recommendations for developing several pilot projects to monitor climate change, including key elements of a pilot monitoring project and selection criteria for picking a location for a pilot project in each state. This memorandum presents our recommendations. It begins with a summary of a quick review of other pilot project development guidance, provides an overview of some key elements for developing a pilot climate change monitoring project, and suggests a process for selecting pilot projects in the LISS area.

We hope that the recommendations presented here will help LISS work toward selecting their pilot project goals and sites. However, we also expect that LISS's particular objectives could result in modifications to some of the proposed recommendations.

Review of Pilot Project Development Guidance and Examples

ICF reviewed a number of guidance documents for developing environmental pilot projects by the National Oceanic and Atmospheric Administration (NOAA), National Park Service (NPS), EPA, and the Hudson River Estuary Program, as well as documentation on the development of already-existing or completed projects. We also considered information provided previously by the LISS Climate Change Workgroup (Workgroup). While the majority of the literature reviewed is not specific to estuary pilot projects, the key elements of each can provide useful guidance to LISS in terms of objectives and scope. The information gleaned from this review is integrated with LISS's stated goals into the suggestions below of key elements for project development and location selection.

Key Elements of Developing a Pilot Climate Change Monitoring Project

In the review of pilot project development guidance, ICF identified some key elements to consider when developing such projects. Many of the recommendations presented here are not yet specific to LISS's particular pilot project goals, since those goals are still under development.

A 1998 World Bank document on developing monitoring projects related to biodiversity suggests that ecosystem-related monitoring projects should: answer a clearly stated set of questions; state clearly what indicators will be used; specify how often monitoring will occur and who will conduct the monitoring; specify how often project evaluations will occur; specify how exactly the results will feed back in to management decisions; and specify up front the expected costs and funding sources.

Accordingly, questions that LISS may want to consider when designing pilot projects are:

- Objectives for the pilots: What knowledge does the program ultimately hope to gain from the project(s) (i.e., what are pilot goals)? What will the program do with the knowledge gained through the studies? How will the monitoring results feed back in to management decisions?
- Pilot locations: What types of locations are consistent with the stated goals? If goals are similar across multiple pilots, consider whether it is preferable to select sites where conditions are similar (e.g., two sites heavily affected by polluted runoff) or sites that provide contrasting conditions (e.g., a marsh that is heavily impacted by polluted runoff versus one that is not).
- Timeframe: What is the timeframe of the pilot project? Will locations be included in a long-term monitoring program? Is the program looking to work primarily with historical information and obtain early results quickly?

- **Data:** Will a site with a well-established historical record help achieve the stated goals? Will any new data collection be required, or will new data collection be left for the long-term monitoring strategy that arises from the pilot projects? Is there a preference between remote data or manually-collected “on the ground” data? How much new data collection can be undertaken with the current budget? How fine is the resolution of the data—fine enough to allow accurate reporting at a site-specific level? For the data to be used for decision-making, will it need to be collected at more than one site for comparison?

Table 1: Key Monitoring Elements for LISS to Consider in Pilot Project Development

Key Monitoring Elements	Comments
Which indicators will most likely provide an unambiguous signal of climate change?	It may be useful to use the information provided in the June 4, 2010, memo, <i>Table of Impacts and Indicators: Development of Climate Change-Related Questions and Proposed Ranking Approach</i> , to help determine which indicators are the best candidates for pulling out this signal. It will be important to think about whether it is possible to quantify the changes.
Cost-effectiveness	Since the amount of available funding is a criterion for LISS in considering how to design its pilot projects, this element could be key in selecting a site.
Utilize data from existing monitoring programs	Utilizing data from existing monitoring programs is cost-effective, time-efficient, and will allow reporting and analysis of results within the desired one-year timeframe. Additionally, a baseline can be defined without new monitoring.
How many indicators would LISS ideally like to monitor across the pilot projects?	The inclusion of multiple indicators could complicate evaluation of monitoring design, results, isolation of climate change signals, etc. However, monitoring more indicators would potentially increase confidence that the pilot project findings are nearly-conclusive.
Select indicator(s) most likely to show effects over the timeframe of interest	Indicators such as water temperature, pathogen levels, turbidity, and pH can be immediately evaluated and even reported remotely (and quickly). Other indicators, such as species abundance, might require more on-the-ground work, which could be outside the scope of current budget and are not suitable for a pilot project.

Suggested Process for Selecting Pilot Projects

Using these key elements as a guide and considering LISS's stated objective to establish two pilot projects—one in New York and one in Connecticut, we suggest the following process for selecting the pilot project locations.

Identify and agree on goals of the climate change monitoring pilot projects

In determining goals for the pilots, ICF suggests that LISS decision-makers consider if the pilot projects will assist in gaining a better understanding of the following:

- How habitat(s) or species of interest will respond to climate change;
- Whether and how it can be determined that trends in indicators can be attributed to climate change;
- Whether or not there is evidence that climate change effects (such as those associated with changes in precipitation, temperature, sea level rise, or ocean acidification) are currently affecting habitats and/or species of concern;
- How observed changes vary across the LISS system, in both Connecticut and New York; and
- What timeframes can particular climate change effects be expected to have significant impacts on the indicators of concern and potentially interfere with existing management goals.

Identify and agree on selection criteria

Agreeing on selection criteria upfront will assist the diverse group of LISS decision makers and stakeholders in selecting pilot locations. ICF suggests LISS consider taking the following steps to identify and agree on selection criteria:

1. Develop a large list of potential pilot project criteria
2. Distribute the list of potential pilot project criteria to LISS decision-makers (at this stage, determine whether the processes for New York and Connecticut decision-makers should be separate or whether the same selection criteria should be used in both states)
3. Because verbal feedback in meetings can lead to mixed results, an individual response process could lead to the most straightforward selection process. It may be valuable to ask decision-makers to rank the selection criteria based on the following three categories:
 - a. Critically important for the project to address in order to gain understanding of the impacts of climate change to the LISS system;
 - b. Important for the project to address, if time and budget allow, but not critical to understanding the effects of climate change on the LISS system; and

- c. Not at all important in determining the impacts of climate change on the LISS system, but may be useful in narrowing down pilot locations.
4. After receiving feedback from decision-makers, compile a short list (e.g., 3-5) of selection criteria that the group has determined to be the most important.

Identify candidate pilot locations

The next suggested step is to develop a list of pilot sites that seem like good potential candidates (prior to formally applying the selection criteria). Some considerations when creating this list of possible pilot locations include:

- Is the site recognized as a site of importance or concern?
- *If* the same criteria are used to select sites in both states, it will be important to consider at this stage whether or not the monitoring goals for both sites will be the same. Should the efforts at each act to duplicate the other for result verification? It might be useful to involve stakeholders in making this determination.
- Determine whether the sites that are to be short-listed should be sites that are currently stressed, stable and relatively unstressed, or a mix of both.
- Determine whether the site has been previously identified as expected to be particularly sensitive to climate changes such as changes in precipitation, sea level rise, etc.

Apply selection criteria to develop a “short list” of candidate pilot locations

LISS decision makers can use the previously-selected criteria to evaluate the list of candidate pilot locations. Evaluation could be undertaken as an informal group discussion, through a process of individual scoring of how pilots stack up to each criterion, or a number of other approaches. It may be most useful to aim to simply narrow the list of potential pilot locations down to a few options (e.g., two or three for each state) rather than trying to select only one site through this process.

Discuss and agree on selection of pilot locations

Accordingly, it can be valuable to convene a group of key decision-makers and/or critical stakeholders once the list of potential sites is narrowed to only a few. The goal in convening such a group is to present the process for how the list of sites was developed and then narrowed. The group can then discuss and agree on the final site selection for each state, allowing some of the less tangible and/or quantifiable criteria (e.g., political concerns, public communication benefits) to enter into the decision-making process.

References

Below is a list of references we have cited in this memo, along with some other relevant references.

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