

Project Title: Peconic Estuary Water Quality Status and Trends Comprehensive Assessment

Principle Investigator: Cameron Engineering & Associates, L.L.P.

Project Tasks:

Task 1: Literature Review

The Contractor shall conduct a thorough review of reports and documentation available regarding topics and issues pertinent to the Peconic Estuary and to the assessment of estuarine and stream water quality. The Contractor shall produce a summary report and description of data sources to be analyzed in Task 2. All major or significant research efforts will be described in detail along with the conclusions reached. Important overview papers will be included in the review. Summary tables will be included in the report that list the research topic and subtopics, researchers, institution, dates conducted, type of data collected, and locations conducted. A short statement will be included in the tables that identifies the findings/conclusions reached.

Task 2: Compile Existing Water Quality Data

The Contractor shall employ a systematic approach for compiling pertinent time-series data sets using a data model and a Microsoft Access database. The Contractor shall expand upon existing data management system with new queries, charts and, potentially, new tools for data exchange with statistical analysis and/or data visualization programs. The Contractor shall also utilize a GIS database to store important water quality and other thematic data for spatial analysis. The Contractor shall be responsible for obtaining any necessary supporting data sets and/or monitoring data assessments, including time series and/or spatial data, that may be available from other agencies or groups (i.e., Cornell Cooperative Extension, USGS, NYSDEC, USEPA, TNC, NADP/NTN), that will complement the spatial trends analysis. These data sets will be collected and stored within the data model for supplemental use, and may include, but are not limited to, any available water quality, meteorological and sediment data. The County shall provide all available surface water quality data collected by the SCDHS in digital format (Microsoft Access). Data for approximately 200 stream sampling events that still exist in paper format shall be computerized by the Contractor.

Task 3: Data Analysis

The Contractor shall conduct data analysis to characterize existing surface water quality in the Peconic Estuary, identify and evaluate trends in key parameters (listed below), assess the extent to which water quality goals of the Peconic Estuary Program CCMP and the Peconic Estuary nitrogen and pathogen TMDLs have been accomplished, provide a comprehensive assessment of water quality status and trends, describe any relationships identified regarding the occurrence of major blooms of Brown Tide (*Aureococcus*) or *Cochlodinium*, assess potential impacts of climate change on the estuary, and if warranted, identify areas where future monitoring efforts should be expanded, redirected and/or improved. Exploratory data analysis

techniques, including graphical and computational methods, shall be employed to identify relationships between variables. The Contractor shall provide a summary quantitative and interpretive report for Task 3 in the form of 6 hard copies and 6 electronic copies (CDs) for departmental review. The report shall contain subsections that characterize existing and historical water quality in the Peconic Estuary, streams and YSI monitoring describing the spatial and temporal trends over the 1976-2008 sampling period, a comprehensive assessment of water quality status and trends, and describes any relationships identified related to the occurrence of major algal blooms, including Brown Tide and *Cochlodinium polykrikoides*. The report shall include appropriate tabular summaries, graphical plots and charts, and reference and thematic maps which clearly depict important spatial relationships. To the extent that available data permits, an additional report section shall also assess the following:

- A. The relative sources of nutrient loading to the estuary, including but not limited to point and non-point sources, rivers and streams, precipitation and storm water runoff, groundwater seepage, sediment flux, and wet/dry atmospheric deposition
- B. Regional and temporal (annual, summer, pre/post CCMP) variability
- C. Sediment and water column processes that may be affecting nutrient cycling and observed levels of nitrogen and phosphorus in the system, including nitrification, denitrification, and benthic flux
- D. The role that benthic organisms, macroalgae and seagrasses (eelgrass) have on estuary nutrient levels
- E. Whether the objectives and goals of the Peconic Estuary Program CCMP pertaining to water quality issues, and of the Peconic estuary pathogen and nitrogen TMDLs, are being adequately met
- F. The effects of climate change on the estuary seen and expected
- G. Whether future monitoring efforts should be redirected, and if so, the changes that are recommended

Task 4: Final Report

The Contractor shall conduct a project ending wrap-up meeting with the Department and other involved agencies, including the PEP Management Committee, and will utilize a PowerPoint presentation to present and discuss the final project report. The Contractor shall amend the summary reports from Tasks 1 through 3 as necessary in response to comments provided by the Department and submit a final report. The final report shall be submitted in the form of 50 colored copies and 50 CD-ROMs containing a .pdf file of the final report and a CD-ROM of all associated data layers and files.