

REQUEST FOR INFORMATION
for the
Charlotte Harbor National Estuary Program
Optical Model Spectral Validation and
Water Clarity Reporting Tool Refinement Project

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RFI Inquires for Information Period: September 2 - 14, 2011

RFI Response Submittals Due: September 30, 2011

Charlotte Harbor National Estuary Program



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The Charlotte Harbor National Estuary Program is a partnership of citizens, elected officials, resource managers and commercial and recreational resource users working to improve the water quality and ecological integrity of the greater Charlotte Harbor watershed. A cooperative decision-making process is used within the program to address diverse resource management concerns in the 4,700-square-mile study area. Many of these partners also financially support the Program, which, in turn, affords the Program opportunities to fund projects. The entities that have financially supported the program include the following:

U.S. Environmental Protection Agency
Southwest Florida Water Management District
South Florida Water Management District
Florida Department of Environmental Protection
Florida Coastal Zone Management Program
Peace River/Manasota Regional Water Supply Authority
Polk, Sarasota, Manatee, Lee, Charlotte, DeSoto, and Hardee Counties
Cities and Towns of Sanibel, Cape Coral, Fort Myers, Punta Gorda, North Port, Venice,
Fort Myers Beach, Winter Haven, and Bonita Springs
and the Southwest Florida Regional Planning Council.

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Purpose

This is a Request for Information (RFI) for planning and informational purposes only. The Charlotte Harbor National Estuary Program (CHNEP) is seeking information on how interested contractors could provide a spectrally-explicit optical model that can be used with ambient water quality data and the CHNEP Water Clarity Reporting tool to assess and convey progress towards achieving CHNEP water clarity and seagrass protection and restoration goals. CHNEP desires that an optical model, validated for spectral components, be developed for each of the 10 estuary segments within the study area and applied to colored dissolved organic matter (CDOM), chlorophyll *a* and turbidity data to estimate annual water clarity conditions for each of the estuary segments. CHNEP also desires that the validated optical model be made available to the Program to share with scientists and the public, specifically via the CHNEP Water Atlas.

This is **not** a Request for Proposal. No contract will be awarded from this announcement. Information gathered through this RFI process will be used by CHNEP to determine the most appropriate steps needed to develop a project Scope of Work, select the proper vendor, and enter into contractual arrangements with the vendor. A more detailed Request for Proposal may be issued by the CHNEP in the future if it is warranted based on the number and quality of responses to this RFI.

Public Availability of RFI Responses

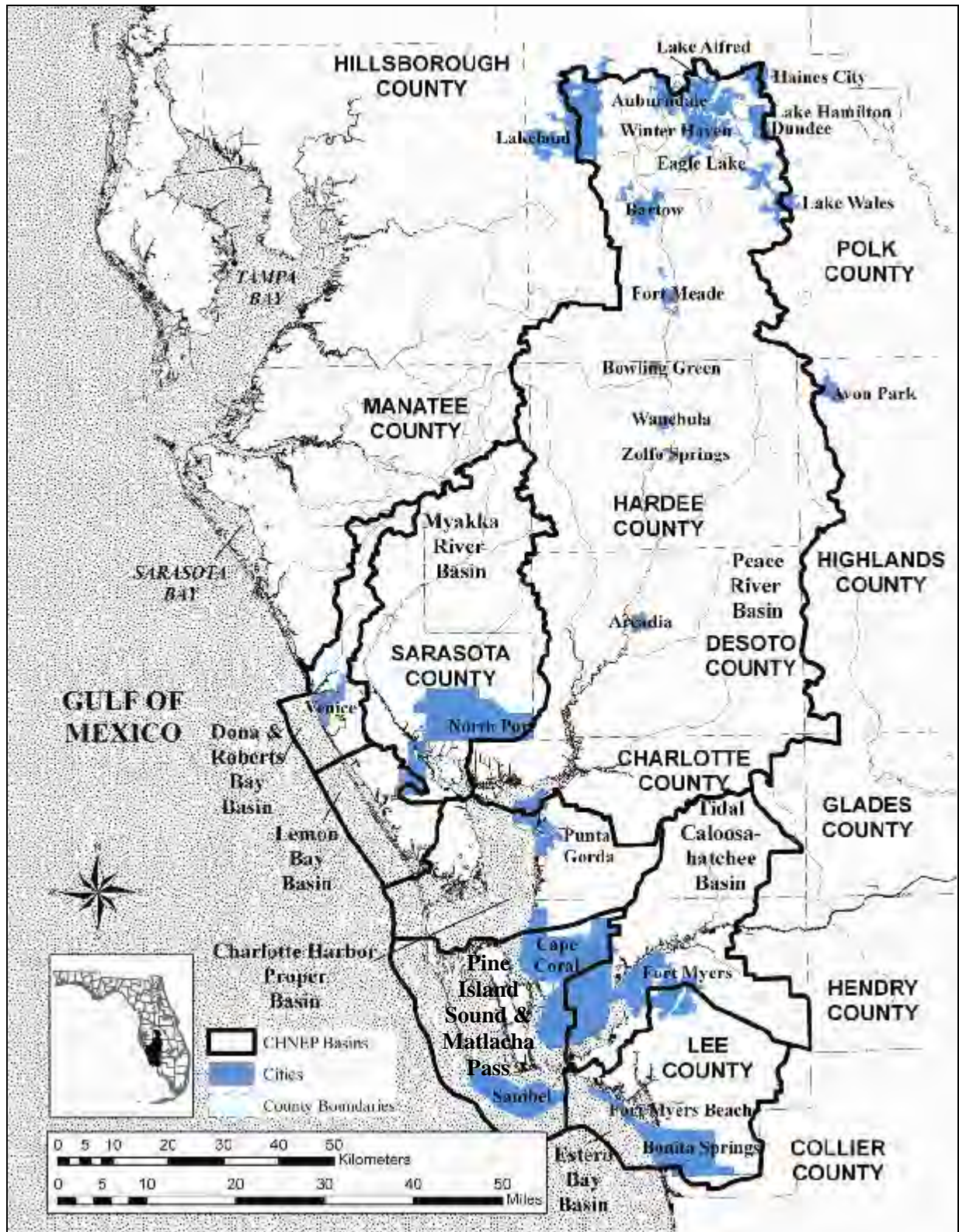
Responses to this Request for Information, upon receipt by the Program, become public records subject to the provisions of Chapter 119 F.S., Florida's Public Records Law. If you believe that any portion of your response is exempt, you should clearly identify the specific sections for which confidentiality is claimed, and provide the specific legal authority of the exemption. CHNEP will redact those sections from the public record.

Introduction

CHNEP (Figure 1) is located in southwest Florida and is 1 of 28 National Estuary Programs nationwide established to implement the federal Clean Water Act. CHNEP is a partnership of citizens, elected officials, resource managers, scientists and citizens working to improve the water quality and ecological integrity of the greater Charlotte Harbor watershed. A cooperative decision-making process is used within the Program to address diverse resource management concerns in the 4,700 square mile study area. The watershed includes all or parts of Lee, Charlotte, Sarasota, Manatee, Polk, Hardee and DeSoto Counties. Within the study area there are 3 major rivers: Myakka, Peace and Caloosahatchee; and 10 estuaries: Dona and Roberts Bays, Lemon Bay, Tidal Myakka River, Tidal Peace River, Charlotte Harbor and Cape Haze, Pine Island Sound, Matlacha Pass, Tidal Caloosahatchee River, San Carlos Bay and Estero Bay.

CHNEP activities are guided by the Comprehensive Conservation and Management Plan (CCMP) (2008, available at <http://www.chnep.org/CCMP/CCMP.htm>). The CCMP addresses 4 Priority Problems for the study area: Water Quality Degradation, Hydrologic Alterations, Fish and Wildlife Habitat Loss and Stewardship Gaps. The CCMP also includes 15 Quantifiable Objectives and 64 Priority Actions which describe tasks needed to accomplish the Program goals.

Figure 1: CHNEP Study Area



The proposed Optical Model Spectral Validation and Water Clarity Reporting Tool Refinement Project implements the following CCMP Priority Actions:

- **WQ-B:** Identify gaps in water quality data needed to calibrate models used to assess impairments.
- **WQ-G:** Develop site-specific criteria for dissolved oxygen, chlorophyll *a*, turbidity, salinity and pesticides as applicable.
- **FW-F:** Restore and protect a balance of native plant and animal communities.
- **SG-3:** By 2010, the program for long-term monitoring strategy and management strategy will be implemented and resulting informational websites maintained systematically.
- **SG-R:** Track and present monitoring data according to CHNEP adopted targets in Environmental Indicators.
- **SG-S:** Post raw data, geographic information system and technical analysis on the Internet under the data management strategy.
- **SG-D:** Produce watershed and estuary communication tools.
- **SG-K:** Present scientific information in a form readily understood by the majority of people.

Progress towards achieving the CCMP Quantifiable Objectives and Priority Actions is assessed by measuring and monitoring the status of identified indicators described in the CHNEP Environmental Indicators Update (2008, available at <http://www.chnep.org/info/admin/EnvironmentalIndicators2008.pdf>). The proposed Project addresses several Environmental Indicators relating to status and trends in water quality (WQ-b, WQ-c) and seagrass (FW-a, FW-b) conditions.

The proposed Optical Model Spectral Validation and Water Clarity Reporting Tool Refinement Project is an FY2012 CHNEP Workplan project (2011, available at <http://www.chnep.org/info/admin/WorkplanFY12.pdf>).

Background

CHNEP encompasses over 283 square miles of estuarine waters comprised of 10 interconnected but distinct bays, harbors, sounds and passes, each having relatively homogeneous seagrass and water quality conditions. For resource management and target purposes, the 10 CHNEP estuary segments include: Dona and Roberts Bays, Lemon Bay, Tidal Myakka River, Tidal Peace River, Charlotte Harbor and Cape Haze, Pine Island Sound, Matlacha Pass, Tidal Caloosahatchee River, San Carlos Bay and Estero Bay (see Water Quality Target Refinement Task 1: Segmentation Scheme, 2009, available at: http://www.chnep.org/info/WQ-NNC/WQNNC1_Segments.pdf).

In 2006, CHNEP adopted initial water quality targets for each of the 10 estuary segments based on the maximum depth of seagrass growth and seagrass light requirements (see Numeric Water Quality Targets for Lemon Bay, Charlotte Harbor and Estero Bay, FL, 2006, available at <http://www.chnep.org/info/NumericWaterQualityTargets.pdf>).

The initial water quality targets were developed using an optical model to estimate water clarity based on key light attenuating water quality parameters, including: color dissolved organic matter (CDOM), chlorophyll *a* and turbidity. The optical model was adapted from previous research in estuaries in southwest Florida.

In 2009, CHNEP initiated refinement of the water quality targets based on seagrass acreage and associated water clarity needs. The results of the research have been conveyed in a series of interim reports, which each build on previous documents. Seagrass protection and restoration targets have been adopted for each of the estuary segments based on a comparison of historical (1950s) acreage and persistence of seagrasses during recent years (1988 – 2006) (see Water Quality Target Refinement Task 2: Seagrass Target Development, 2009, available at http://www.chnep.org/info/WQ-NNC/WQNNC2_SeagrassTargets.pdf). The final seagrass targets are shown in Table 1.

Table 1: CHNEP Seagrass Protection and Restoration Targets

Segment	Baseline, adjusted (B)	Mean Annual Extent all years (A)	Higher of 2	Protective Target	Restoration Target	Total Target
Dona and Roberts Bay	112	91	B	91	21	112
Upper Lemon Bay	880	1,009	A	1,009		1,009
Lower Lemon bay	2,882	2,502	B	2,502	380	2,882
Tidal Myakka	344	456	A	456		456
Tidal Peace	975	384	B	384	591	975
West Wall	2,106	1,907	B	1,907	199	2,106
East Wall	3,898	3,465	B	3,465	433	3,898
Cape Haze	5,670	6,998	A	6,998		6,998
Lower Charlotte Harbor	2,964	3,342	A	3,342		3,342
Pine Island Sound	23,757	26,837	A	26,837		26,837
Matlacha Pass	9,315	7,582	B	7,582	1,733	9,315
San Carlos bay	3,118	4,372	A	4,372		4,372
Tidal Caloosahatchee	93	87	B	87	6	93
Estero Bay	3,662	3,071	B	3,071	591	3,662
Total	59,776	62,103		62,103	3,954	66,057

Based on the seagrass protection and restoration targets, water clarity targets have been developed from measured water clarity data for the reference period (2003 – 2007) using frequency distribution curves of light attenuation values (see Water Quality Target Refinement Task 3: Water Clarity Target Development, 2010, available at http://www.chnep.org/info/WQ-NNC/WQNNC3_WaterClarityTargets.pdf).

Progress towards meeting the water clarity targets can be conveyed to scientists and the public using the Water Clarity Reporting Tool developed for the project (see Water Quality Target Refinement Task 3 Supplement: Evaluation Strategy for Water Clarity Targets, 2010 available at http://www.chnep.org/info/WQ-NNC/WQNNC3_supp.pdf). The Tool generates annual water clarity scores for each of the estuary segments based on the percentage of water clarity measurements that are better or worse than the target percentiles for a given year.

However, subsequent analyses have shown that there is a lack of statically rigorous relationships between water clarity estimates from field measurements of light attenuation and empirical model and mechanistic model results (Assessing the Performance of an Optical Model Used in Setting Water Quality Targets in Lemon Bay, Charlotte Harbor and Estero Bay, FL, by M. Wessel and C. Corbett, 2009, available at http://www.chnep.org/info/FloridaScientist_Autumn2009/10Wessel_Assess_Optical_Model_FS_72-4-367.pdf).

More recent research indicates that empirical spectrally-explicit optical models using water quality data (CDOM, chlorophyll *a* and turbidity) may more consistently represent water clarity conditions than actual field measurements of light attenuation. In addition, a properly validated empirical optical model could be applied to past water quality data available prior to when light attenuation measurements were collected, allowing water clarity estimates to be made from historical data.

Therefore, CHNEP desires that an optical model, validated for spectral components, be developed for each of the 10 estuary segments within the study area and applied to water quality data (CDOM, chlorophyll *a* and turbidity) to estimate annual water clarity conditions for each of the estuary segments. CHNEP also desires that the updated water clarity estimates be used with the Water Clarity Reporting Tool to provide a readily understood format for sharing progress towards meeting water clarity and seagrass targets with the public and elected officials. In addition, CHNEP desires that the validated optical model be made available to the Program to share with scientists and the public, specifically via the CHNEP Water Atlas.

Project Description

It is anticipated that the Optical Model Spectral Validation and Water Clarity Reporting Tool Refinement Project will be accomplished according to the following tasks:

- **Task 1:** Compile the complete raw light and water quality data (CDOM, chlorophyll *a* and turbidity) for the period of record for the 10 CHNEP estuary segments and correct if possible to incorporate any needed data reduction.
- **Task 2:** Validate an empirical spectrally-explicit optical model driven by water quality data (CDOM, chlorophyll *a* and turbidity) for each of the 10 CHNEP estuary segments against field data for light attenuation, including statistical reliability of the modeled values.
- **Task 3:** Identify any additional light attenuation and water quality (CDOM, chlorophyll *a* and turbidity) field data that may be needed to further validate the optical model.
- **Task 4:** Apply the validated optical model to the 2003- 2007 water quality data (CDOM, chlorophyll and turbidity), model mean water clarity values for each of the 10 CHNEP estuary segments and update the light attenuation (K_d) and percent light (photosynthetically active radiation (PAR)) values at the seagrass depth targets for each estuary segment.
- **Task 5:** Using the modeled K_d and PAR values, generate updated K_d and PAR frequency distribution curves and water clarity thresholds and targets at selected percentiles for each of the 10 CHNEP estuary segments.
- **Task 6:** Apply the CHNEP Water Clarity Estimating Tool to updated K_d and PAR frequency distribution curves and calculate annual water clarity scores for the 10 estuary segments.
- **Task 7:** Create an automated software tool that can be easily applied to future water quality data (CDOM, chlorophyll *a* and turbidity) to generate modeled K_d and PAR values and annual mean water clarity scores for each of the 10 CHNEP estuary segments that can be presented to the public. The software tool and data sets will be made available to CHNEP and CHNEP will make the tool and data available to the public via the CHNEP Water Atlas (www.wateratlas.org), website and/or other venues.
- **Task 8:** Present the interim and final project results to the CHNEP Technical Advisory Committee (TAC) and subcommittees.
- **Task 9:** Train CHNEP staff and others as appropriate how to use the optical model to develop future water clarity estimates.
- **Task 10:** Prepare a final project report, including methods, models, database and results.

The expected deliverables for each of the Project tasks are as follows:

- **Task 1:** Compiled light and water quality (CDOM, chlorophyll *a* and turbidity) database.
- **Task 2:** Validated empirical spectrally-explicit optical model for each of the 10 CHNEP estuary segments.
- **Task 3:** List of any additional light and water quality (CDOM, chlorophyll *a* and turbidity) field data needed to further validate the optical model.
- **Task 4:** Modeled mean K_d and updated PAR values at the seagrass depth targets each of the 10 CHNEP estuary segments.
- **Task 5:** Frequency distribution curves of modeled K_d values for 2003 – 2007 for each of the 10 CHNEP estuary segments.
- **Task 6:** Updated Water Clarity graphic showing annual water clarity scores based on modeled K_d values for each of the 10 CHNEP estuary segments.
- **Task 7:** Software tool that can be applied to water quality data to generate modeled K_d , PAR and annual mean water clarity values for each of the 10 CHNEP estuary segments.
- **Task 8:** Presentations of the interim and final project results to the CHNEP Technical Advisory Committee (TAC) and subcommittees.
- **Task 9:** Completed training session and materials.
- **Task 10:** Final project report, including methods, models, database and results.

RFI Response Elements

Please include the following elements in your Response to this RFI:

- RFI Transmittal Page (see Appendix A).
- Answers to the RFI Response Questions (below).
- Please indicate which, if any, of the information in your RFI Response is proprietary.

RFI Response Questions

1. What is your interest in completing this project to validate a spectrally-explicit optical model for the CHNEP estuary segments and to refine the CHNEP Water Clarity Estimating Tool?
2. What is your familiarity with the CHNEP estuaries?
3. What is your experience developing and refining optical models, spectrally-explicit or not?
4. What is your experience with field collection of light attenuation and water quality (CDOM, chlorophyll *a* and turbidity) data?
5. What is your experience with correction and analysis of light attenuation and water quality (CDOM, chlorophyll *a* and turbidity) data?
6. What is your experience with using and refining water clarity estimating tools?
7. What is your experience in developing software tools using secondary datasets?
8. What is your experience and willingness to provide a spectrally-explicit optical model with open architecture to be made available to CHNEP scientists and the public (through the Internet via the CHNEP Water Atlas)?
9. What would be your approach to using secondary datasets, including those available through the online water atlas (www.wateratlas.org)?
10. What is your experience training other scientists and the public to learn to properly use models or other analytical tools?

Inquiries for Further Information

The **period for inquiries** for further information and questions regarding the RFI is *September 2 - 14, 2011*.

Inquiries for further information must be submitted to:

Charlotte Harbor National Estuary Program
Judy Ott, Program Scientist
1926 Victoria Avenue
Fort Myers, FL 33901
Email: jott@swfrpc.org
Phone: (239) 338-2556 Ext. 230

Answers to inquiries for further information will be posted on the CHNEP website (www.chnep.org) and will be made available to the public through the website.

RFI Response Submission

The **deadline for submitting RFI Responses** is *September 30, 2011*, Close of Business.

Responses must be submitted to:

Charlotte Harbor National Estuary Program
Judy Ott, Program Scientist
1926 Victoria Avenue
Fort Myers, FL 33901
Email: jott@swfrpc.org
Phone: (239) 338-2556 Ext. 230

It is anticipated that the next steps needed to develop a project Scope of Work and select the proper vendor will be discussed at the CHNEP Management Conference meetings in October and November, 2011. The number and quality of RFI Responses received will be considered when determining if a more detailed Request for Proposal will be issued by the CHNEP in the near future.

Appendix A
RFI Response Transmittal Page

Charlotte Harbor National Estuary Program
Optical Model Spectral Validation and
Water Clarity Reporting Tool Refinement Project

Submit RFI Response to:

Charlotte Harbor National Estuary Program
Judy Ott, Program Scientist
1926 Victoria Avenue
Fort Myers, FL 33901
Email: jott@swfrpc.org
Phone: (239) 338-2556 Ext. 230

RFI Responses Due: *September 30, 2011*, Close of Business

Name: _____

Organization: _____

Address: _____

City/State/Zip: _____

Email Address: _____

Telephone: _____

Federal I.D. Number or Social Security Number:

I certify that this response is in all respects fair and made without collusion or fraud. I agree to abide by all conditions of this response and certify that I am authorized to sign this response for the proposer.

Full Name (type or print): _____

Title (type or print): _____

Authorized Signature: _____