COUNTY OF BARNSTABLE

CAPE COD WATER
PROTECTION COLLABORATIVE
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ANDREW GOTTLIEB
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September 18, 2011

RE: Barnstable County Independent Scientific Review of MEP Technical Reports

Dear Interested Party:

Barnstable County has finalized its plans for an independent review of the Massachusetts Estuaries Project (MEP) Linked Watershed Embayment Modeling Approach. The County has selected an outstanding panel of unbiased technical experts to conduct this review and report it's finding to the County. The panel will conduct its assessment November 14-16, 2011 here on Cape Cod. The panel will file an oral report with the Cape Cod Water Protection Collaborative on the 16th and will follow up with a written report by the end of the year.

The plan for the review panel was developed with input from the Collaborative's Technical Advisory Committee (TAC) and their recommended approach was distributed for public comment and was the subject of two public hearings. Many thanks go to those who commented on the draft document entitled, "Massachusetts Estuary Project (MEP) Linked Watershed Embayment Model, Scientific Peer Review, Framework for Review", dated January 26, 2011. We received a number of very thoughtful and helpful comments and suggestions, generally falling into the three categories outlined below. We have responded to the comments depending on the nature of the comment as follows:

1. Comments on the Peer Review Goals and Process – The Framework Document has been revised to address these comments. Please see the attached revised document.

2. Comments and Technical Questions to be Addressed in the Review - Numerous good comments were received that posed detailed technical questions to be addressed by the panel. Rather than add these questions to the Framework Document, the Collaborative will add these questions to a technical document to be sent to the panel members in preparation for the review study and workshop. The comments will be grouped by category of the technical issue. Specific response to each of the comments will be requested of the panel, to be included in the final report.

3. Suggestions for Nutrient Removal Technologies or Other Remediation Approaches – These suggestions relate more appropriately to alternatives to be considered the Comprehensive Wastewater Management Planning (CWMP) work that is targeted at meeting the TMDLs and developing actual management strategies. These comments will be added to the public record for consideration by towns, their consultants and others during the development of specific CWMPs.

The TAC revised the format for the panel to reflect the comments discussed above and the final plan is attached for your information. The final approach was approved by the Steering Committee of the Water Protection Collaborative.

In selecting the panelists to participate in the review, we sought people with the experience and expertise required to conduct a professional review of the many elements of the modeling approach. We also endeavored to include experts with no known bias toward, or relationship to, the principals guiding this project. I believe the panel reflects these dual objectives quite well. The names and backgrounds of the participants are included in the attachments to this memo.

While developing this plan has been time-consuming, the County has moved as expeditiously as possible once we determined that no other entity was willing and able to fund this undertaking. That the County prioritized funding for this review in a very tight budget year speaks to the importance and seriousness of this task.

The County appreciates your interest and involvement in the critical initiative and look forward to your continued participation in the important process of restoring and protecting our embayments and estuaries.

Very truly yours,

Andrew Gottlieb
Cape Cod Water Protection Collaborative

CC: Cape Cod Legislative Delegation
Boards of Selectmen
County Commissioners
Governing Board
Commissioner Ken Kimmell
Secretary Richard Sullivan
Chancellor Jean MacCormack
Brian Howes, SMAST
Public Commenters

Massachusetts Estuary Project (MEP)
Linked Watershed Embayment Model Approach

Scientific Peer Review

September 15, 2011

Goal: To conduct an independent scientific peer review of the MEP methodology for developing appropriate technical background to be used by DEP for the development of Total Maximum Daily Loads (TMDLs) for the estuaries and embayments of Cape Cod and to review the use of the MEP modeling approach as the basis of wastewater and nutrient management planning and implementation on Cape Cod with the goal of answering the following questions:

1. *Is the MEP modeling approach scientifically defensible and functionally adequate to be relied upon in the development and implementation of appropriate nitrogen TMDLs for the estuaries and embayments of Cape Cod in support of the state's Comprehensive Wastewater Management Planning and EPA Clean Water Act requirements and in developing overall wastewater and nutrient management plans for Cape Cod to meet the TMDLs?*

2. *To what level of accuracy will the MEP linked model predict the effect of alternative nitrogen load planning scenarios and/or the prospective water quality in the affected estuaries and embayments and what is the degree of uncertainty in those predictions relative to alternative planning methodologies available in the industry?*

Approach: Convene a multi-disciplined panel of independent, unbiased experts over a period of three months, including a three-day technical workshop, to undertake a applied scientific review of the MEP methodology and protocols, following the approach and agenda included in Attachment A. The panel will comprised of 3-6 experts in relevant scientific, engineering and policy disciplines, as outlined in Attachment B.

The review workshop will focus at three levels:

- Overall scientific methodology and analytical approach of the MEP's linked model framework to determine the theoretical validity for TMDL development
- Methodology used to develop the basis for TMDLs in two representative embayments of Cape Cod considering extent and quality of data, model calibration/verification and application of the model to actual ecological systems

- Use of the calibrated model in development of TMDL in terms of space and time scales, integration with water quality standards, consideration of future conditions, scenario development and other issues.

Scientific, technical and regulatory disciplines to be included on the panel, with potential candidates for each discipline, are:

1. Soil science, nitrogen loading and transport - Nitrogen and phosphorus sources, land use and land management, nutrient loading, soil chemistry and pollutant transport with respect to the impacts of land use on embayments and small estuaries.
2. Surface and ground water pollutant transport – Science and analytical tools (modeling) related to land-side generation, transport and fate of nutrients
3. Estuarine hydrodynamics and water quality - Development and application of water quality models for eutrophication and estuarine ecosystem processes
4. Estuarine ecology - Structure, function and dynamics of coastal and estuarine systems with focus on marine sea grass and associated aquatic and benthic habitat
5. TMDL development and implementation - Development and implementation of programs related to water quality standards, TMDLs, load and waste-load allocations, regionalization, pollutant trading, watershed-based permitting, water quality monitoring and compliance assessment

Extremely well qualified nationally and internationally recognized experts in the above disciplines have been contacted and are interested and have agreed to serve on the panel. The candidates contacted have complete independence with respect to the MEP analytical and modeling efforts. Candidates have experience in both the academic and private sections, which is desired to ensure both technically rigorous and practical assessments and conclusions. There will be some overlap in the desired disciplines, which will be helpful and, in fact, necessary to ensure fully integrated evaluation of the technical issues, as well as internal confirmation of resulting conclusions and recommendations. Alternate candidates will be solicited as a contingency to late unexpected unavailability of a panelist.

The Pleasant Bay system will be one of the water bodies used for evaluation of the application of the methodology. The second case study

could be the either the Three Bays Estuary in Barnstable or the Popponesset Bay watershed in Mashpee. The panel will be asked to consider and discuss the range of applicability and reliability of the model and the key factors in the use of the linked-model methodology to other Cape Cod embayments having significantly different hydrologic characteristics.

The review workshop would be facilitated by an experienced, independent facilitator/moderator.

Results of the analyses and review workshop will be verbally presented to the Collaborative in a videotaped session and summarized in the final report of the panel to be submitted within two months of the completion of the workshop. It is expected that the report will identify and quantify the relative strengths and weaknesses of the MEP linked model for predicting the loads reductions and impacts of wastewater plan implementation on Cape Cod.

MEP Model Approach Review Workshop

Agenda

Six weeks before review workshop:

Send background materials, model files, input data, focus questions, pictures, agenda for the workshop and other information to panel members.

Three weeks before review workshop:

Having reviewed information, panel members submit a written summary of their assessment of the key issues (not conclusions) and additional important questions to be addressed. Requests for additional background, model analyses or other information will also be made at this time.

The CCWPC TAC will maintain communication with panel members during this six-week preparation period to ensure engagement, facilitate information transfer and prepare for review workshop.

First Day of Workshop:

Morning:	Convene at workshop location. Introduction, statements of goals and objectives and review of agenda and expected outputs provided by CCWPC and DEP.
	Presentations by SMAST staff to the panel on overall TMDL modeling methodology.
Afternoon	Continue presentations by SMAST staff to the panel; SMAST response to panel questions.

Second Day of Workshop:

Morning:	Presentation by the SMAST team on specific application of TMDL methodology to Pleasant Bay and other characteristic systems. Panel questions to SMAST team addressed.

Panel meets privately to review information, discuss focus questions, clarify points of interest, and request additional specific information.

Afternoon: Panel meets privately to review information, discuss focus questions, clarify points of interest, and request additional specific information. SMAST staff available by phone for follow-up questions.

Third Day of Workshop:

Morning: Panel continues private consultations and review. Panel develops draft of findings and conclusions.

Afternoon: Panel meets with Collaborative representatives to present results of workshop for both overall methodology and site-specific application. Draft outline of findings and conclusions presented.

Workshop adjourned.

The final report will be delivered to CCWPC within four weeks. CCWPC will coordinate additional distribution and communications as appropriate.

Cape Cod MEP TMDL Development - Scientific Review

Panel Members

September 19, 2011

Candidate	Education	Affiliation	Specialty
Estuarine Science			
Judson Kenworthy	Ph.D.	NOAA, Center for Coastal Fisheries & Habitat Research; Dept. of Biological Sciences, UNC - Wilmington	Structure, function and dynamics of coastal and estuarine systems with focus on marine seagrass and associated benthic habitat
Estuarine Hydrodynamic & Water Quality Modeling			
Victor Bierman	Ph.D.	Limno Tech Ann Arbor MI	Development and application of water quality models for eutrophication and estuarine ecosystem processes
Groundwater Modeling			
Peter Shanahan	Ph.D.	Hydroanalysis Inc., Acton, MA; Dept. Civil and Environmental Engineering, MIT	Modeling and assessment of groundwater hydrology and pollutant transport

Soils Science & Nitrogen Transport			
Lawrence Band	Ph.D.	University of North Carolina Chapel Hill, NC	Land use and surface water hydrology Impacts of land use on pollutant loading and transport Nitrogen impacts on embayments and small estuaries and the relation to land use.
TMDL Policy & Regulatory Issues			
Paul Stacey	M.S.	Research Coordinator, Great Bay National Estuarine Research Reserve, Durham, NH	Fisheries biology, TMDL policy, development and implementation