

**Response to Comments of the Scientific Advisory Committee (SAC)
Review of the Environmental Monitoring Collaborative Report January 2005**

DEM-Office of Water Resources Comments

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Reported to the RI Environmental Monitoring Collaborative

Response

DEM-OWR agrees with the findings under the response section (page 1-2). With respect to the last bullet, DEM notes that the RI Water Strategy currently incorporates the ambient monitoring activities of the Narragansett Bay Commission, Department of Health and Water Resources Board that are on-going in nature. The roles of the CRMC and the RI Rivers Council are discussed in the strategy as well. DEM looks forward to continuing to work with all agencies to adapt the monitoring strategies to best meet the needs of all agencies.

Tier 1 – General Strategy

1. Framework – DEM-OWR agrees that the monitoring strategy should be periodically reviewed and updated. As more effort is invested in integrating and synthesizing data, DEM expects to gain insights into the limitations of the existing datasets. For example, DEM is currently working with EPA on a project focused on interpreting the time-series data generated from the Bay. The project is expected to lead to determinations and recommendations about extrapolating data from the fixed –site stations to larger areas of the Bay, including the potential adjustment of locations to improve representativeness.
2. Connection to Management Needs – DEM-OWR agrees with the view that ambient monitoring programs should be coupled to management needs. This is best judged by whether the data being generated is actually used in one or more state programs. Among management needs it is important to recognize that certain monitoring conducted within the water quality and fisheries programs is federally mandated and should be priority for on-going implementation.

We agree more work is needed to bring programs together to better integrate data to support ecosystem-based management. To be successful in this regard will require the state agencies to have access to specific expertise (modelers, etc.) when appropriate while at the same time having sufficient staff to coordinate and collaborate with such experts. In this regard, DEM-OWR further recommends that the procurement system be modified to foster, rather than inhibit, the collaboration between academia and state management agencies.

DEM-OWR agrees that being able to hire personnel of appropriate education and background and providing on-going training to nurture their expertise will be important

to successfully building the state's capacity to implement an adequate monitoring and assessment program.

3. Principles – DEM-OWR agrees with the comments on the principles developed by the EMC. With respect to data management and availability, DEM-OWR shares the goal of releasing data promptly and facilitating public access via the internet. With respect to the fixed-site network, further investment will be needed to convert the system into one in which raw data is posted in real-time across all stations. Pursuit of this capability should occur only in conjunction with or after funds to sustain the basic on-going operations of the network are secured.

4. Process – DEM-OWR agrees with the recommendation that monitoring programs be coordinated by the agencies that have management responsibility. This will foster the linkages between field monitoring activities and use of the data in management decision-making. In the area of water quality, the RI Water Monitoring Strategy calls for establishing an ambient monitoring program in the DEM-OWR in order to provide sufficient capacity to implement various aspects of the strategy. In some cases, such as in collaborating with the URI-Watershed Watch Program, DEM expects to continue to maintain a contractual relationship that helps reinforces the link between the program and DEM management actions.

DEM-OWR agrees with the SAC recommendation on the role of the EMC and notes that providing staff support, in a form determined by the Coordination Team, to the EMC is essential to ensuring its effectiveness.

DEM-OWR agrees that further attention to data processing and analysis is warranted. This continues to be an area in which resources constraints delay the release of data to the public. As mentioned previously, data assimilation and integration may periodically require expertise beyond that employed in the management agencies.

Tier II – Tactics

1. Rotating Basins – DEM-OWR believes the rotating basin approach remains the most appropriate and cost-effective with respect to its primary purpose of periodically assessing conditions and identifying in general those waters which are impaired. Experience in other states clearly shows that the data generated from such an approach can support evaluation of trends in condition; e.g. what portion of waters in a watershed are impaired for various uses. It is the DEM-OWR's intention that the rotating basin approach provide a thorough evaluation of water quality once every five years. In the intervening years, other monitoring by the state or volunteers to meet watershed specific management needs may be needed and is not precluded by the rotating basin approach. DEM-OWR believes the rotating basin approach will fulfill its data needs with respect to mandates of the federal Clean Water Act.

DEM-OWR acknowledges there may be limitations in the proposed approach with respect to tracking trends on an annual basis. After further review, it may be

appropriate to pursue supplemental monitoring strategies in order to collect data needed to better measure success in restoring water quality.

DEM-OWR is comfortable with the five-year cycle because it has been the agency's experience that improvements in ambient water quality generally don't occur more quickly. Most of the pollution sources identified via the TMDL process as the major contributors to water quality degradation are non-point in nature. The circumstances under which the rapid implementation of a few best management practices (BMPs) or other corrective actions can be expected to result in measurable improvements in water quality are increasingly rare. For example, in the Stafford Pond TMDL, the majority of the nutrient pollutant loading was associated with a single property allowing for a very targeted BMP implementation strategy. In most river watersheds, the numbers and types of BMPs recommended as abatement actions are larger and require significantly more time and resources to implement. Although programs are under development to facilitate BMP implementation, it normally takes several years to design and construct major BMPs; stormwater treatment systems.

DEM-OWR agrees that interpreting data from this approach will be easier if an adequate number of stations are regularly monitored in order to characterize the conditions present for the given year; e.g. dry year, wet year, etc. USGS has previously recommended that a review of existing river water quality data be conducted to better ascertain the most appropriate sampling frequency as well as number and location of stations. This review may lead to more specific recommendations about maintaining a certain number of stations as sites needed to provide reference conditions for the rotating basin approach. DEM-OWR currently has established reference sites for the biological component of this program. Those will also be evaluated as part of the on-going evolution toward a reference condition approach.

Regarding coupling of the rotating basin assessments with the monitoring in coastal waters, it is DEM-OWR's intention to align watershed assessments with any corresponding coastal water assessments as much as feasible. The strategy has been modified to clarify the issue of scheduling assessments. The watershed assessment units, as designated in Figure 5, are intended to illustrate that the workload associated with assessing all rivers and streams in the state could be realistically carried out over a five year period by executing a roughly comparable amount of work each year. DEM has estimated that the proposed staffing level (four FTEs plus seasonals) will support this workload, with additional contractual and operational expenses. A specific schedule or sequence for assessments has not yet been determined. As indicated in the strategy on page 41, once resources are made available to begin full implementation of the rotating basin approach, then further planning of the schedule would be undertaken. Careful consideration would be given to synchronizing assessments in a manner that best meets both scientific and managerial needs across multiple water programs in multiple agencies. This process will also include consideration of interstate basins and aligning activities with programs in both Massachusetts and Connecticut. During this process, different configurations of sub-

basins will be able to be considered along with different options for the sequencing of basins. The final schedule will be influenced by resource limitations that constrain the total number of locations that can be sampled in a given year and necessitate that work be spread out over several years. As most of Rhode Island lies within the Narragansett Bay watershed, it will not be practical or cost-effective to intensively monitor all sub-basins contributing to the Bay during the same year. However, DEM-OWR intends to align basins in a manner that enhances coastal monitoring programs and supports integration and interpretation of data; e.g. helps us better correlate coastal water conditions to river pollutant loadings.

Regarding the recommendation to chronicle climatic conditions, within the specific sampling designs in the rotating basin approach, this issue is considered. For water chemistry, by design, sampling is conducted to be representative of dry weather conditions. Conditions in the field related to extremes, such as drought or flooding, or anthropogenic influences that might affect sample representativeness are noted. It has been DEM's experience that low flow conditions have prevented the sampling of first order streams due to the absence of flow in late summer, a situation more widespread during very dry or drought years. With respect to biological sampling, the habitat assessment and interpretation of data are done with consideration of climatic influences, especially extremes. Where dry weather impairments are identified, the water quality studies conducted under the TMDL program are used to characterize the wet and dry weather contributions to the problem.

2. Septic Systems and Stormwater Monitoring – The proposal regarding the organization of information related to sewerage, cesspool replacements and alternative on-site wastewater technologies would constitute a significant enhancement in how the information could be analyzed and applied in environmental management decision-making. The SAC is correct in its current assessment that much of the necessary information would need to be converted into geo-referenced, electronic formats to support data applications. Additional resources would clearly be required to develop this component of the overall information system.

With respect to monitoring downstream of major wastewater and stormwater improvements, DEM-OWR agrees data to document improvements should be collected. DEM-OWR envisions this will be done in several ways: (1) within basin – specific sampling designs developed for the rotating basin approach, stations can be established for this purpose; (2) implementation of supplemental monitoring recommended in completed TMDLs; (3) Non-point Source Program monitoring of selected BMP performance and (4) volunteer-based monitoring. The number of locations monitored and the capacity to monitor intensively are currently constrained by the availability of resources.

3. Nutrients

With respect to monitoring the symptoms of eutrophication in Narragansett Bay, DEM-OWR agrees strongly with the recommendation to find stable funding to

sustain long-term data collection on dissolved oxygen and related parameters. The DEM-OWR makes active use of the data generated from the fixed-site network (stations on both docks and buoys) and periodic surveys of DO. DEM-OWR is currently working with EPA on refining procedures for applying time-series data to the pending new criteria for dissolved oxygen in marine waters. The time-series data is essential to assessing compliance with the applicable standards and criteria.

DEM also strongly agrees with the need for measuring pollutant loadings, including nutrients, from the major tributaries to Rhode Island coastal waters. The long-term program on the state's largest rivers operated by USGS under agreement with DEM was suspended in October 2002 as a result of a reduction in available state funding. Regular monitoring of the water quality of the large rivers (Blackstone, Pawtuxet and Pawcatuck) has not yet resumed, but is clearly needed.

DEM also agrees that further evaluation is needed to develop a strategy for measuring nutrient concentrations and important aspects of the trophic web in marine waters. The fixed-site network does not yet incorporate direct measurements of nutrient concentrations. DEM looks forward to collaborating with the SAC and RIEMC on devising an appropriate strategy to measure nutrients and the ecological response to nutrients in the Bay. DEM expects refinements to the RI Water Monitoring Strategy will be an outcome of such discussions.

4. Biological Monitoring and Indices of Biological Integrity

With respect to freshwaters, DEM expects to further develop its biological monitoring programs over time and eventually achieve the goal of measuring two biological communities in each waterbody type; e.g. macroinvertebrates and fish. DEM will be giving greater emphasis to freshwater biological monitoring as a cost-effective means of measuring the aquatic life use support and expects to identify additional impairments in rivers and streams not previously identified via monitoring for water chemistry alone. Comparisons reported from Ohio (ten-year dataset) and Oregon revealed that chemical monitoring often did not detect the impairments identified by biological monitoring, leaving up to 50% of the biological impairments undiagnosed. (Yoder and Rankin, 1990; MBI, 2003)

The SAC raised several concerns about the limitations of the current macroinvertebrate protocol used by DEM-OWR. The primary purposes of the current monitoring are to determine water quality condition relative to standards and criteria, and identify whether an impairment exists. DEM-OWR is currently able to use the sample size of 100 organisms for Clean Water Act assessment purposes to screen for impaired conditions. The issue of sample size has been examined by EPA and the New England states. Massachusetts DEP utilizes primarily a 100 sample size and indicated that an analysis of 100, 200 and 300 specimen subsamples taken over a three-year period found close comparability between the 100 and 200 sample counts. (Nuzzo, R. personal communication). A report from the Aquatic Resources Center (1998) for EPA New England examined the differences between sample sizes of 100,

200 and 300 organisms and concluded the 100 sample size was the most cost-effective to use provided the assessment of water quality used several metrics based on different criteria. The same report noted that the largest increase in reported total number of taxa occurred going from the 100 to 200 subsample size. A biologist with the EPA New England laboratory indicated the 200 size is preferable for additional genus identifications (Snook, H., personal communication). DEM-OWR recognizes a larger sample may generate additional data to support a more detailed assessment, however, it would also be more costly to implement. As DEM-OWR builds capacity within its monitoring program, issues related to sample size and within reach variability will be further analyzed with the goal of adjusting the monitoring program as needed to better serve management decision-making.

DEM also recognizes the current limitations with respect to the development and use of indexes of biological integrity (IBI) for marine ecosystems. Over time however, it is hoped that the use of biological indicators can be enhanced to reinforce the concepts of ecosystem management.

5. Comments deferred to DEM Division of Fish & Wildlife
6. Inland/Coastal Balance – DEM-OWR agrees that eventually the environmental monitoring strategy should fully encompass aquatic and terrestrial habitats. It was appropriate to give initial emphasis to Narragansett Bay and its watershed, but over time an effective strategy should provide data to meet the needs of all relevant state programs. The RI Water Monitoring Strategy was intended to document the monitoring programs needed to address surface water resources, including aquatic habitats - both freshwater and marine. It was not intended to address other aspects of the terrestrial environment, such as land use mapping, that are also needed to support effective environmental protection, management and restoration programs.

DEM-OWR also agrees there is need to re-map wetlands in the state. DEM-OWR looks forward to continuing to work with the RIEMC subcommittee on land use mapping to explore options for accomplishing the re-mapping. The recommended approach should be stereoscopic interpretation of large-scale, color-infrared photographs. Further evaluation of costs and available resources is needed to resolve the appropriate scale.

Tier III – Monitoring Proposals and Gaps

- A. DEM-OWR did receive approval of \$38,325 to initiate a fish tissue sampling program in 2006.
- B.4. As part of the RIEMC, DEM-OWR strongly agrees that the collaborative needs to be supported in order to effectively fulfill its mission. This appropriate level and means of support need to be worked out with the Coordination Team.

References:

- Rankin, E.T. and Yoder, C.O. 1990. A comparison of aquatic life use impairment detection and its causes between an integrated, biosurvey-based environmental assessment and its water column chemistry subcomponent. Appendix I, Ohio Water Resource Inventory (Volume 1), Ohio EPA, Water Quality Plann. Assess., Columbus, Ohio
- Yoder, C.O., 2003. Rhode Island DEM Monitoring & Assessment Program: Initial Assessment of Design and Indicator Options. Technical Report MBI/07-03-01 Midwest Biological Institute & Center for Applied Bioassessment & Biocriteria, Columbus, Ohio