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To: Jackie McGorty, Florida DEP
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Subject: Summary of Comments Made at ERC Hearing, January 24, 2003

1. Existing data & modeling indicate that 10 ppb is achievable with wetland treatment (as a long-term geometric mean outflow concentration), but there is much uncertainty regarding how this can be done cost-effectively & how long it will take.

2. In evaluating the feasibility of achieving 10 ppb, it is important to distinguish the performance of existing STA's from the limits of STA technology in general. The existing STA's were designed to achieve 50 ppb, so there is no reason to expect that they would achieve 10 ppb without substantial modification and/or expansion. Similarly, the >60 experimental and full-scale systems that have been studied were not designed to achieve 10 ppb, but to compare P uptake rates of different plant communities under ranges of flow, loading, depth, concentration, and soil preparation. Time constraints, low biota turnover rates, and transient effects of antecedent soil conditions make it difficult to achieve 10 ppb in short-duration experiments. Despite these limitations, sustained outflow concentrations of 11-14 ppb have been observed in periphyton and SAV experimental platforms. From my point of view, the major objective of conducting this research was not to test the feasibility of achieving 10 ppb directly, but to develop and calibrate a mathematical model that integrates the research results and simulates the important phosphorus cycling processes.

3. With the support of SFWMD staff & contractors, the DMSTA (Dynamic Model for Stormwater Treatment Areas) was developed by Dr. Kadlec & myself to integrate data from the various STA's and experiments and to provide a basis for designing STA's to achieve 10 ppb or other possible targets. This model has been used by SFWMD in its Basin Specific Feasibility Studies (as presented to the ERC by Dr. Gary Goforth). While the model is successful in explaining a high portion of the variance across full-scale & experimental systems, residual variance is on the order of 20% of the predicted outflow concentrations and there are different approaches to calibration. Model results indicate that 10 ppb is achievable (without specific constraints on cost or land availability), but, as a consequence of the remaining model uncertainty, there is wide range of designs that could achieve the target (generally from optimizing a portion of the existing STA's to both optimizing and expanding them).

4. Given that the "learning curve" is still relatively steep, it is not unreasonable to expect that the uncertainty band will decrease with long-term commitments to monitoring, engineering evaluation, and optimization of the STA's, to continued operation and study of large-scale experimental platforms, and to continued investigation of alternative biological technologies. Such a commitment would presumably be driven by an objective to achieve a 10 ppb goal at EPA inflow points (consistent with protecting the entire EPA marsh) and over a time frame that reflects existing technical limitations and uncertainties. At some point, expansion of the existing STA's may be needed to achieve 10 ppb, but it is premature at this point to recommend such a measure, given the possibility that much less costly measures may be successful and the potential for integration with CERP projects.

5. It is incorrect to state that the outflow concentration from an STA is independent of the area or inflow load. Area and load are among the more sensitive input parameters to the model. This sensitivity decreases as the 10 ppb target is approached, but it never vanishes. For example, based upon DMSTA simulations, a 20% reduction in inflow P concentration (relative to existing levels) might result in a 5-10% reduction in outflow concentration, depending upon STA and initial concentration range.

References:

Treatment Research: http://www.sfwmd.gov/org/erd/ecp/etweb/main_template/atthome.html

DMSTA: http://www.wwwalker.net/dmsta

Basin Specific Feasibility Studies: http://www.sfwmd.gov/org/erd/bsfboard/bsfsboard.htm