

**Q1) Many of the pollutants we are now trying to address (such as mercury, phosphorus, and nitrogen) have diverse sources. How can we develop regulations or incentives that get polluters to undertake source reduction rather than have tax-payers pay for the clean-up?**

**A1)**

- **Failure of Command-&-Control**

- **Why should the regulated entities take TMDL-based nonpoint source water quality controls from diverse sources seriously if the responsible Federal and state regulatory agencies haven't, ...**

- **... e.g., the string of TMDL lawsuits filed by environmental NGOs in general over the last two decades and specifically the 1999 Florida TMDL lawsuit?**

- **FDEP missed the 09/30/12 Consent Decree deadline for an enforceable TMDL for all Hg-impaired water bodies.**

## **A1)**

- **Failure of Command-&-Control (Continued)**
  - **FDEP didn't even revise Florida's THg WQS since USEPA published the revised MeHg WQC in January 2001, and without an enforceable WQS, there is no enforceable TMDL or WQBELs deriving therefrom.**
  - **USEPA Region 4 has approved scientifically and administratively deficient Hg TMDLs for other states, so it is likely to approve Florida's statewide approach.**
- **Clearly, the command-and-control approach has failed to deal with nonpoint sources whether within or between environmental compartments.**

## **A1)**

- **Incentives and Fees**

- **We need a combination of tax incentives for internalizing waste management costs and fees for consumptive use of water quality when nature's waste management services are used for dilution, decomposition, and/or transfer to long-term storage in the sediments.**

## **A1)**

- **Incentives and Fees (Continued)**
  - **Both the incentives and fees should increase progressively with the extent, magnitude, duration, and frequency of the consumptive use of water quality and should be phased in over time to give the polluters time to plan, design, construct, and optimize the operation of process changes and new treatment technologies.**



- **Q2) The water quality changes we are discussing have state-wide implications. Will they really affect the Everglades? If so, what on the ground impacts (good or bad) can we expect?**

## **A2)**

- **A) Hg & The FL Hg TMDL:**
  - **FDEP's proposed 87% reduction in controllable air emissions, which includes global sources beyond the reach even of the USEPA, purports to protect the 90<sup>th</sup> percentile Florida water body, thus not full restoring 10%, ...**
  - **the River of Grass is more susceptible than the 90<sup>th</sup> % fresh water body, so up to 100% of Everglades could remain impaired.**
  - **$WLA = TMDL - LA - MOS < 0$ , so  $WLA = 0$  and  $WQBELs = 0$  for controllable point and nonpoint sources, ...**
  - **... including EAA runoff**



## **A2)**

- **A) Hg & The FL Hg TMDL: (continued)**
  - **The WQT of 0.3 ppm THg as MeHg in fish flesh is not an enforceable WQS and ...**
  - **... not fully protective of average or subsistence FL consumer; based on national ave. fish and shellfish consumption rates and MeHg BAFs, not Florida-specific values.**
  - **After discussing the exposure and risks to wildlife, the statewide approach assumes that protecting the average human consumer is also protective of the most exposed, most sensitive life stage of the most sensitive wildlife species, including species protected by the Endangered Species Act (ESA).**

## **A2)**

- **A) Hg & FL Hg TMDL: (continued)**
  - Using the WQC derivation formula adopted by USEPA in its 1996 Mercury Report to Congress and Florida-specific T3 and T4 MeHg BAFs from FDEP's statewide survey, the WQT can also be demonstrated not to be fully protective of all wildlife subsisting solely on aquatic prey, e.g., the endangered Everglades mink or bald eagle.**
  - Using Everglades data and exposure assumptions, also true of the FL panther.**
  - MeHg is acting as a barrier to full T&E use of otherwise accessible habitat, which constitutes a taking, contrary to the requirements of the ESA.**

**A2)**

**A) Hg & The FL Hg TMDL: (continued)**

- **Key Findings**

- not enforceable using unenforceable WQT
- no account for seasonal variation in TMDL, despite sig. obs. seasonal variation
- implicit MOS in WQT < TMDL uncertainties
- same TMDL for fresh and salt waters
- omits groundwater contribution to background
- omits land-applied sludge nonpoint loads
- omits known influential factors, e.g., S
- **Once published, all waters are removed from Hg-impaired list**

**A2)**

**A) Hg & The FL Hg TMDL: (continued)**

**Key Recommendations**

- **Promulgate an enforceable revised Hg WQS.**
- **Implement a statewide Hg source reduction via tax incentives and disincentives.**
- **Suspend sludge appl. in Hg-impaired basins.**
- **Analyze sludge site dust, runoff, and groundwater for ultra-trace THg and MeHg.**
- **Develop and implement water body-specific TMDLs based on use importance and degree.**
- **Since LA > TMDL , set WQBELs = # 1631 MDL**
- **Do not delist any water until long-term monitoring proves compliance per CGM 42.**

**Q2) The water quality changes we are discussing have state-wide implications. Will they really affect the Everglades? If so, what on the ground impacts (good or bad) can we expect?**

**A2)**

- **B) Nutrients:**

- **The EFA Everglades WQS default value was 10 ppb TP.**

- **No margin of safety in that value for the Southern Everglades, which averages 2-3 ppb TP, and + 2 x S.D. is ~7-8 ppb.**

- **Scientists testifying at Dec. 2003 ERC hearings for FDEP obs. stat. sig. > 50% loss of some resident diatom and algae species in Everglades water samples dosed at 8 ppb TP.**

- **Sawgrass to cattail shift obs. 18-22 ppb TP per WCA-2A P study.**

**A2)**

- **B) Nutrients:**

- **Regulated entities wanted 22 ppb TP, but would OK 16-19 ppb with compliance monitoring at edge of several km. transition zone.**

- **In 9/12 USEPA Region 4-approved TP Water Quality Plan for the Everglades watershed includes a NPDES permit for STAs with a flow-weighted annual average 19 ppb TP WQBEL not to be exceeded more than 3 times in 5 yrs**

- **This effectively grants an implicit rather than explicit variance and/or transition/mixing zone for the TP WQS.**

**A2)**

- **B) Nutrients: (continued)**

- **It appears the regulated entities have achieved in permit negotiations what they couldn't achieve before the ERC or Judges Hoevler and Marino.**

- **On this and every other example of environmental backsliding you are being told by the agencies who have failed the Everglades for decades not to let the perfect be the enemy of the good.**

- **I'm saying don't be stampeded into accepting not good enough in trade for expedited activity.**



## **A2)**

- **B) Nutrients: (continued)**

- **There are known and potential unacceptable adverse consequences of rerouting high-sulfate water into the Everglades on P, H<sub>2</sub>S, and Hg for which FDEP does not have the required reasonable assurances.**

- **If we are going to make such trade-offs, let's make them explicitly using a rigorous ecological risk-benefit analysis, not implicitly as a matter of policy because we don't want to deal with the consequences imposed by these real-world constraints.**

**A2)**

**B) Nutrients: (continued)**

- **FL's narrative-to-numerical WQC translation rule is based on acceptable extremes**  
... i.e., **blue-green and toxic algae blooms that are infrequent w/o unnatural nutrient concs. and proportions or sed. recycling.**  
... **not on more subtle indicators below severe impairment threshold, e.g., C:N:P**
- **Acceptable freq. does not provide sufficient time to recover between impairing events**
- **Ignores nutrient recycling from sediments.**
- **Ignores synergistic effects of related stressors, e.g., reduced light, DO sag, toxins**

**Q2) The water quality changes we are discussing have state-wide implications. Will they really affect the Everglades? If so, what on the ground impacts (good or bad) can we expect?**

- **C) DO**
  - **FDEP has granted a DO SSAC for the Everglades**

**A2)**

- **C) DO**

**Need for Change**

- **Not demonstrated existing DO WQC are:**
  - **scientifically deficient per lit. published since last revision**
  - **unduly burdensome based on number of SSAC petitions**

**A2)**

- **C) DO**

**Technical Approach**

- **Not substantially equivalent to USEPA-approved approach**
- **Arbitrary selection of representative regions, water bodies**
- **FDEP would reject regional SSAC petition using its criteria**

**A2)**

- **C) DO**

**Adverse Consequences of Proposed Revision to the DO WQC**

- **No or inadequate MOS for high oxygen-demand fish**
- **Decreases growth potential & increases other stressor risks**
- **Shifts burden of proof to the public to prove a water body is underprotected by the revised DO WQC without providing a mechanism for petitioning FDEP for same.**





**Q2) The water quality changes we are discussing have state-wide implications. Will they really affect the Everglades? If so, what on the ground impacts (good or bad) can we expect?**

**A2)**

- **D) Human Health Criteria**

- **FDEP's new approach uses statistics rather than individual values to derive diet-weighted consumption rates for fish and shellfish appropriate for Florida's median (50<sup>th</sup> percentile) consumer.**

- **The FL-specific consumption rates are then used to calculate lifetime increased cancer risks to FL consumers for each carcinogen.**

- **However, new approach uses old bioconcentration factors (BCFs) rather than new bioaccumulation factors (BAFs).**

**A2)**

- **D) Human Health Criteria**

- For Trophic Level 3 and 4 fish, using USEPA technical guidance, the discrepancies are on the order of 5x and 10x, respectively.**

- This is not supported by sound science and is a fatal technical flaw.**

**A2)**

- **D) Human Health Criteria: (continued)**
  - **FDEP accepts without proof industry position that existing human health WQC are overprotective by compounding margins of safety in animal-to-human extrapolation and exposure assumptions.**
  - **$10^{-6}$  lifetime increased cancer risk for ave. consumer applies to each carcinogen separately, ignoring simultaneous exposure to multiple carcinogens and endocrine & immune disruptors that magnify potency**
  - **$\sim 1/3$  of observed 1-in-3 lifetime any cancer risk is due to environment.**

## **A2)**

- **D) Human Health Criteria: (continued)**
  - Creates a new category of highly exposed citizen, the subsistence consumer, with less protection ( $10^{-4}$ ) than average consumer, because health benefits outweigh risks, except:**
    - Already not true for non-carcinogens, e.g., methylmercury**
    - Violates equal protection clause**
    - Violates environmental justice provisions of statutes and Presidential Executive Orders**



**Q2) The water quality changes we are discussing have state-wide implications. Will they really affect the Everglades? If so, what on the ground impacts (good or bad) can we expect?**

## **A2)**

- **E) Designated Use Changes**

- **No direct application to/effect on `glades**
- **but, new USEPA Region 4-approved NPDES Permits for STAs with LTA WQBEL > TP WQS creates a variance or mixing zone implicitly even if not requested explicitly.**
- **Failure of the Settlement Agreement to require remediation of highly nutrient-contaminated sediment in already impacted areas will retard the recovery from pre-BMP/STA EAA runoff pollution legacy**
- **~30 years required to deposit 30 cm of new peat in the high P area.**



**A2)**

- **E) Designated Use Changes**
  - CERP & CEPP ignore time-to-recovery as a restoration project performance measure, so it cannot influence planning, design, operation, or maintenance .**







**Q3) In the Panel's opinion, what water quality issues are still in need of addressing in order to ensure a clean and healthy Everglades?**

- **A3) Sulfur in the form of sulfate**
- **-- At concs. well below the drinking water standard, sulfate in excess of background levels can severely perturb the Everglades ecosystem by causing or contributing to:**
  - excess production of hydrogen sulfide in concentrations toxic to rooted plants, ...**
  - as evidenced by the work of LSU's Irv Mendelssohn for FDEP and documented in previous SFERs, and ...**
  - benthic organisms, as evidenced by the exceedance of USEPA's Red Book WQC of 2 ug/L**

### **A3) Sulfur in the form of sulfate**

- the excess production of methylmercury up to a maximum dictated by local conditions in the sediment.**
- the displacement of phosphate from sediment complexes and binding sites, increasing the flux of legacy P from the sediments**
- For support, see the sulfur chapter of the South Florida Environmental Reports co-authored by FDEP and SFWMD for the last decade.**









**Q4) Water quality issues are very technical and it is often hard for the public to keep up with the latest developments. If you had to boil down the progress we are making on these issues into one or two lines, what would that be?**

## **A4)**

- **Since the advent of the Water Pollution Control Act Amendments of 1972, the combined effect of inadequately regulated point and nonpoint sources, sediment recycling, and changes in watershed hydrology is an increase in the extent, magnitude, duration, and frequency of impaired Florida waterways, as evidenced by the most recent Sierra Club report.**
  - With the advent of global warming, these extremes are likely to change unpredictably.**

**A4)**

**-- Since advent of WRDA 1996, with the exception of P, the effect of CERP and CEPP on Everglades water quality is being ignored in project planning**

**-- with respect to phosphorus, both assume that P will be adequately addressed by the Everglades P watershed water quality plan, when it will not.**









**Q5) Are there still areas of scientific study that are needed to address these water quality issues and, if so, how do we move forward while this information is being developed?**

## **A5:**

- **Sulfur**

- **EAA mass budget and source attribution**
- **effects of sulfate on Everglades biogeochemistry and toxicity on attainment of performance objectives for CERP and CEPP, specifically:**
  - **... P release from sediment binding sites**
  - **... hydrogen sulfide toxicity**
  - **... methylmercury production and bioaccumulation.**

## **A5:**

- **Contaminated Sediments**

- **The contribution of pollutants accumulated in sediments from historical and on-going unregulated, inadequately regulated, and regulated point and nonpoint sources in general and ...**

- **... P in Lake Okeechobee sediments and the effect on CERP & CEPP project design & time-to-recovery of the Everglades**

- **... P in canal sediments that release P on a day-night cycle obs. by SFWMD's Dave Struve and co-workers**

- **... P in the impaired portions of the Everglades.**

## **A5:**

- **Water Quality Modeling**
  - **Adopt standardized approach e.g.,**  
**... whether to model statistically or**  
**mechnaistically,**  
**... preference for adapting USEPA-approved**  
**models over developing new models from**  
**scratch to minimize challenges and expedite**  
**compliance and ecological assessments, &**  
-- **... to verify code and parameterize,**  
**calibrate, post-audit, QA/QC & peer review.**

## **A5:**

- **Water Quality Modeling (continued)**
  - **Use model sensitivity analysis to focus on uncertainties that have the greatest impact on restoration decision-making and design studies to reduce those uncertainties to acceptable levels for well-informed restoration decision-making.**

## **A5:**

- **Adopt Precautionary Principle**
  - **When in doubt, keep it out, because what we don't know can injure the Everglades and deform, impair, debilitate, and shorten the life of endangered species and humans.**
  - **It also prevents the regulated entities from delaying restoration and protection initiatives with demands for more studies in the name of sound science, ...**
  - **... so uncertainty favors public over private interests and the internalization rather than externalization of waste management costs.**