Perspective on Adaptive Implementation

Adaptive Implementation of TMDLs Workshop

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My View of Adaptive Implementation

- Adaptive Implementation, in the TMDL context, is an iterative process of taking action steps of limited scope to make progress toward attaining water quality standards in accordance with available data and information while continuing to improve our understanding of the water quality impairment and its solutions, so that we can continue to make progress

Prefer “Adaptive Management” over “Adaptive Implementation”

- AI could be seen as limited to the post-TMDL implementation stage
- AM would better denote an approach that continually updates the TMDL thru
  - Refined monitoring
  - Additional implementation controls
  - Improved tools
  - Changes in TMDL target or water qual std
- Terms often used interchangeably

Importance of AI for the TMDL

- The basic TMDL process is prescriptive
- Some factors limiting effective TMDL
  - Limited data
  - High levels of uncertainty in TMDL and allocations
  - Major loadings from nonpoint sources
  - Stringent water quality standard
  - Narrative water quality criteria
  - Limited correlation of loads to water quality

Concerns about AI for TMDLs

- Water quality standards may not be achievable under any circumstances
  - Reluctance to change standards
- More time may not be the answer
  - Permit renewals put pressure on point source discharges
- Nonpoint sources remain uncontrolled
- Anti-backsliding establishes a barrier
- Phased TMDL may not be AI
- Legal constraints have yet to be tested

Case Study
Delaware Estuary PCB TMDL

- The Delaware River Basin Commission (DRBC) is doing a mix of the traditional and adaptive implementation TMDL.

The Conundrum

- Traditional TMDL approach has technical and regulatory issues that increase the likelihood of ….litigation and/or severely restricted growth in the watershed

Modified Adaptive Implementation

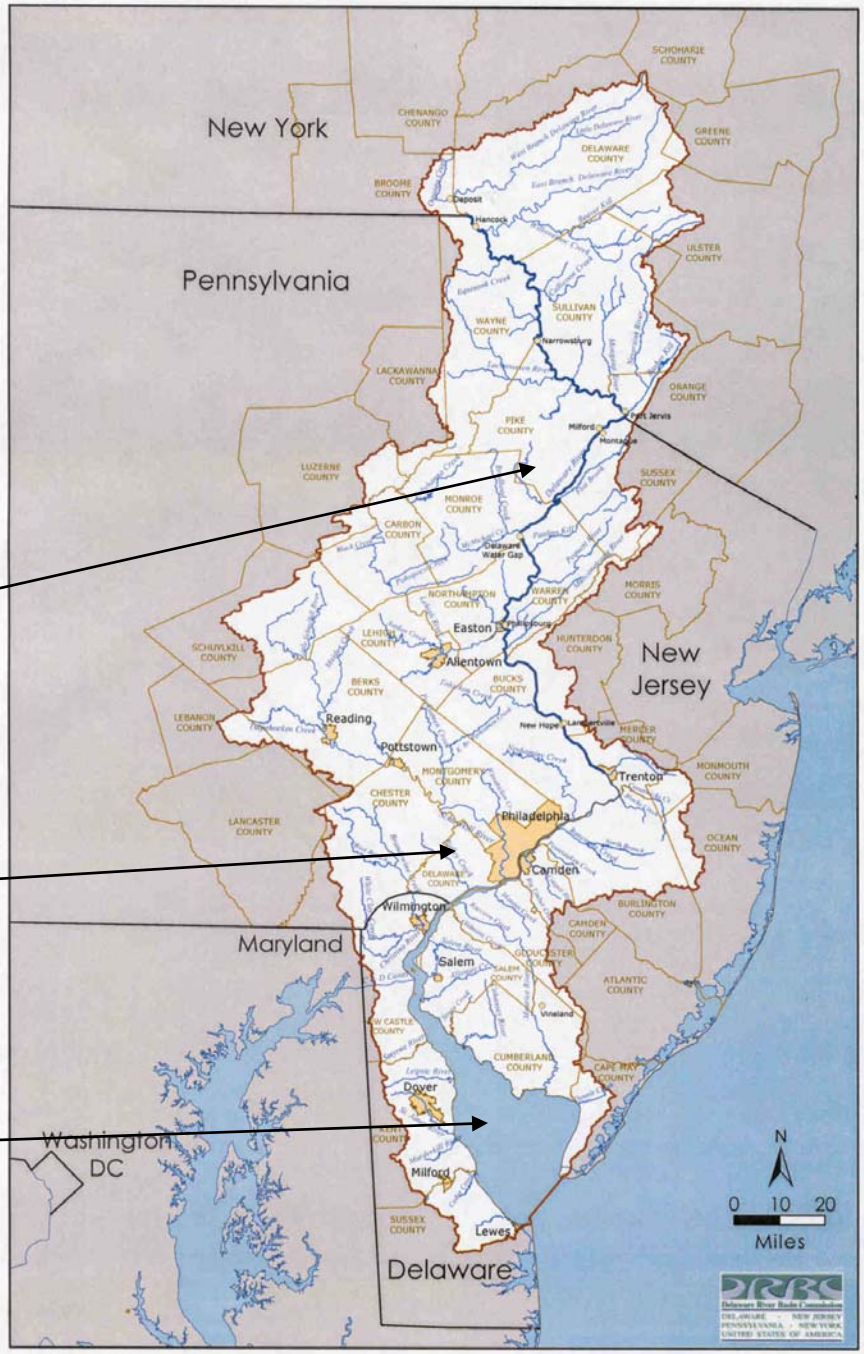
- Delaware Estuary PCB TMDL Staged Approach
  - Phase 1: Dec 2003
    - Point Source Discharges BMPs and monitoring
    - Establishment of Implementation Advisory Committee
  - Phase 2: 2005
    - Upgrade water quality model.
    - Final WLAs and LAs
    - Additional PCB data collection

Case Study
Delaware Estuary PCB TMDL

- Review of DRBC PCB TMDLs identifying barriers that will hinder development and implementation of a TMDL

Delaware River Basin

- Drainage area 13,539 sq mi.
- Port Complex is the largest freshwater port in the world



PCB TMDL: Technical Barriers

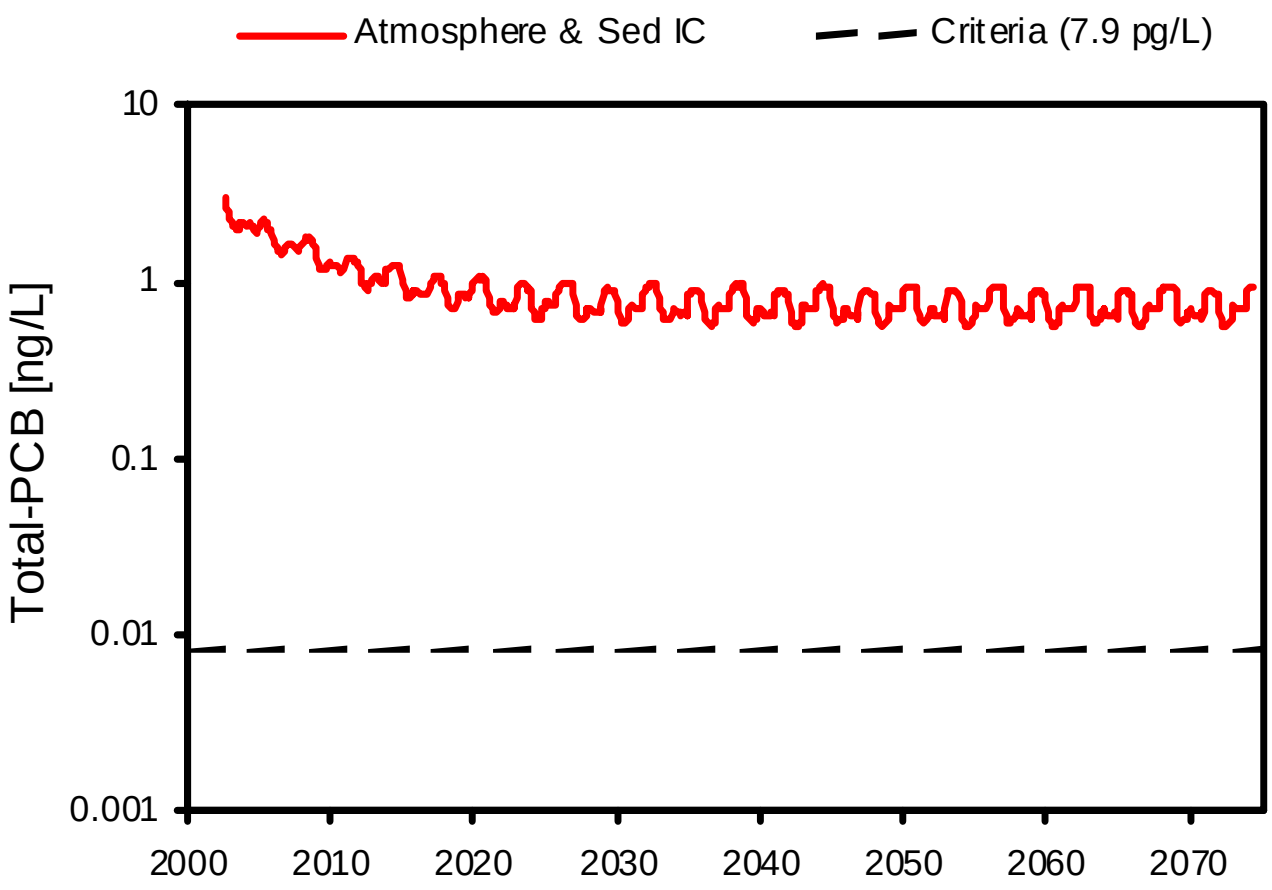
- All loads need to be reduced 99.8% to meet WQS
- No demonstrable wastewater treatment technology can attain the proposed WLAs.
- Nonpoint source LAs reductions are unattainable.

PCB TMDL: Technical Barriers

- PCB Source Loadings **(99.8% Reduction)**
  - Superfund/RCRA 108,800 mg/day
  - Tributaries 66,600 mg/day
  - Point Source 45,700 mg/day
  - Stormwater 42,100 mg/day
  - CSOs 15,500 mg/day
  - Atmospheric Deposition 3,500 mg/day

PCB TMDL **379 mg/day**

PCB TMDL: Regulatory Barrier



PCB TMDL: Technical Barrier

			Average	PCBs*
NPDES Discharger	Outfall	Zone	Flow	WLA
			(mgd)	pg/L
Yates Foil	001B	2	0.01	**5.08**
Hamilton Township	001	2	9.40	**21.68**
PSD - SW	001	3	176.00	**1.64**
GCUA	001	3	16.00	**1.98**
Valero	001A	3	8.50	**3.32**
DELCORA	001	4	30.00	**2.93**
City of Wilmington	001	5	71.00	**12.97**
Carney's Point	001	5	0.46	**15.93**
Water Quality Standard				**7.9**

* WLA conc values derived from WLA mass values

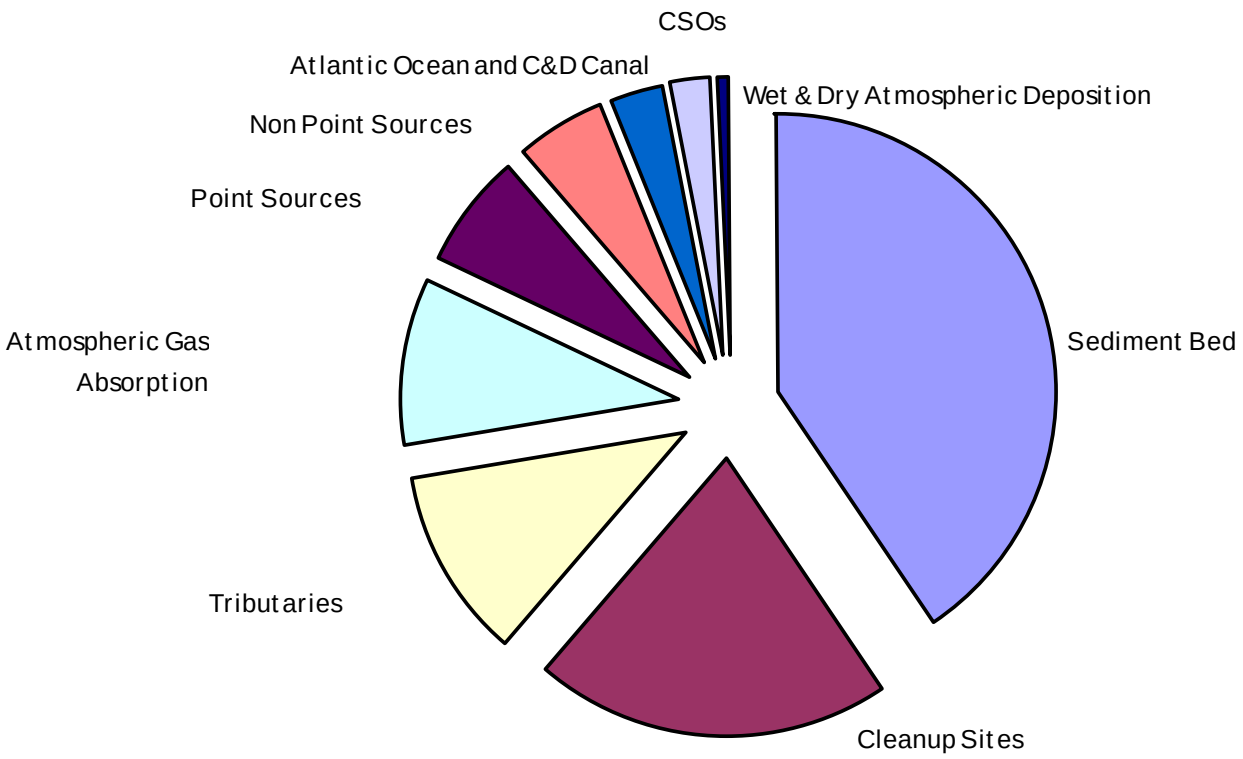
PCB TMDL: Technical Barrier

- Stormwater/Rainfall Concentrations (median or range of data set.)
  - Rural/Residential* …….. 6,000 pg/L
  - Estuary Rainfall ……..2,300 - 19,000 pg/L
  - Estuary Industrial …… 4,680 pg/L

  - Water Quality Standard…… 7.9

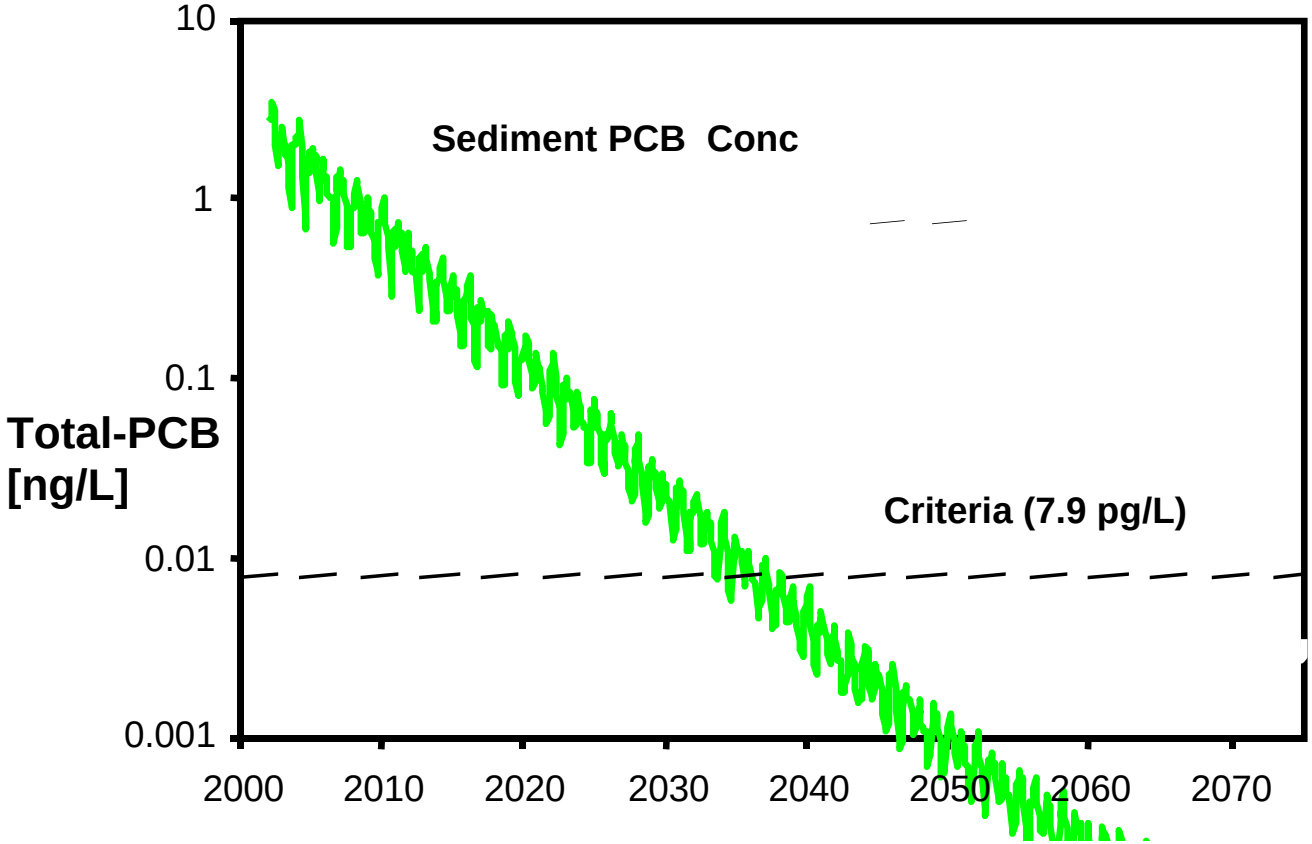
* Literature values

PCB TMDL: Technical Barrier



Contributions to Water Column Concentrations

PCB TMDL: Regulatory Barrier



PCB Sediment Burial & Washout

PCB TMDL: Regulatory Barrier

- Any new or increased discharge (including stormwater) will have to meet the water quality standard which can severely restrict future growth such as
  - MS4s “Residential Growth”
  - POTWs
  - Industrial
  - etc…..

PCB TMDL: Regulatory Barriers

- There is no reasonable assurance that TMDL can be achieved, thus a TMDL “is not approvable”.
- WLA dischargers will not accept permit limits which are not achievable or affordable.
- Decades, if not centuries to meet WQS.

Strategy to Overcome Barriers

- Use Attainability Analysis must be performed in conjunction with TMDL development
  - An attainable water quality objective must be set by the regulatory authority to address sources that are controllable.
  - A review of this objective must be included in each iteration of the adaptive implementation process.

AI and UAA

- AI (including UAA) could lead to
  - An approvable TMDL
  - Continued growth in the Watershed
  - Point source dischargers with achievable NPDES permits.
  - Cost effective solutions to reduce PCBs into the Delaware Estuary.