Regional Approach to PCB TMDLs in the Tidal Potomac River

Presentation to the
DC/MD/VA Technical Advisory Committe
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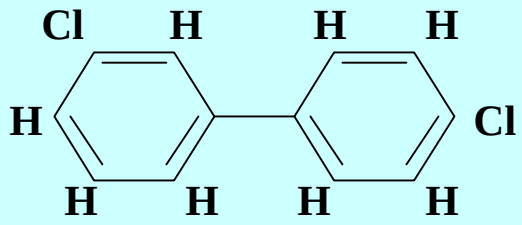
Interstate Commission on the Potomac River Basin

TOPICS

1. What are PCBs / why are they a problem?
2. What do the data tell us about scope of the problem?
3. TMDL Process & Timeline
4. Stakeholder involvement
5. About the model: approach and challenges

Polychlorinated Biphenyls (PCBs)



Example of a di-chloro-biphenyl molecule

- 209 related compounds formed by chlorination of biphenyl molecule
- Complex mixtures manufactured in US until 1977; sold under trade name "Aroclor"
- Used as heat transfer, hydraulic, and dielectric fluids; also in inks, carbonless copy paper, paints, pesticides, adhesives
- Highly fat soluble; tend to bioaccumulate; especially high concentrations in predator fish

Health effects of PCBs

- Acne-like skin conditions in adults.
- Neurobehavioral and immunological changes in children.
- Known to cause cancer in animals.

State Criteria

	Consumption Advisories Fish Tissue (ng/g)	Water Quality Standards Total PCBs (ng/L)
DC DOH:	20 (EPA)	0.045
MDE:	78	0.64
VADEQ:	54	1.70

Consumption Advisories for Fish Caught from the Potomac River Watershed (Maryland, Virginia, West Virginia, Pennsylvania, Washington D.C.)

MDE

MDE

Prepared by Maryland Department of the Environment, June 2002
1(410) 537-3000
http://www.mde.state.md.us

PA

MD

WV

VA

Pennsylvania Statewide Advisory

All Game Fish

Meadow Grounds Lake

Confluence of Licking Creek and Big Cove Creek to PA/MD Border

Savage River Reservoir - Mercury

North Branch Potomac River

South Branch Potomac River

Potomac River

Shenandoah River

Potomac River

Non-game Fish

1 - RM Bottom of Potomac River North Branch, Lower 50 Miles Dioxin

All Fish

Confluence of N and S Forks of Shenandoah to WV Line
Passage Creek to Confluence of N and S Forks
619 Bridge to Confluence of N and S Forks
PCBs

Non-game Fish

All Other Fish

WV Portion of Shenandoah River
PCBs

Washington D.C. Potomac River, Anacostia River and Tributaries
PCBs and Pesticides

Maryland Statewide Advisories
Mercury
Freshwater Impoundments

Non-tidal Rivers and Streams

All Fish

Port Republic to 619 Bridge
Riverton Dam to Passage Creek
Mercury

All Other Fish

Waynesboro to Port Republic - Mercury

Adults (18-75)	Women (18-45)	Children (0-6)
DO NOT EAT		
1 Meal per Month		
2 Meals per Month		
4 Meals per Month		
8 Meals per Month		
Unlimited Consumption		
8 ounce meal	6-8 ounce meal	3 ounce meal

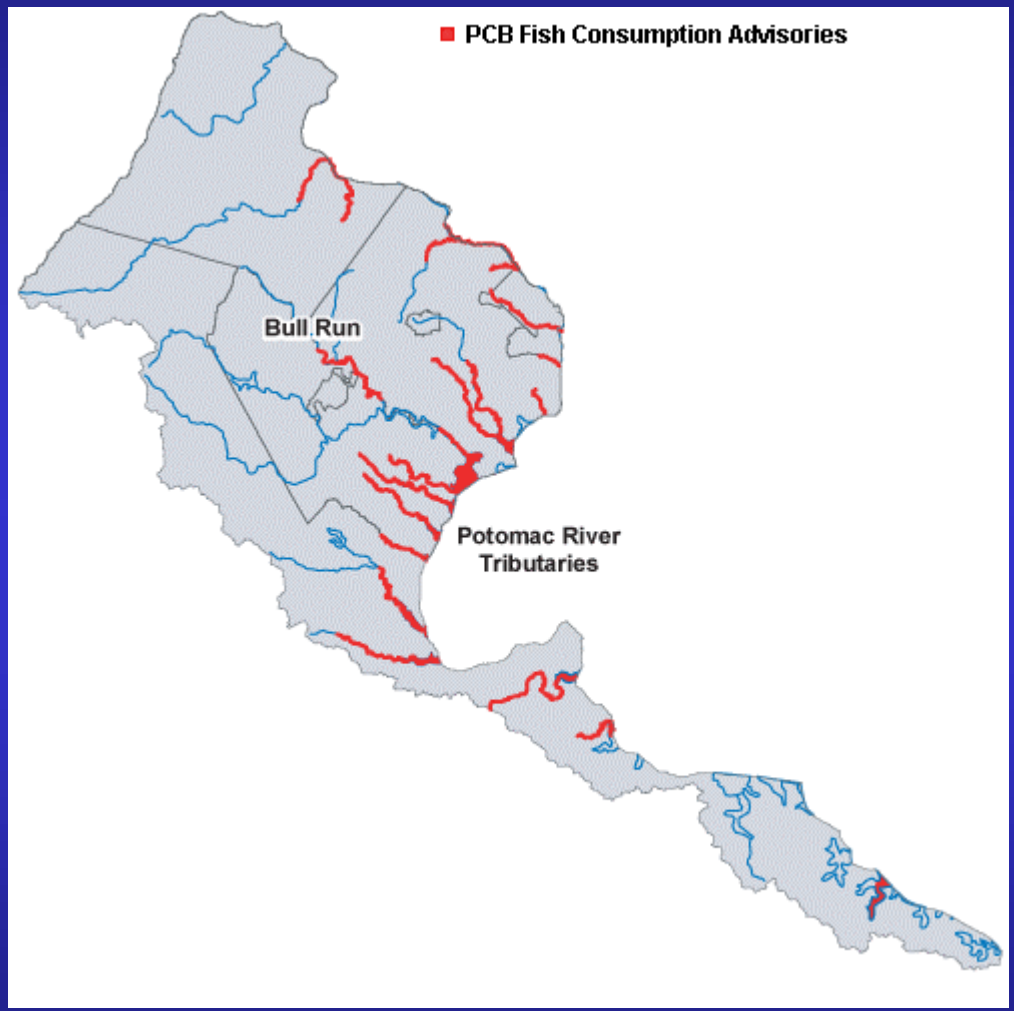
Potomac River

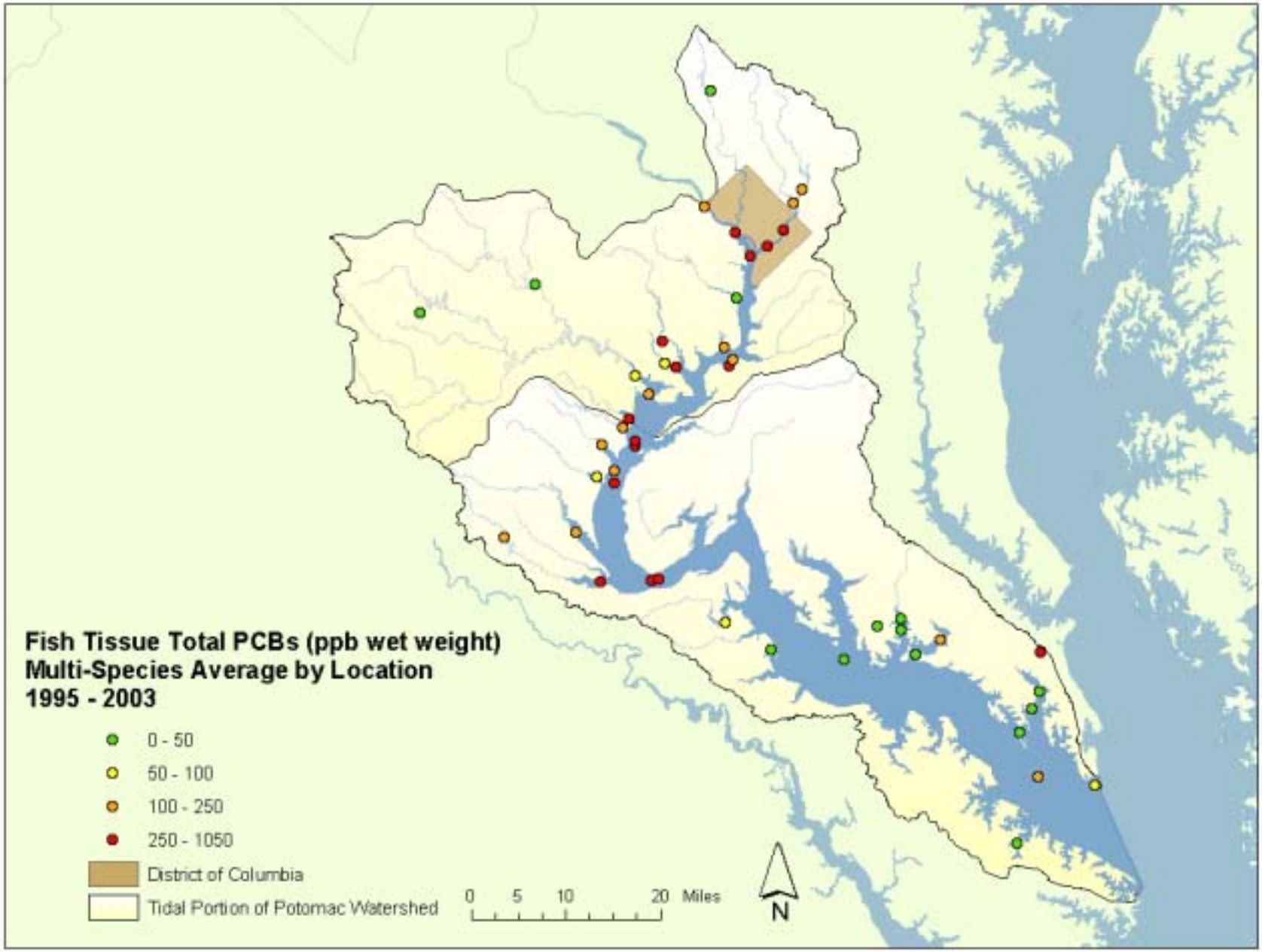
Potomac River, DC Line to MD 301 - PCBs, Pesticides

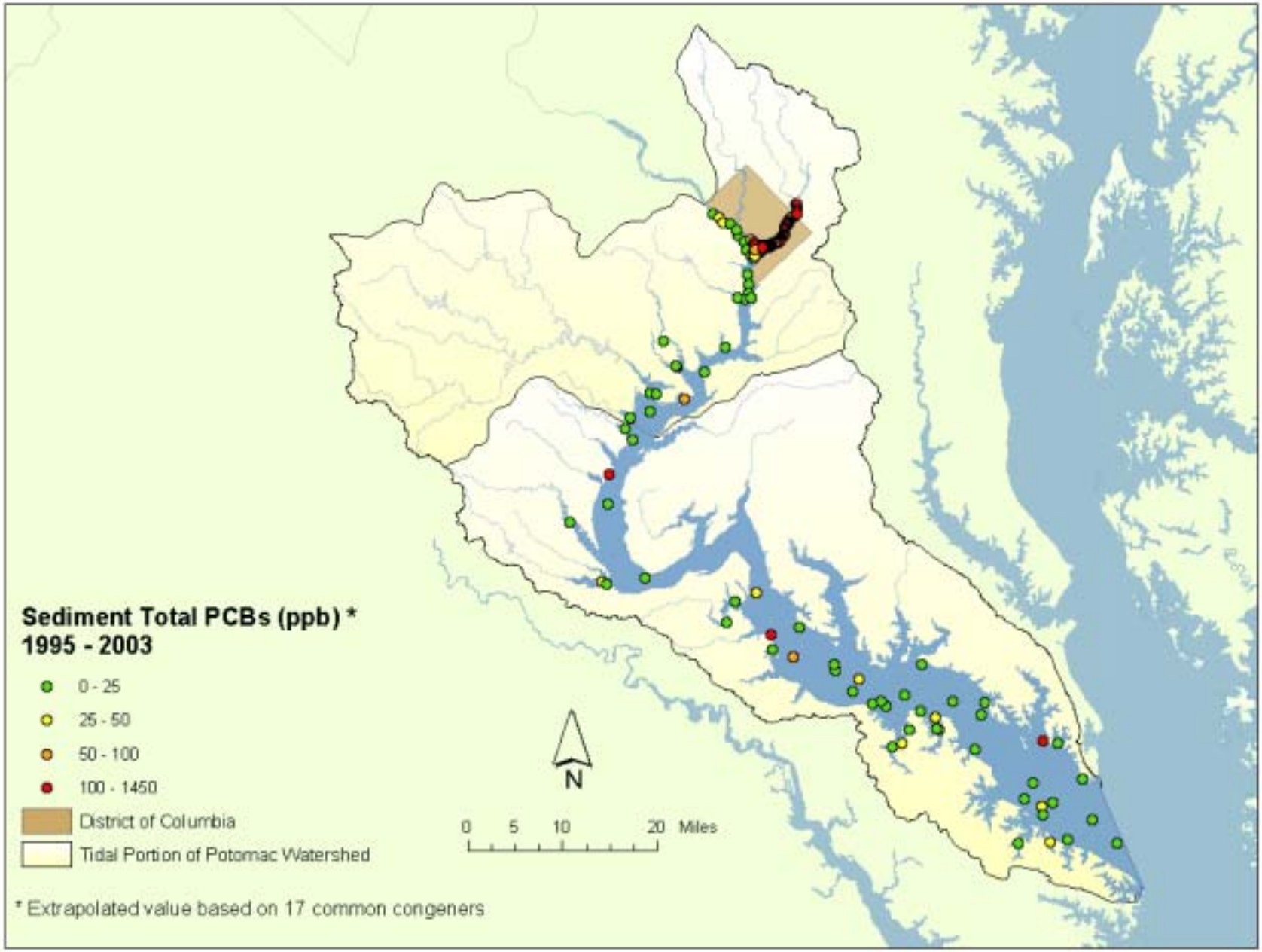
Potomac River and Tributaries near Quantico, VA Tidal Waters from DC Line to Aquia Creek
PCBs

For Black and White Printers
Recommended number of meals in lower left corner of advisory boxes

VA Dept of Health Fish Consumption Advisories




Fish Tissue Total PCBs (ppb wet weight)
Multi-Species Average by Location
1995 - 2003
0 - 50
50 - 100
100 - 250
250 - 1050
District of Columbia
Tidal Portion of Potomac Watershed
0 5 10 20 Miles
N


Sediment Total PCBs (ppb) *
1995 - 2003
0 - 25
25 - 50
50 - 100
100 - 1450
District of Columbia
Tidal Portion of Potomac Watershed
N
0 5 10 20 Miles
* Extrapolated value based on 17 common congeners

Total PCBs in Potomac Estuary Waters Ambient Conditions

- Potomac fall line (CBP/Foster, 1992): ~ 4 ng/L
- DC, near Anacostia, (Velinsky et al., 1998): 1–4 ng/L
- MD, main channel (private comm., Baker): 1–6 ng/L
- Ches. Bay (private comm., Baker): 0.2–0.6 ng/L

TMDL development problem

1. DC, MD, and VA have placed portions of the tidal Potomac river on their 303(d) impaired waters lists for PCB contamination.
2. DC consent decree requires TMDL by Sept. 2007, but MD and VA TMDLs not required till later.
3. Because contaminated waters are in close proximity and likelihood that PCBs are transported across state lines, independent TMDL efforts would be confusing to public.

Solution

- Jurisdictions agree to share data collection and model development, as well as a stakeholder involvement process, for cost effectiveness and stakeholder acceptance.
- ICPRB acts as coordinator and technical resource for joint effort.
- LTI provides model development under contract to EPA.
- Financial support from EPA, states, ???.
- MD and VA agree to aim for DC's due date.

Challenges

1. States have different water quality standards. Must resolve what the TMDL endpoint(s) is (are) going to be.
2. Multiple jurisdictions and geographic extent complicate stakeholder involvement.
3. Short time line for model development.
4. Lack of loading data, and limited data within estuary, with which to calibrate a model.
5. Demanding (and expensive) technical requirements for sample collection and analysis.
6. Point source monitoring data all ‘non detects’.
7. Current concentrations are ~10-100 times greater than water quality standards: implications for TMDL.

Different WQS

- Need to ensure that all affected states' standards are achieved
- For some embayments, due to their poor flushing, achievement of the VA standards could be the most critical condition for development of the TMDL, if the flushing and other processes in the mainstem Potomac more than compensated for the more restrictive standards that apply to the mainstem.
- At this point, we just don't know…the modelling will provide those answers.

Approach

1. A steering committee formed to coordinate and guide efforts: DC, MD, VA, EPA, ICPRB, MWCOG
2. Collect historical data / develop input loading estimates from major source categories.
3. Collect additional data (quickly) to fill in knowledge gaps for model.
4. Establish process to keep stakeholders in all jurisdictions involved / informed throughout TMDL development.
5. Build model for PCB fate and transport.

TMDL Development Timeline

09/07 – PCB TMDL for DC due to EPA

??/07 – Draft TMDL to stakeholders for review

03/07 – Draft TMDL to state agencies for internal review

09/06 – Finish PCB Model Calibration/Validation and Sensitivity Analyses

12/05 – Finish Hydrodynamic/Salinity Model Calibration/Validation and Sensitivity Analyses

Fall/05 - Technical Advisory Committee begins qtrly meetings

9/05 – LTI develops modeling options

04/05 to 05/06 – new samples collected to better characterize sources

TMDL Development Team / Stakeholder involvement

STEERING COMMITTEE

MDE, DC DOH, VDEQ, MWCOG, ICPRB, EPA, LTI

MDE, DOH, VDEQ: regulatory role, decision-making on process

EPA: contributing expertise, $

ICPRB: coordination, staff support, contract mgmt for monitoring, develop model input data, develop and run TMDL scenarios, write draft TMDL

MWCOG: contributing expertise and regional perspective

LTI: developing PCB model, contributing expertise

TMDL Development Team / Stakeholder involvement

TECHNICAL ADVISORY COMMITTEE

MEMBERSHIP: Institutional stakeholders (likely to be affected by TMDL decisions, civic, conservation and business groups). Individuals/organizations may decide to just be on e-mail list, or keep track via project website.

ROLES: Receive briefings from, and provide feedback to, experts on model / data / policy as these topics evolve.

MEETINGS: Quarterly, during business hours

LOCATION: Geography makes this a challenge. MWCOG?

TMDL Development Team / Stakeholder involvement

SPECIAL PURPOSE WORKGROUPS

Topic oriented, membership from TAC, meeting schedule would vary as issue requires. Members may include stakeholders with expertise and other contribution to topic.

Example workgroups:

- Monitoring
- Loading estimate issues
- Modeling
- Implementation

TMDL Development Team / Stakeholder involvement

PUBLIC MEETINGS

Three (sets of) meetings proposed – in each jurisdiction

- Kickoff (Fall 2005)
- Source Assessment (?)
- Draft TMDL (Summer 2007)

Widely public noticed

In the evening to attract public.