TMDL PUBLIC MEETING

FOR THE

Levisa Fork, Slate Creek and Bull Creek

Bacteria, Benthic and PCB Phased TMDL Development

Shelley D. Williams
DEQ- Southwest Regional Office

Overview

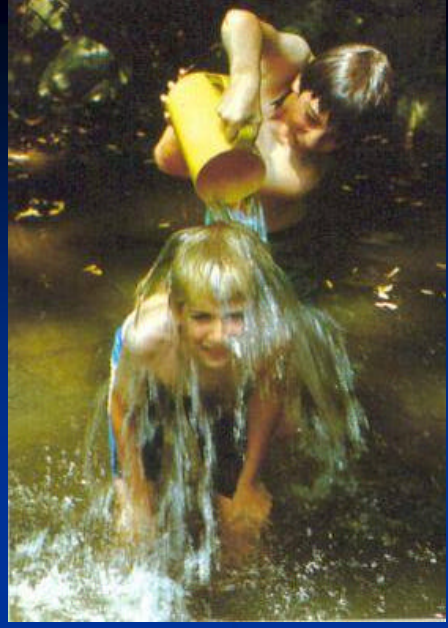
- Department of Environmental Quality
  1. Conducts Water Sampling
  2. Assess the data by comparing it to standards
  3. Problem (**Impaired**) waters are listed In an EPA report called the 303(d) Total Maximum Daily Load (TMDL) List

TMDL required by State and Federal Law

Total Maximum Daily Loads are Mandated by Law

- Federal 1972 Clean Water Act requires
  - **Water Quality Monitoring**
  - **Periodic Assessment and Impaired Waters Listing**
  - **Develop TMDLs for Impaired Waters**
- Virginia's 1997 Water Quality Monitoring Information and Restoration Act (WQMIRA) requires
  - **TMDLs for Impaired Waters**
  - **An Implementation Plan**
- 1999 Consent Decree with EPA to develop TMDL Reports for all 1998 listed streams by 2010

Designated Uses



Recreation *(swimming and boating)*

Aquatic Life

balanced, indigenous including game fish

Wildlife

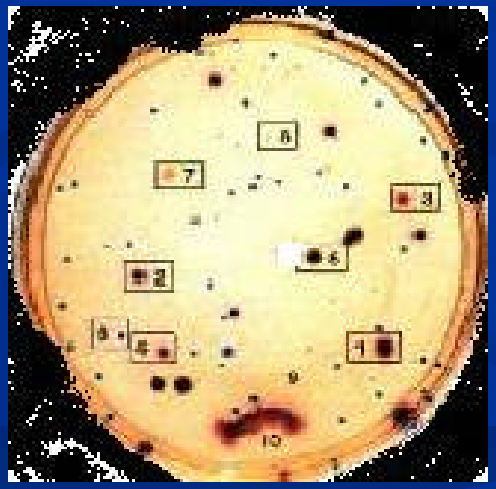
Edible natural resources

Fish

Shellfish (on the coast)

What are Water Quality Standards?

- **Numeric** or **Narrative** Limits designed to protect designated uses
  - **Recreational use**: measured by the number of colony forming units of bacteria in the water
  - **Aquatic life use**: measured by the numbers and varieties of aquatic organisms that live in our streams
  - **Fish Consumption Use**
    PCBs = Polychlorinated Biphenyls
    Surface Water = 0.00064 µg/L
    Fish tissue = 54 µg/kg



Bull Creek:
Why Are We Here?

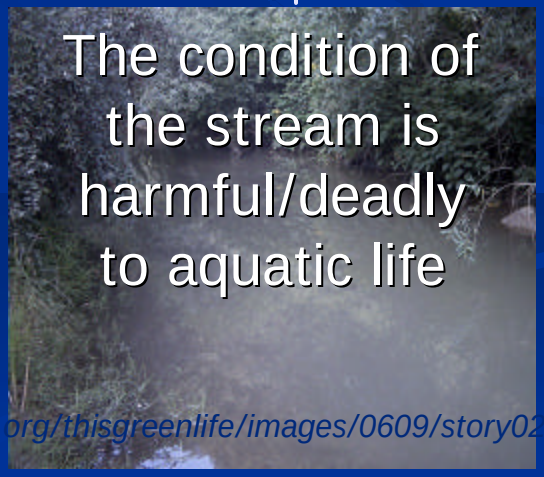
Two Separate Problems!

#1 Bacteria

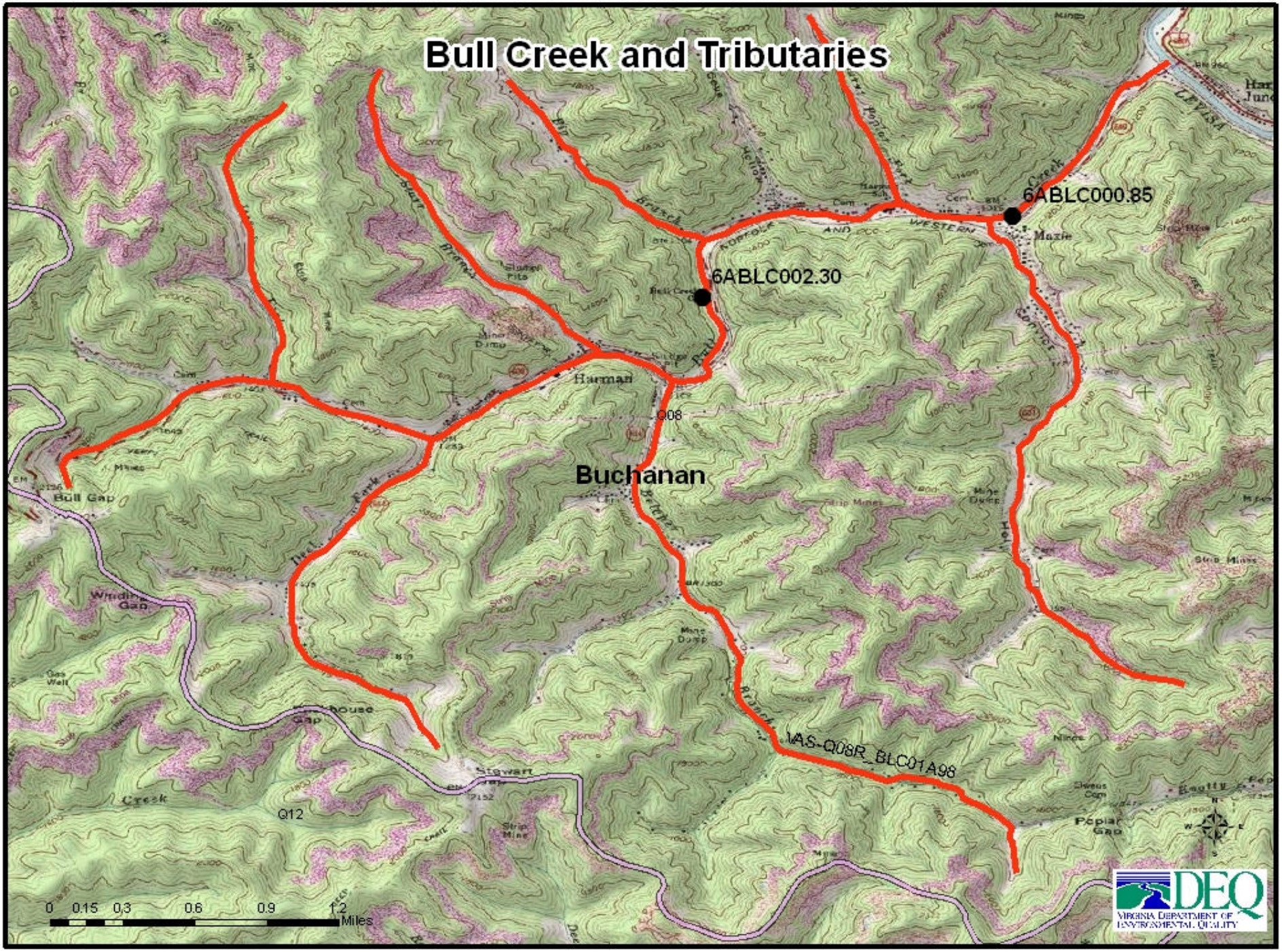
Listed in 2008

#2 Aquatic Life

Listed in 1998



http://www.nrdc.org/thisgreenlife/images/0609/story02.jpg

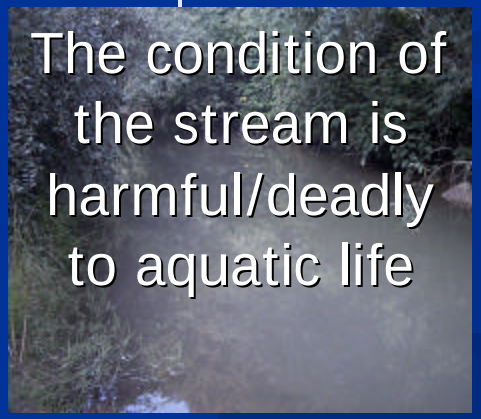

Bull Creek and Tributaries
6ABLC000.85
6ABLC002.30
Buchanan
Harman
Maxie
Bull Gap
Winding Gap
Stewart
Poplar Gap
Q08
Q12
IAS-Q08R_BLC01A98
0 0.15 0.3 0.6 0.9 1.2
Miles
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Levisa Fork:
Why Are We Here?

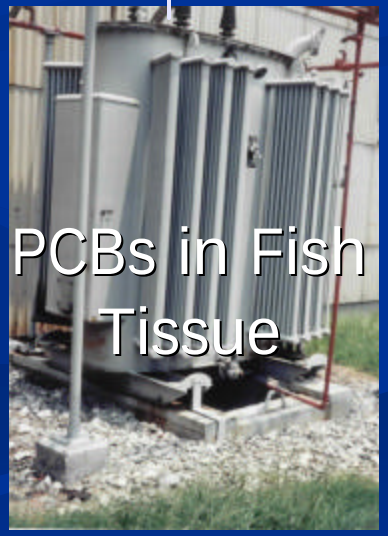
Three Separate Problems!

#1 Bacteria

#2 Aquatic Life



#3 PCBs



http://www.nrdc.org/thisgreenlife/images/0609/story02.jpg

http://www.savannahenvironmental.com/transformer.jpg

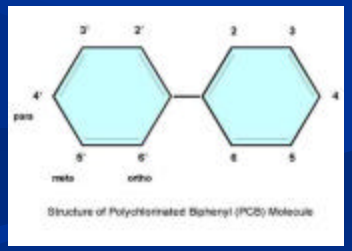
PCBs - Background

- Estimated that > 1.5 Billion lbs. manufactured in the U.S. until 1977
- Very stable and heat resistant
- Common uses:
  - Transformers, capacitors, hydraulic fluids, circuit breakers, PVC Products, carbonless copy paper, caulking material, etc.

PCBs – Why Important?

- Bioaccumulates at low conc. (lipids)
- Suspected carcinogen
- Other toxicological effects (humans)
  - Immunotoxicity, reproduction and developmental, hepatotoxicity (liver), neurotoxicity, and chloracne
- Major Sources of Exposure (humans)
  - Consumption of contaminated fish
  - Inhalation (dust from contaminated sites)

WQC = 0.00064 ug/L



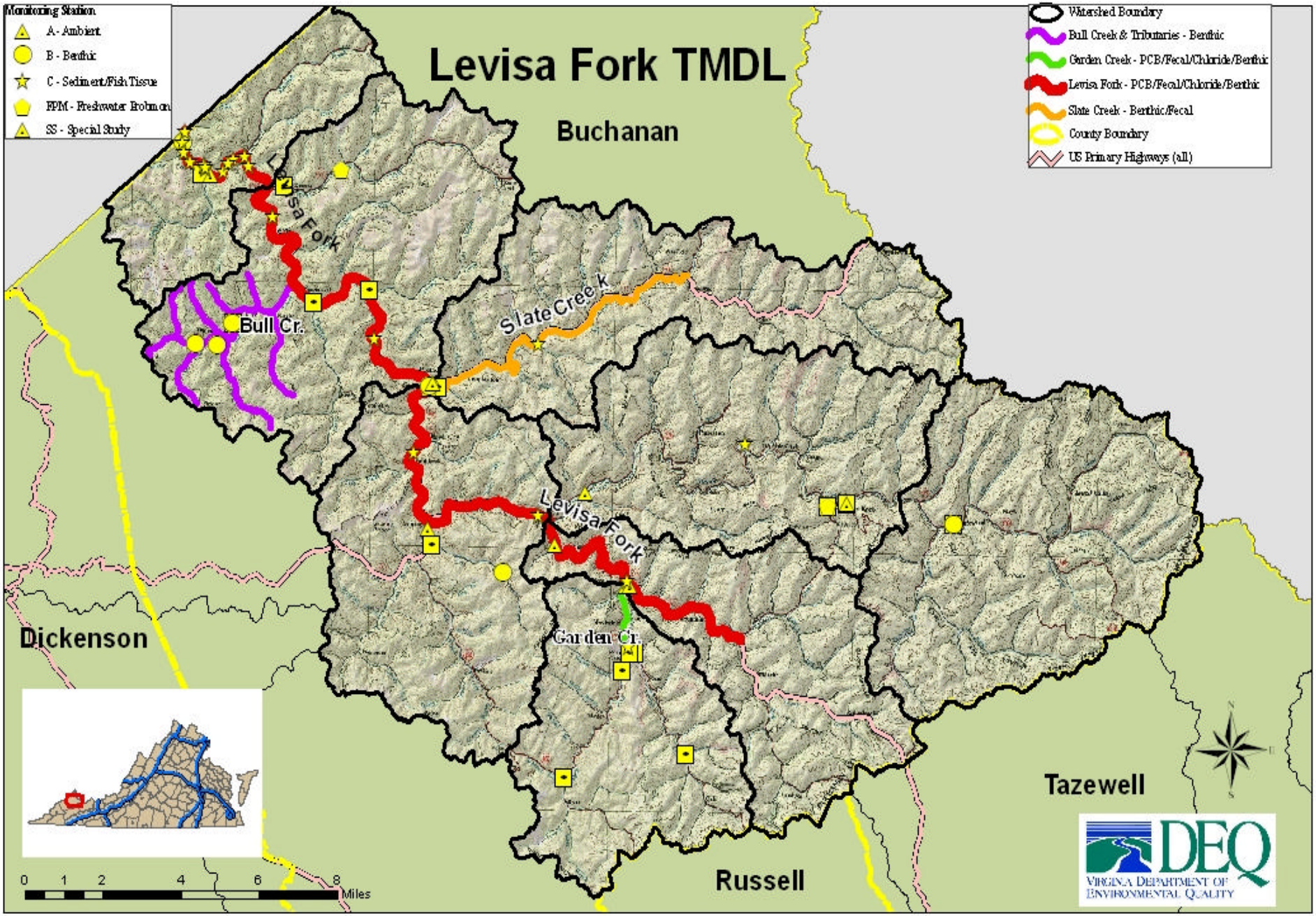
PCB Source Identification

- Storm water runoff
  - Contaminated sites
  - Leaking transformers
- Industrial/Municipal Point Sources
- Atmospheric Deposition
  - Contaminated sites (PCB off-gas)
  - Combustion of contaminated recycled oil
- Sediment "Hot Spots"

VA Regulatory Criteria
Total PCBs

Consumption Advisories Fish Tissue (ppb)	Water Quality Criterion (ppb)
50	0.00064

–WQC represents conc. in water column where exposure of fish to PCBs should minimize bioaccumulation such that the fish tissue conc. will be protective of human consumption


Levisa Fork TMDL
Monitoring Station
A - Ambient
B - Benthic
C - Sediment/Fish Tissue
FPM - Freshwater Probmon
SS - Special Study
Watershed Boundary
Bull Creek & Tributaries - Benthic
Garden Creek - PCB/Fecal/Chloride/Benthic
Levisa Fork - PCB/Fecal/Chloride/Benthic
Slate Creek - Benthic/Fecal
County Boundary
US Primary Highways (all)
Buchanan
Dickenson
Tazewell
Russell
Levisa Fork
Bull Cr.
Slate Creek
Garden Cr.
0 1 2 4 6 8 Miles
DEQ
Virginia Department of Environmental Quality

What is a **TMDL** or **T**otal **M**aximum **D**aily **L**oad?

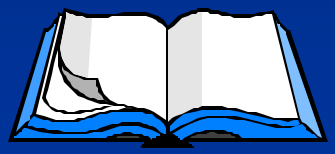
- **Amount of a pollutant that a waterbody can receive and still meet water quality standards**
- It is pollutant specific
  - Aquatic Life Stressors
  - Bacteria
- It is a process to restore impaired waters
- A special study that:
  - Identifies all significant pollution sources,
  - Calculates amount of pollution from each source, and
  - Calculates pollution reductions, by source, needed to attain water quality standards.

What Next?

Total
Maximum
Daily
Load

We Are Here
Phased TMDL

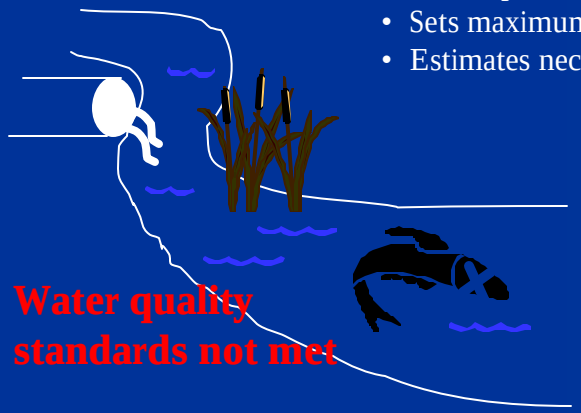
Implementation Plan



- Identifies permit controls, best management practices, or remediation options needed to make necessary pollutant reductions

- Calculates amounts from each source
- Tracks pollutants in the system
- Sets maximum pollutant load
- Estimates necessary pollutant reductions

Polluted



Water quality standards not met

Implementation

Clean

Water quality standards met

The Process

Information

- **TMDL**
  - **Virginia**
    - **DEQ homepage -** http://www.deq.virginia.gov/tmdl
  - **Federal**
    - **EPA homepage -** http://www.epa.gov/owow/tmdl/

Thank You !

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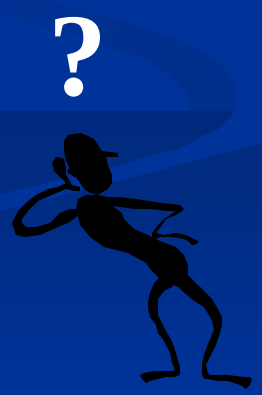
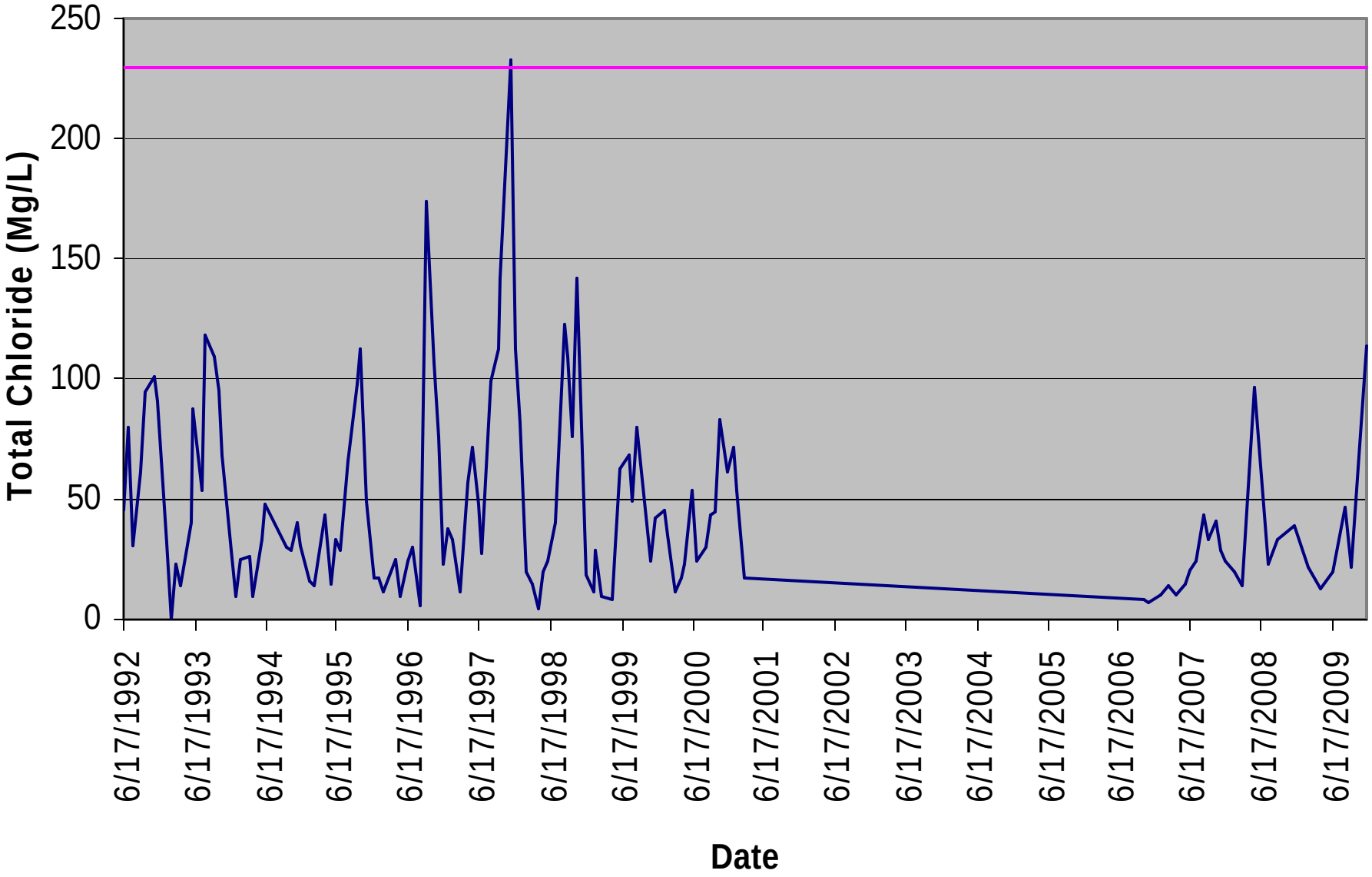
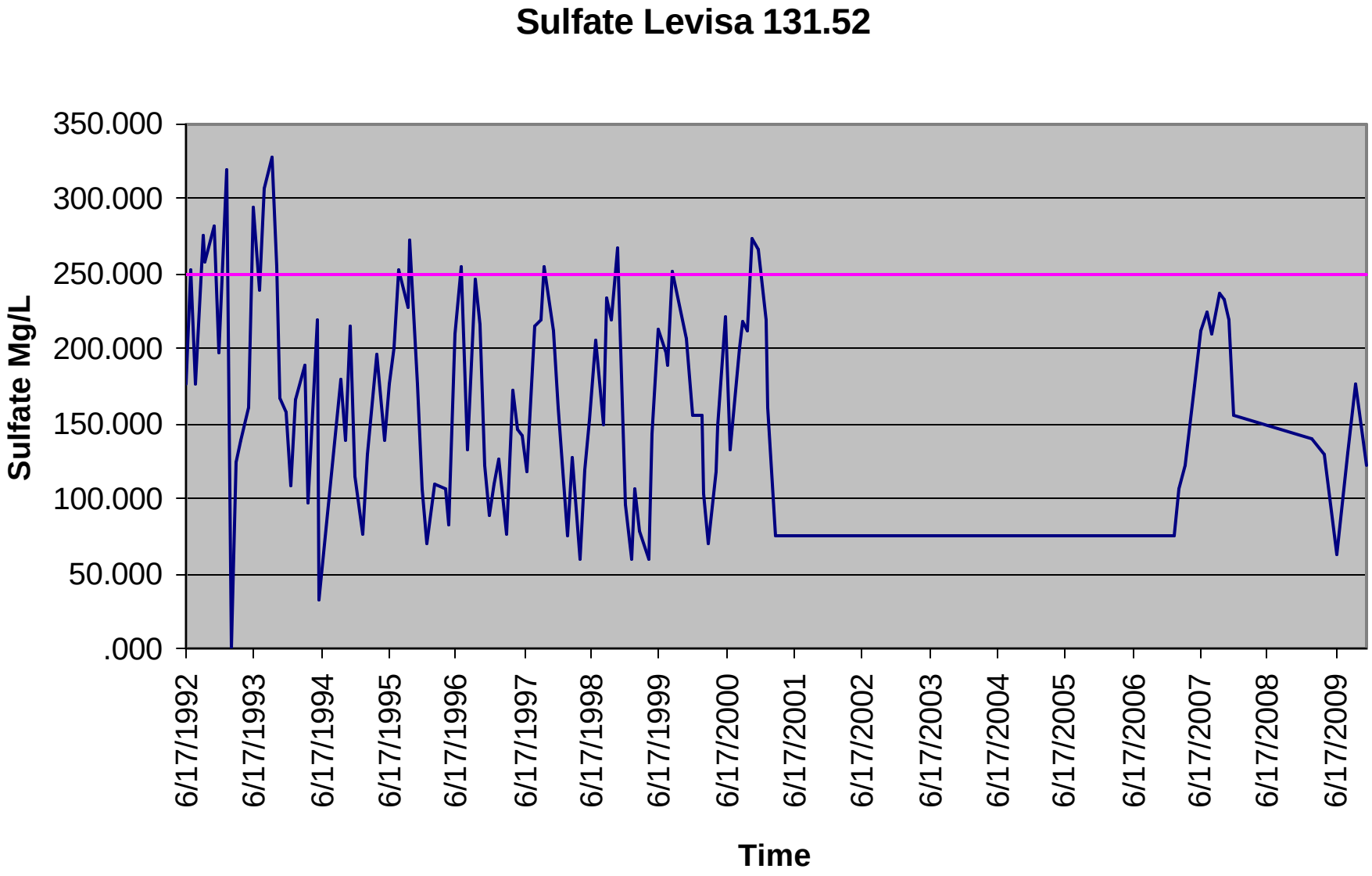


Chloride Levels in Levisa Fork at RM131.52




Sulfate Levisa 131.52
Sulfate Mg/L
350.000
300.000
250.000
200.000
150.000
100.000
50.000
.000
6/17/1992
6/17/1993
6/17/1994
6/17/1995
6/17/1996
6/17/1997
6/17/1998
6/17/1999
6/17/2000
6/17/2001
6/17/2002
6/17/2003
6/17/2004
6/17/2005
6/17/2006
6/17/2007
6/17/2008
6/17/2009
Time

Problem Identification

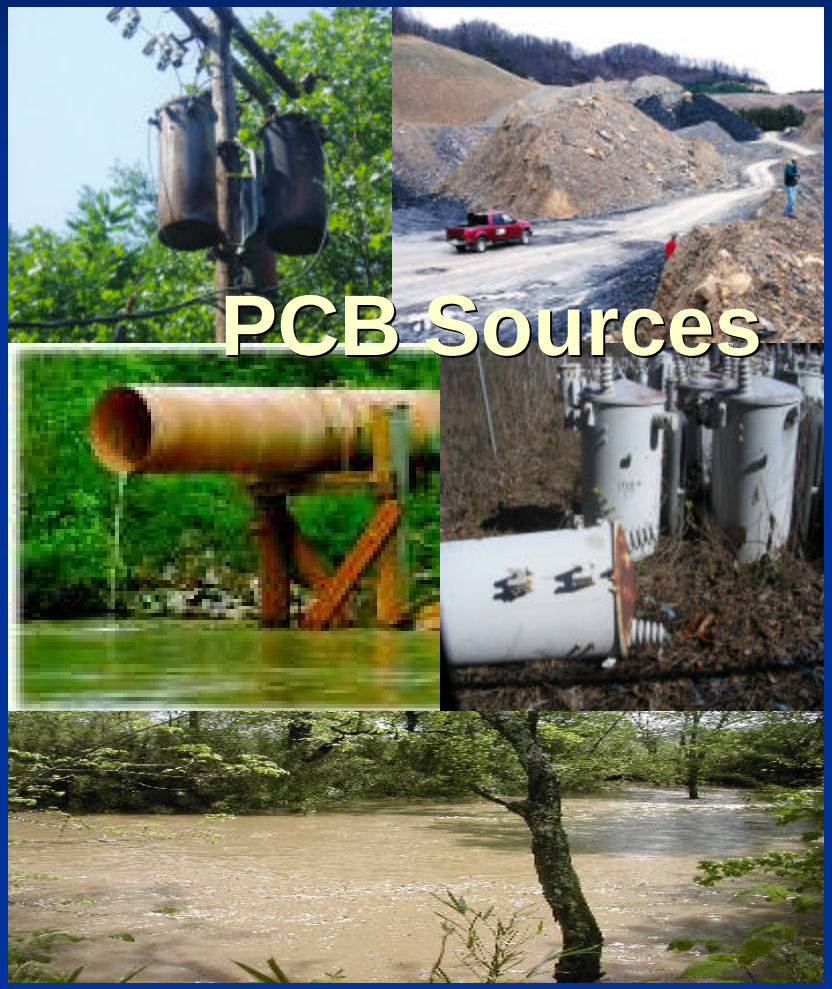
- Levisa Fork Watershed -

- Fish Consumption Advisories (all species)
  - Levisa Fork (incl. Garden Crk up to Right Fork) to confluence with Slate Creek (18 miles) – no more than 2 meals/month
  - Levisa Fork confluence with Slate Creek (at Grundy) to Kentucky State Line (14 miles) – DO NOT EAT

PCB TMDL Development

- Steps
  - TMDL Study will attempt to identify all sources of PCB inputs
  - Calculate the amount of PCBs entering the stream from each source
  - Calculate the PCB reductions needed from each source to attain water quality standards
    - Ultimate Goal → 50 ppb fish tissue
  - Allocate allowable load to sources

PCBs:
How do we Determine the TMDL?



Watershed data

Endpoint

TMDL

PCB TMDL Implementation

- If baseline PCB load exceeds the TMDL WLA:
  - BMP WQBELs (40 CFR 122.44(k))
    - Numeric effluent limits considered infeasible
    - EPA accepted approach on Potomac River PCB TMDL
  - Pollutant Minimization Plan
  - Adaptive Implementation
    - Objective to back-track source and not treat at end of pipe

Levisa Fork PCB Results in Water

Ambient Location	Sample Date	Flow	Total PCB (pg/L)	Sample Date	Flow	Total PCB (pg/L)
6ALEV156.82 - Levisa Fork	9/26/2007	Low	141	3/5/2008	High	428
6AGRF000.56 - Right Fork Garden Creek	9/26/2007	Low	13.2	3/5/2008	High	218
6AGAR000.16 - Garden Creek	9/26/2007	Low	40	3/5/2008	High	537
6A LEV152.46 - Levisa Fork	9/26/2007	Low	5.7	3/5/2008	High	372
6ADIS001.24 - Dismal Creek	9/26/2007	Low	8.3	3/5/2008	High	1,140
6ABIP000.18 - Big Prater Creek	9/26/2007	Low	0	3/5/2008	High	132
6ALEV143.80 - Levisa Fork	9/27/2007	Low	35	3/5/2008	High	836
6ASAT000.26 - Slate Creek	10/23/2007	Low	133	3/5/2008	High	323
6ABLC002.30 - Bull Creek	10/1/2007	Low	52.4	3/5/2008	High	148
6AHME000.42 - Home Creek	9/27/2007	Low	11.3	3/5/2008	High	104
6ALEV131.52 - Levisa Fork	9/27/2007	Low	23	3/5/2008	High	986
QA/QC Levisa Fork (DI water/field blank)	9/27/2007	NA	16 (QC)	3/5/2008		