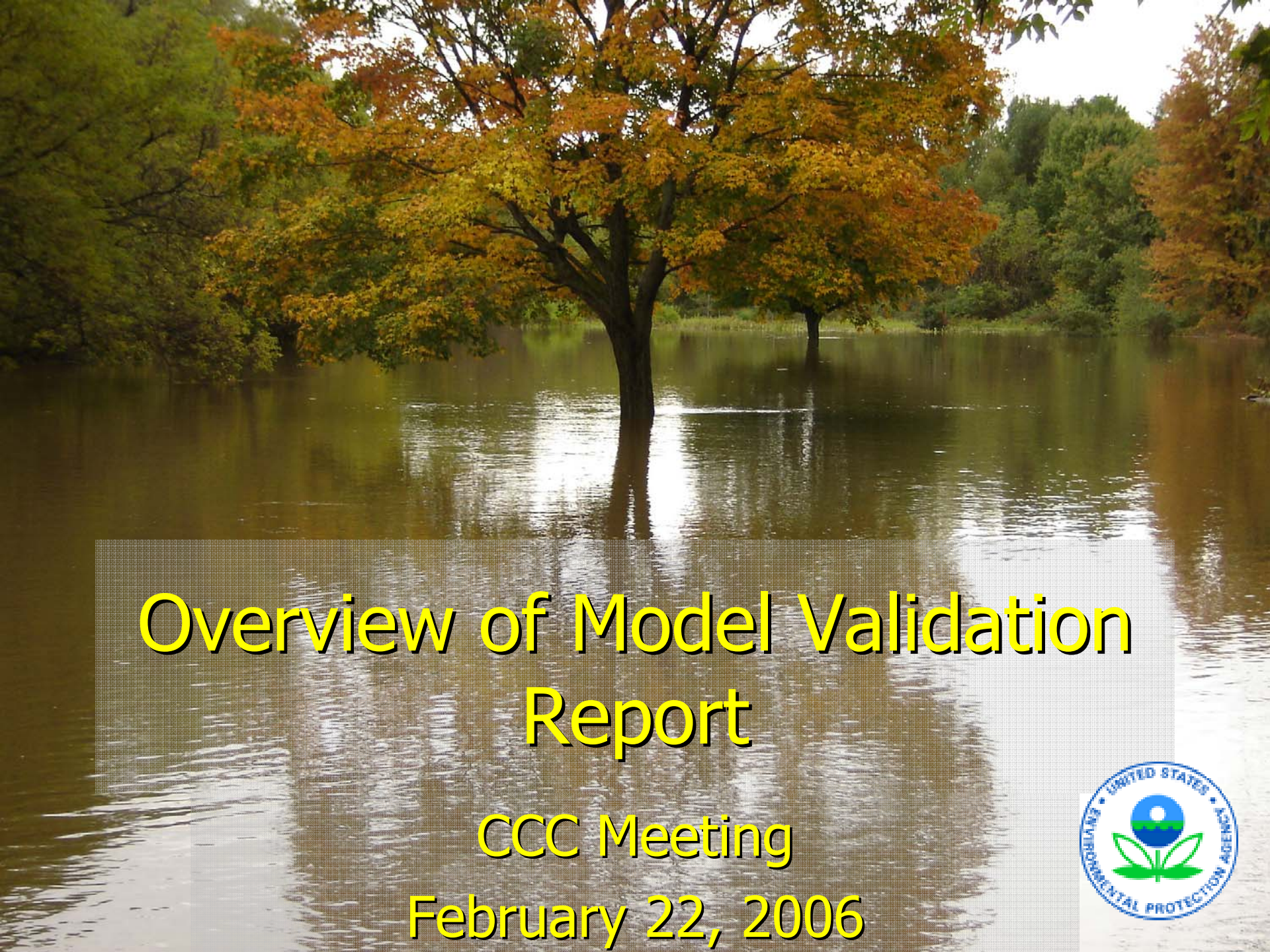
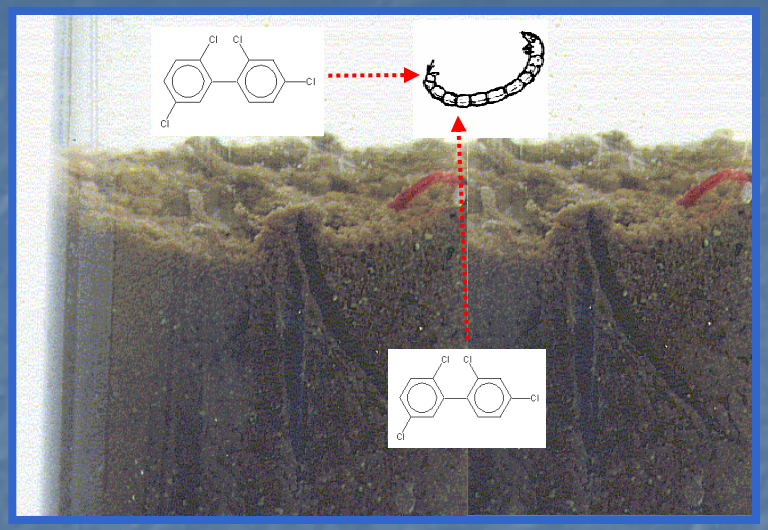


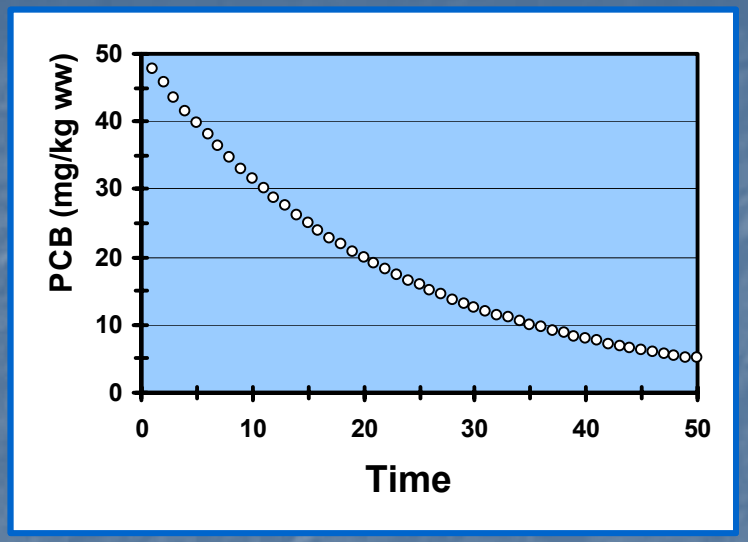
Overview of Model Validation Report

CCC Meeting

February 22, 2006

Purpose of Modeling Study





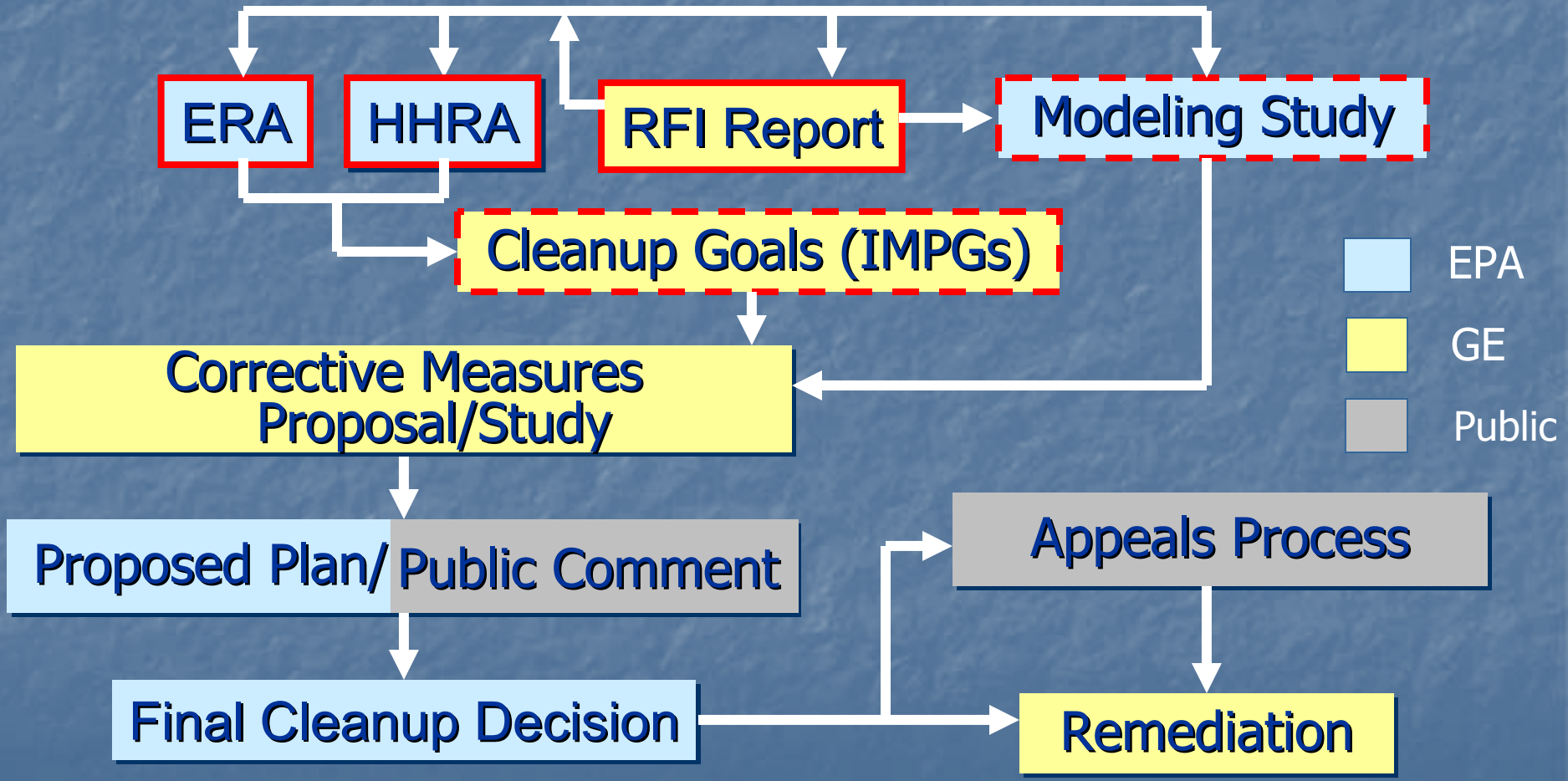
Develop a tool for the Housatonic River that can be used to estimate PCB concentrations in:

- Water
- Sediment
- Aquatic Biota

- Estimate the time needed for PCBs to be reduced below levels of concern
- Compare future baseline conditions with the relative performance of potential remedial alternatives

Rest of River Process

Outlined in CD and Reissued RCRA Permit



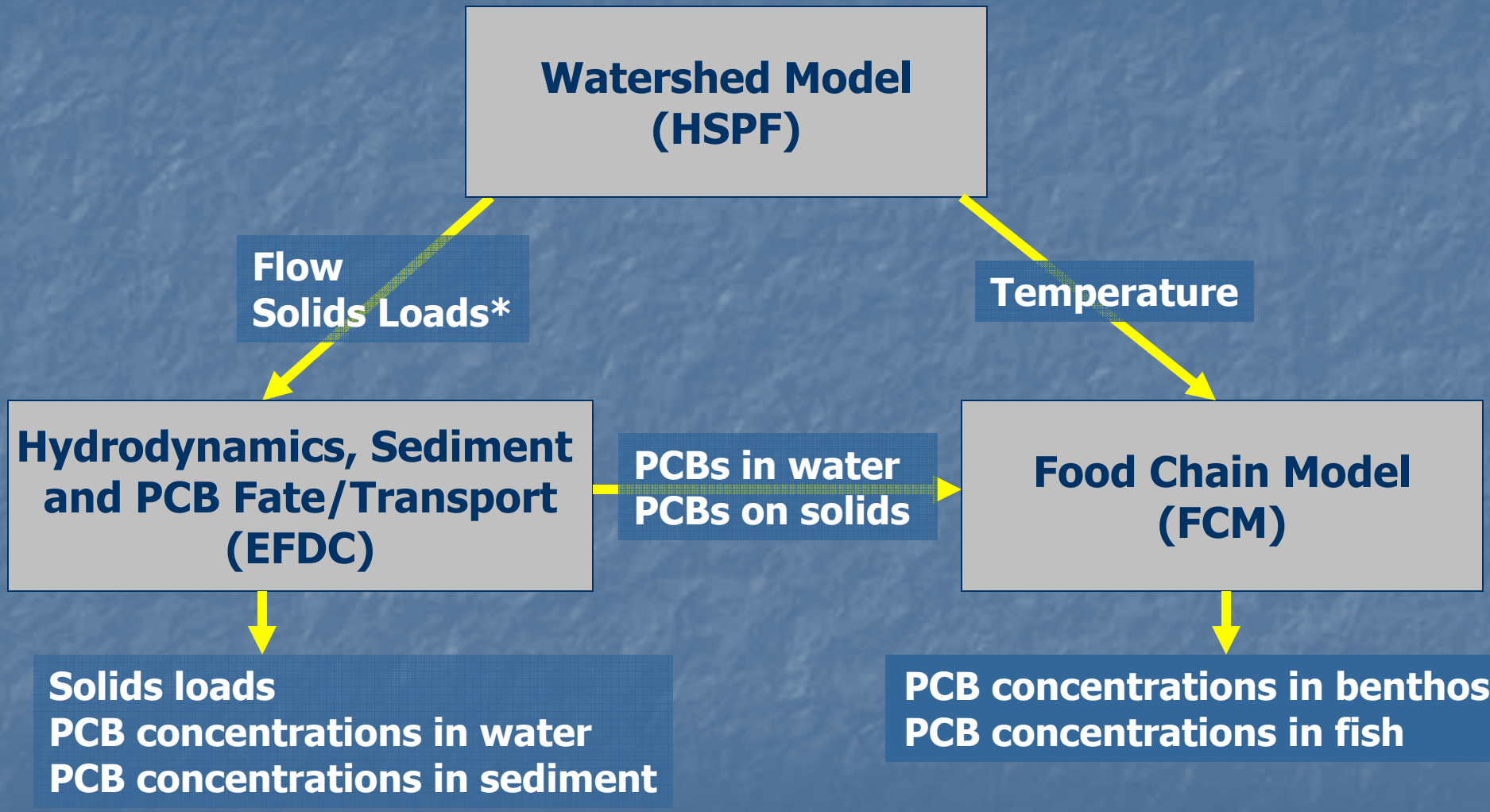
Modeling Study Background

- Three phases in the Modeling Study as required by the CD, all of which were to be Peer Reviewed
  - Modeling Framework Design (MFD)
  - Model Calibration
  - Model Validation
- Peer Review of these documents conducted in accordance with the Charge

Model Framework Design

- Blueprint for the Modeling Study
  - Described the Conceptual Model of the site
  - Evaluated various publicly-available models
  - Proposed Linked Model Framework
    - HSPF (Watershed model)
    - EFDC (Hydrodynamic, Sediment Transport, PCB Fate/Transport model)
    - FCM (Food Chain model)
- Peer Review conducted in 2001
- Final MFD issued April 2004

Modeling Framework - Model Linkage



* Solids loads from HSPF used when data aren't available

Model Calibration

- Evaluated and adjusted minimum number of model parameters to optimize ability to reproduce the Housatonic River system
- Initially conducted for periods with largest amount of high quality data, including storm event sampling
  - HSPF 1990-2000
  - EFDC 1999-June 2000
  - FCM 1995-June 2000
- Peer Review conducted in spring 2005

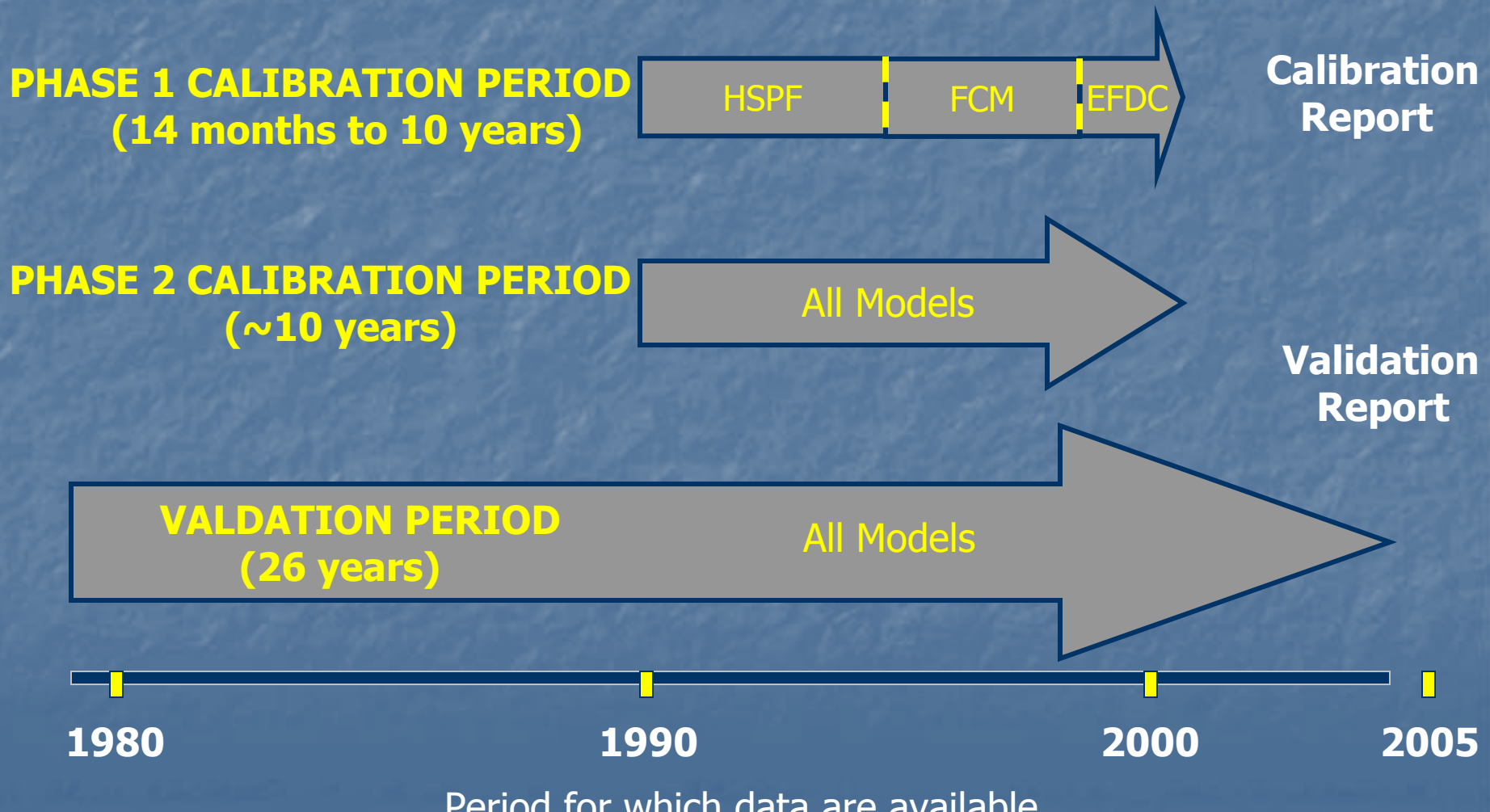
Model Validation

- Models run without changing any parameters following final Model Calibration
- No data used during the Calibration are used for evaluating model Validation performance
- Evaluate models' ability to reproduce the behavior of the Housatonic River system over a long time-period

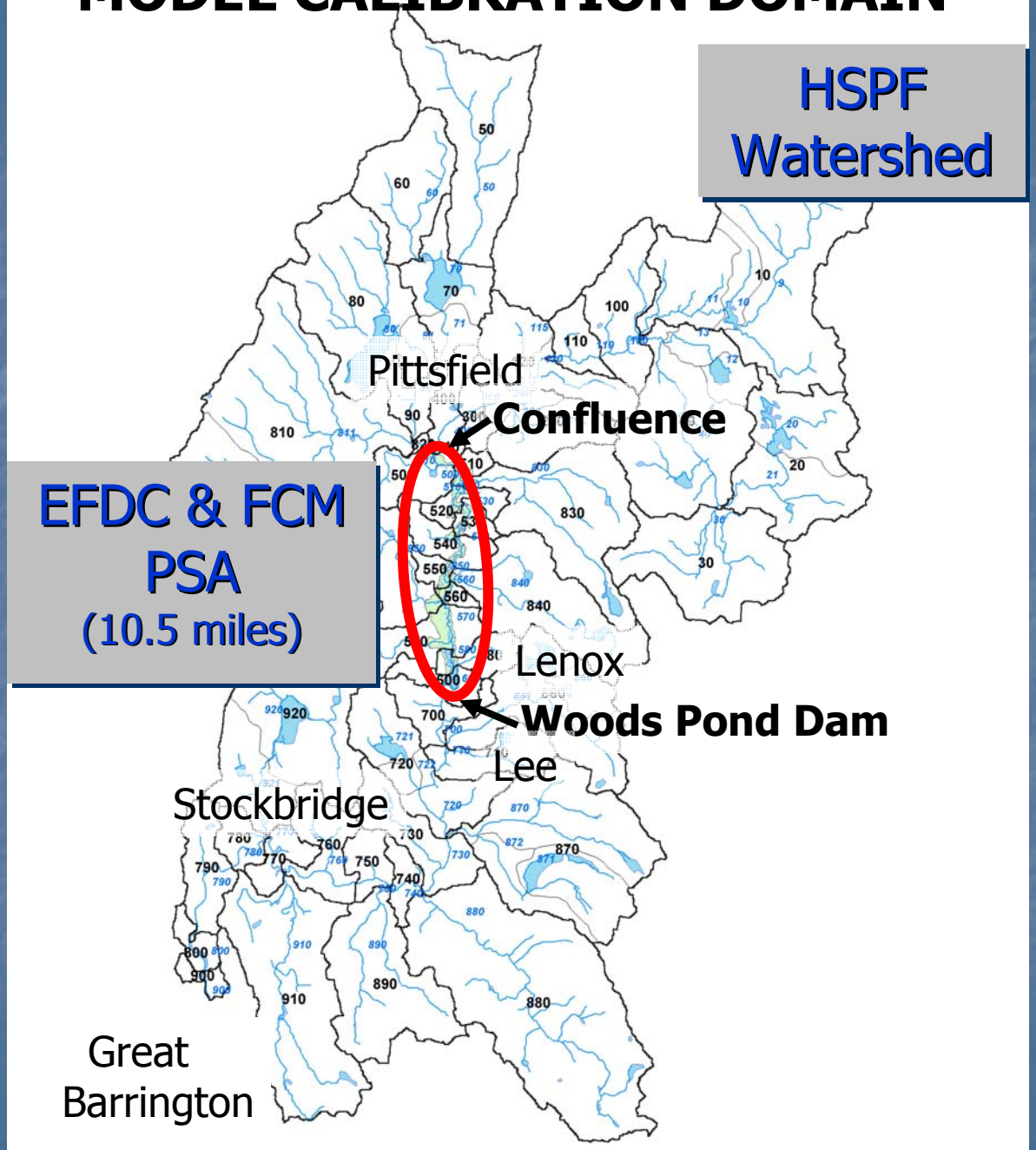
Response to Peer Review of Calibration Report (in Validation Report)

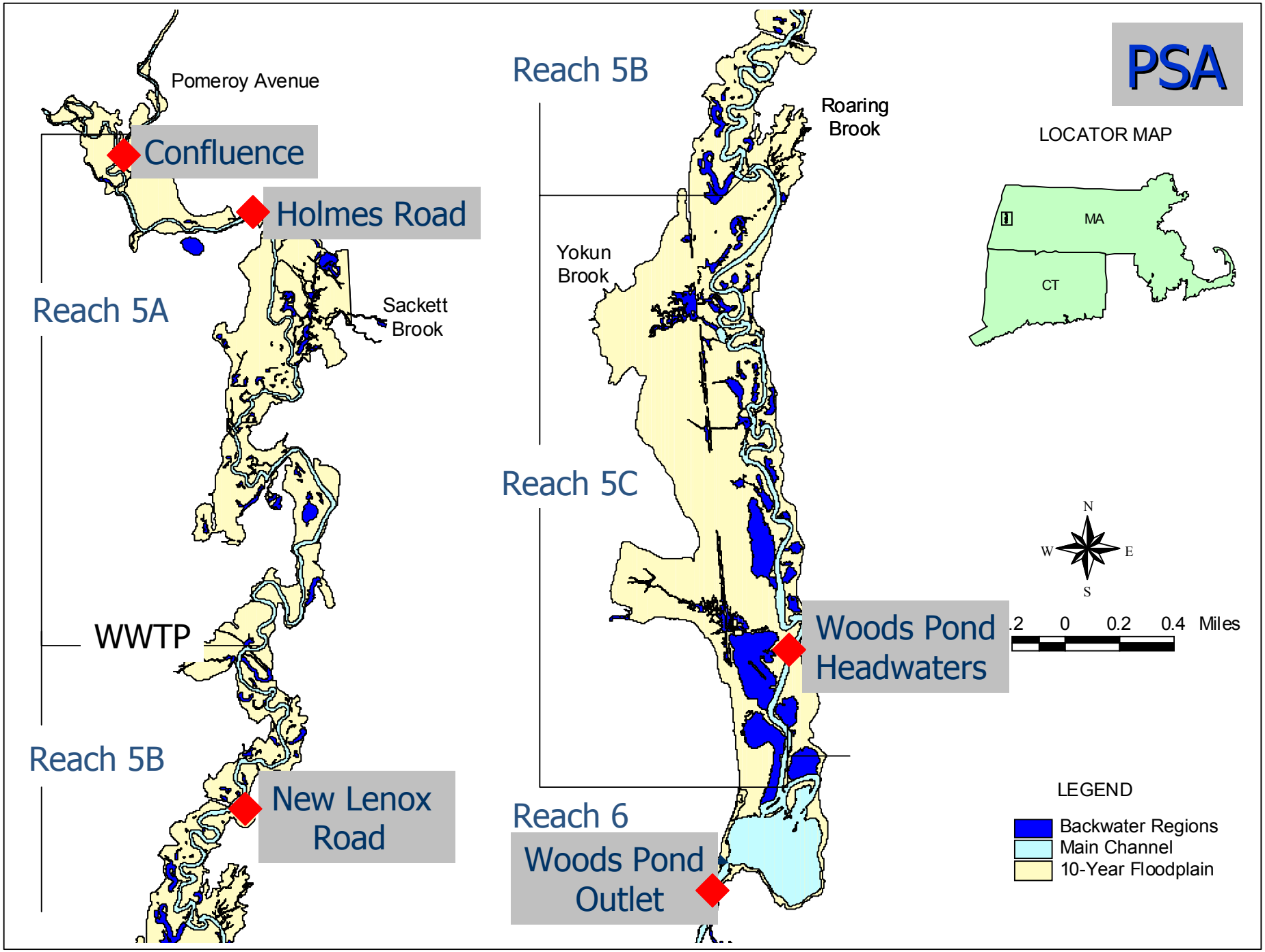
1. Extend Calibration Period (Phase 2 Calibration)
2. Include Bank Erosion in Calibration
3. Revisit Depth of Sediment Bioavailable Layer in Calibration
4. Revisit Volatilization in Calibration
5. Extend Model Domain downstream for Validation
6. Include Examples of Model Performance

Relationship between Calibration and Validation Periods

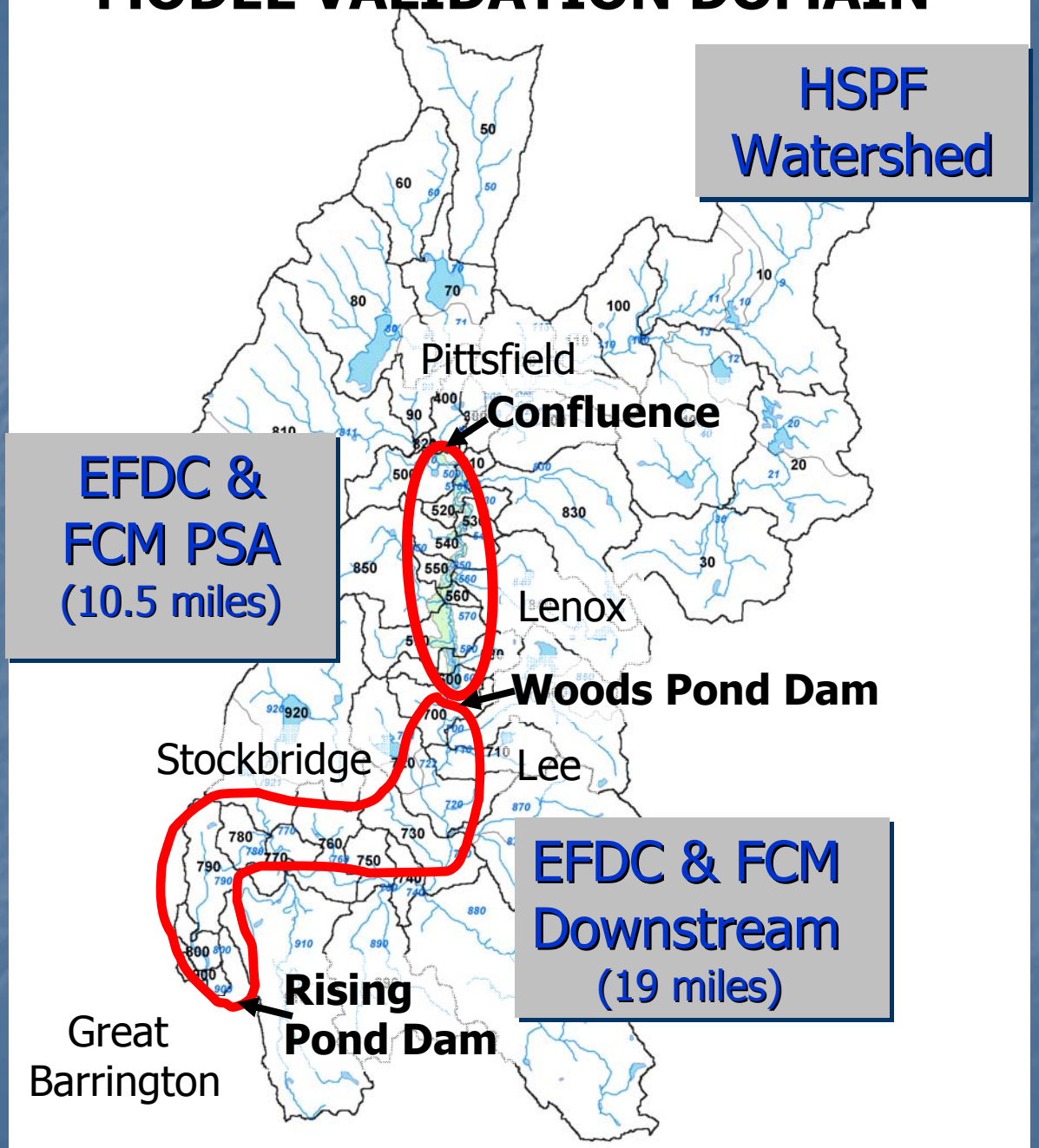


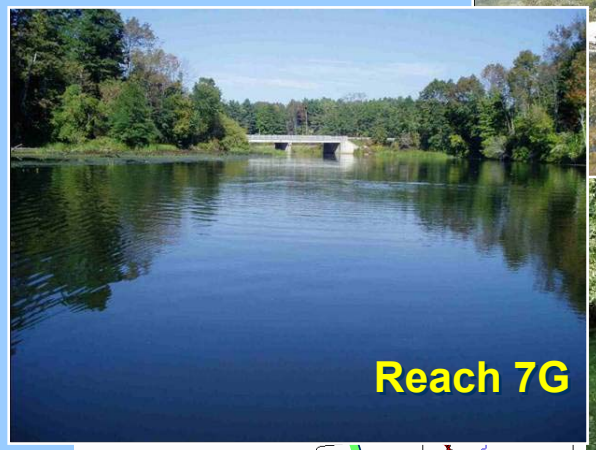
MODEL CALIBRATION DOMAIN




PSA
Pomeroy Avenue
Confluence
Holmes Road
Reach 5A
Sackett Brook
WWTP
Reach 5B
New Lenox Road
Reach 5B
Roaring Brook
Yokun Brook
Reach 5C
Woods Pond Headwaters
Reach 6
Woods Pond Outlet
LOCATOR MAP
MA
CT
N
W
E
S
.2 0 0.2 0.4 Miles
LEGEND
Backwater Regions
Main Channel
10-Year Floodplain

MODEL VALIDATION DOMAIN





Legend:
- Segment Boundary (Dam)
- Segment Boundary (No Dam)
- EFDC Grid
- Sediment Sample (Synoptic OC only)

Woods Pond Dam

7A

7B

7C

Lee

Glendale Dam

7G

7F

Meadow St. Bridge

7D

7E

7H

8

Rising Pond Dam

Downstream Model Domain

Remainder of the Presentation

- Watershed Model Validation
- Sediment and PCB Fate/Transport Validation
- Food Chain Model Validation
- Downstream Model Validation
- Example Model Runs
- Model Sensitivity and Uncertainty