

Problem

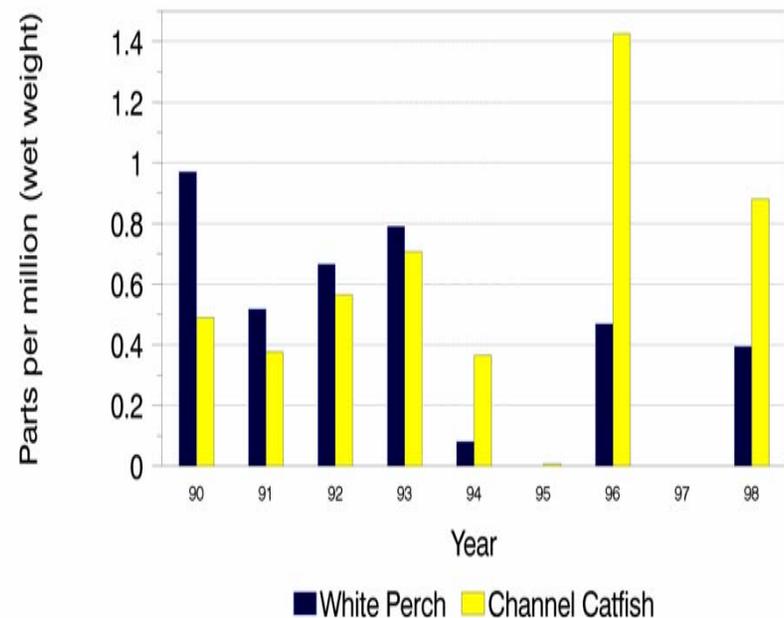
- DRBC studies in 1987 and 1988 identified PCBs in both fish tissue and sediment collected from the tidal river in the vicinity of Philadelphia.
- Currently the tidal Delaware River is listed as impaired for PCBs, Pesticides and Metals based upon fish tissue levels.

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in support of TMDL Development

Fish Tissue Contamination

- The DRBC began consistently collecting fish tissue samples (standard filets) at five stations between Trenton, NJ and Artificial Island since 1990.
- White perch and catfish are the target species.
- In fall 1997 and spring 1998, American shad juveniles and adults were collected and analyzed from the upper river and estuary.

Average PCB Concentrations
Delaware River Estuary

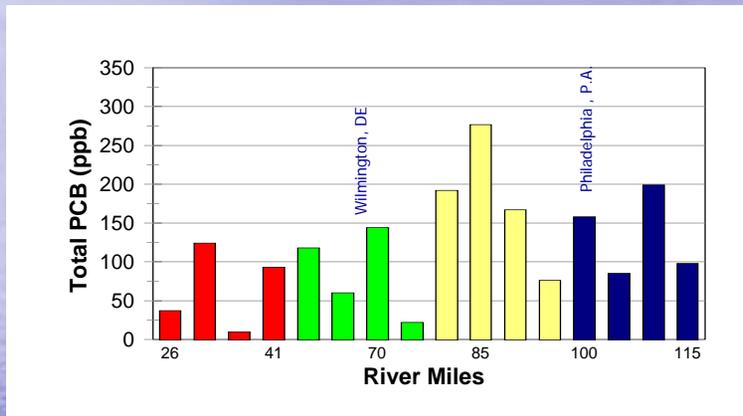


1996 & 1998 data is the sum of 74 congeners. 10-6 Risk Level is 0.0014 ppm @
1994 & 1995 data is the sum of 56 congeners. consumption rate of 6.5 g/day.
1990 - 1993 data is the sum of Aroclors.

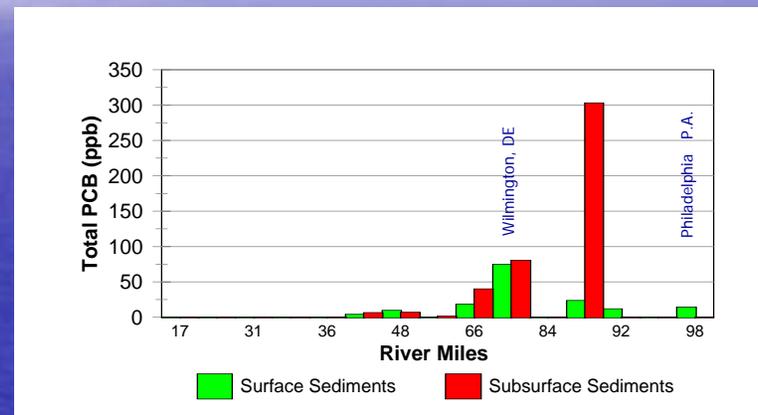
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Sediment Contamination

A.D. Little Study 1993



USA COE 1996

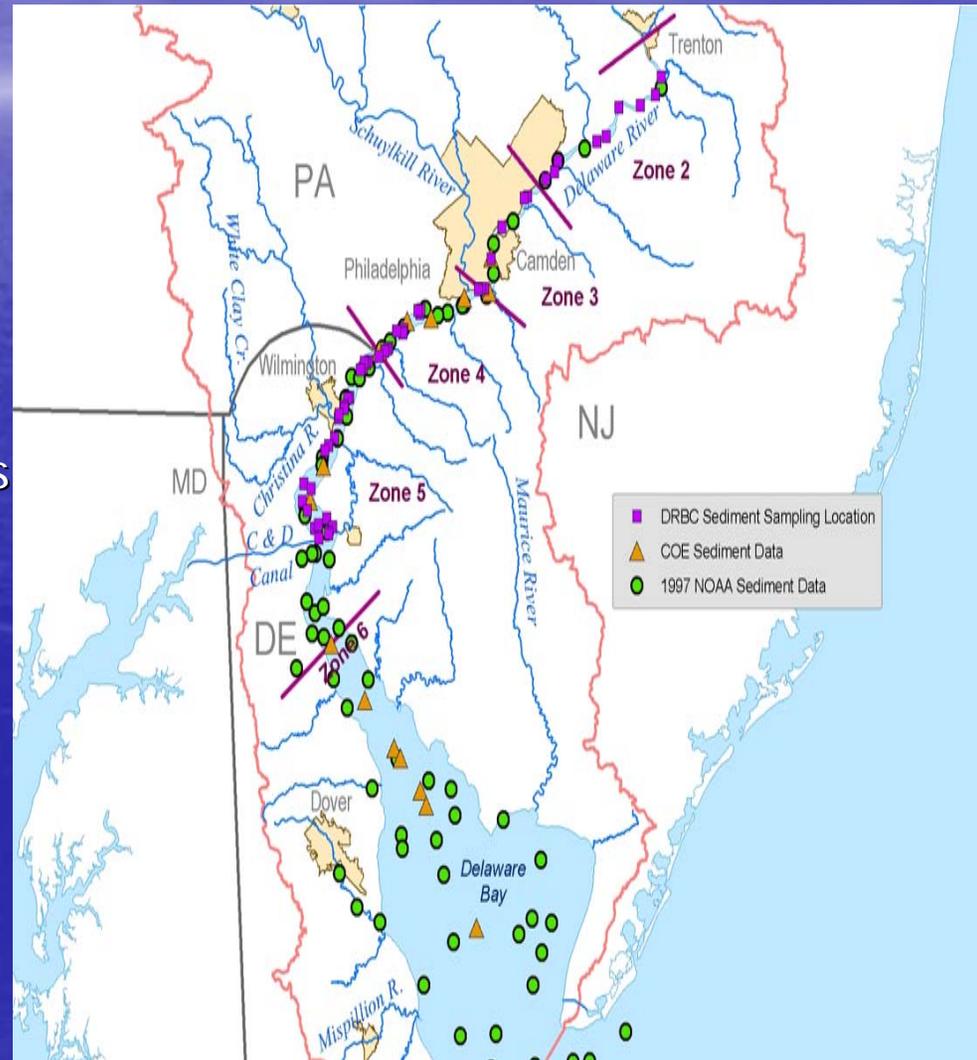


- As with fish tissue, recent investigations of sediment concentrations of PCBs have utilized congener-specific approaches.
- Additional sediment data collected by DRBC will be available from results of the National Coastal Assessment Program during 2000-2003

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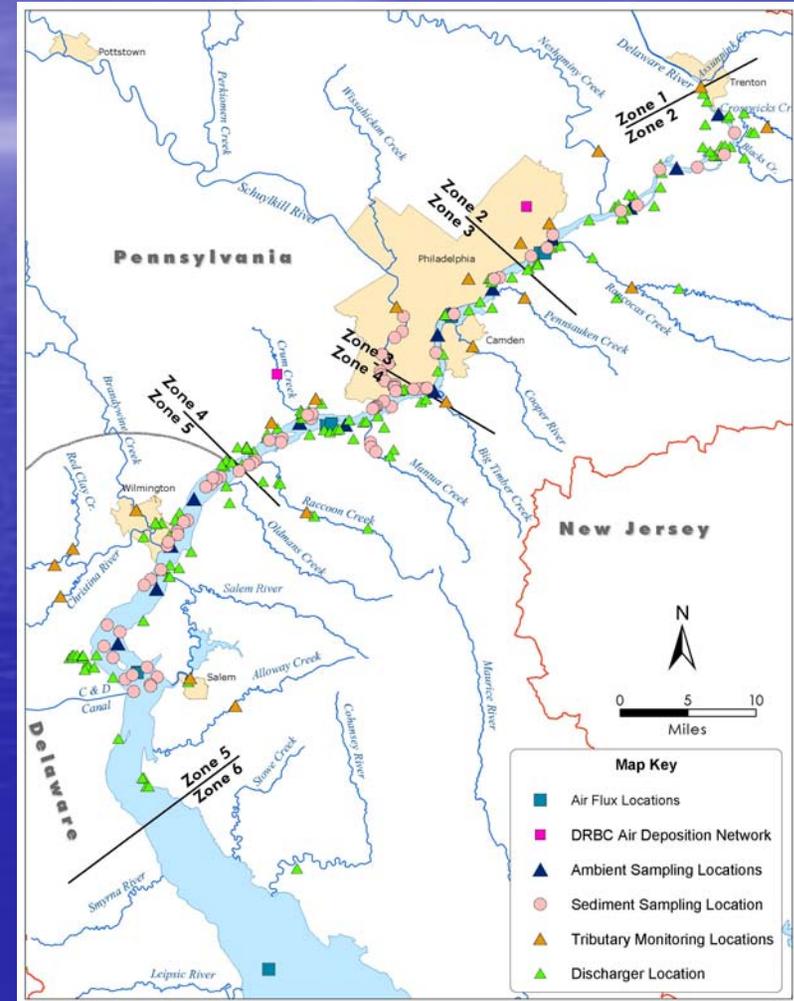
Surficial Sediment Studies

- DRBC conducted Sediment sampling in the Delaware Estuary utilizing EPA Method 1668A from 2001.
- Fifty-two sediment samples were analyzed for 124 congeners.
- Sediment concentrations of PCBs are typically higher in the shallows compared to the navigation channel.
- Total PCB concentrations in sediment are also higher in the riverine portion of the estuary, trending downward toward the mouth of Delaware Bay.



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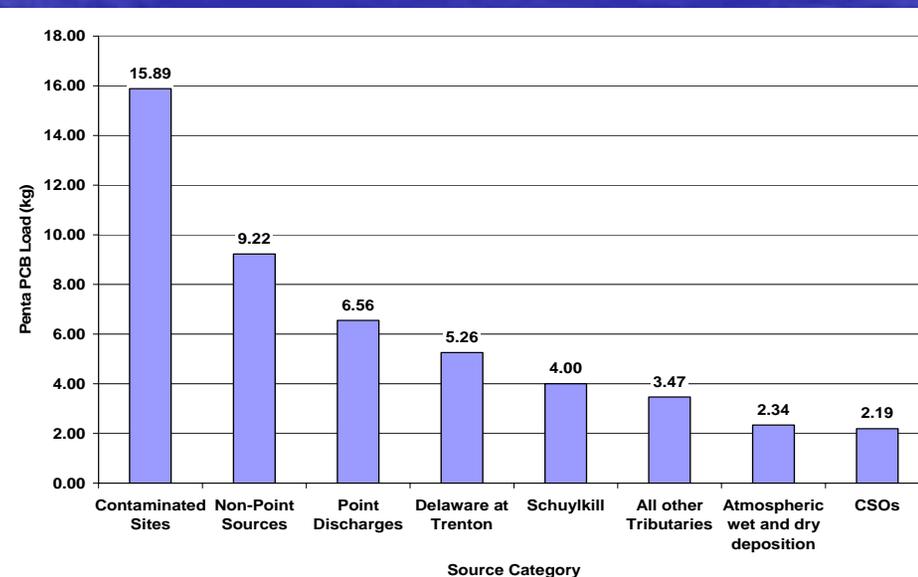
- The DRBC in cooperation with its State and Federal partners embarked on an extensive multi year monitoring activity to identify and evaluate the extent and loadings of PCB contamination into the Delaware Estuary.
- This included collection and analysis of
 1. Ambient waters both in the river and tributaries,
 2. Aquatic sediments,
 3. Air deposition,
 4. Fish tissue, and
 5. Point source dischargers



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NPDES Dischargers

- DRBC requested ninety-two NPDES permittees to sample and analyze discharges and storm water effluents utilizing congener specific methods.
- The current water quality criterion varies between 44.8 and 7.9 pg/L for total PCBs within the Estuary.
- To evaluate compliance with criteria on the order of pg/L, EPA Method 1668A was selected for monitoring of ambient water and was also utilized by many of the NPDES permittees in analyzing effluent.
- Method 1668A provides detection limits lower than those utilizing Aroclor methods, thereby reducing the number of false negative results and giving a more accurate estimation of loading.



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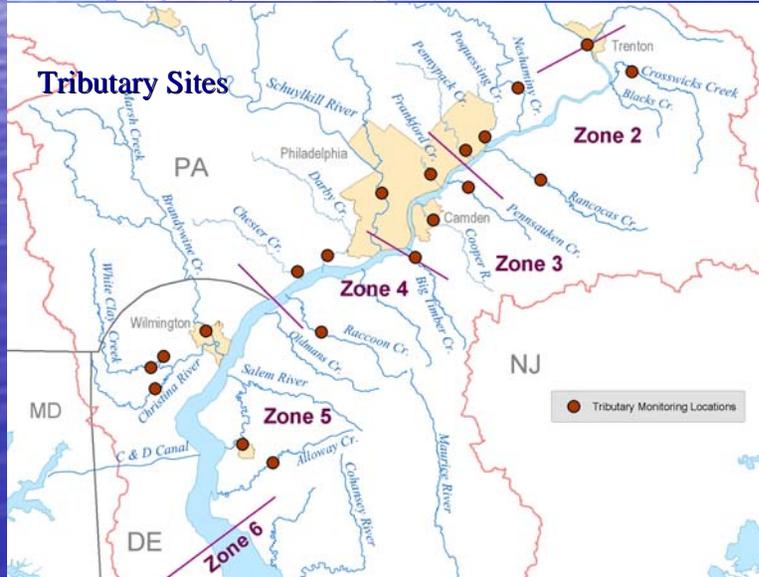
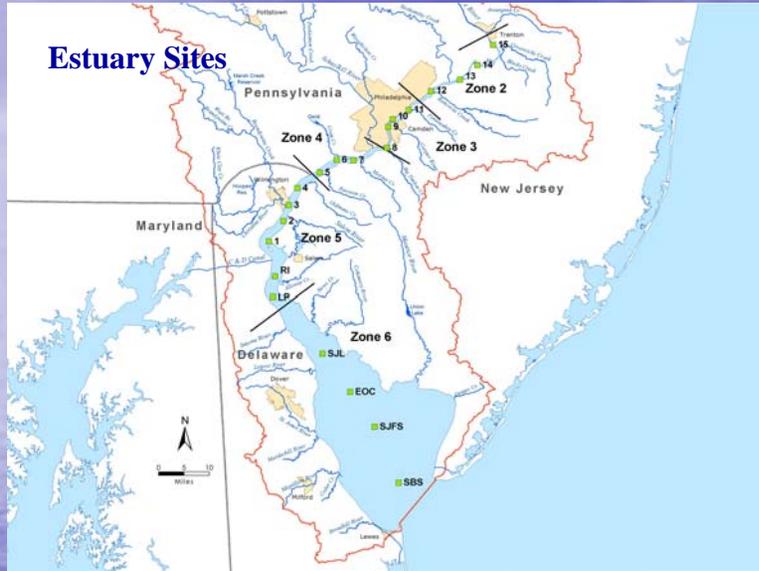
Sedimentological and Geophysical Surveys

- Drs. Sommerfield and Madsen of UDel. utilized Chirp & Side Scan sonar and sediment cores to characterize the aquatic sediments in the estuary.
- Sediment samples were evaluated for conventional parameters and sampled for PCBs.
- Samples were also evaluated for the cesium 137 and lead 210 signatures to determine rates of sediment deposition.
- These investigations assisted the DRBC in selecting sediment sampling locations for PCB analysis.



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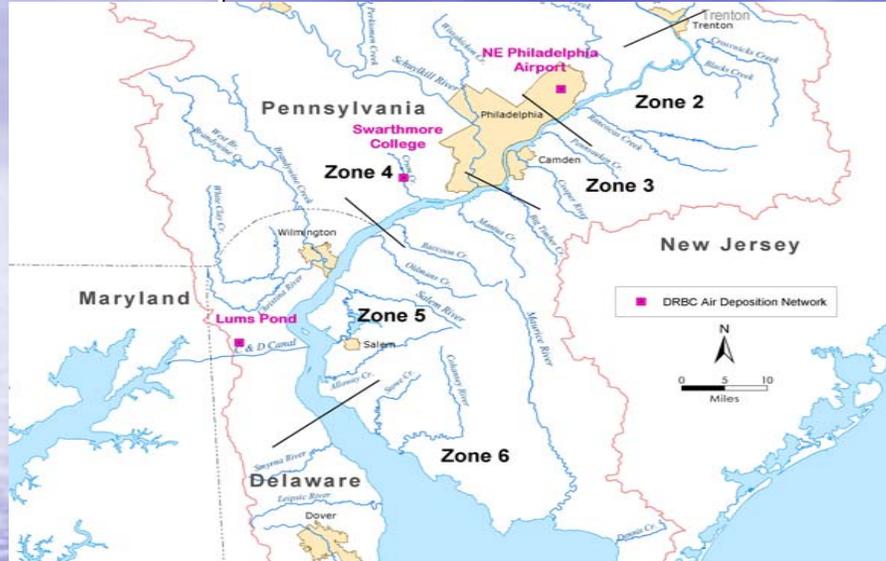
Estuary & Tributary Surveys



- DRBC collected more than three hundred ambient water samples were collected from 21 estuary locations and 23 tributaries
- Analyzed for 124 PCB congeners using Method 1668a. Approximately, twenty-liter samples were collected at mainstem locations and two major tributaries filtered and analyzed for particulate and dissolved phase PCBs.
- Congener specific detection limits for the 20L sample were typically less than one picogram per liter.
- 2.5 liter Samples were collected at select tributaries during different flow conditions. Congener specific detection limits ranged from 1-10 picograms per liter.

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Air Deposition Studies



- Over the period 2001-2003 the DRBC collected ~100 air samples from 3 locations every 12 days (11/2001-1/3003)
- These air samples were analyzed by GC-ECD Techniques
- The data generated were combined with results at 4 NJADN Sites
- 3 sampling locations in the Delaware Estuary.
 - Lums Pond, De
 - Swarthmore, PA
 - Northeast Airport, PA
- Samples collected over 24 hour period using Hi- volume sampler. Samples were analyzed for 116 congeners, 37 were coeluters using GC ECD method
 - Representing 7 homologs

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Interaction with Federal Programs

- The DRBC worked with National contract Laboratories to “dovetail” its program requirements for additional congeners and the analysis of edible tissue within the existing Federal project framework.
- With moderate matching funds, DRBC arranged for the laboratories to analyze organisms collected in the Delaware Estuary for PCB congeners, beyond the 18 standard congeners for these Programs.
- DRBC was interested in the PCB content of the edible (fillet) portion of the fish as well as an expanded set of congeners to be analyzed.
- The laboratory developed a work plan, conforming to the Federal data quality objectives, and provided DRBC with additional PCB data on tissues, while providing the National program with the whole body data for these samples.
- Results for the fillet samples were reported to DRBC, the data is being used to determine congeners of concern, as background information, for fish consumption advisories and may be used in food chain modeling in the near future

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Future Efforts

- **Air:** DRBC will seek funding sources to conduct monitoring to identify local sources and establish sites for long term/regional trend analysis.
- **Tributaries:** States will use data collected for the TMDL in their 303d listing. DRBC will seek funding to continue tributary monitoring to refine the loadings of PCBs.
- **Hazardous Waste Sites :** EPA will estimate PCB loads for sites that have significant PCB contamination in proximity to the Estuary. The States will provide comparable PCB loading information for state lead sites.
- **Mainstem monitoring:** DRBC will continue its program of water monitoring in the estuary.

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Future Efforts

- DRBC, EPA, and the states will work to:
- DRBC will coordinate and utilize load estimates as part of the overall PCB TMDL effort.
- DRBC will develop stormwater monitoring plans and seek stable funding for monitoring.
- Require waste minimization plans to minimize PCB discharges; and identify significant local sources.
- DRBC, EPA, the states and other agencies will work to:
- Identify PCB hot spots in sediments in the
- Estuary; and

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Future Efforts

- DRBC will lead the effort to develop an implementation strategy to complement the NPDES permit requirements.
- The DRBC effort will focus on achieving PCB load reductions as soon as is practicable.
- EPA, the states and DRBC hope to forge a long long-term watershed partnership with stakeholders to reduce the need for fish consumption advisories and achieve a cleaner, healthier Delaware Estuary.



Questions ??