Philadelphia's Experiences with the Pollutant Minimization Plan Requirements

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Contents of Presentation

- Issues Affecting PCB Reduction Strategy
- Philadelphia Water Department's Approach to Management of Privately owned PCB Containing Devices
- PWD's Experiences and Plans Regarding Sewershed Trackdown

PCB Reduction Strategy

- Modeling indicates that PCB loads are three (3) orders of magnitude above the TMDL
- Sources from air deposition, tributary loading, point source discharge, contaminated sites and stormwater runoff and even ocean tidal inflow all contribute significant PCB loads into the estuary

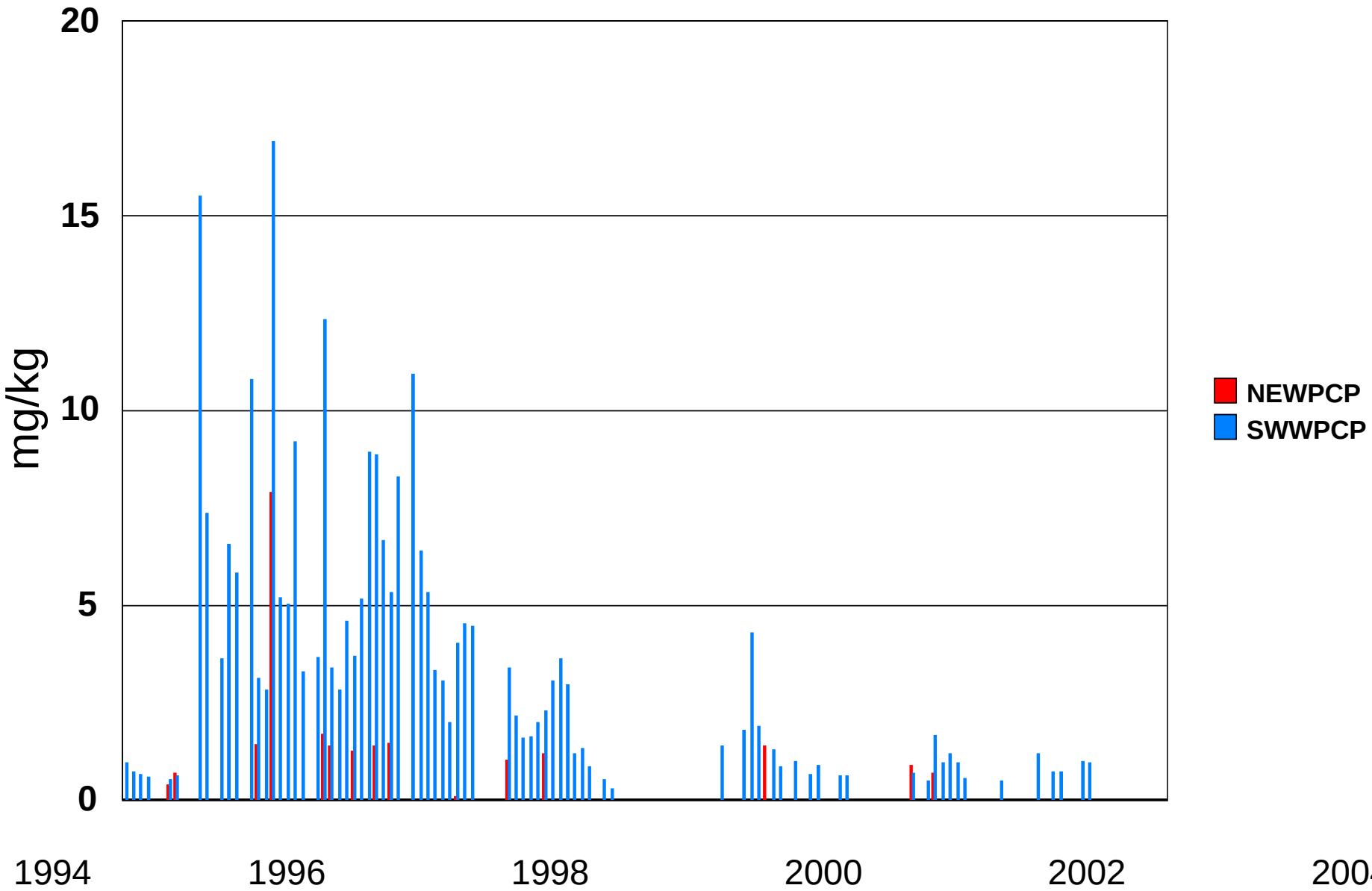
PCB Reduction Strategy
(cont'd)

- Analysis of modeling results clearly indicate that:
  - All sources of PCBs into the estuary must be substantially reduced before the water quality goal can be realized
  - Achievement of PCB water quality goals will likely take decades to achieve
- A reasonable course of action for point source dischargers is to perform a good faith effort to minimize further PCB loads

Philadelphia Water Department's Approach to Management of Privately owned PCB Containing Devices

- In September of 1994, PWD was victim of an approximately 1000 lbs illegal discharge of PCB-filled transformers into one of our sewersheds
- Devices were not listed on Maga rule database
- We agree that a better managed program might prevent future discharges

SLUDGE PCB LOADING



Management of PCB Containing Devices (Cont'd)

- Create a GIS database of known PCB containing devices within PWD's sewershed - both the City and suburban.
- Data sources include:
  - Philadelphia Fire Department
  - Philadelphia Health Department
  - USEPA (Mega rule, CERCLA, TSCA and RCRA databases)
  - PaDEP

Management of PCB Containing Devices (Cont'd)

- DRBC
- Partnership for Delaware Estuary files
- Electric service providers

- Letter to above agencies has been sent requesting information on PCB devices, PCB past spills and other PCB clean up efforts

Currently Available Information on PCB Containing Devices

- USEPA and Phila. Fire Code requires registration of transformers containing greater than 500 mg/l PCBs with PFD
- In 1998, the Megarule required that owners of PCB containing devices over 500 mg/l submit information to the USEPA:
  - maintain annual records of PCB devices and disposal activities

Currently Available Information (cont'd)

- Name, address and USEPA identification number of facility
- Number and type of PCB containers
- Weight of PCBs in each device
- Disconnected device, not stored in an approved location, must be disposed within 60 months
- All transformers must be labeled regarding PCB levels (>500, 500>50, <50)

Management of PCB Containing Devices (cont'd)

- Identify for each location:
  - Owner
  - Address
  - Assign process and stormwater discharge to sewer segment or a system connection
  - Type of devices
  - Number of devices

Management of PCB Containing Devices
(Cont'd)

- Type of Aroclor (if available)
- PCB concentration (if available)
- Fluid volume
- Status of device (in use, out of service, disconnected)
- Status of facility (in operation, closed, abandoned/not secure)

Management of PCB Containing Devices (Cont'd)

- PWD, utilizing our Industrial Waste Unit's inspectors, intends to visit all PCB identified sites within the City to gather requested information
- PWD will request suburban township fire authorities (or others) to visit facilities within their townships to gather information. If PWD manages facility's pretreatment program, we will visit facility

Management of PCB Containing Devices
(Cont'd)

- PWD intends to focus attention on the removal of PCB devices according to the following priority:

  1st Abandoned facility

  2nd Closed Facility

  3rd Disconnected device

  4th Out of service device

Management of PCB Containing Devices (Cont'd)

- Management options include:
  - Seek regulatory assistance to insure facility compliance with current PCB management regulations
  - Consider providing information to all device owners regarding proper management of PCB devices and encourage their removal
  - Request updated information in future and maintain a current database

Management of PCB Containing Devices (Cont'd)

- Attempt to develop a notification procedure in which electric service providers notify PWD or a regulator when high tension service is terminated. Notification could prompt letter contact or visit to facility
- Consider creation of a fund and overcoming any legal barriers to drain and dispose of *vulnerable* PCB devices (may include disposal of device carcass)

PWD's Experiences and Plans Regarding Sewershed Trackdown

- In 2001, each plant effluent was sampled for PCBs - 3 times in dry and 3 times in wet weather
  - results from the 9 dry weather samples were 1 congener just above detection in 1 sample
  - results* from wet weather samples averaged
    - 6,313 picrograms per liter for Northeast Plant
    - 10,773 picrograms per liter for Southeast Plant
    - 3,023 picrograms per liter for Southwest Plant

* non-detected congeners were computed as zero

Sewershed Trackdown
(cont'd)

- In 2005, each plant effluent is being sampled for PCBs - 3 times in dry and 3 times in wet weather
- number of congeners reported increased and detection level decreased
- Available results to date are as follows

Total Average PCBs

(in pg/l)

(Incomplete data set)

	2001		2005	
	Dry	Wet	Dry	Wet
Northeast	-	6,313	3,037	11,000
Southeast	-	10,773	2,024	13,500
Southwest	-	3,023	3,205	7,918

Sewershed Trackdown
(cont'd)

- In 2001/2002, PWD, as well as CCMUA, supported by the USEPA, PaDEP and DRBC, developed and conducted an initial trackdown of a sewershed
- Methodology:
  - Southeast Plant was selected due to highest wet weather PCB levels and simpler influent configuration
  - All sampling in wet weather (3/4 inch of rain event)

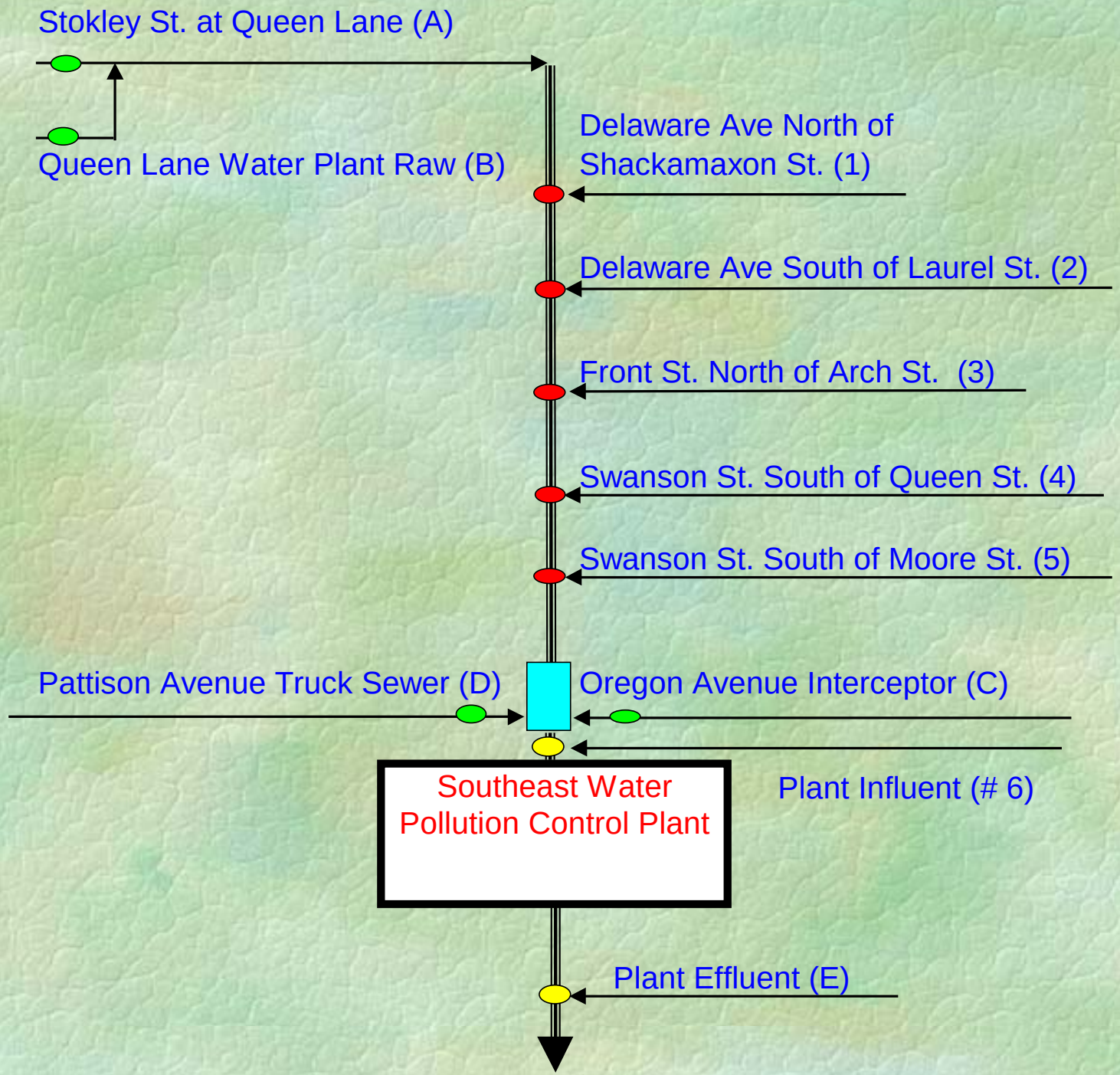
Sewershed Trackdown
(cont'd)

- Samples taken at various locations in interceptor since numerous individual trunk sewer sampling was deemed too costly
- All sewer samples consisted of a composite of 2 grab samples taken 20 minutes apart
- Initial sample taken at head of interceptor and at one hour post storm start

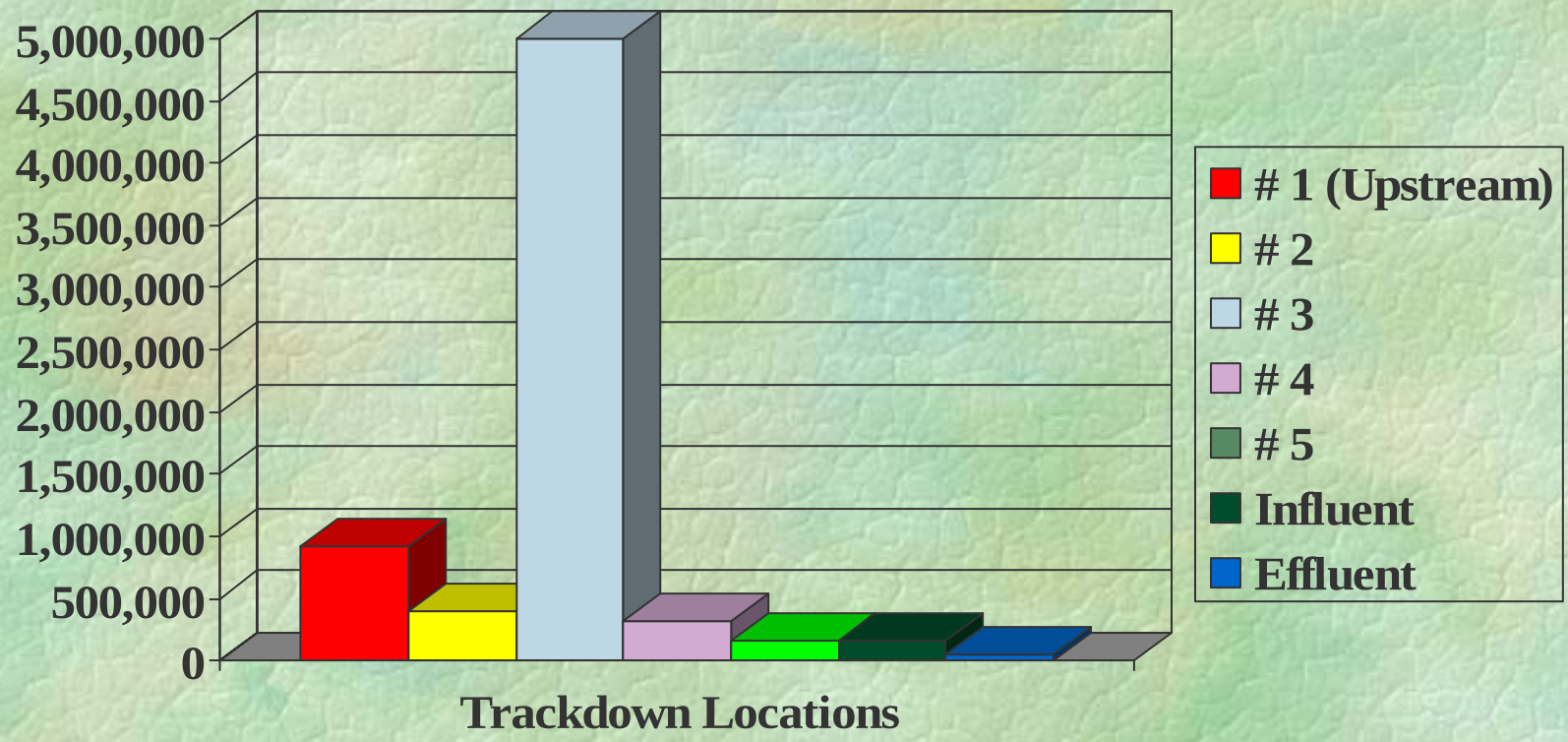
Sewershed Trackdown
(cont'd)

- Interceptor time of travel was estimated and downstream samples taken accordingly
- Plant influent sample was an ISCO 30 minute composite, starting at estimated time of arrival at plant and for eight hours
- Plant effluent sample was similar to influent sample but with a two hour delay
- IWU employed 3 crews of two persons to conduct sampling

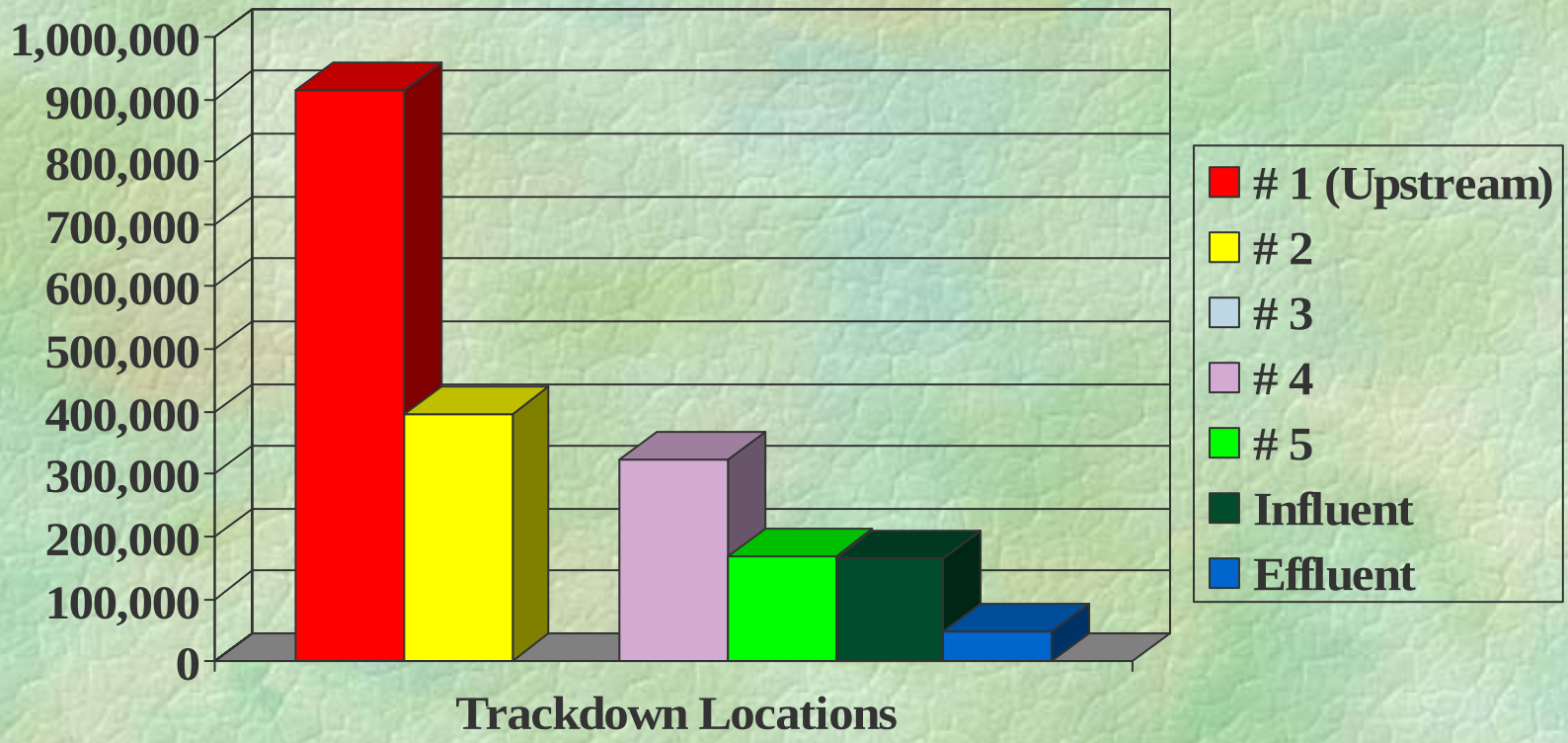

Stickley St. at Queen Lane
Queen Lane Filter Plant
Lower Delaware Interceptor at Delaware Ave. North of Shackamaxon St.
Lower Delaware Interceptor at Delaware Ave. South of Laurel St.
Lower Delaware Interceptor at Front St. North of Arch St.
Lower Delaware Interceptor at Swanson St. South of Queen St.
Oregon Avenue Interceptor
SEWPCP Influent
SEWPCP Effluent
Pattison Ave Trunk Sewer
SWMM5 Output (Links and Nodes) with Track Down Sampling Locations
SWMM5 Output
Junction
Outfall
Storage
SWMM5 Output
Link
Track Down Sampling Site
Sewershed Type
Combined Sewer Area
Separate Sewer Area
Storm Sewer Only
Non-Contributing Area
Hydrologic Feature
March 2004
CDM


Stokley St. at Queen Lane (A)
Queen Lane Water Plant Raw (B)
Delaware Ave North of Shackamaxon St. (1)
Delaware Ave South of Laurel St. (2)
Front St. North of Arch St. (3)
Swanson St. South of Queen St. (4)
Swanson St. South of Moore St. (5)
Pattison Avenue Truck Sewer (D)
Oregon Avenue Interceptor (C)
Southeast Water Pollution Control Plant
Plant Influent (# 6)
Plant Effluent (E)

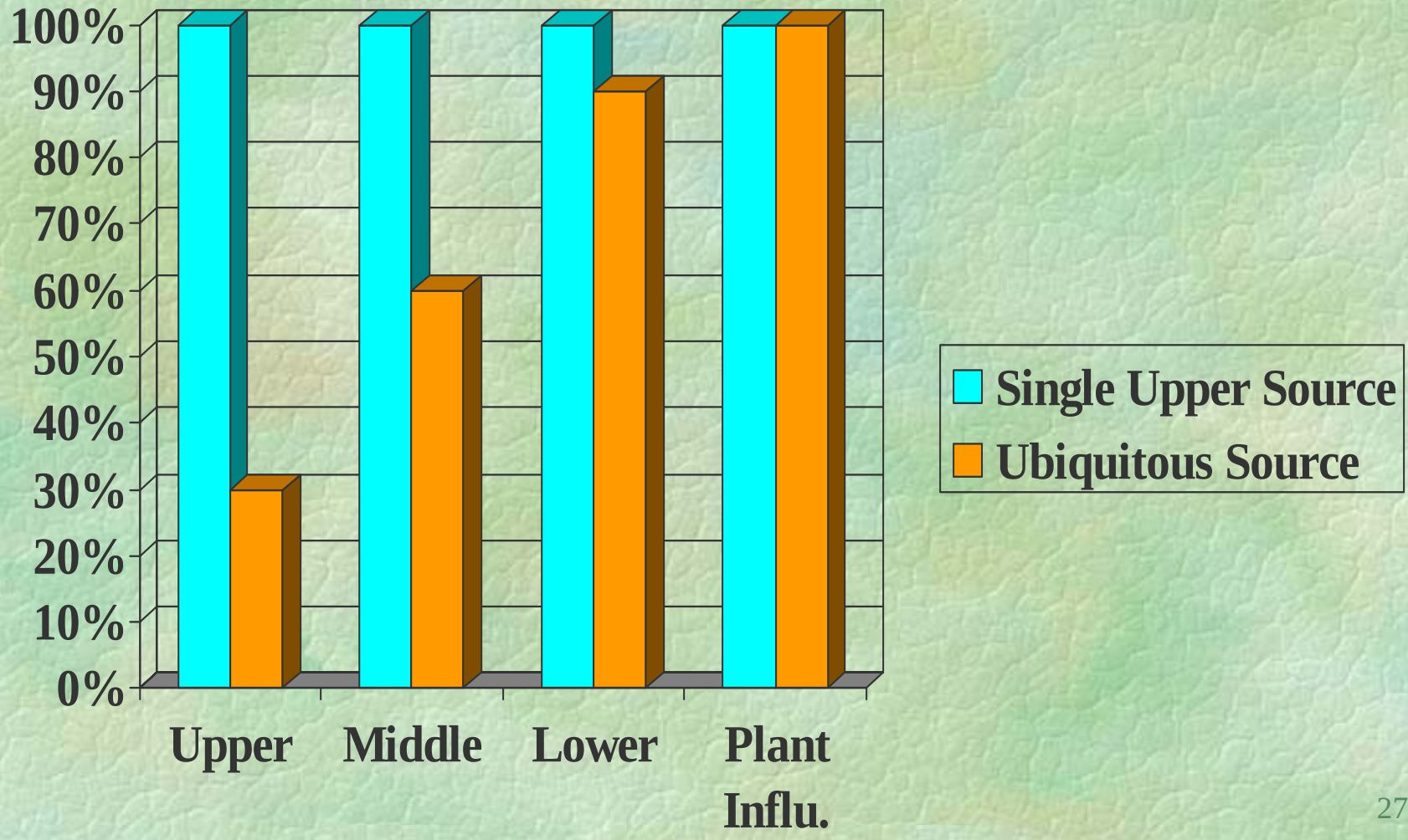
PCB Concentrations in samples in pg/l



PCB Concentrations in samples in pg/l without # 3



Theoretical Graphs for Various Loadings (Percentage of Plant Influ. Loading)



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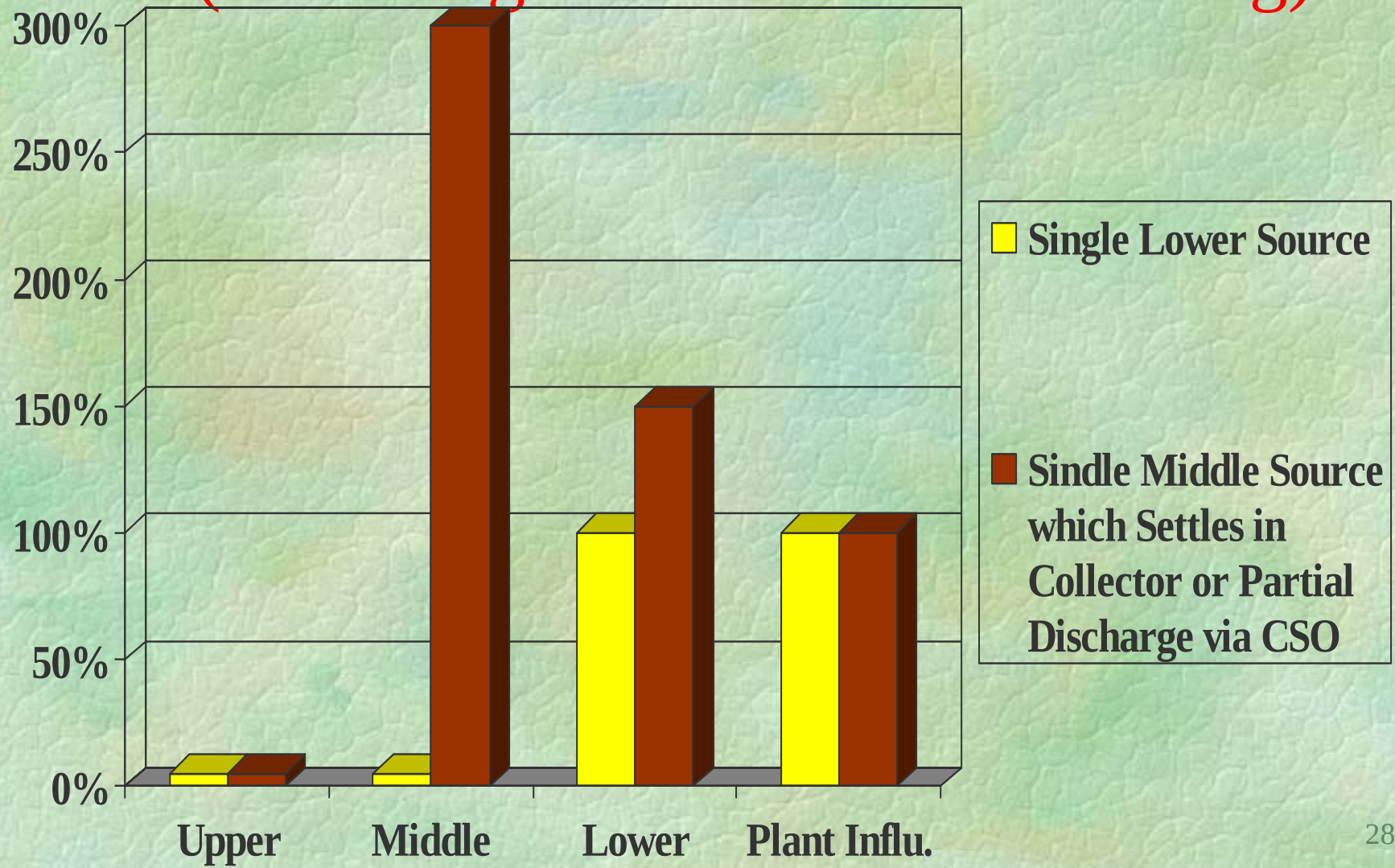
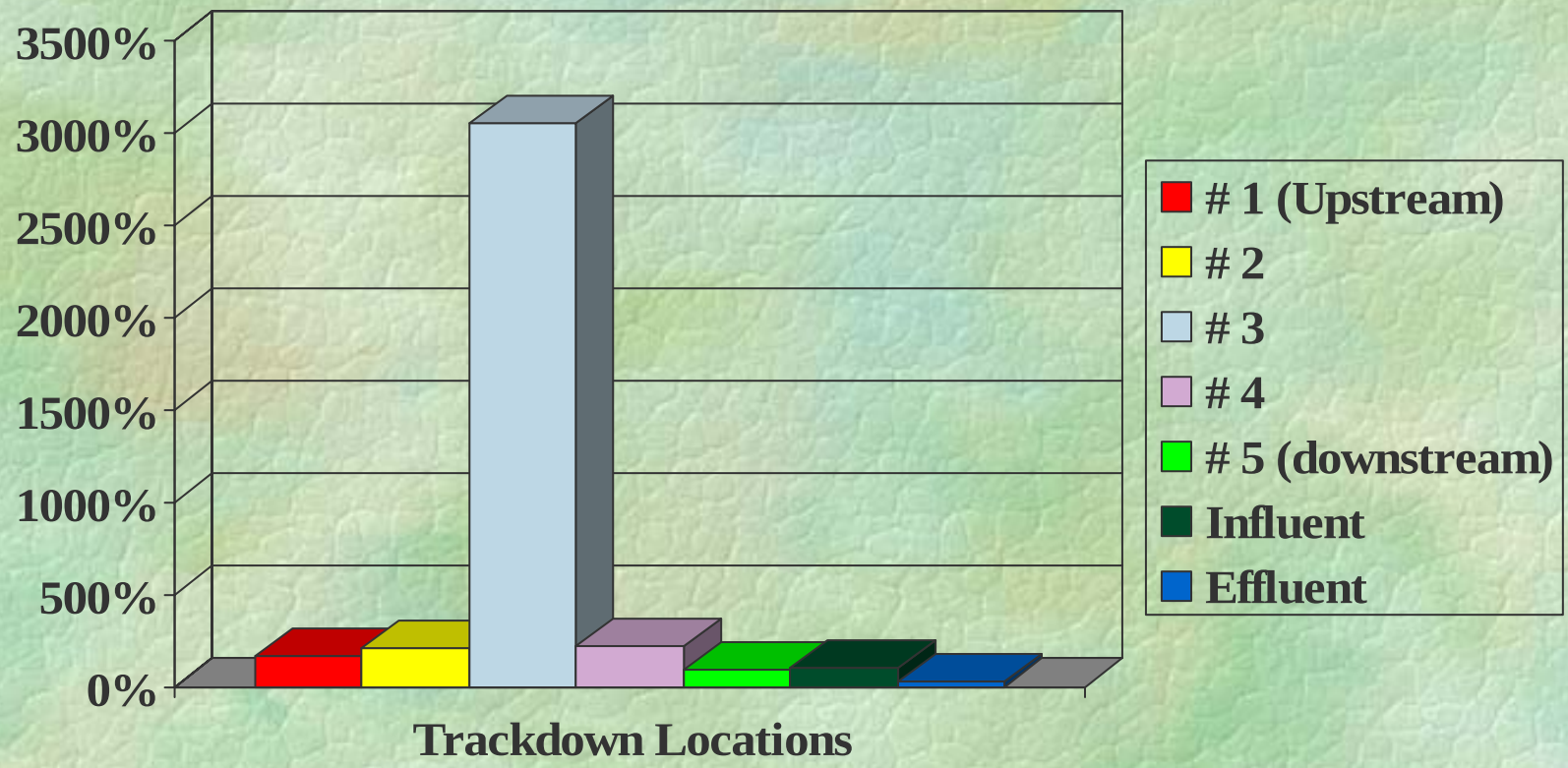
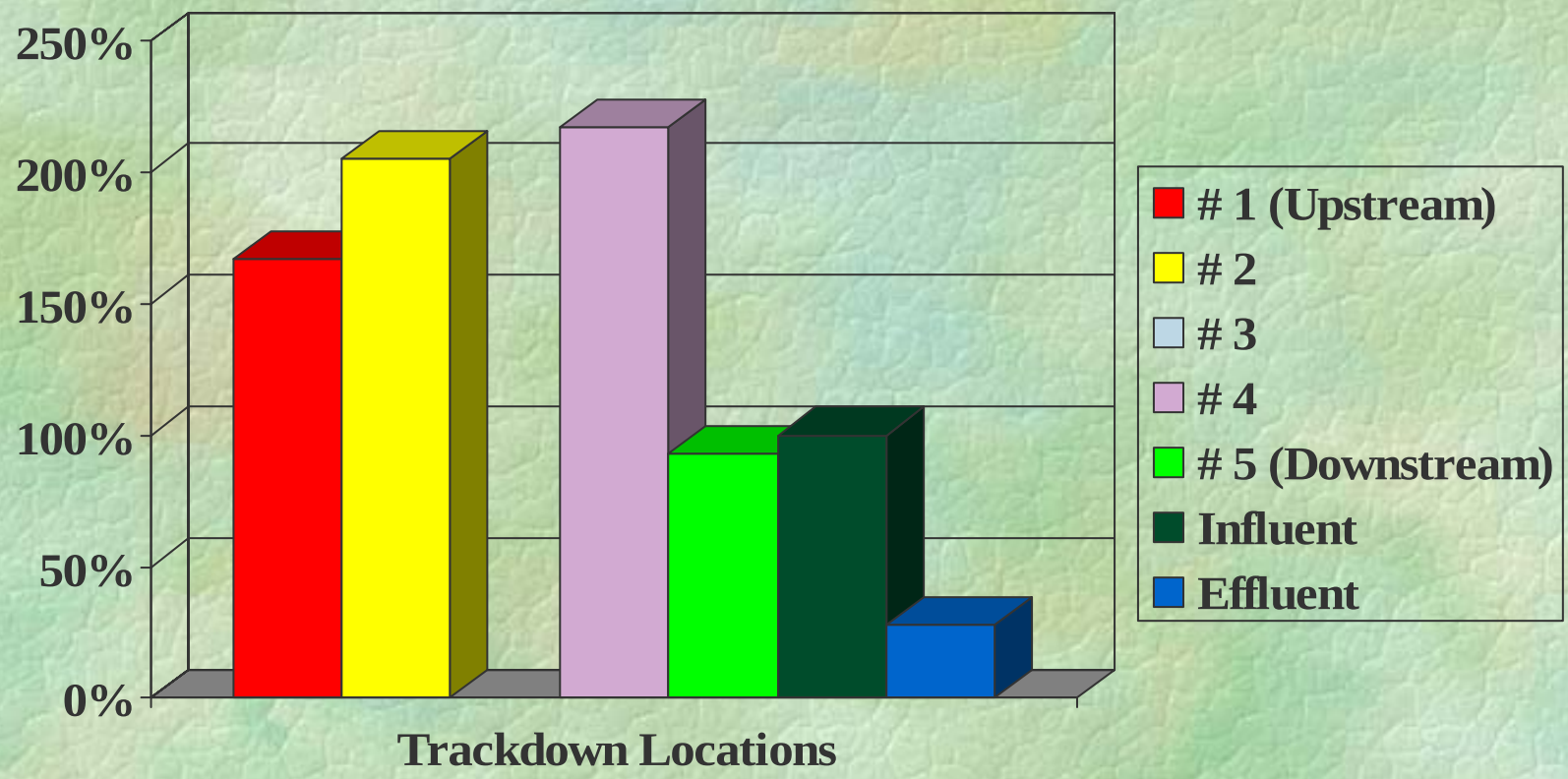


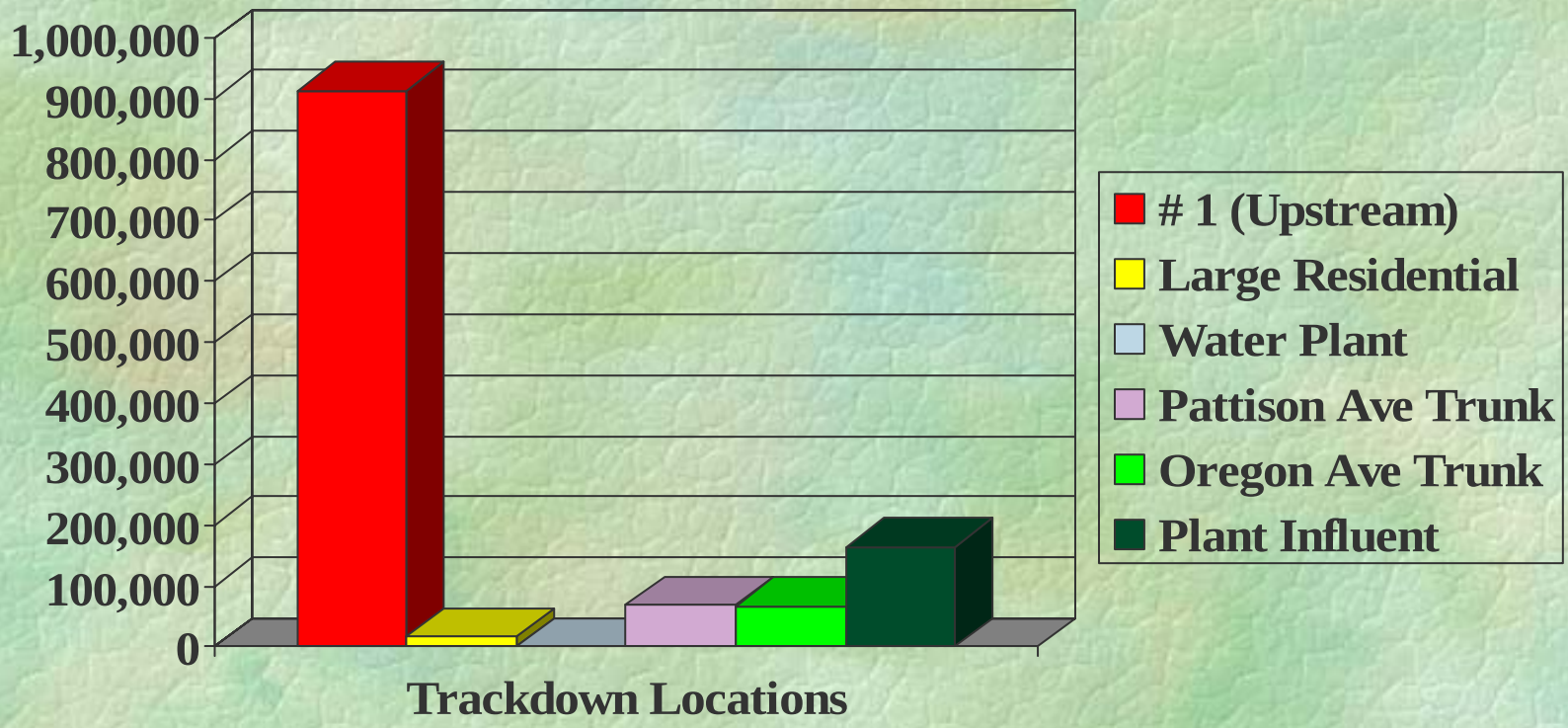
PCB Loadings in Shed as a % age of Plant Influent Load



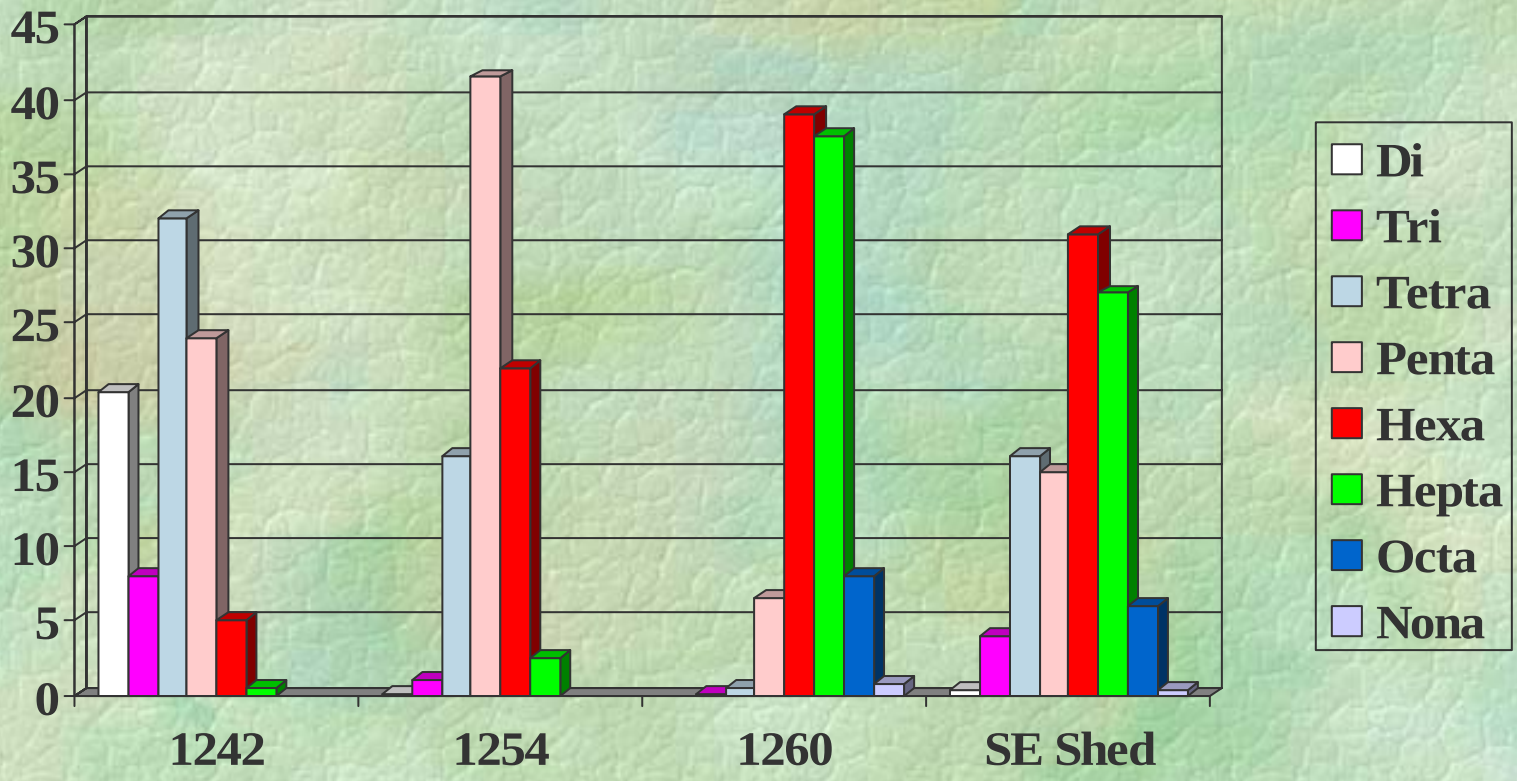
PCB Loadings in Shed as a % age of Plant Infl. Load w/o # 3



PCB Concentrations (pg/l) at other locations within Sewershed



Aroclor Comparison
% for each Homolog



Sewershed Trackdown
(cont'd)

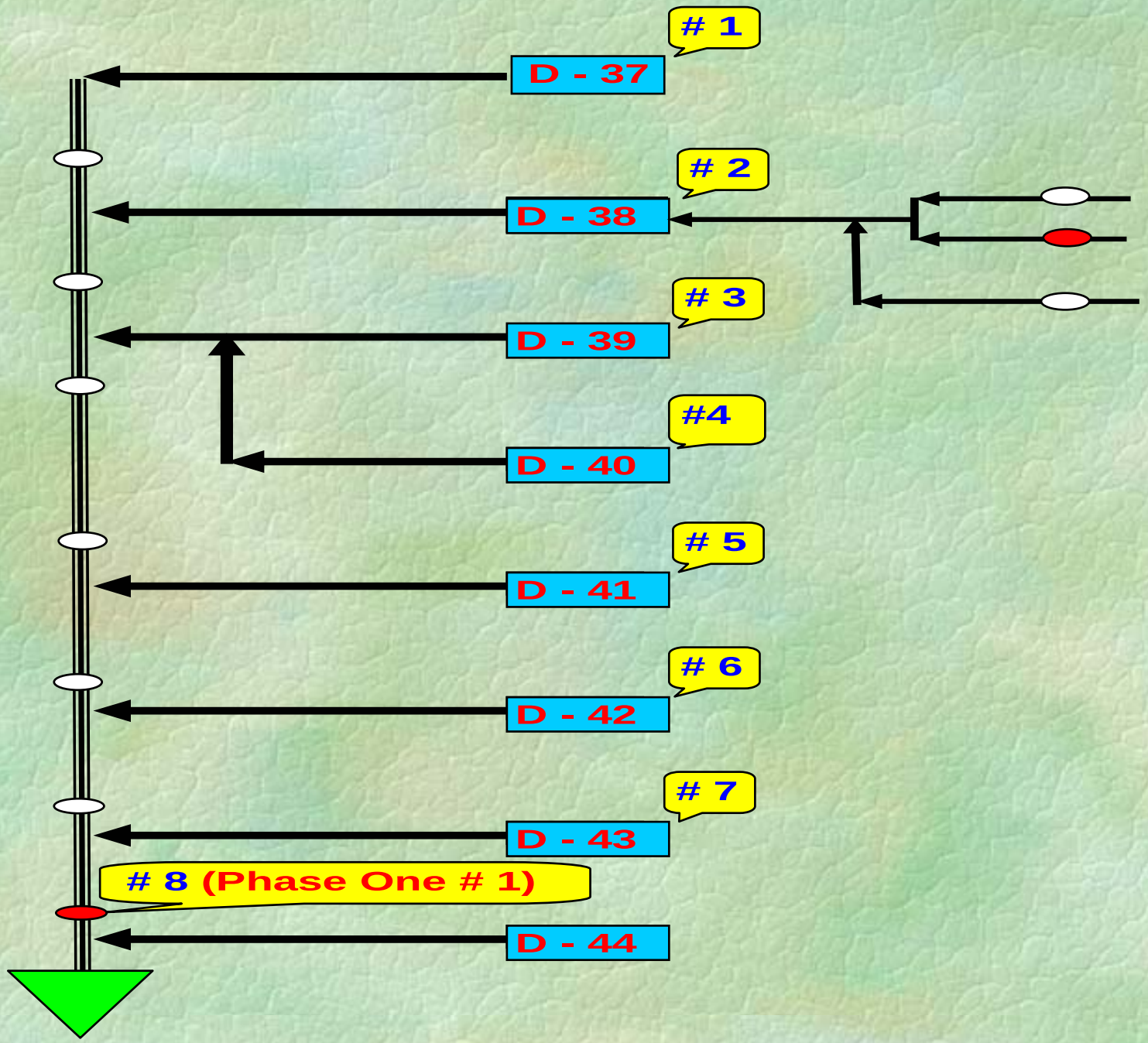
- Observations/Comments
  - Schuylkill River (at average flow) is not a significant PCB contributor to shed via water plant
  - Two minor interceptors located near Southeast Plant are not significant PCB contributors
  - Large residential/retail shed is not a significant PCB contributor

Sewershed Trackdown
(cont'd)

- Over 150 percent of plant influent PCB load appears to originate from source(s) affecting sample location # 1 - a distance of five miles from Southeast Plant
- The 1994 illegal discharge was upstream of sample location # 1
- Aroclor type at sample location # 1 is similar to 1994 discharge

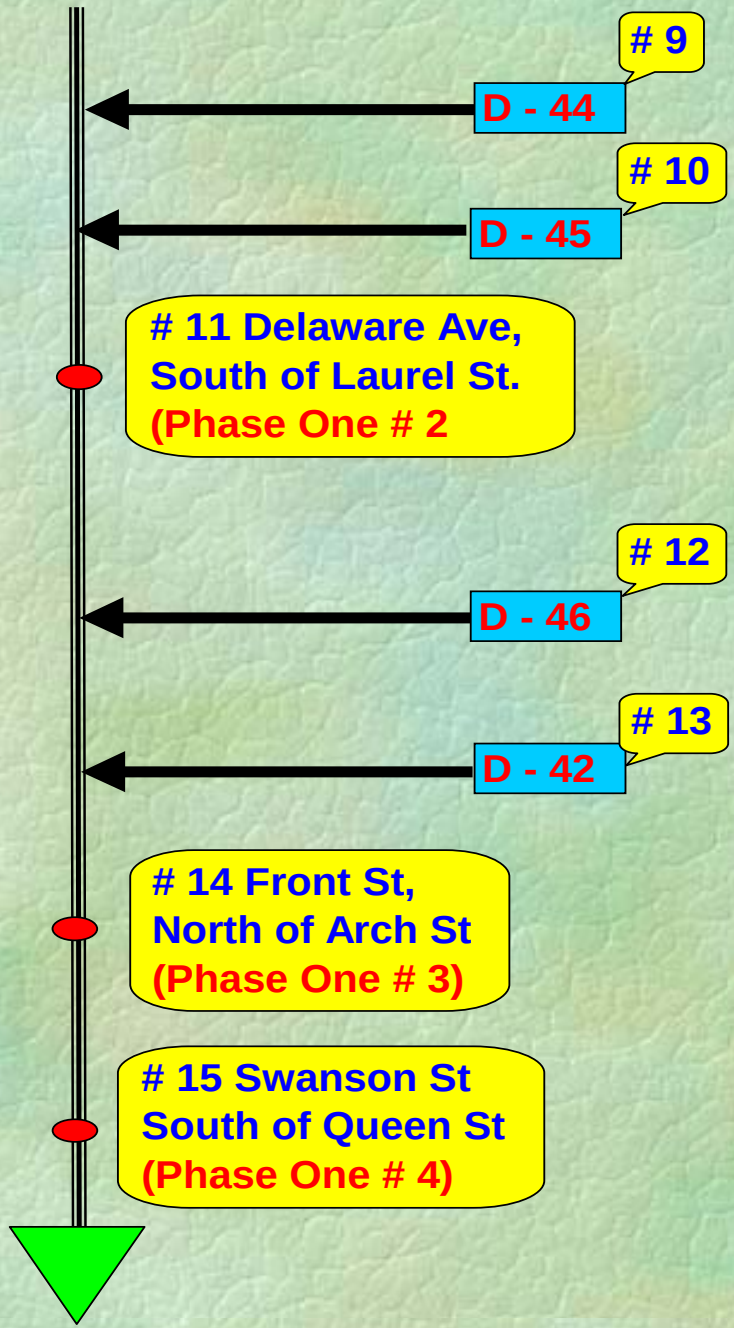
Sewershed Trackdown
(cont'd)

- Initial upstream sampling site (# 1) needs further study (Phase 2)
  - Determine if PCB source is from 1 or more trunk sewers contributing flow ahead of site # 1 or from the sediment in the intercepting sewer
  - Sample during a storm event
  - Use analytical method 8082


1
D - 37
2
D - 38
3
D - 39
#4
D - 40
5
D - 41
6
D - 42
7
D - 43
8 (Phase One # 1)
D - 44

Sewershed Trackdown
(cont'd)

- High PCB concentration near Arch Street nears further study (Phase 2)
  - Conc. increases 5 fold from upstream sample
  - But then immediately decreases 6 fold in next downstream sample
  - Sample may be an aberration or may be due to some resuspension/resettling of sewer sediment phenomena or ??
  - Ultimate importance of site as a significant contributor to plant influent loading is not certain
  - Resample during a storm event using analytical method 8082


9
D - 44
10
D - 45
11 Delaware Ave,
South of Laurel St.
(Phase One # 2
12
D - 46
13
D - 42
14 Front St,
North of Arch St
(Phase One # 3)
15 Swanson St
South of Queen St
(Phase One # 4)

Analytical Methods

	1668a	8082
Sensitivity (per congener)	10 to 100 pg/l	100 to 1000 pg/l
Accuracy	+/- 25 %	+/- 50 %
Contamination	Often below Background levels	Often above
Cost per sample	$ 1500	$ 300

Sewershed Trackdown
(cont'd)

- Sources identified via sewer trackdown
  - Assign GIS coordinates
  - IWU to visit sites and attempt to obtain information regarding source of PCBs
  - Identify potential minimization strategies
  - Confer with regulatory agencies regarding future strategy

Sewershed Trackdown
(cont'd)

- Known spills and contaminated sites
  - Develop list from requested agencies
  - Assign GIS coordinates
  - Populate a database with available information
  - IWU to visit sites and determine if there is any reason to expect that site may be an significant source
  - If so, consider taking samples of runoff or soil and analyze for PCBs
  - Confer with regulatory agencies regarding future strategy

Thank you

and

Good Hunting