Sediment Quality in the Delaware Estuary

RSMP Sediment Quality Committee:

Joel A. Pecchioli – NJDEP
David Burke – PADEP
W. Scott Douglas - NJDOT
Barbara Conlin - USACE
John Yagecic - DRBC

Delaware Estuary Science and Environmental Summit
January 30, 2013

RSMP Sediment Quality Objectives

Sediment is a Resource

Manage and improve sediment quality in the Delaware Estuary/Basin system to ensure it is capable of supporting a healthy and productive ecosystem, meets water quality standards, and supports beneficial use of the sediments (including dredged material).

Sediment Quality Study Objectives

Conduct a planning-level evaluation of available sediment quality data to gain insight about potential limitations on the beneficial use of dredged material.

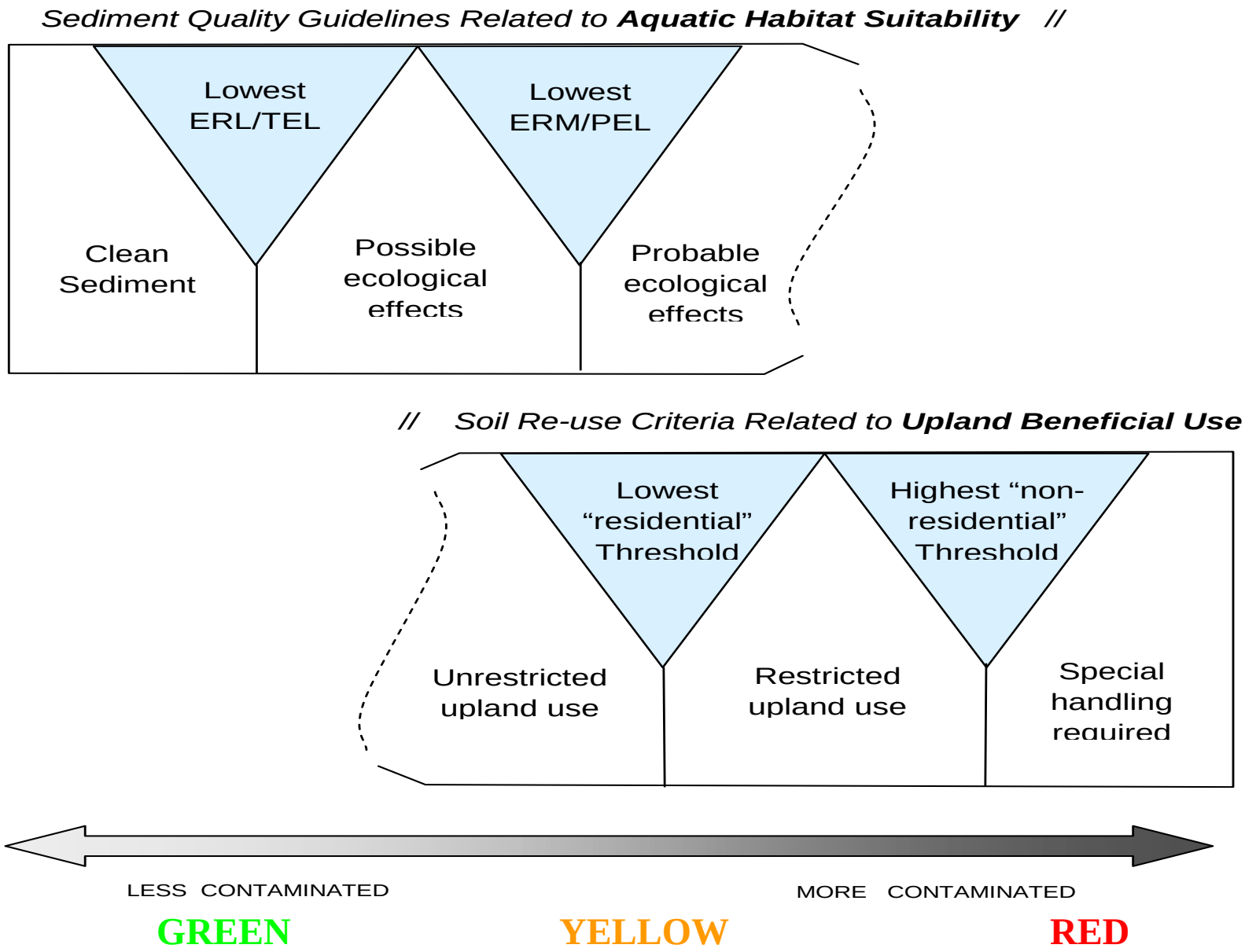
1 - Identify COCs that could limit beneficial uses

2 - Identify geographic areas where COCs would limit beneficial uses.

Bulk Sediment Chemistry Data

- 932 samples collected from 1990-2009
  - USACE dredging projects
  - NOAA Status and Trends
  - USEPA REMAP
  - Others
- Delaware River from Trenton to Delaware Bay
- Tributaries
- Surface grab (77%) and core (23%) samples

Figure A-1. Categories of sediment quality and corresponding thresholds.



Sediment Quality Thresholds

Table A-1: Sediment Quality Thresholds	Clean Sediment Lower of ERL/TEL	Probable Eco-effects Lower of ERM/PEL	Unrestricted Upland Beneficial Use Lower of DE, NJ, PA Clean/Residential Fill	Restricted Upland Beneficial Use Higher of DE, NJ, PA Non-Residential Fill
Sum PCBs (ug/kg)	21.6	189	200	1,000
4,4'-DDT (ug/kg)	1	4.77	2,000	230,000
4,4'-DDE (ug/kg)	1.42	6.75	2,000	170,000
4,4'-DDD (ug/kg)	1.22	7.81	3,000	30,000
Dieldrin (ug/kg)	0.02	4.3	40	440
Benzo(a)pyrene (ug/kg)	31.9	763	90	11,000
Dioxin/furan TEQ (ug/kg)	0.00085	0.0215	0.120	1.0
Chlordane (ug/kg)	0.5	6	200	16,000
Cobalt (mg/kg)	Not Available	Not Available	8	12,000
Arsenic (mg/kg)	5.9	17	12	53
Mercury (mg/kg)	0.13	0.49	10	610
Copper (mg/kg)	18.7	108	310	45,000
Lead (mg/kg)	30.24	91.3	400	1,000
Cadmium (mg/kg)	0.596	3.53	4	100

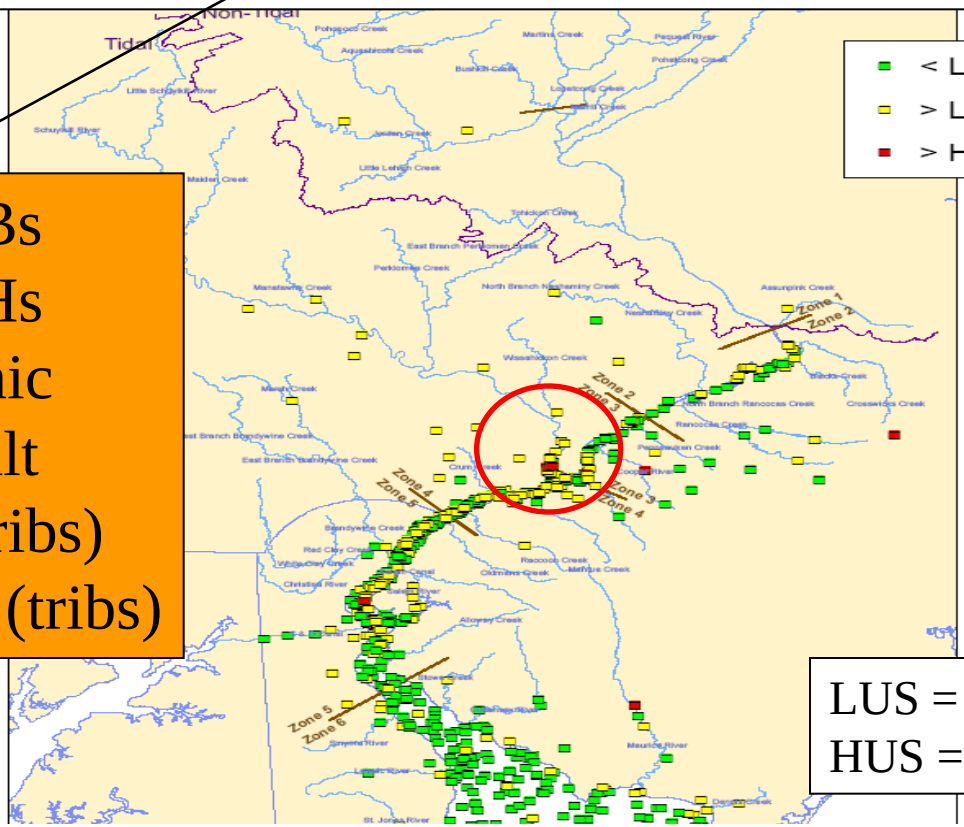
Evaluation Uses and Limitations

Planning purposes only – not for regulatory decisions

- Selected list of Chemicals of Concern
- Data gaps – analytes, geographic areas, types of samples
- Non-detects with elevated DLs for PCBs, PAHs & pesticides
- Aquatic Habitat Restoration Thresholds are based on sediment quality guidelines (not regulatory criteria)
- Upland Beneficial Use Thresholds (regulatory criteria) differ between DE, NJ, and PA
- Sediment characteristics can change once dredged

Upland Beneficial Uses

< LUS	>LUS & < HUS	> HUS
63%	35%	2%

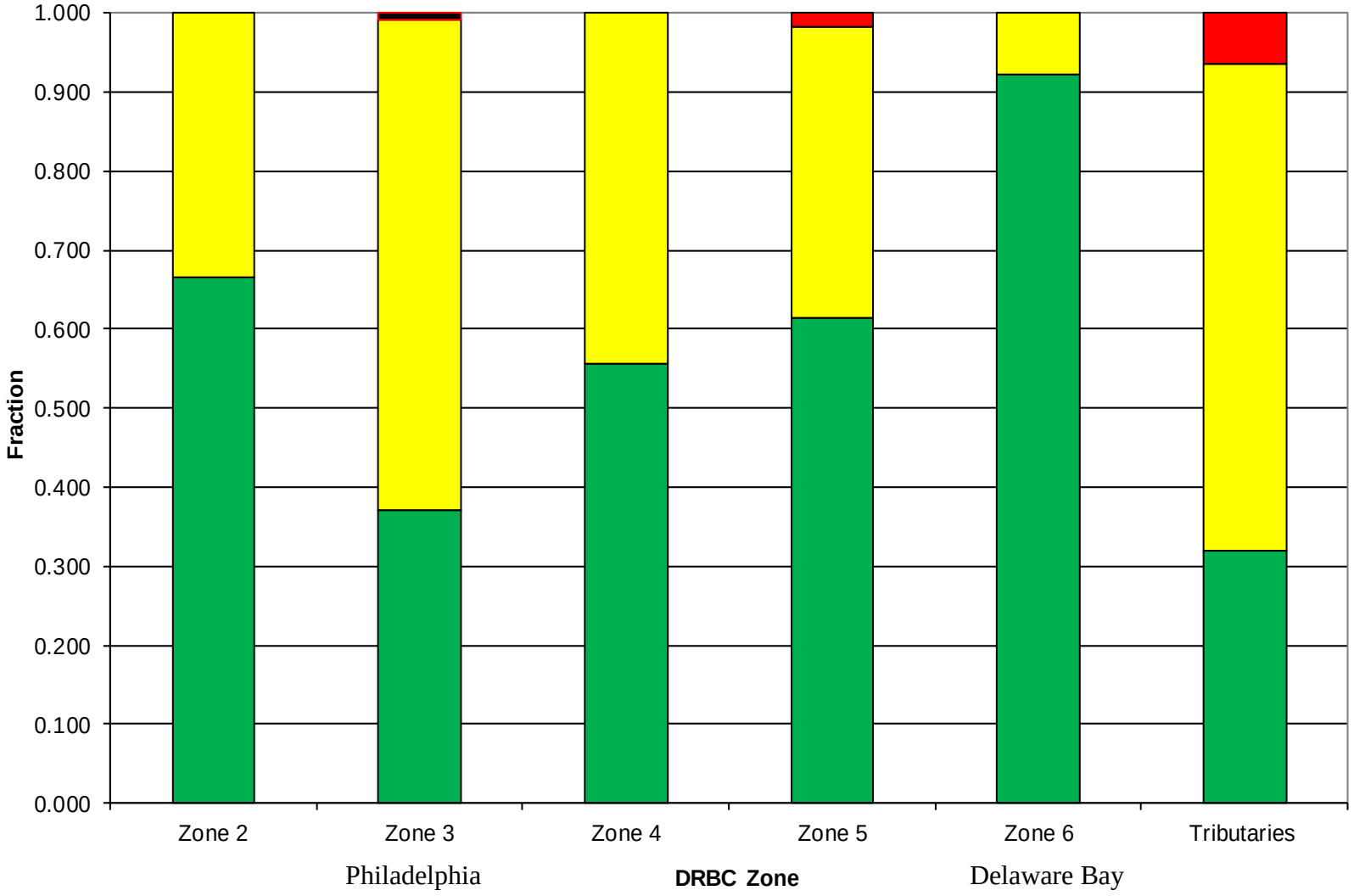


*PCBs
*PAHs
Arsenic
Cobalt
Lead (tribs)
*Dieldrin (tribs)

*PCBs
Arsenic
Lead

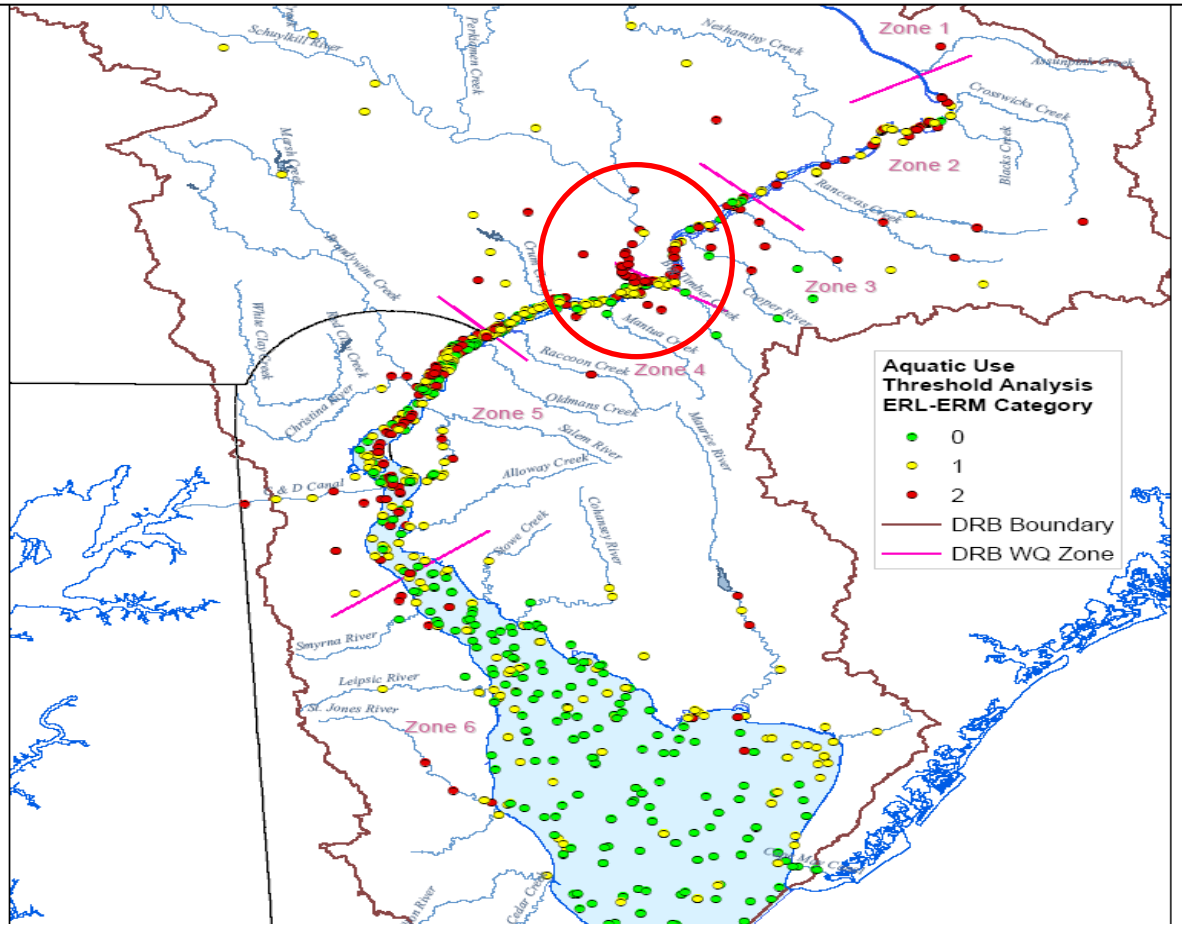
LUS = Lowest Upland Standard
HUS = Highest Upland Standard

Upland Beneficial Use Threshold Analysis
Fraction of the Sediment Samples in Each DRBC Zone



Aquatic Habitat Beneficial Uses

< ERL	> ERL & < ERM	>ERM
35%	34%	31%



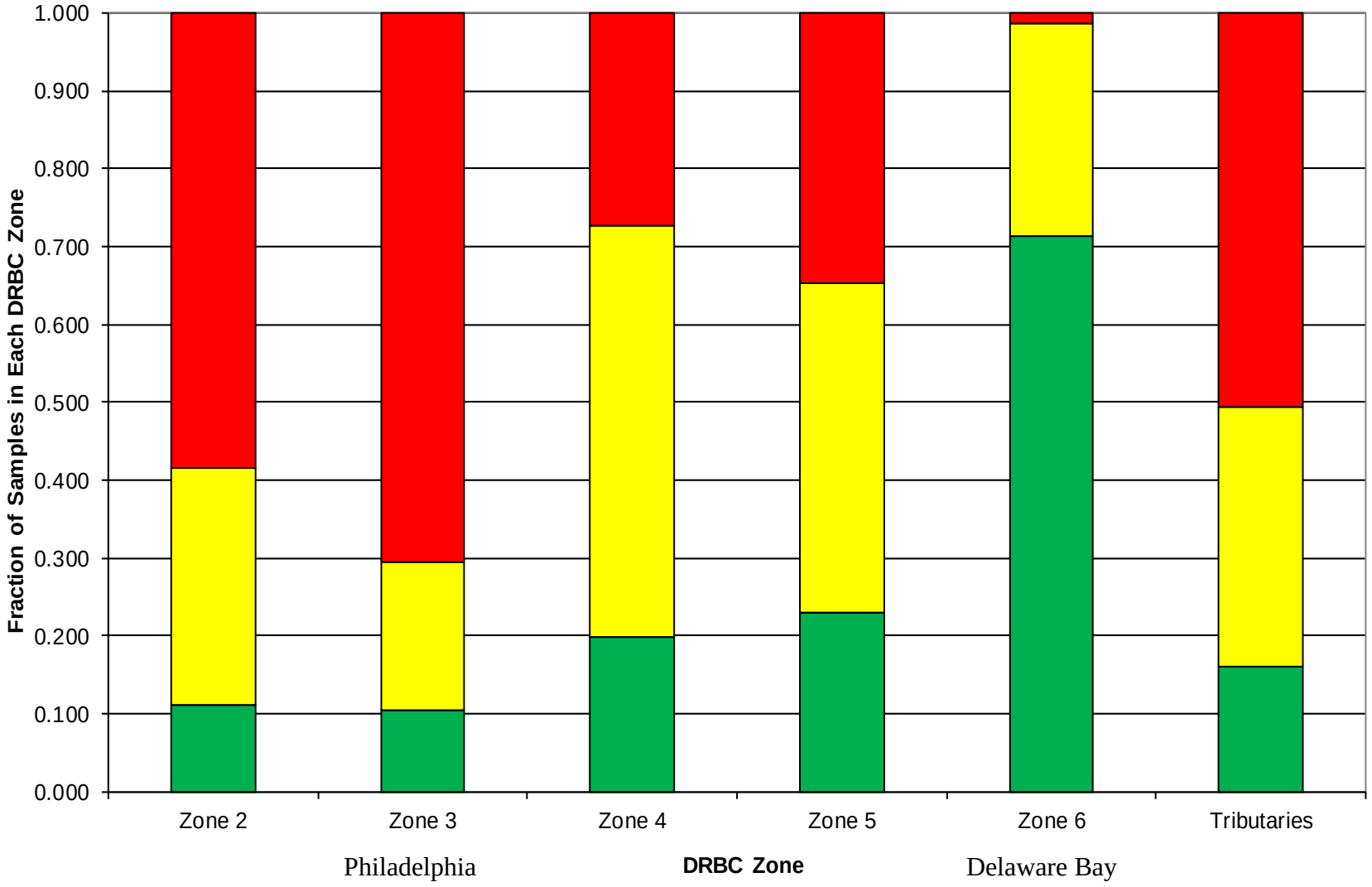
Zone 2
Chlordane
Cadmium
DDT/D/E

Zone 3
Cadmium
DDT/D/E
*PCBs

Zone 4
DDD/E
*PCBs

Zone 5
*PCBs
Arsenic

Aquatic Habitat Suitability Restoration Threshold Analysis
Fraction of the Sediment Samples in Each DRBC Zone



Summary

Upland Beneficial Uses

~98% of sediment samples suitable

Aquatic Habitat Restoration

~70% of sediment samples suitable

Summary

Sediment samples suitable for beneficial uses are usually interspersed among samples acceptable for “limited/restricted” beneficial uses

Areas of Concern

- Schuylkill River
- DRBC Zone 3 – downstream of the Walt Whitman Bridge
- DRBC Zone 4 – Philadelphia Naval Shipyard (near mouth of the Schuylkill River - aquatic habitat only)
- DRBC Zone 5 – near the mouths of Shellpot Creek, the Christina River, and the C & D Canal

Questions?????