

PCDD/Fs in Bay & Wetland Cores

Dioxin Strategy Group Meeting
October 26 2011

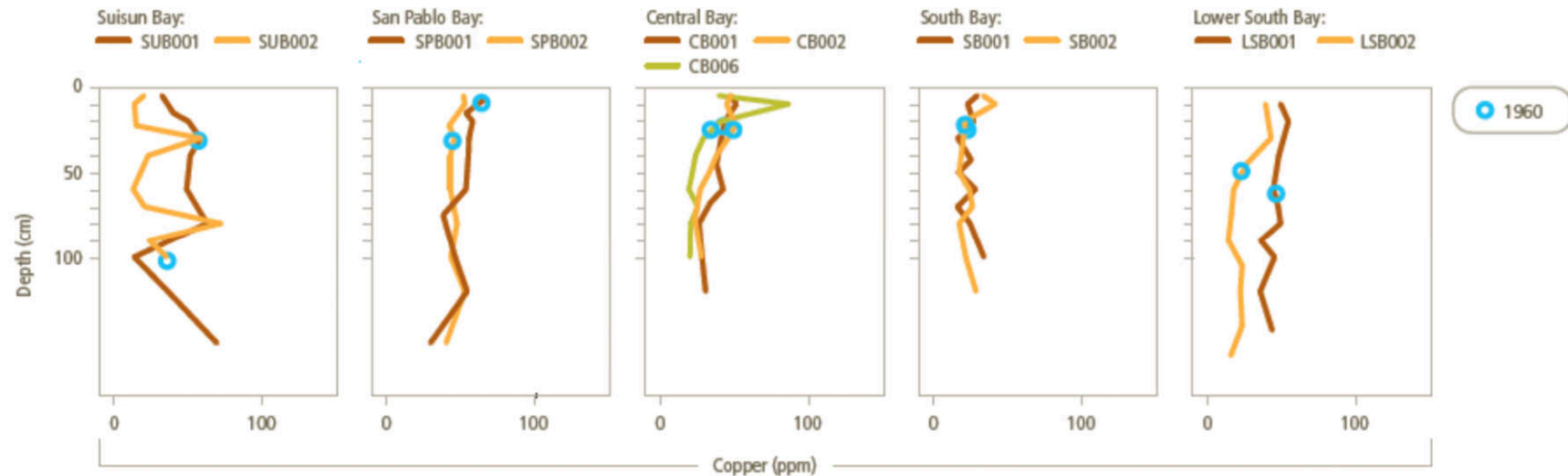


Core Dioxin Goals

- Distribution of dioxin inventory
 1. Is there a legacy pool
 2. Risk to biota (humans)
 3. Loading trend (pre/post industrial)

Sections Previously Analyzed

- For metals, PCBs, OCPs, PBDEs

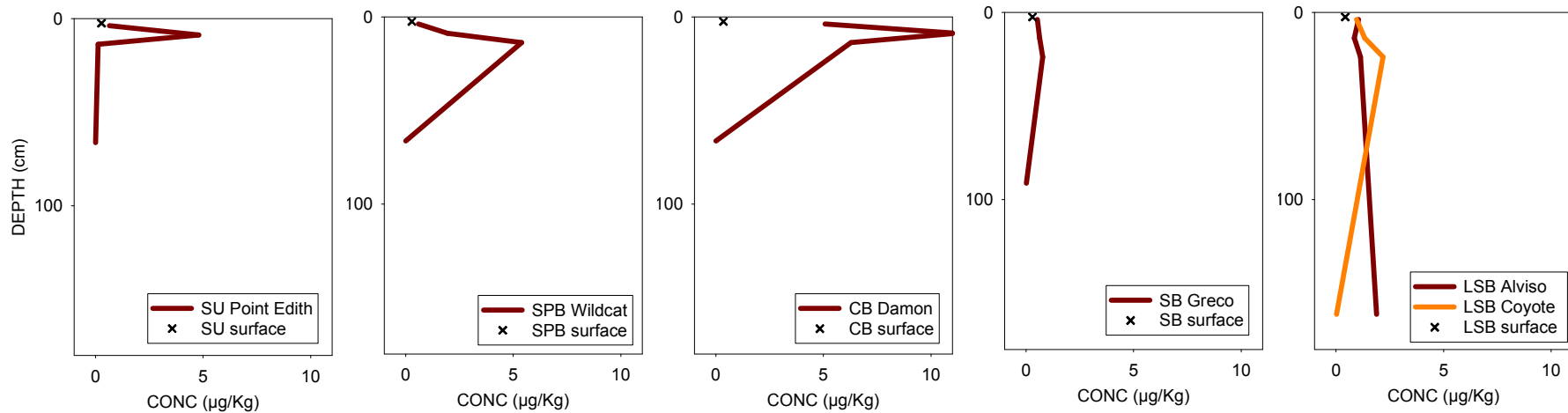


Sections Analyzed for PCDD/Fs

- No more material in previously analyzed sections
 - Interpolate section ages in between
- Top 3 + bottom sections each Bay core adjacent to already analyzed sections
 - Current = top 3, pre industrial = bottom
 - Generally covers sediment mixed zone in Bay (usually 10-15cm)

PCDD/Fs in Wetland Cores

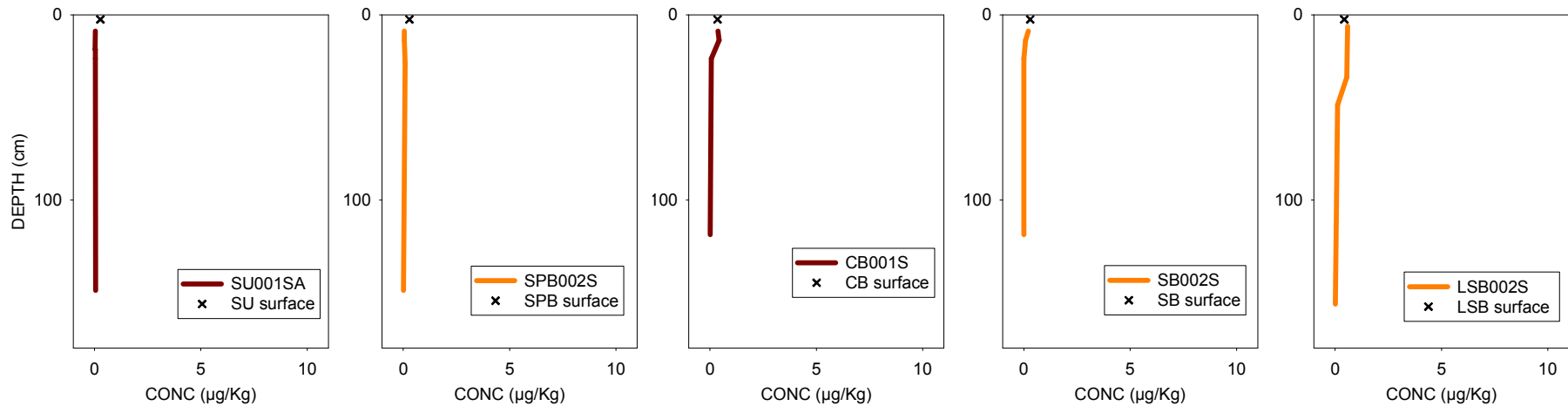
- PCDD/Fs in wetlands show past peaks



Concentrations in $\mu\text{g/kg}$ fine sediment ($<63\mu\text{m}$)

PCDD/Fs in Bay Cores

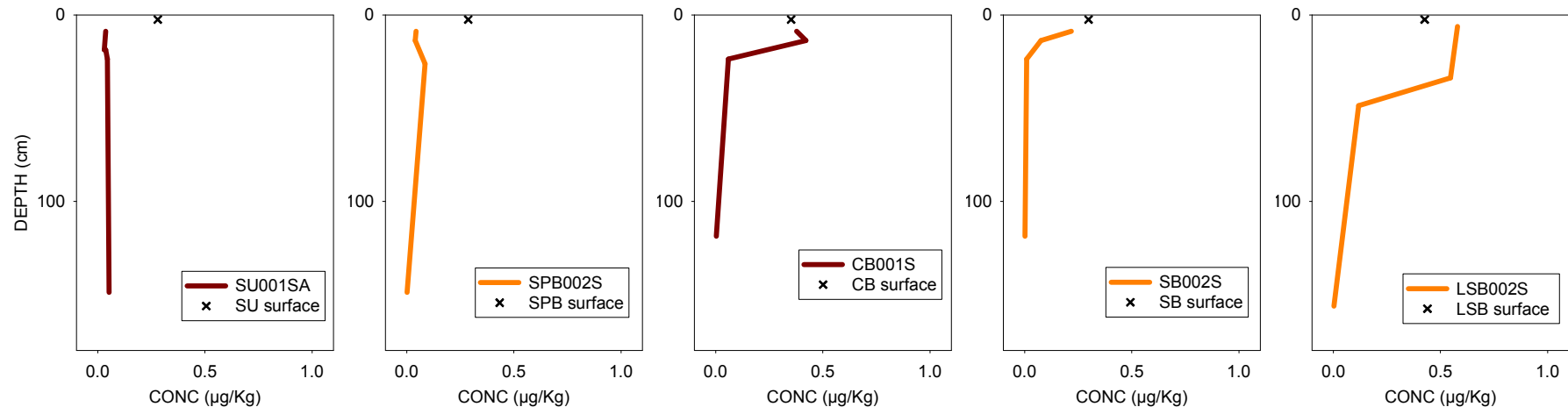
- PCDD/Fs in Bay more uniform, slightly elevated near surface



Concentrations in ug/kg fine sediment (<63um)

PCDD/Fs in Bay Cores

- PCDD/Fs in Bay slightly elevated near surface



Concentrations in ug/kg fine sediment (<63um)

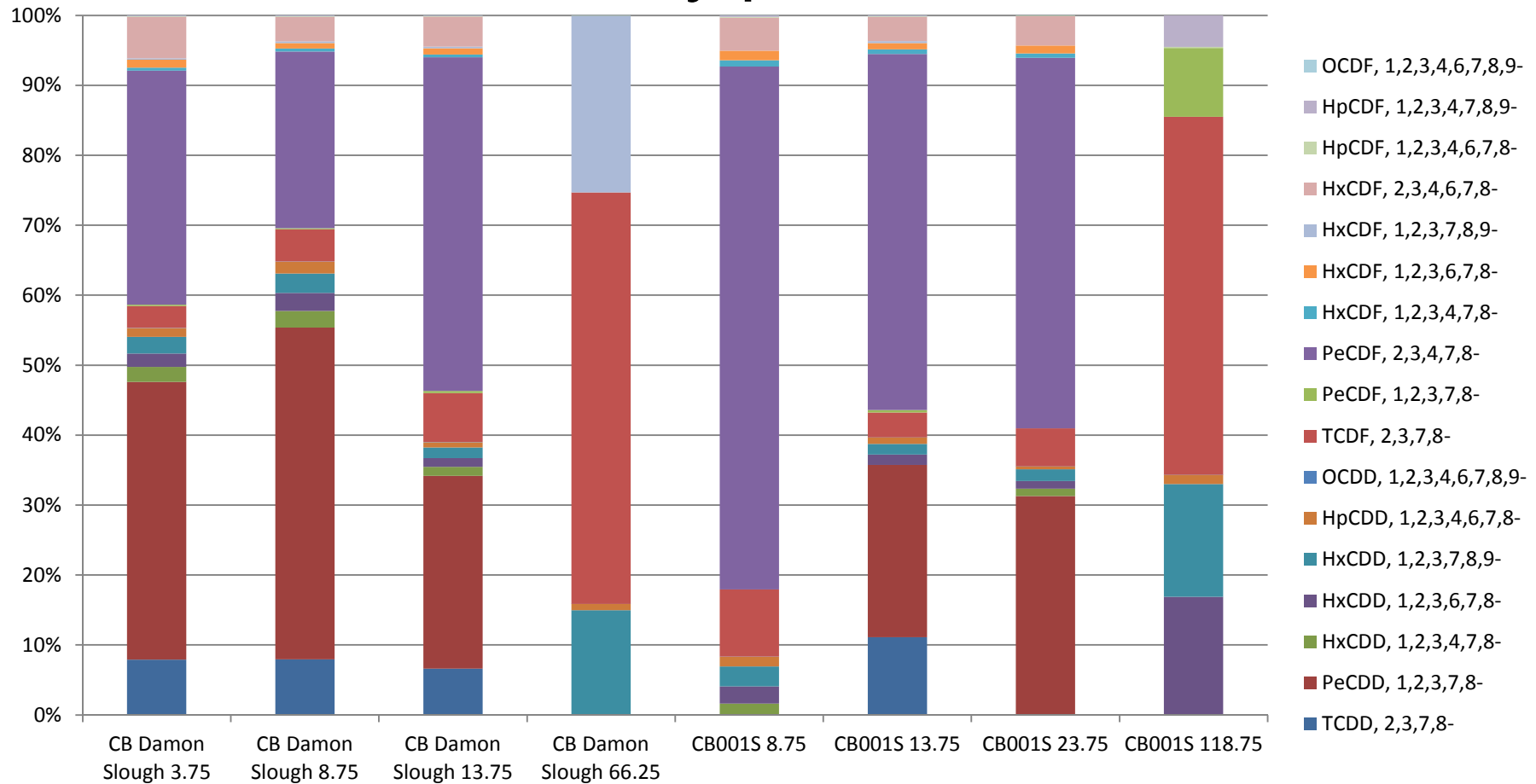
*note different scale

TEF & BEF(fish from sediment)

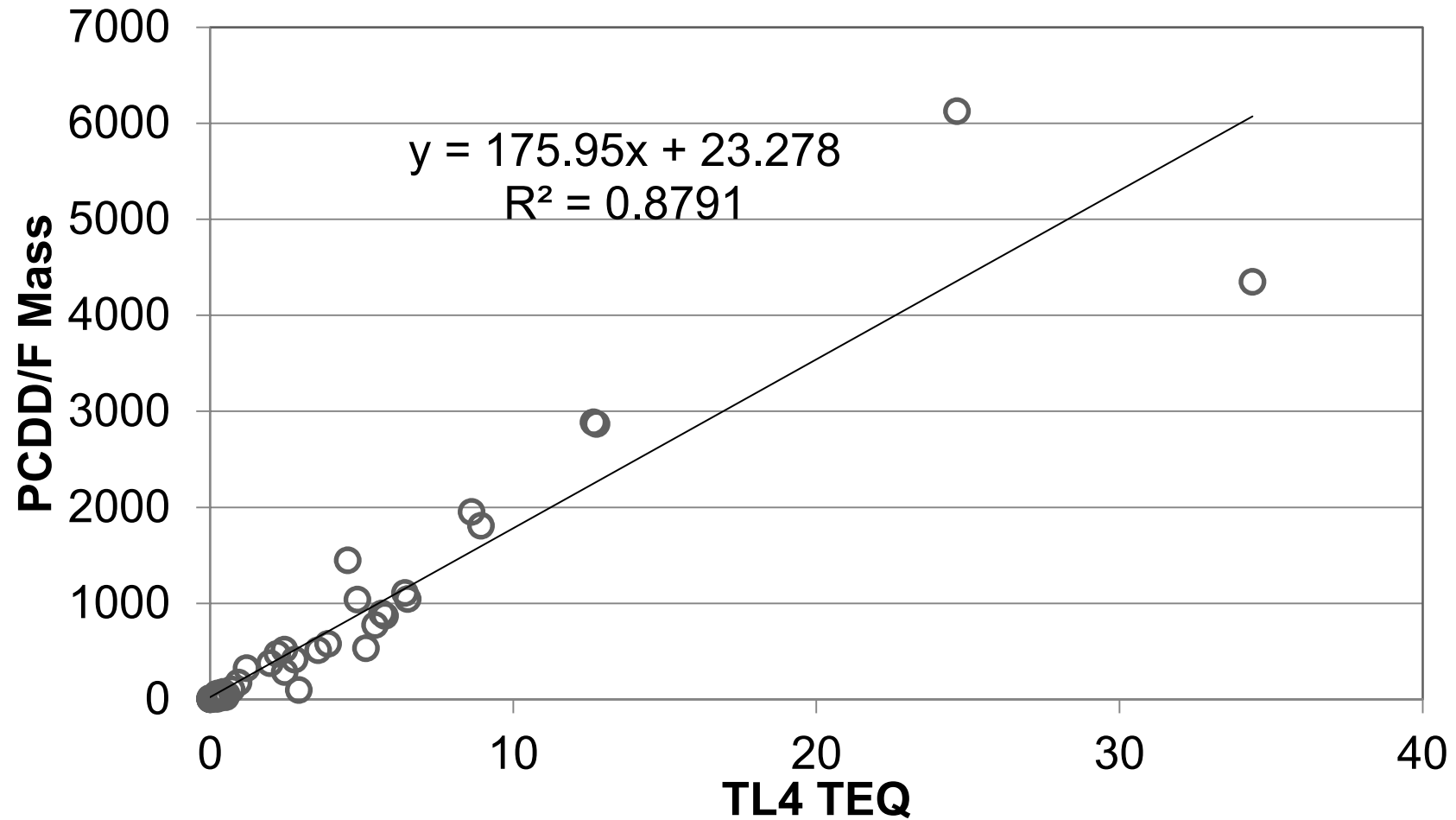
Congener	KOW	BSAF	BEFsed	BEFwater	TEF1998
2,3,7,8-TCDD	7.02	0.059	1	1	1
1,2,3,7,8-PeCDD	7.5	0.054	0.92	1.13	1
1,2,3,4,7,8-HxCDD	7.8	0.018	0.31	0.4	0.1
1,2,3,6,7,8-HxCDD	7.8	0.0073	0.12	0.16	0.1
1,2,3,7,8,9-HxCDD	7.8	0.0081	0.14	0.18	0.1
1,2,3,4,6,7,8-HpCDD	8.2	0.0031	0.051	0.072	0.01
OCDD	8.6	0.00074	0.012	0.017	0.0001
2,3,7,8-TCDF	6.5	0.047	0.8	0.48	0.1
1,2,3,7,8-PeCDF	7	0.013	0.22	0.22	0.05
2,3,4,7,8-PeCDF	7	0.095	1.6	1.59	0.5
1,2,3,4,7,8-HxCDF	7.5	0.0045	0.076	0.094	0.1
1,2,3,6,7,8-HxCDF	7.5	0.011	0.19	0.23	0.1
2,3,4,6,7,8-HxCDF	7.5	0.04	0.67	0.84	0.1
1,2,3,7,8,9-HxCDF	7.5	0.037	0.63	0.78	0.1
1,2,3,4,6,7,8-HpCDF	8	0.00065	0.011	0.015	0.01
1,2,3,4,7,8,9-HpCDF	8	0.023	0.39	0.52	0.01
OCDF	8.8	0.001	0.016	0.023	0.0001

(TL4 Fish) TEQs %

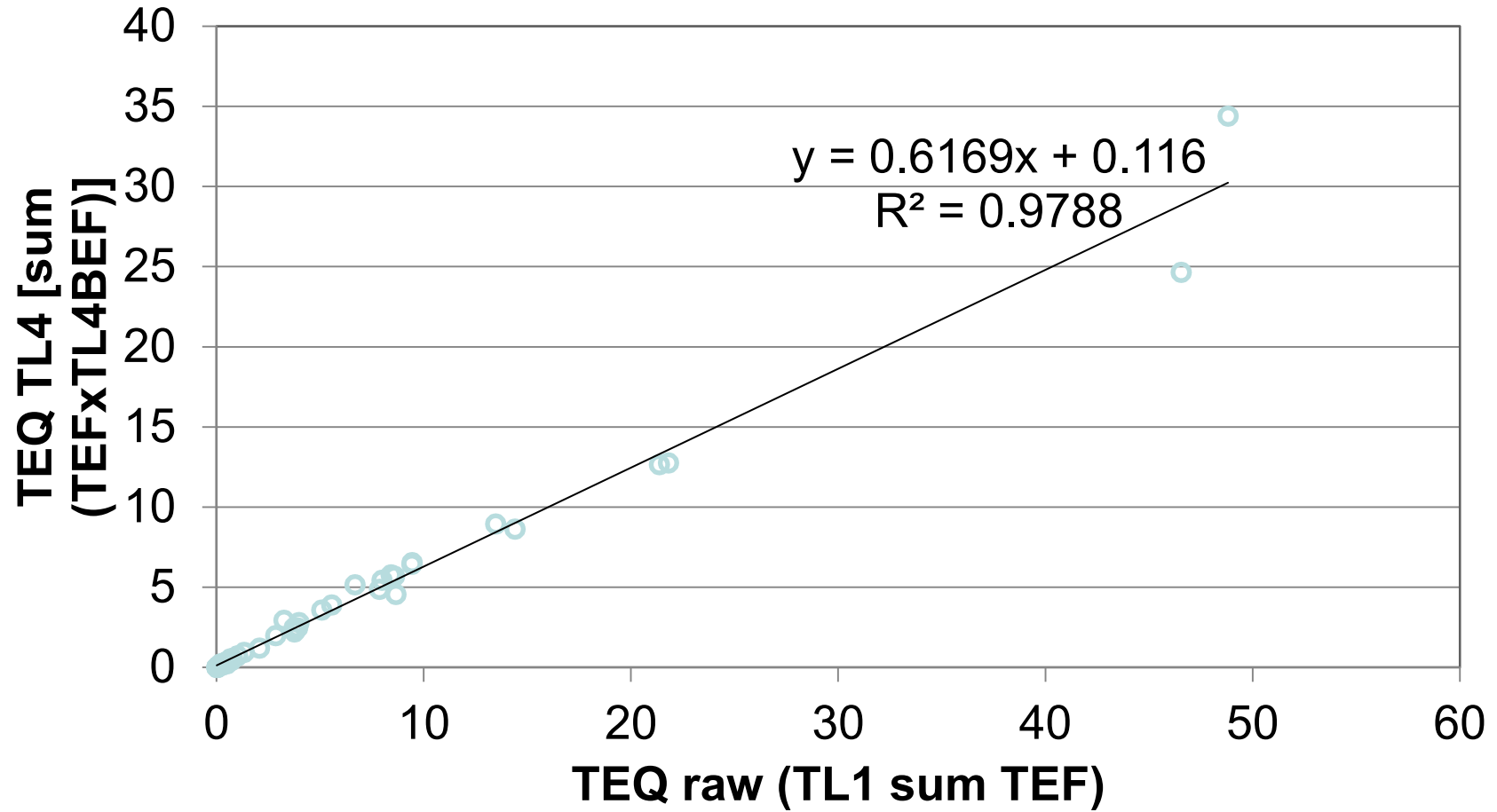
- TEQ dominated by penta-, tetra-



TL4 TEQ vs PCDD/F Mass



TL4 TEQ vs Raw (TL2) TEQ



Summary Review

- Cores shallow sections provide PCDF/F inventory of “active” sediment
- Like other contaminants, Bay PCDD/Fs lower and more uniform
- Wetland and Bay cores show past PCDD/F peak, and minimal PCDD/Fs in deepest sections

Summary Review (cont...)

- TEQs calculated for TL4 fish consumption (sediment BEFs x body burden TEFs)
 - Water BEFs generally higher
 - Dose based TEFs lower but already include differential biouptake
- Total mass mostly octa, hepta, TEQs mostly penta, tetra
 - However, total PCDD/Fs still $\sim \propto$ TEQs, so TEQs have same trends (core profiles would look alike)
 - Similar to PCB case where >95% risk is from usually undetected coplanars

Next Steps

- Dioxin in wetland cores generally show decreasing trends, suggesting greatly reduced loads
- Bay core suggests no hidden inventory, exposure risk likely to improve over current state.
- Surface & core sediment data, ongoing loads to be combined in updated simple mass balance (“1-box”)