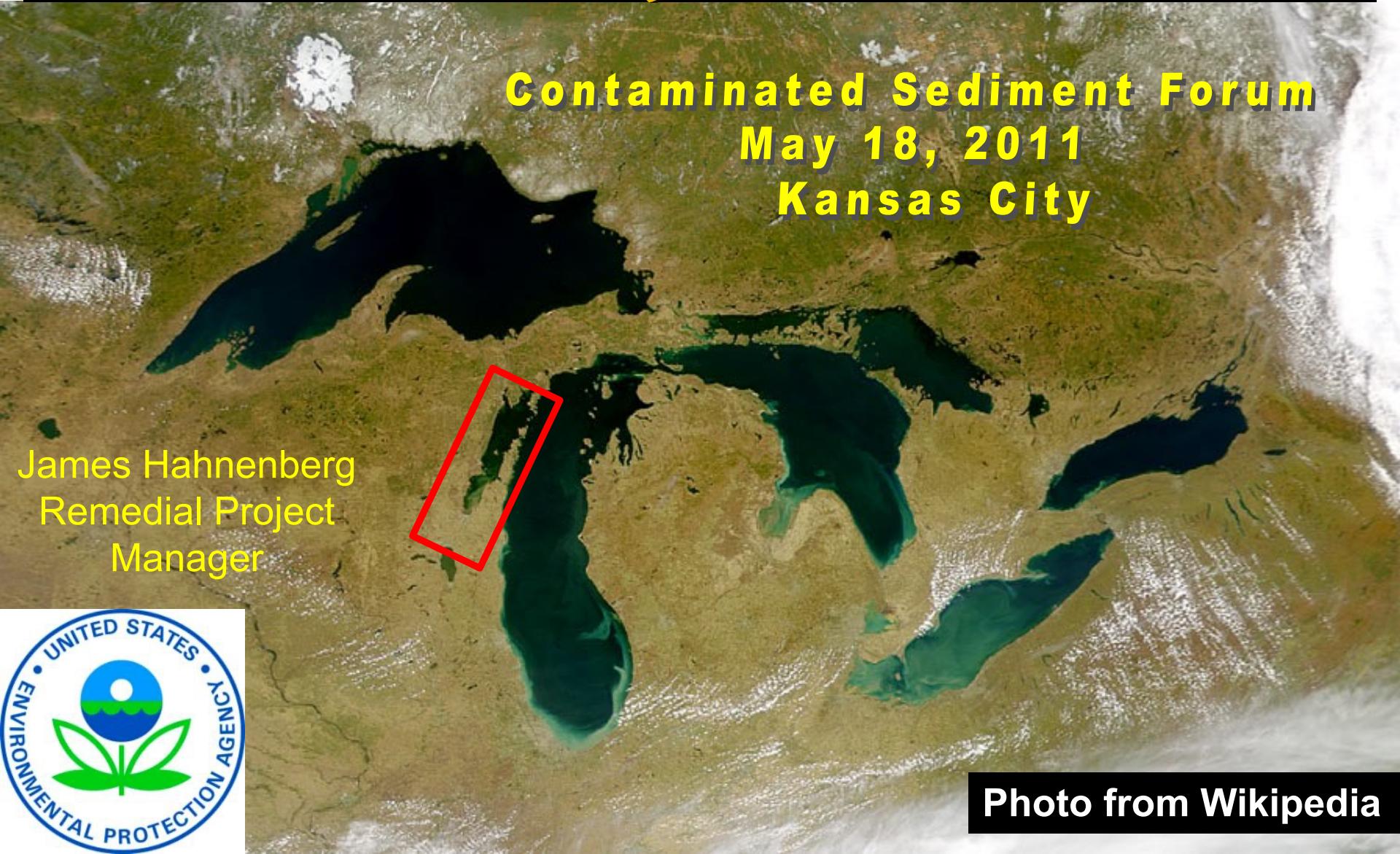


Long-term monitoring plan & upper river results **Fox River, Wisconsin**



Contaminated Sediment Forum
May 18, 2011
Kansas City

James Hahnenberg
Remedial Project
Manager



Photo from Wikipedia



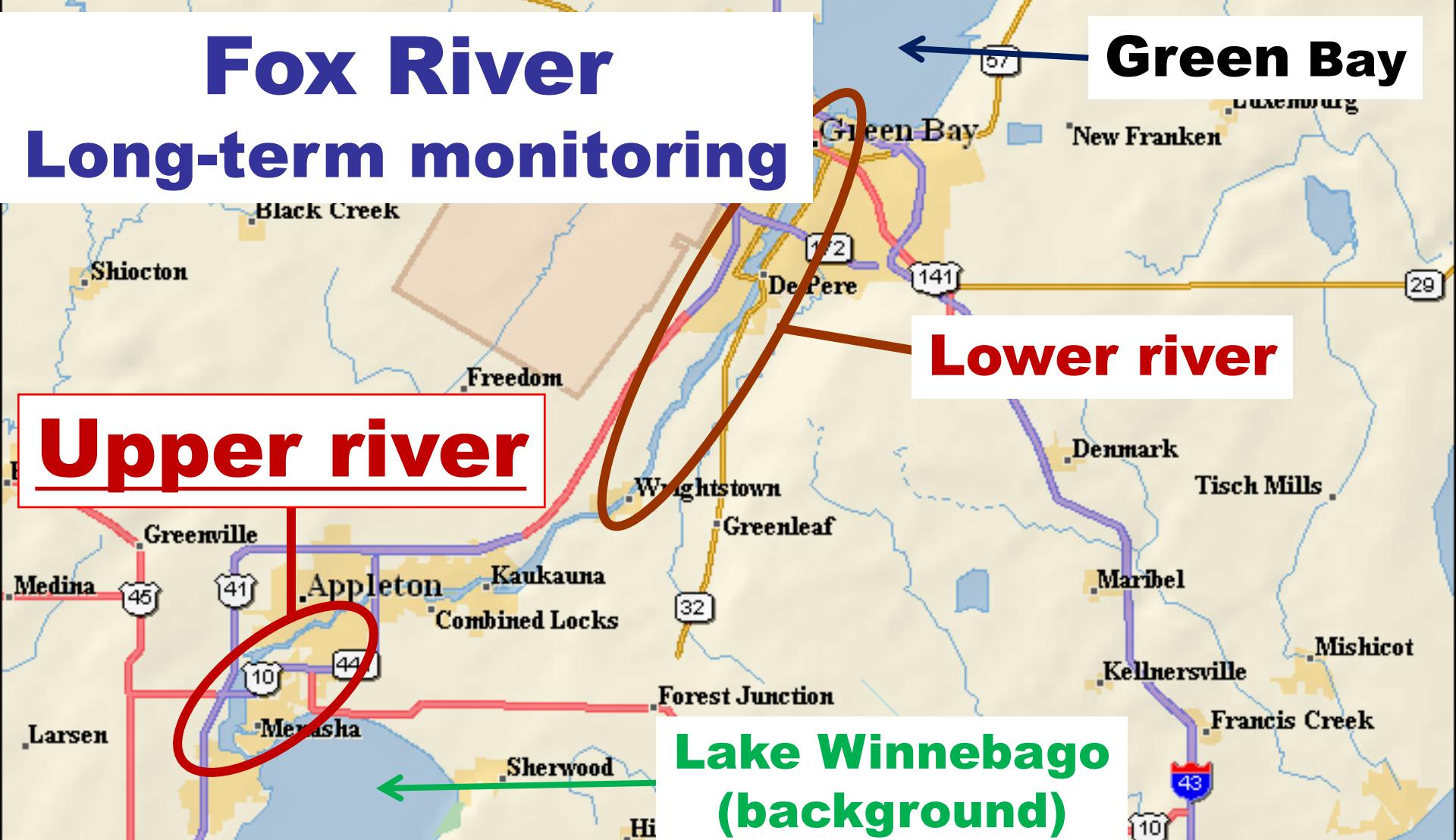
The Great Lakes Song
The Earth Tones' 15th Anniversary Concert
Bill Tong, Karen Reshkin, Mary Ann Suero
U.S. EPA - Region 5
Chicago, IL - April 20, 2011
Video by Bill Tong

Fox River long-term monitoring

- Long-term monitoring plan for Fox River
- Upper river 2010 results: 1 year after cleanup completion (Yea!)

Fox River

Long-term monitoring



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Data Zoom 8-3

Fox River

Long-term monitoring

- **Sediment**
- **Fish**
 - **Walleye & bass: human health**
 - **Carp & drum: ecological**
 - **Shad: rapid response**
- **Surface water**

Long-term sediment monitoring Considerations

- Frequency
- Number of samples
- Composites or individual samples
- Statistical concerns
- Sediment monitoring (?)

Confirmation sampling



From: Tetra Tech Inc. EC, Weekly QC Report, week ending April 22, 2011

Fox upper river

Sediment confirmation

Sampling (northern half)

Legend



- 2,422 post-dredge locations
- Biased sampling

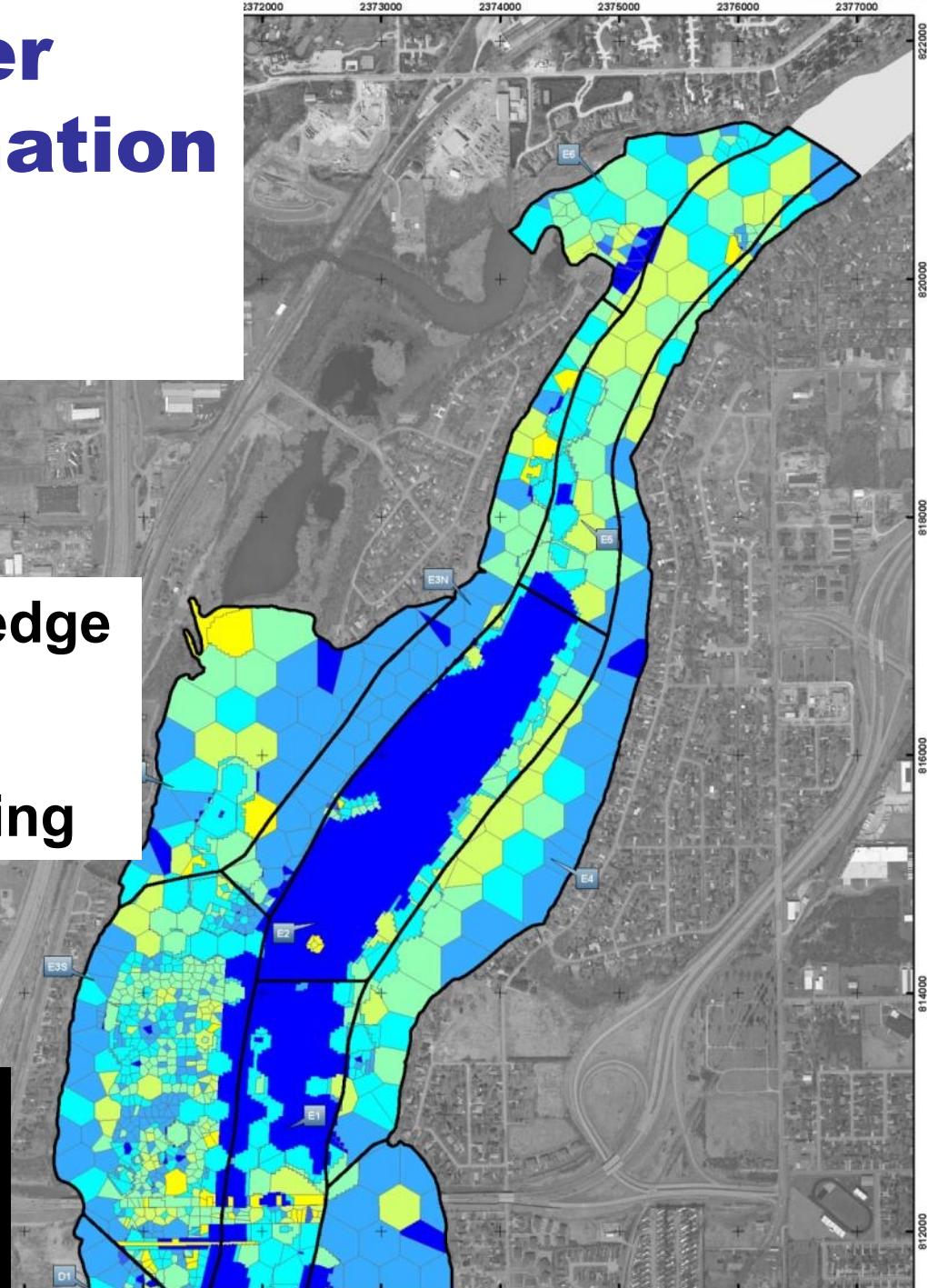
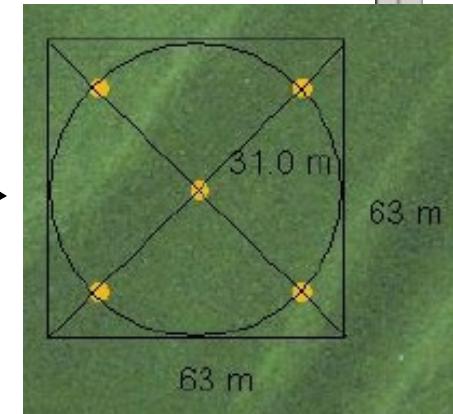


Figure 1-26, from: GW Partners, LLC,
Remedial Action Certification of
Completion Report, Lower Fox OU1,
November 2010.

Upper river Long-term sediment Sampling



- Unbiased grid
- 63 locations
- 315 samples
(5 composites per location)



Fish & water Monitoring Locations Upper river Example

Water transect

Fish sampling target locations

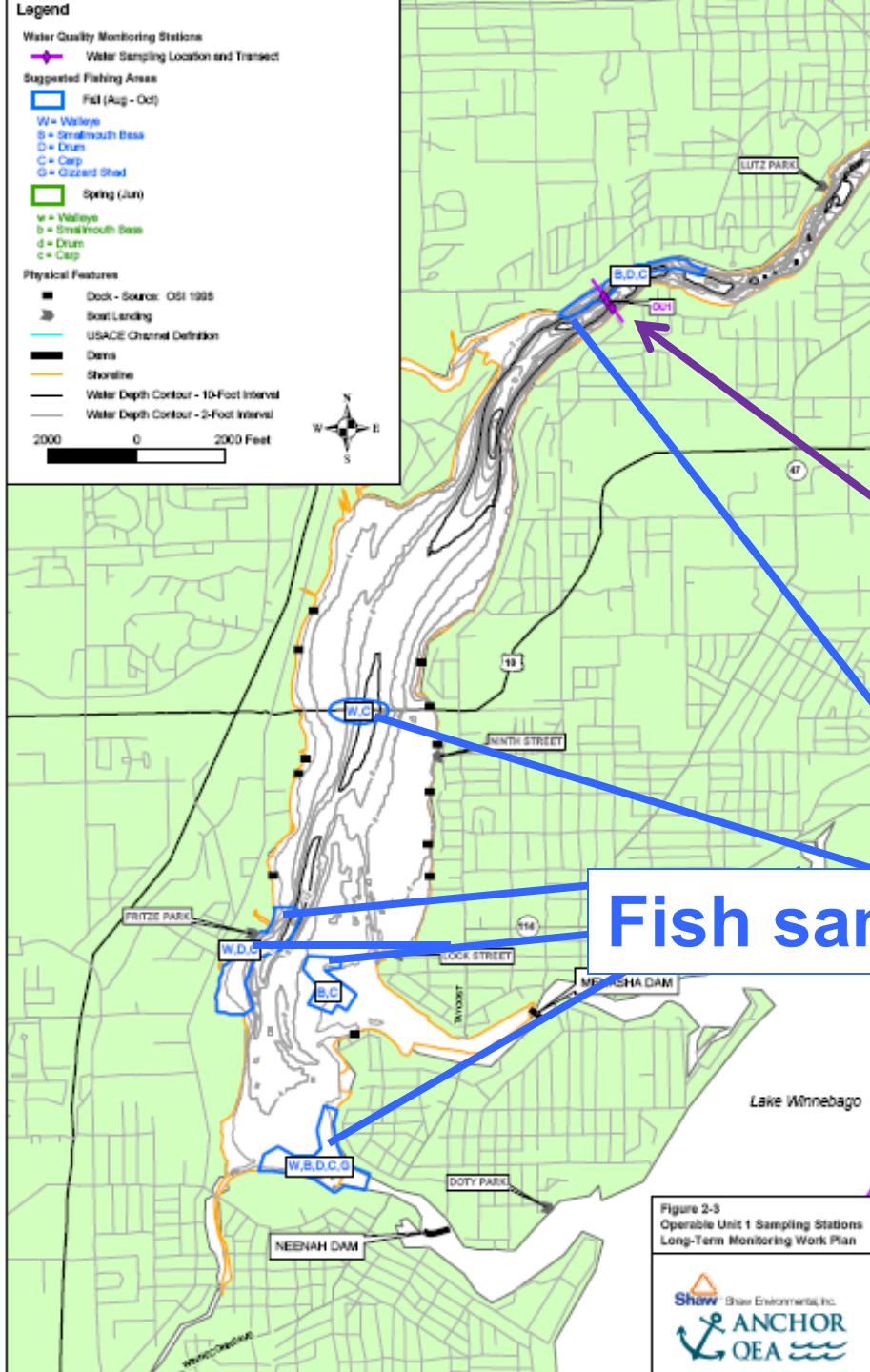


Figure 2-3, from: Anchor, et al, 2009, Lower Fox River Long-Term Monitoring Plan.

Long-term monitoring fish

Sampling considerations

- Species
- Size & age
- Number
- Frequency & time of year
- Collection methods

Long-term monitoring fish Sampling considerations (continued)

- Locations
- Composites or individual
- Whole or fillets
- Statistical considerations
- Baseline sampling

Primary species



Walleye (human health)



Carp (ecological)



Gizzard shad
(early indicator)

Secondary fish species

Human health



From: WDNR website

Bass

Ecological



Drum

*If needed, secondary species
will substitute for primary species*

Species, number, size, & processing

SPECIES	SIZE RANGE	Skin-on Fillet	Skinned Fillet	Whole Fish	No. Individuals	No. Composites ⁽¹⁾	No. Fish/Composite
Walleye Human	12 to 22 inches	X			15		
Carp Ecological	10 to 20 inches		X	25	5	5	5
Gizzard Shad	< 3 inches	Early indicator	X	125	5	5	25
Channel Catfish Human	12 to 22 inches		X	15			
Drum Ecological	12 to 22 inches		X	25	5	5	5

(1) Walleye and channel catfish will be analyzed as individuals, not composites

Collection period: August – September

Species and size

	2 - 4"	4 - 6"	6 - 8"	8 - 10"	10 - 12"	12 - 14"	14 - 16"	16 - 18"	18 - 20"	20 - 22"	22 - 24"	Total Fish (Optimum)
Primary Species												
Walleye												15
Carp												35
Gizzard shad	■											175
Secondary Species												
Smallmouth bass					■	■						15
Drum					■	■				■	■	25

Notes:



Target size class

Alternate size class

From: Manchester, Jon, 2011, OU1-LTMP Year Zero Fish Collection and Compositing Memorandum.

Collection methods

- **Electrofish**
- **Fyke net**
- **Trawl**
- **Angler catch**
- **Hoop net**
- **Set line**
- **Gillnet**

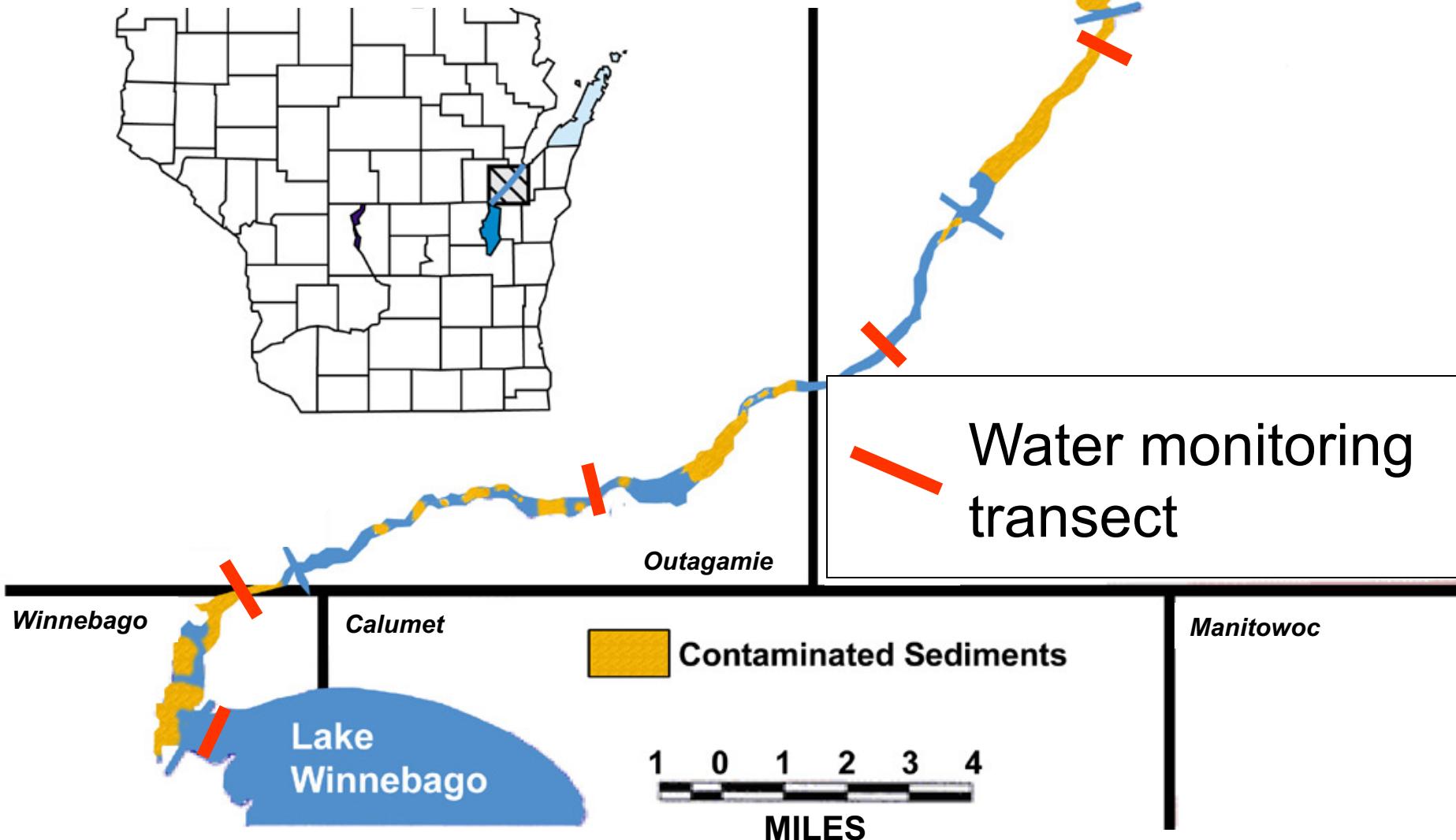
Method depends on species/habitat

Long-term water monitoring Considerations

- Number of transects
- Frequency
- Time period & number of sampling episodes
- Number of samples & compositing
- Volume and analytical methods

Fox River

Surface water transect locations

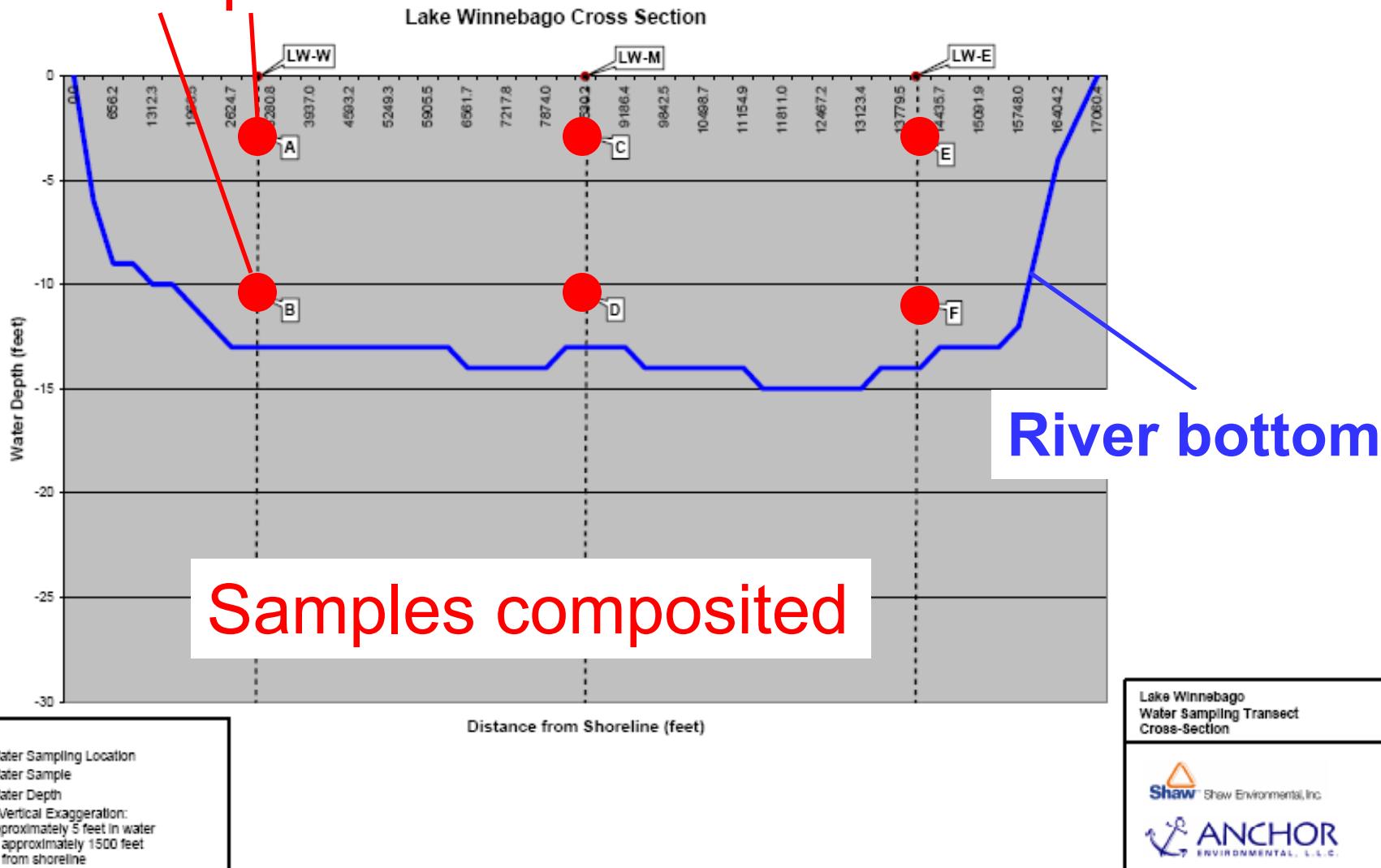


Surface water monitoring

- Transects
 - River: five
 - Lake Winnebago: one
 - Green Bay: three
- 6 samples composited/station
- Monthly sampling (April – November)

Surface water transect example

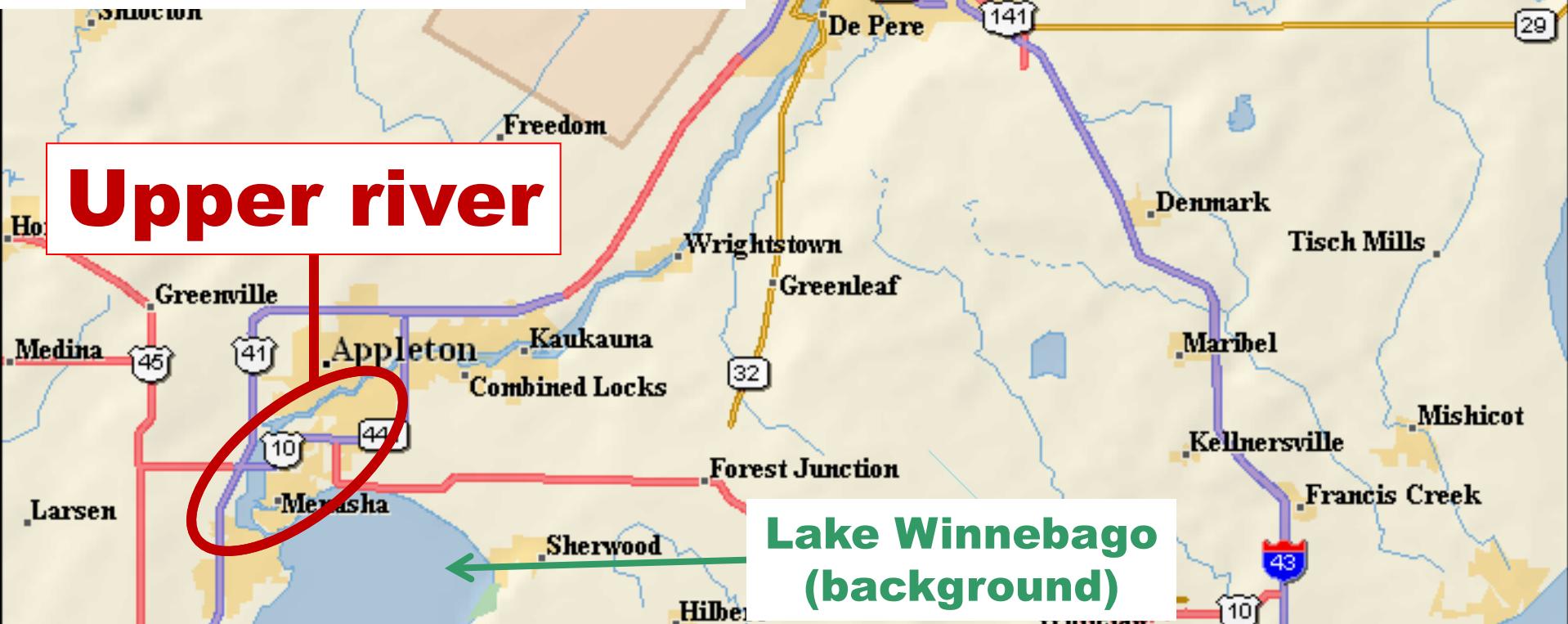
Water samples



Fox River

Monitoring results

Upper river



 **DELORME**

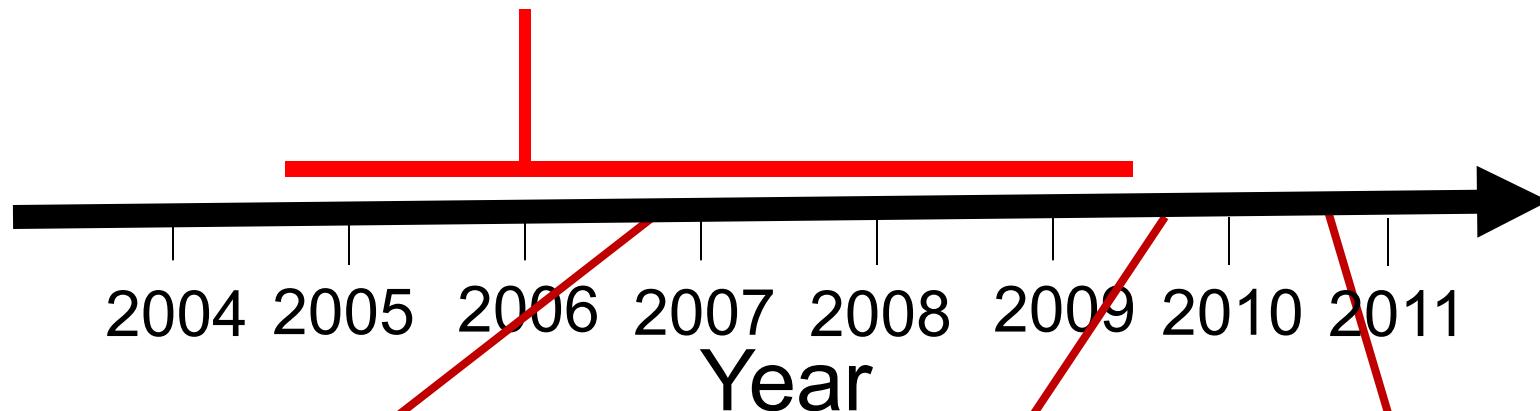
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Upper river cleanup & monitoring

Dredging & Capping – 800,000 cy

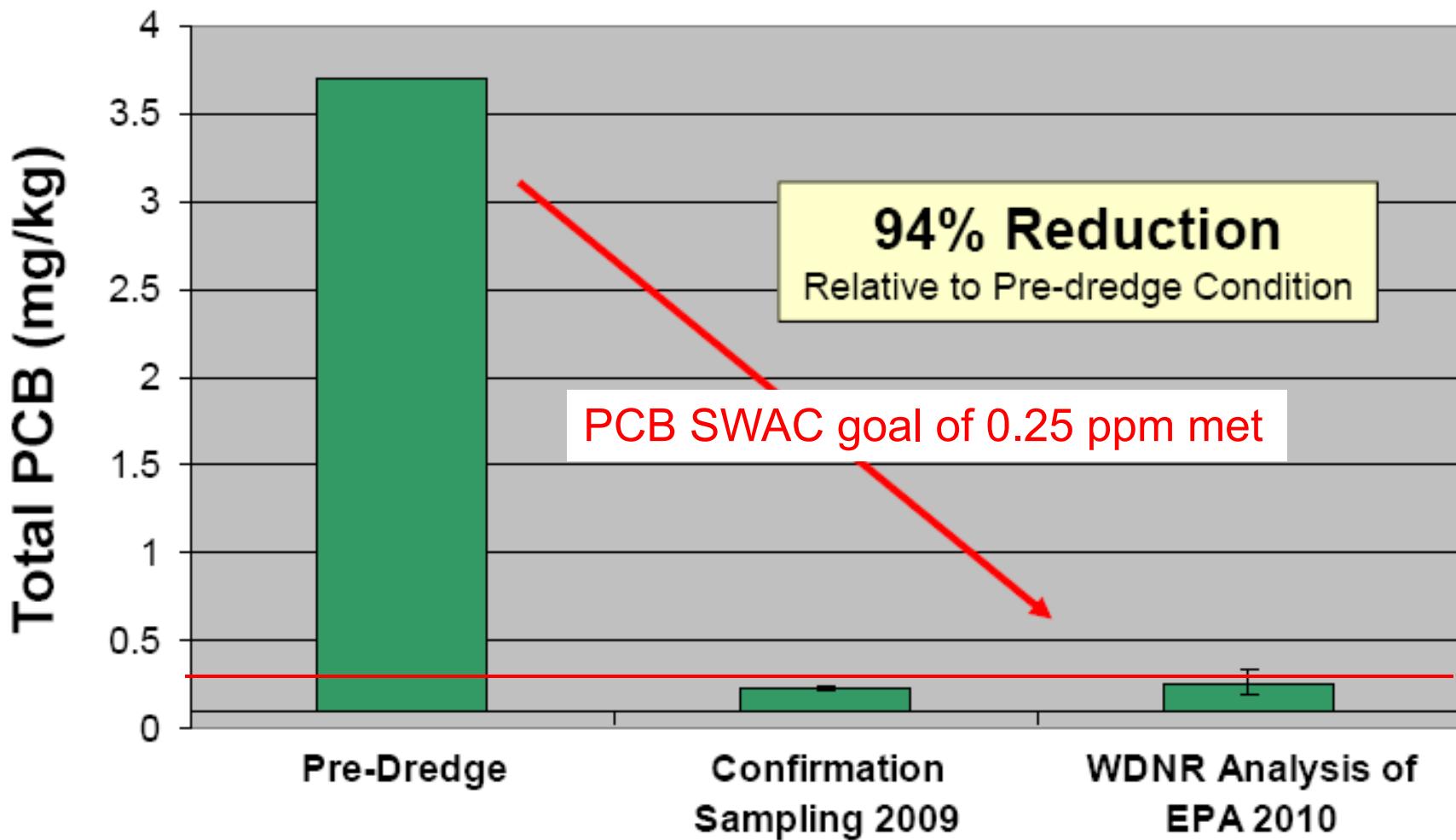


“Baseline”

Sediment sampling

Post-cleanup baseline
("Year 0")

Total PCB Concentration in Surface Sediments Little Lake Buttes Des Morts, WI



From: Boldt oversight team

Fox upper river 2009

PCB sediment concentrations (northern half)

PCB SWAC:
0.23 ppm

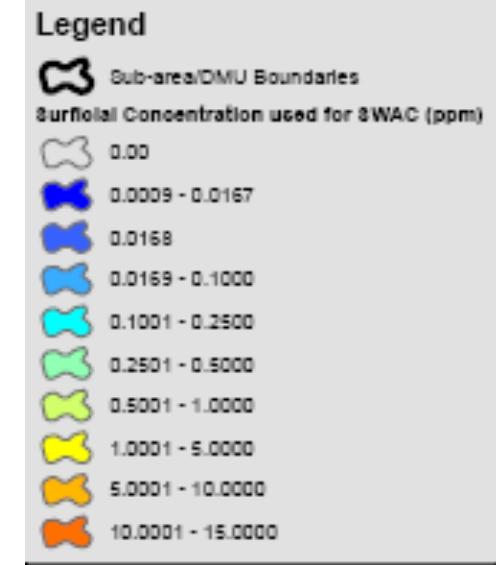
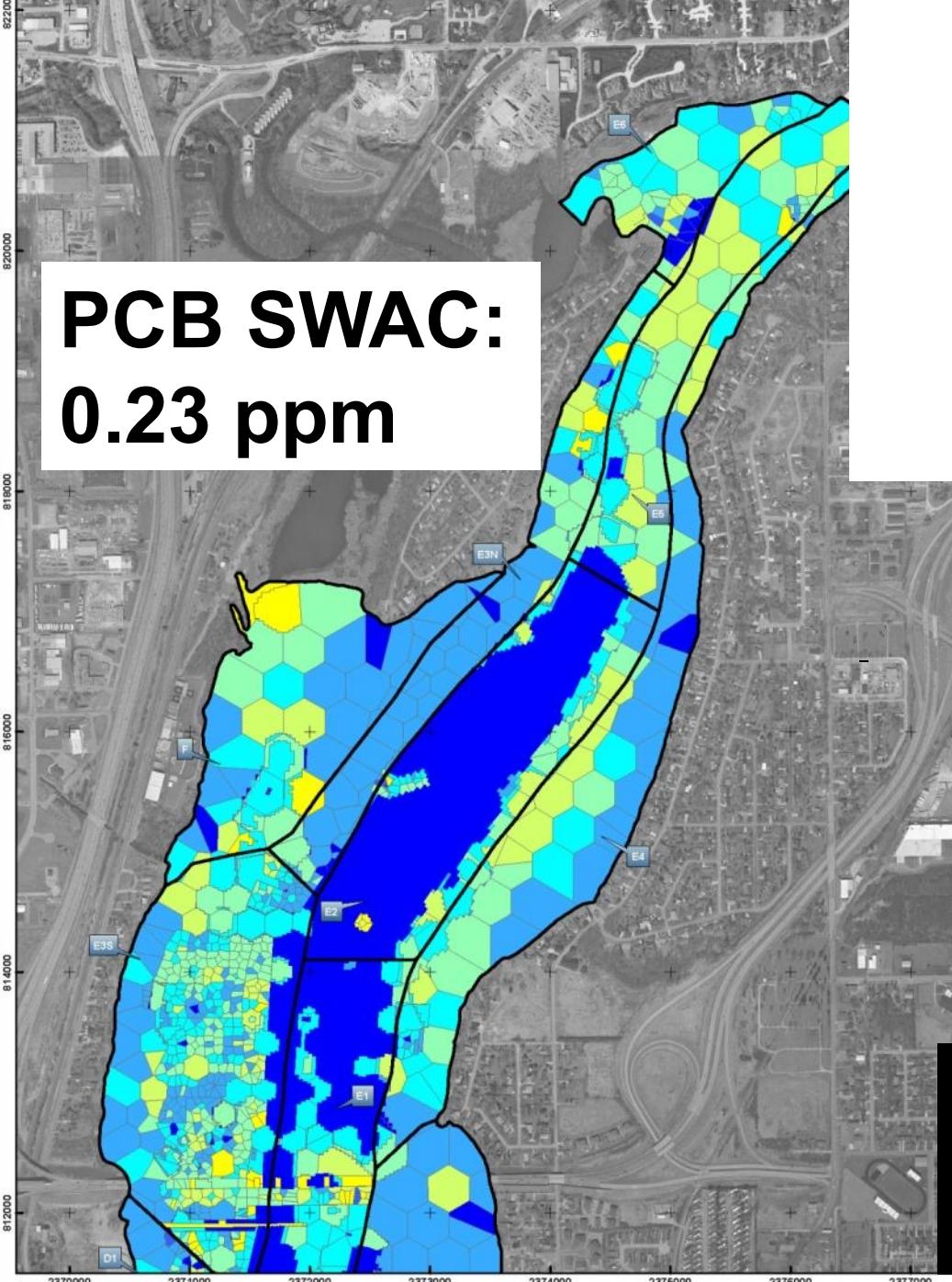


Figure 1-26, from: GW Partners, LLC,
Remedial Action Certification of
Completion Report, Lower Fox OU1,
November 2010.

Upper river

Post cleanup SWAC calculation

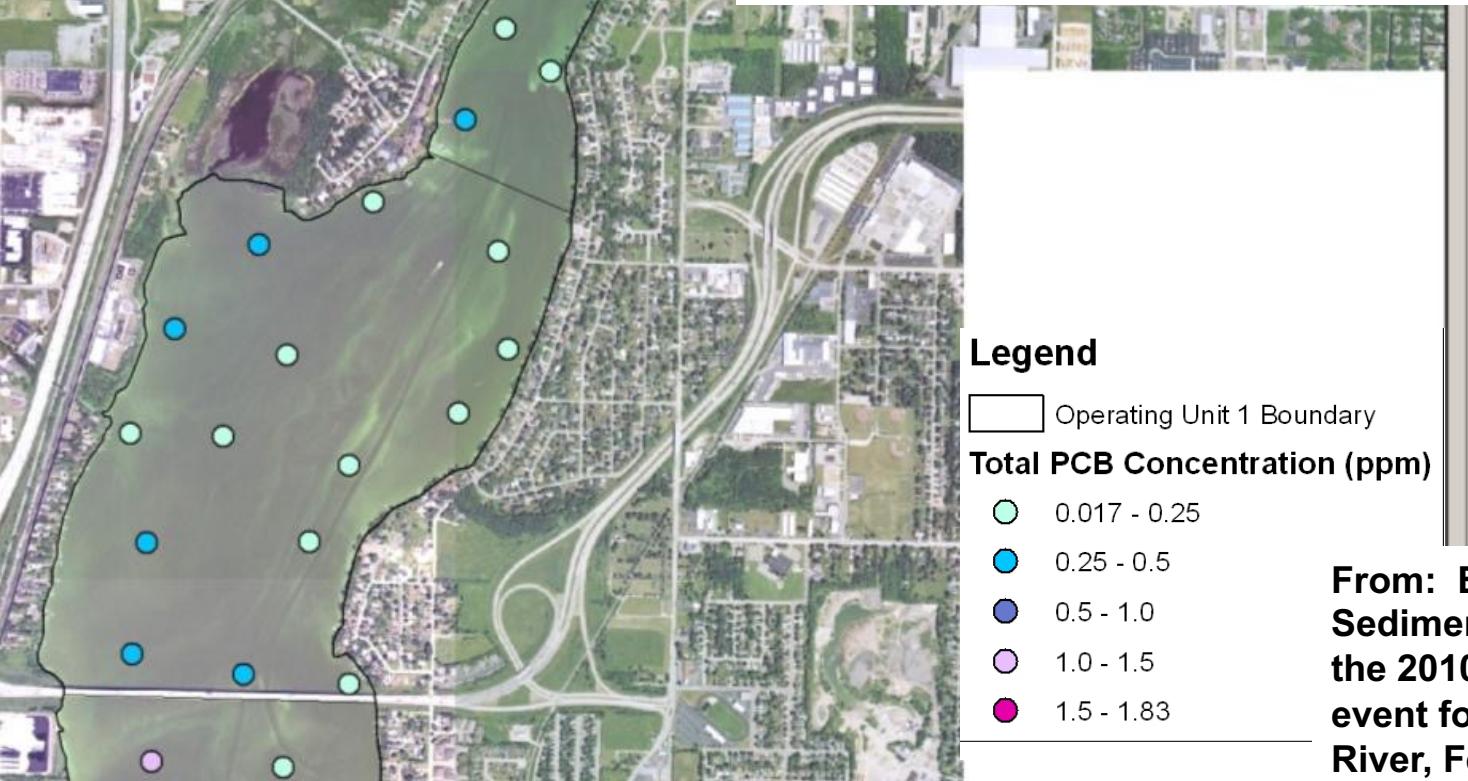
Area	Ave. PCB conc. (ppm)	Acres	Data source
Dredged	0.41	173	Confirmation sampling
Capped	0.0065	114	Cap materials sampling
Sand cover	0.152 – 0.541	142	Pre-design sampling (7 - 20% of concentration)
Inter-deposit	0.390	456	Pre-design sampling
No sediment	0 - 0.0168	471	No recovery & clay sampling
Utility, shoreline, & artifacts	3.68	8	Pre-design sampling
ALL AREAS	0.23	1364	

2010 FIELDS

Upper river sediment sampling (northern half)



PCB SWAC: 0.26 ppm



**From: EPA (FIELDS),
Sediment PCB results from
the 2010 Long-term sampling
event for OU1 of the Lower Fox
River, February 2011.**

Upper river Fish collection Locations 2010



This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only.

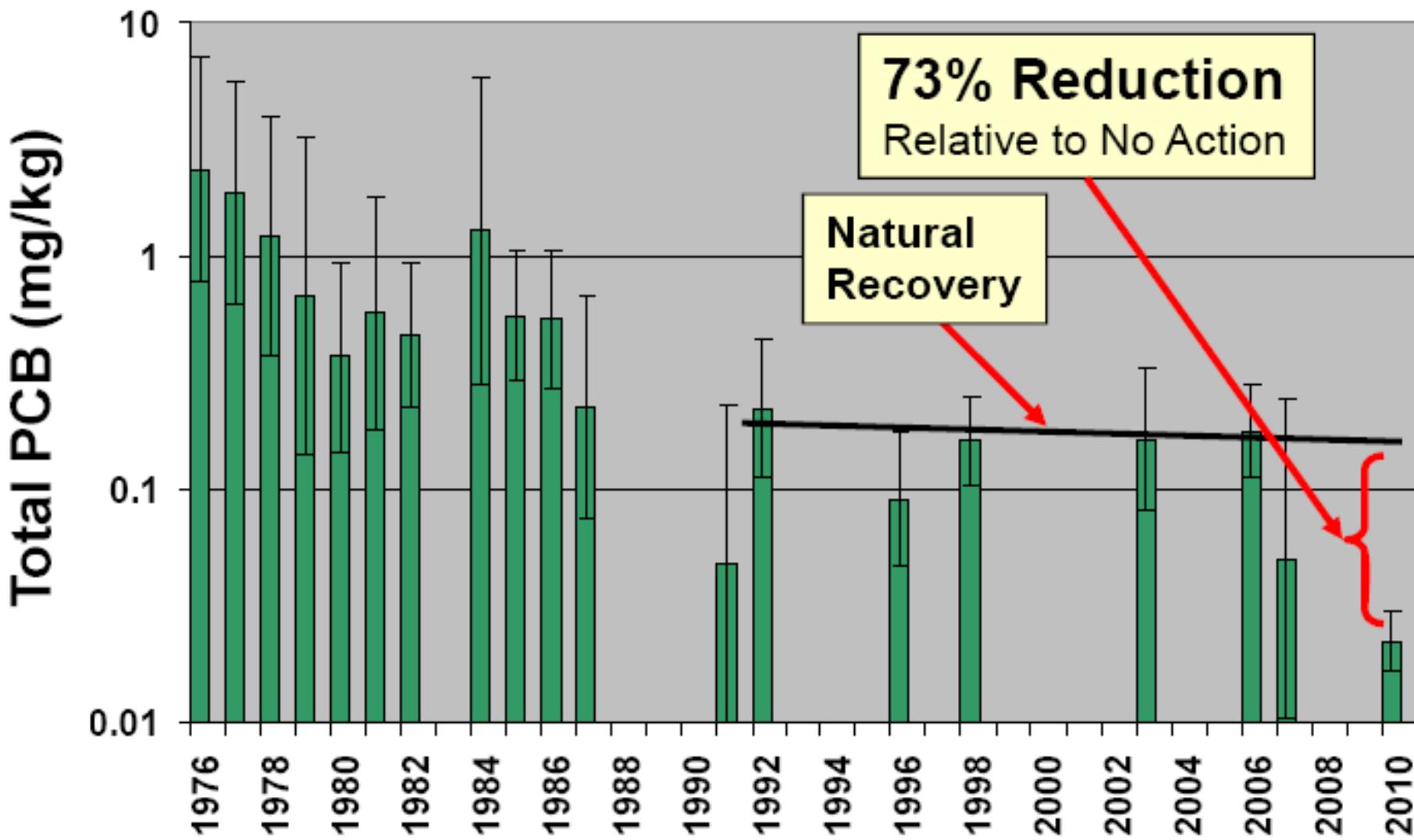
Source: USGS and ESRI Basemaps

Legend

GW PARTNERS	
OU1 LONG TERM MONITORING	
OU1 2010 SAMPLING	
N	
SCALE:	 1,500 3,000 Feet
PROJECT ID: 10G007	
DATE: 04-29-11	
PREPARED BY: DAT	
CHECKED BY: JEM	
 Foth Foth Infrastructure & Environment, LLC	
FIGURE NO. 2-6	

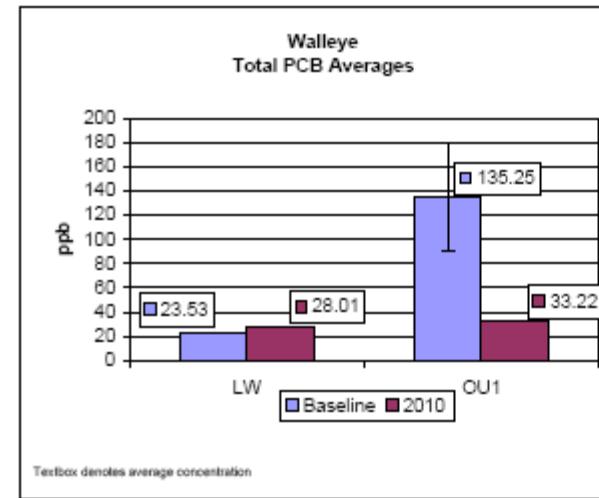
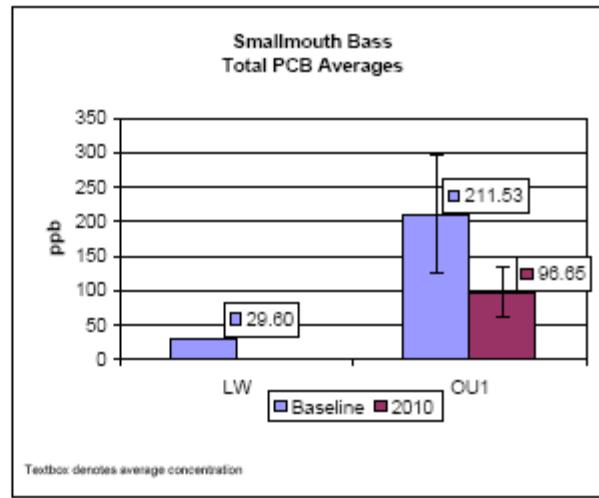
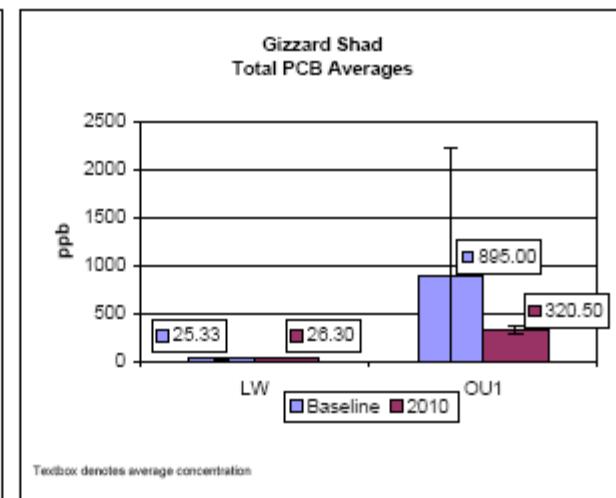
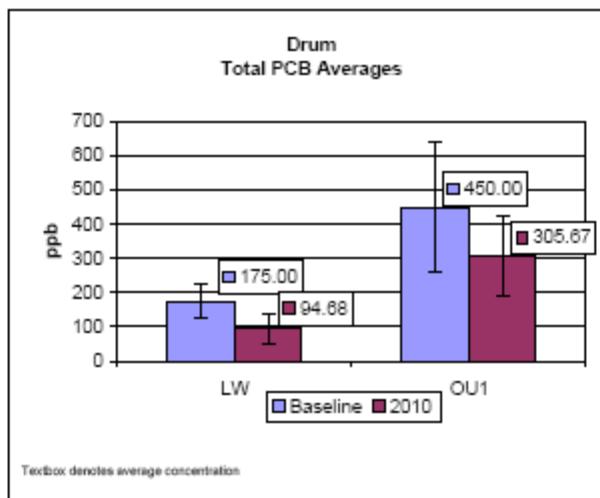
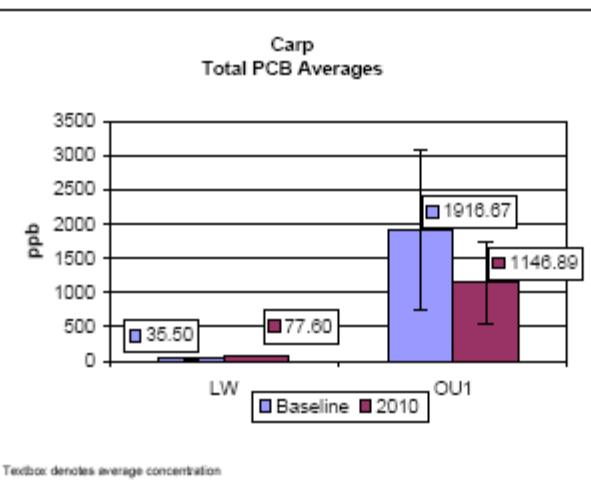
**From: GW Partners, and LLC,
Preliminary draft, Year Zero Summary
Report, Lower Fox River OU1, May 2011.**

Total PCB Concentration in Walleye Fillets Little Lake Buttes Des Morts, WI*



* a.k.a.: upper river

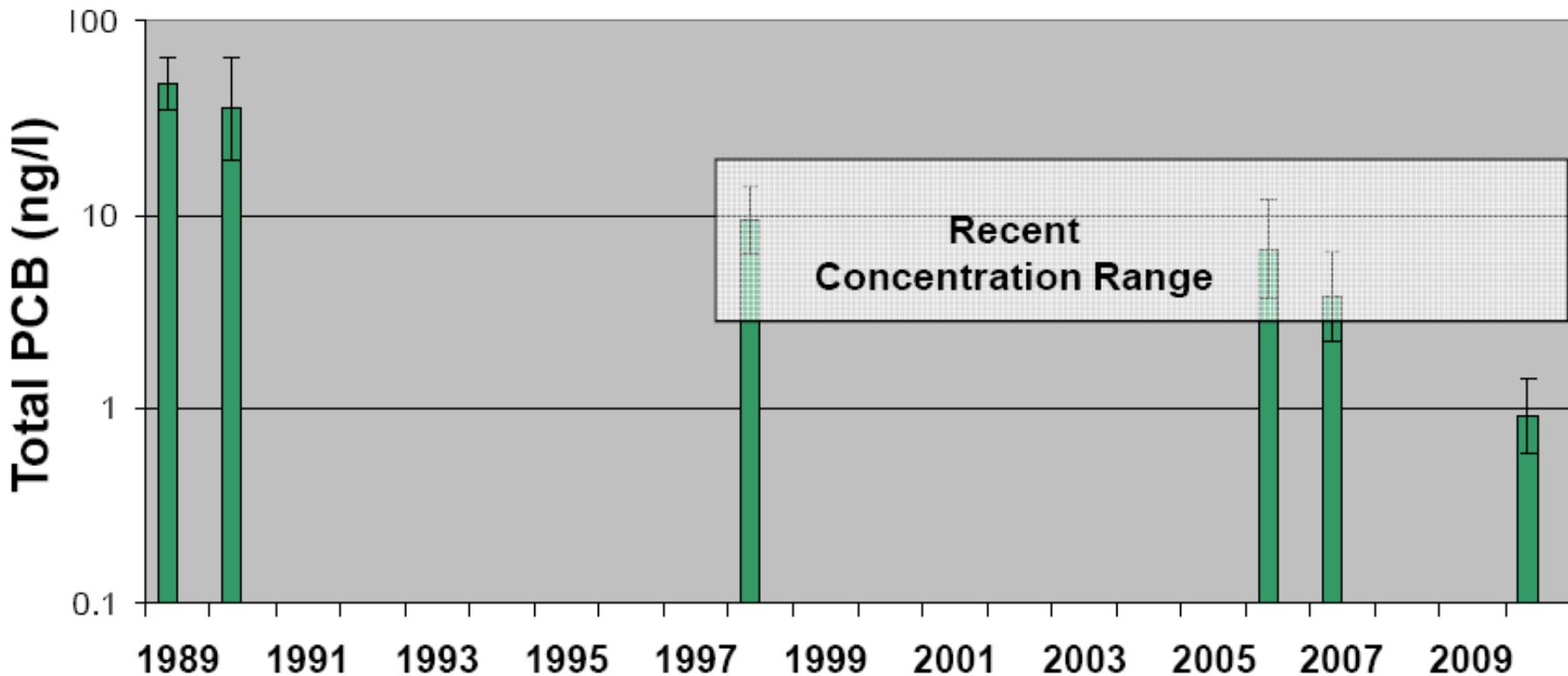
From: Boldt oversight team



From: GW Partners, and LLC, Preliminary draft, Year Zero Summary Report, Lower Fox River OU1, May 2011.

Total PCBs in Water

Little Lake Buttes Des Morts, WI *



* a.k.a.: upper river

From: Boldt oversight team



Photo by Michael Beck, April 2010

