

Fox River PCB Sediment Remediation Site, Wisconsin

**Project Update
June 2011**

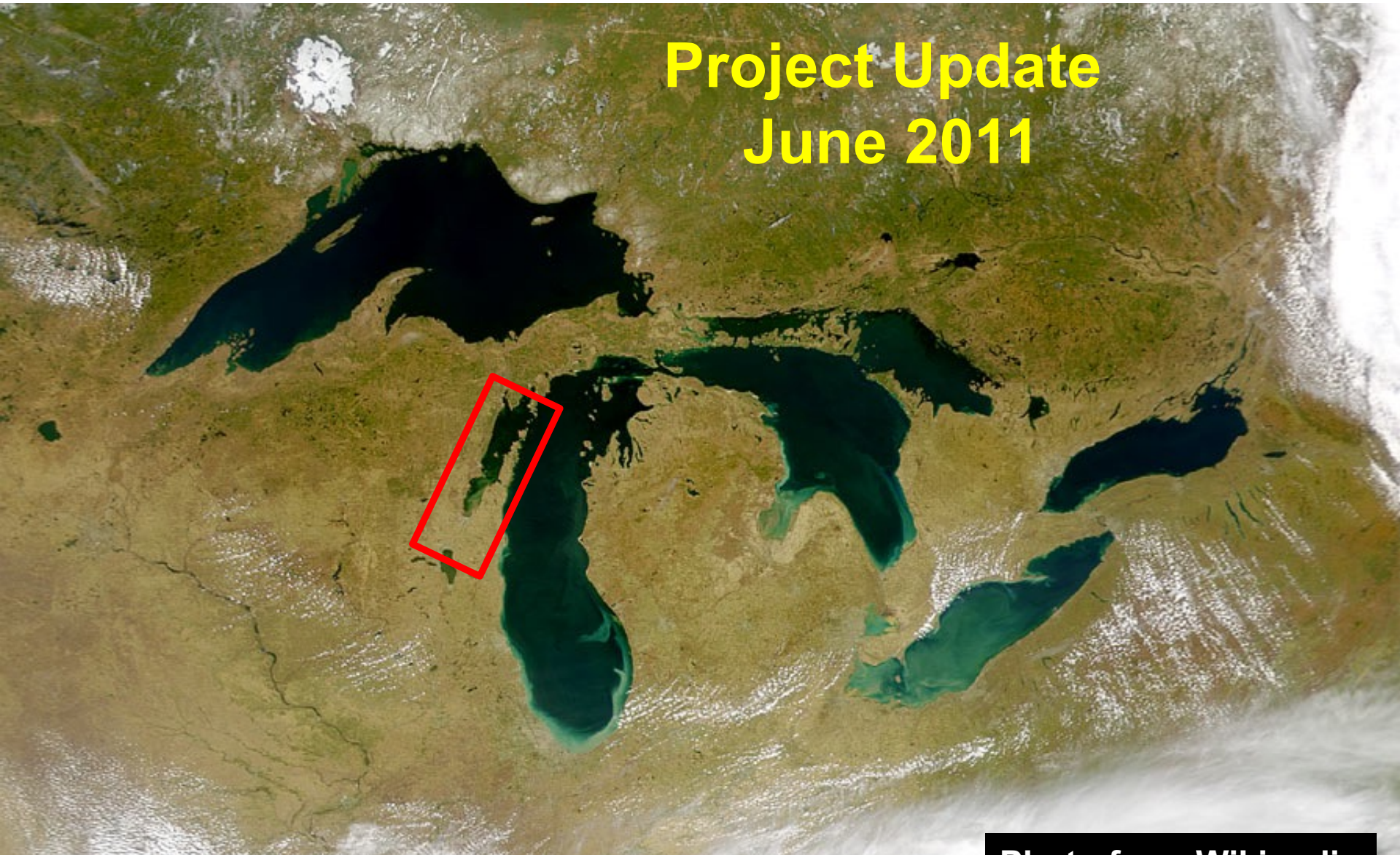
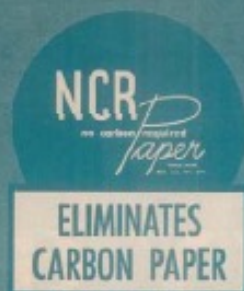


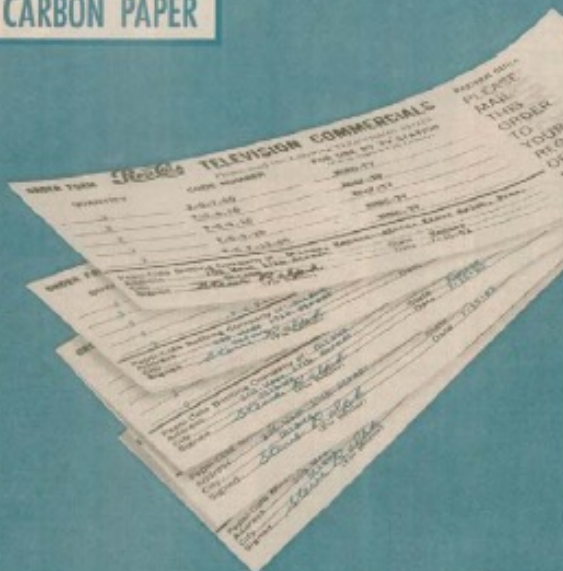
Photo from Wikipedia

Fox River PCB Remedy

- **Largest environmental sediment cleanup ever done: 8 million cubic yards dredged, capped or covered**
- **\$800 million cleanup cost**
- **Major risk driver: PCBs in fish**



"FOR THOSE WHO THINK YOUNG"



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saves us its total annual cost ... every six months."**

— PEPSI-COLA COMPANY, New York, N. Y.

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"All these advantages have money values. Thus, we estimate NCR Paper saves us its total annual cost, every six months, giving us a 200% annual return on our investment.

Herbert L. Barnett
Herbert L. Barnett, President

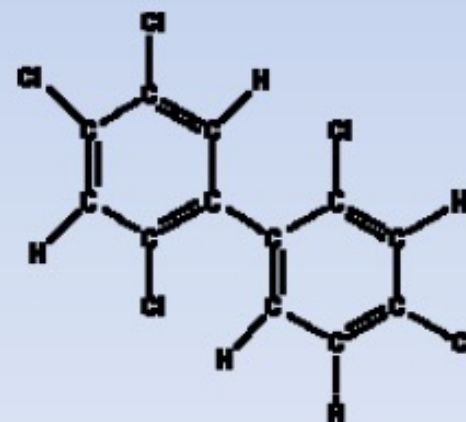
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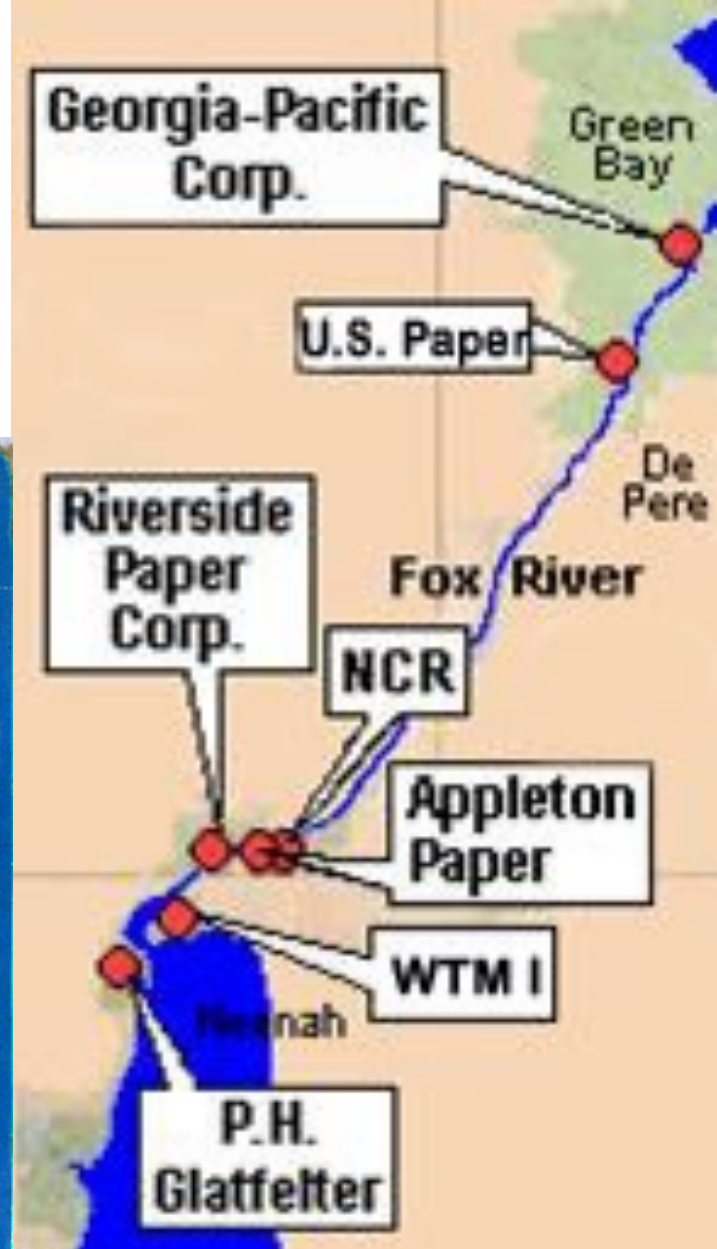
Site Background

Between 1954 and 1971, NCR Corporation and Appleton Papers sold carbonless copy paper made with polychlorinated biphenyls (PCBs).



2,2',4,4',5-Pentachlorobiphenyl

PCB Sources (1954 – 1971)



Modified from Green
Bay Press Gazette

Paper mill pollution in Little Lake Butte des Morts in 1970

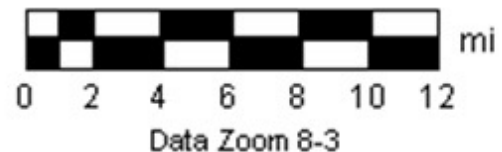
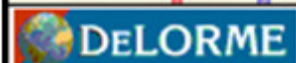
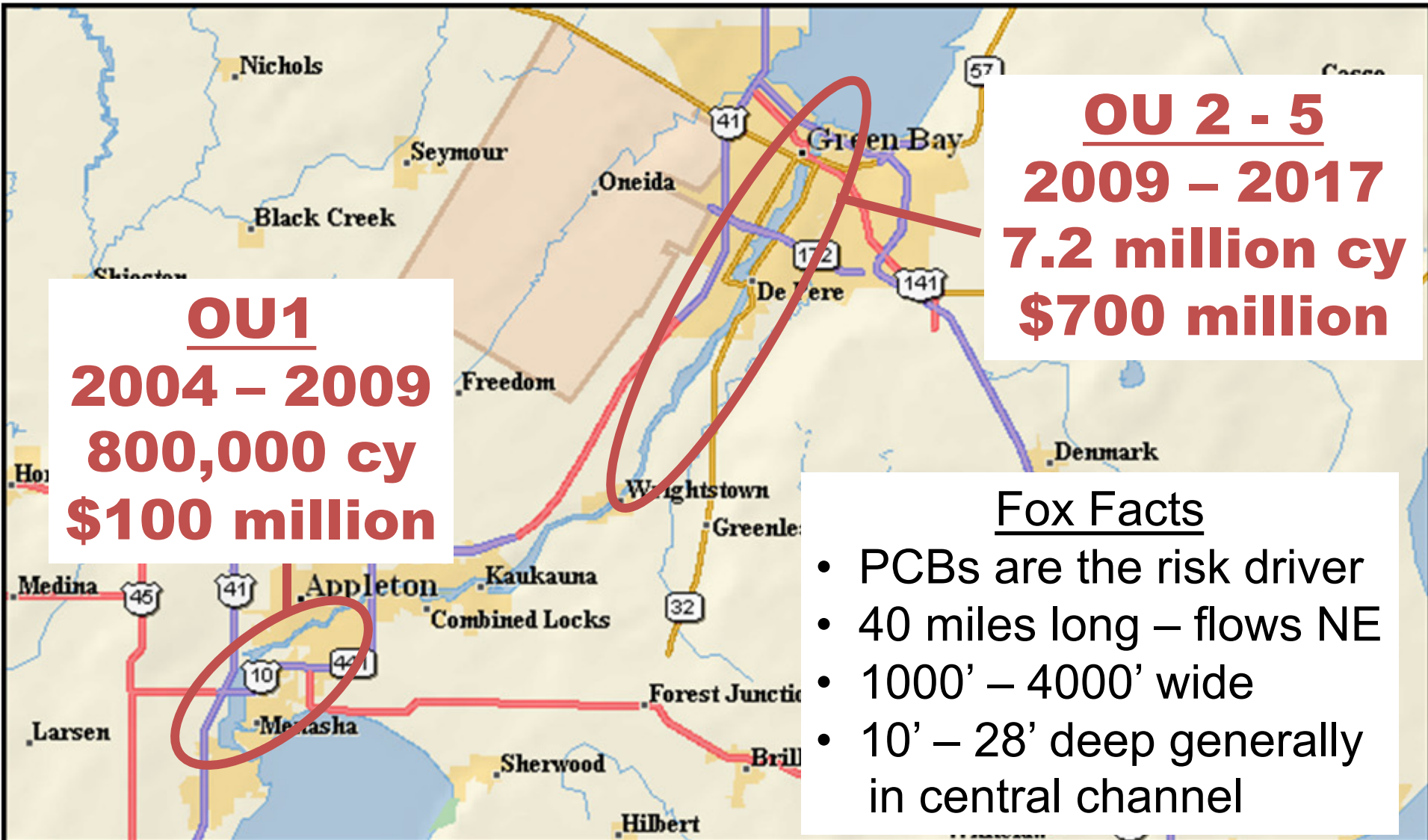


The PCBs in the polluted wastewater would stick to paper fibers and sediment on the bottom of the River and Green Bay



Fox River pollution entering Green Bay in 1969

Fox River Remedy



Fish Advisories



Black Crappie



Bluegill



Brown Trout



Carp



Channel Catfish



Chinook Salmon



Northern Pike



Rock Bass



Rainbow Trout



Smallmouth Bass



Splake



Sturgeon



Walleye



White Bass



White Fish



White Sucker



White Perch



Yellow Perch

PCB HEALTH ADVISORY

for Fox River-downstream from DePeri Dam

*Minimum size for Smallmouth Bass = 14 inches

Enjoy your day of fishing and have a tasty, healthy meal of fresh-water fish. For the health of your kids, please follow this health advice. Eat the following fish with caution from this water. These fish contain PCBs.

1) Eat no more than 1 meal per week (52 meals per year) of...

_____	_____	_____
_____	_____	_____
_____	_____	_____

2) Eat no more than one meal per month (12 meals per year) of...

<u>Walleye under 14 inches</u>	<u>Bluegill</u>
<u>Northern Pike under 25 inches</u>	<u>Rock Bass</u>
<u>Black Crappie under 9 inches</u>	<u>Yellow Perch</u>
<u>Sheepshead under 10 inches</u>	

3) Eat no more than one meal every two months (6 meals per year) of...

<u>Walleye 14-22 inches</u>	* <u>Smallmouth Bass</u>
<u>Northern Pike above 25 inches</u>	<u>White Perch</u>
<u>Black Crappie above 9 inches</u>	
<u>Sheepshead 10-13 inches</u>	

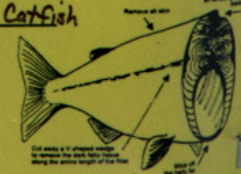
4) DO NOT EAT...

<u>Walleye above 22 inches</u>	<u>White Bass</u>
<u>Sheepshead above 13 inches</u>	
<u>Carp</u>	<u>Channel Catfish</u>

When preparing fish from these waters, remove the skin and all fat before cooking. Do not use juices from the cooked meat.

See your fishing regulations book for legal size limits.

Recommended by the Wisconsin Department of Natural Resources and the Division of Public Health. Call the local DNR office 920-492-5500 for a copy of the state-wide advisory.



Fox River Green Bay Fishers

- ~50,000 fishers
- 2,000-5,000 eat Fox River & Green Bay fish



PCB Costs

- Clean up: nearly a billion dollars
- Affects:
 1. Fishing
 2. Tourism
 3. Shipping
 4. Human health
 5. Ecosystem
 6. Lake Michigan

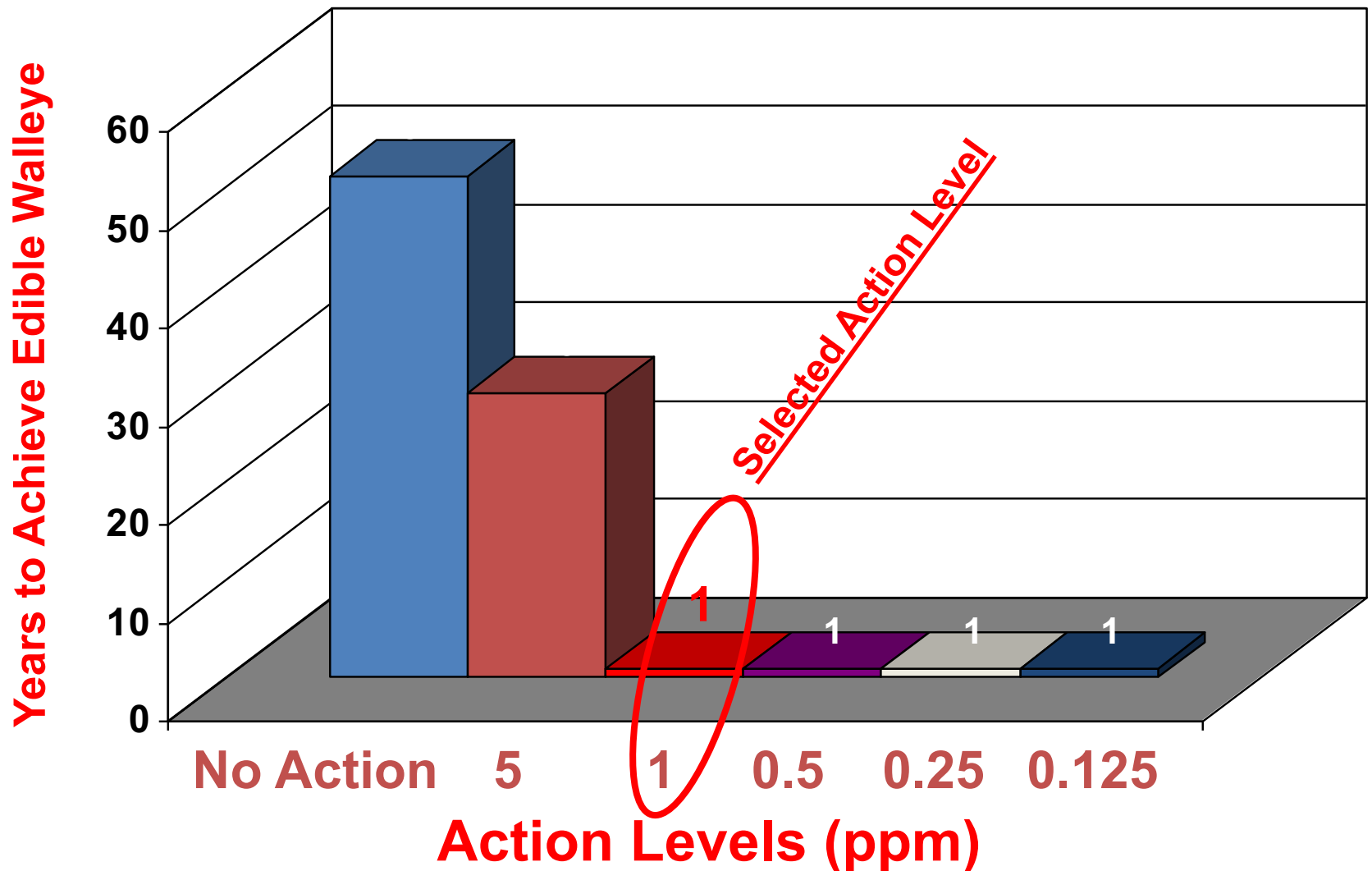


Cleanup Progress

- PCB Action Level of 1 ppm - average surface concentration goal of 0.25 ppm
- Upriver cleanup started in 2004
- Downriver cleanup to be completed by 2017
- 2.2 million cubic yards dredged, capped or covered to-date
- 5.8 million cubic yards remaining

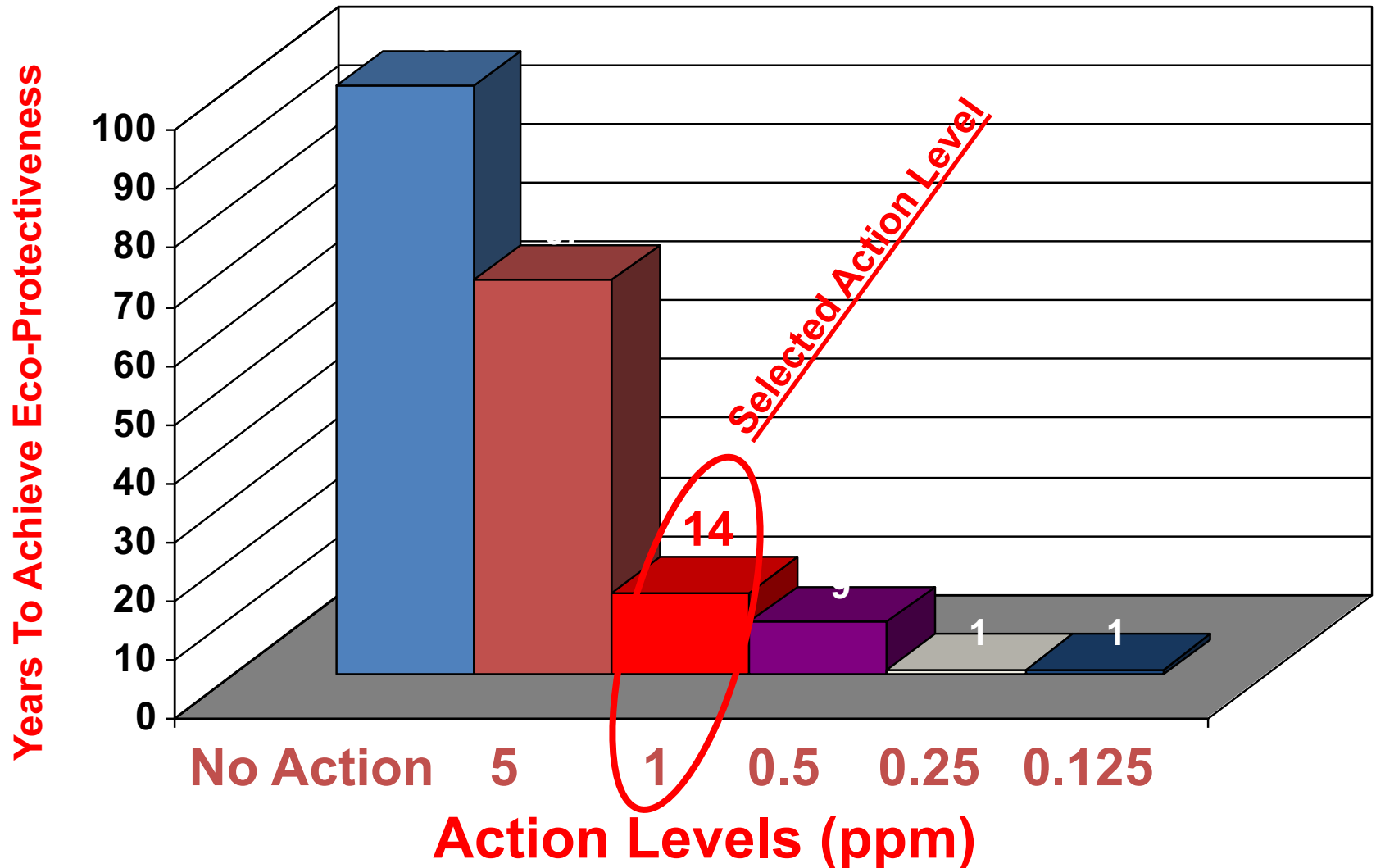
Basis for Human Fish Consumption Action Level

Little Lake Butte des Morts

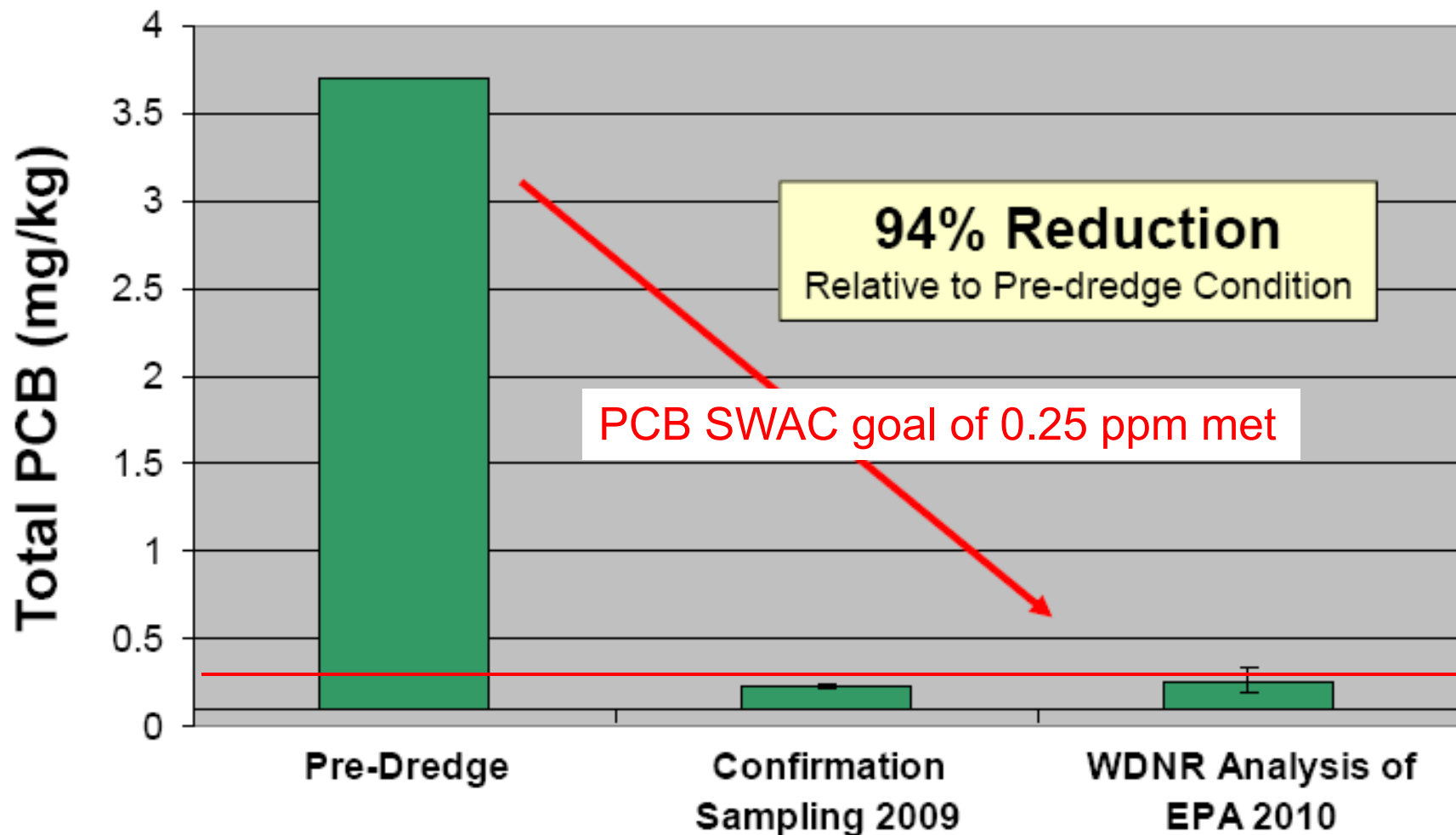


Basis For Ecological Action Level Selection

Little Lake Butte des Morts

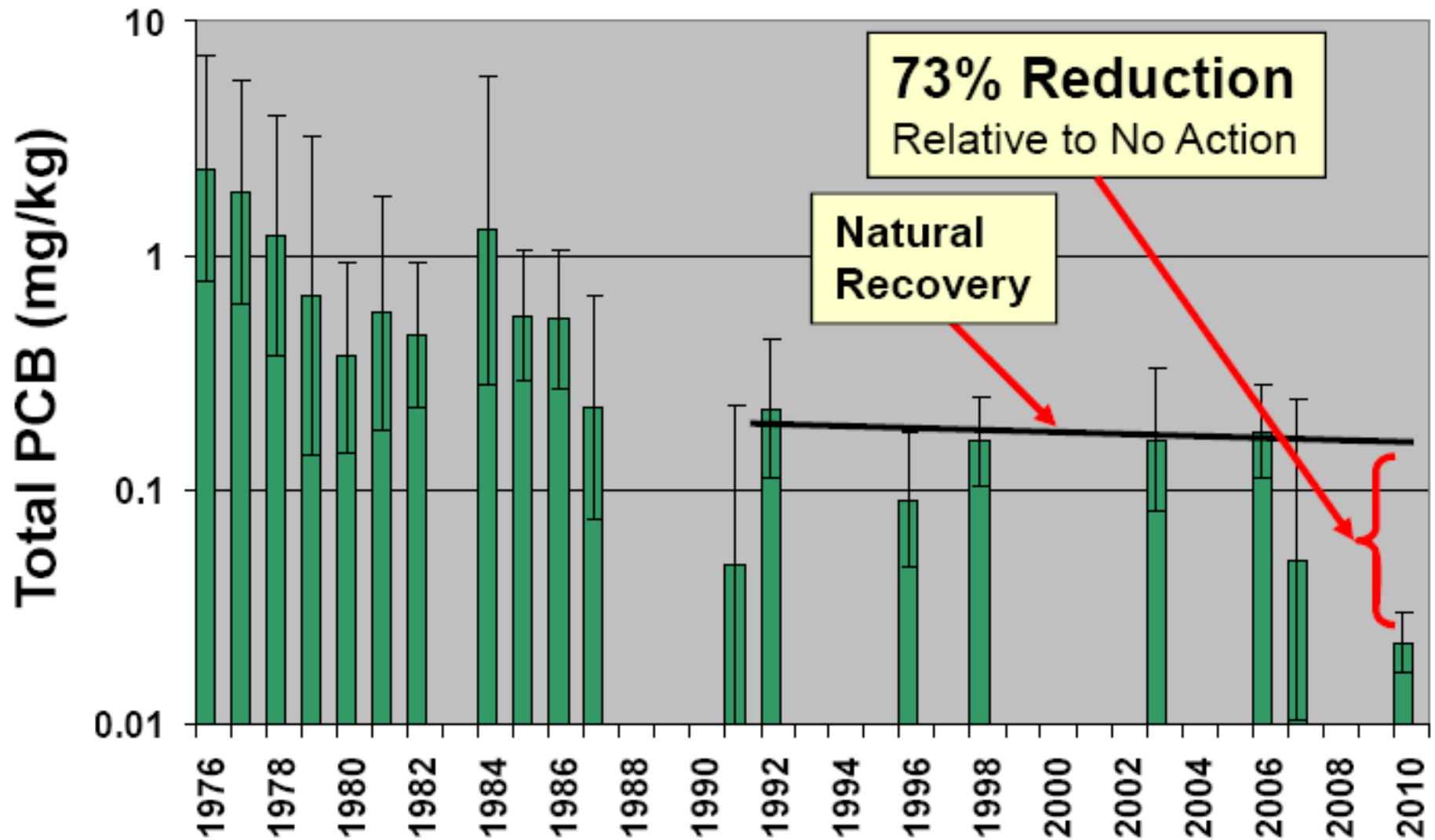


Total PCB Concentration in Surface Sediments Little Lake Buttes Des Morts, WI



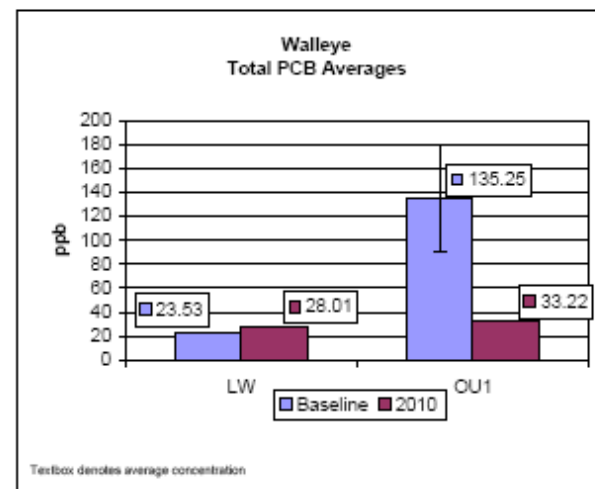
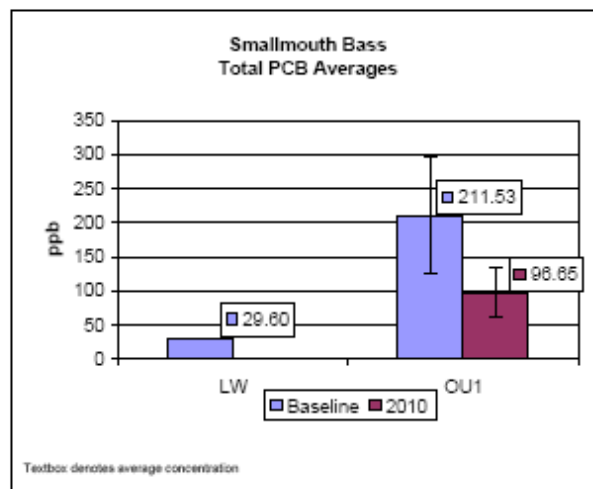
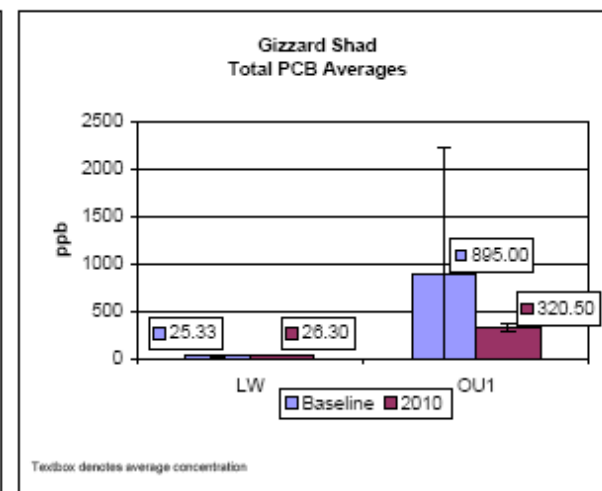
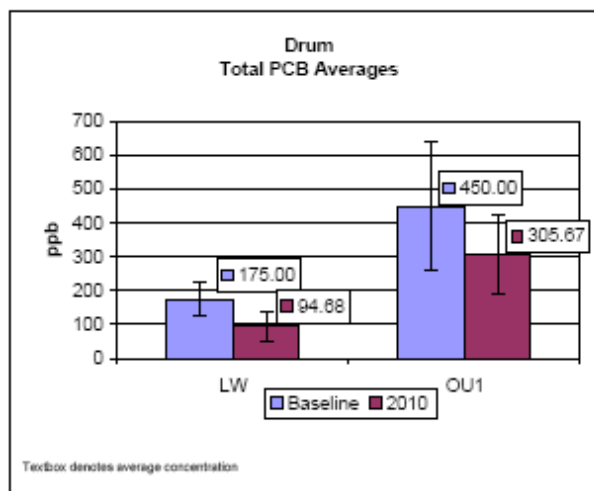
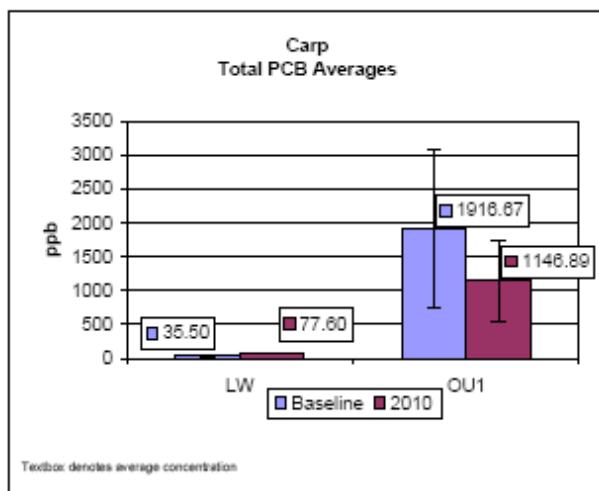
From: Boldt oversight team

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




* a.k.a.: upper river

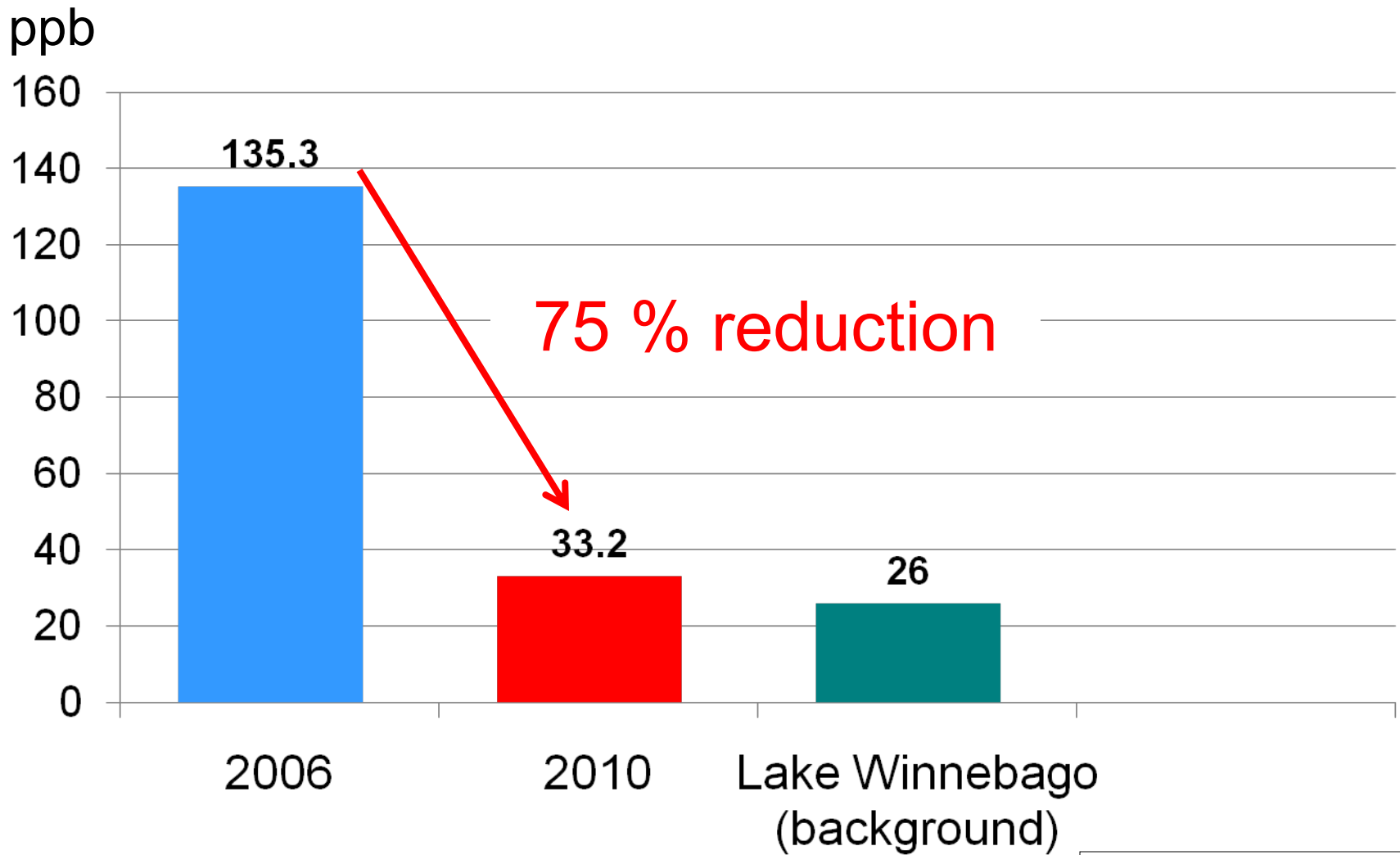
From: Boldt oversight team



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

GW Partners	
Figure 4-2	
Fish Average Concentrations and 95% Confidence Intervals	
SCALE: NTS	PROJECT ID: 10g007
Date: 04-18-11	
PREPARED BY:SGL	
CHECKED BY:JBM	
FIG 4-2	

Upper River PCB Walleye Concentrations* (Parts Per Billion [ppb])



* Preliminary data

Local Economic Benefits

PCB removal dredges up work for local companies

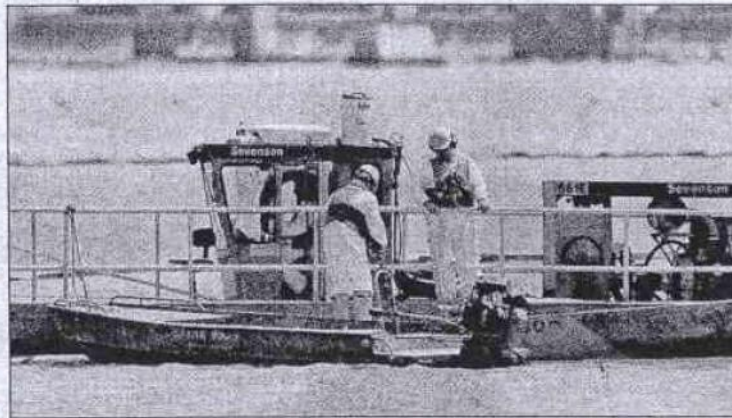
River project has generated state, regional revenue

BY TONY WALTER

twalter@greenbaypressgazette.com

The negative environmental impact of PCBs in the Fox River is providing a positive economic result for many local companies.

The 10-year project that includes removing polychlorinated biphenyl sediment from the Lower Fox, treating it in a process plant under construction, and hauling it to a Calumet County landfill has resulted in \$200 million in contracts to local, regional



Fox River PCB cleanup site workers float on a dredging barge offshore from Fort Howard Avenue in De Pere. **File/Press-Gazette**

and state companies, project officials say.

"We definitely wanted to hire local companies," said Ray Mangrum, project manager for Tetra Tech, the company in charge of the river cleanup project.

"We just bid it out to locals."

Tetra Tech is supervising construction of a 247,800-square-foot processing facility on the river.

More online

For archived coverage, go to www.greenbaypressgazette.com/foxrivercleanup.

cific Corp.'s Broadway plant. Dredging of almost 4 million cubic yards of PCB-contaminated sediment is scheduled to begin in May south of the De Pere dam and eventually cover the river portions north of the dam to the bay.

It will be the largest PCB river remediation project in the world and is estimated to cost about \$600 million, although the paper mills responsible for dumping the PCBs — a waste material from the production of carbonless

countability.

The processing center is the first of its kind, something Mangrum said he designed on a napkin.

"Everybody in the world with a major sediment project will come here to see what's going on," said Stephen McGee, project coordinator for Tetra Tech.

They will see that the majority of the work is being provided by local companies and laborers. Mangrum said there will be about 140 workers on site through the winter and 85 to 100 working at the center when it becomes operational.

"I've worked all over the U.S. and these are the best

Feb. 2008 Green Bay Press Gazette

- \$300 million+ contracts with local, state, & regional companies
- 140 jobs for initial construction & 85-100 ongoing (most local)

Additional Local Benefits

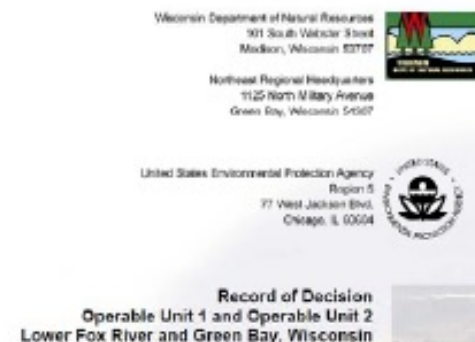
- **Contractors spending**
 - Hotels and restaurants
 - Local supplies
 - Home purchases, etc.
- **River improvement**
 - Tourism
 - Recreational

Status of the Cleanup

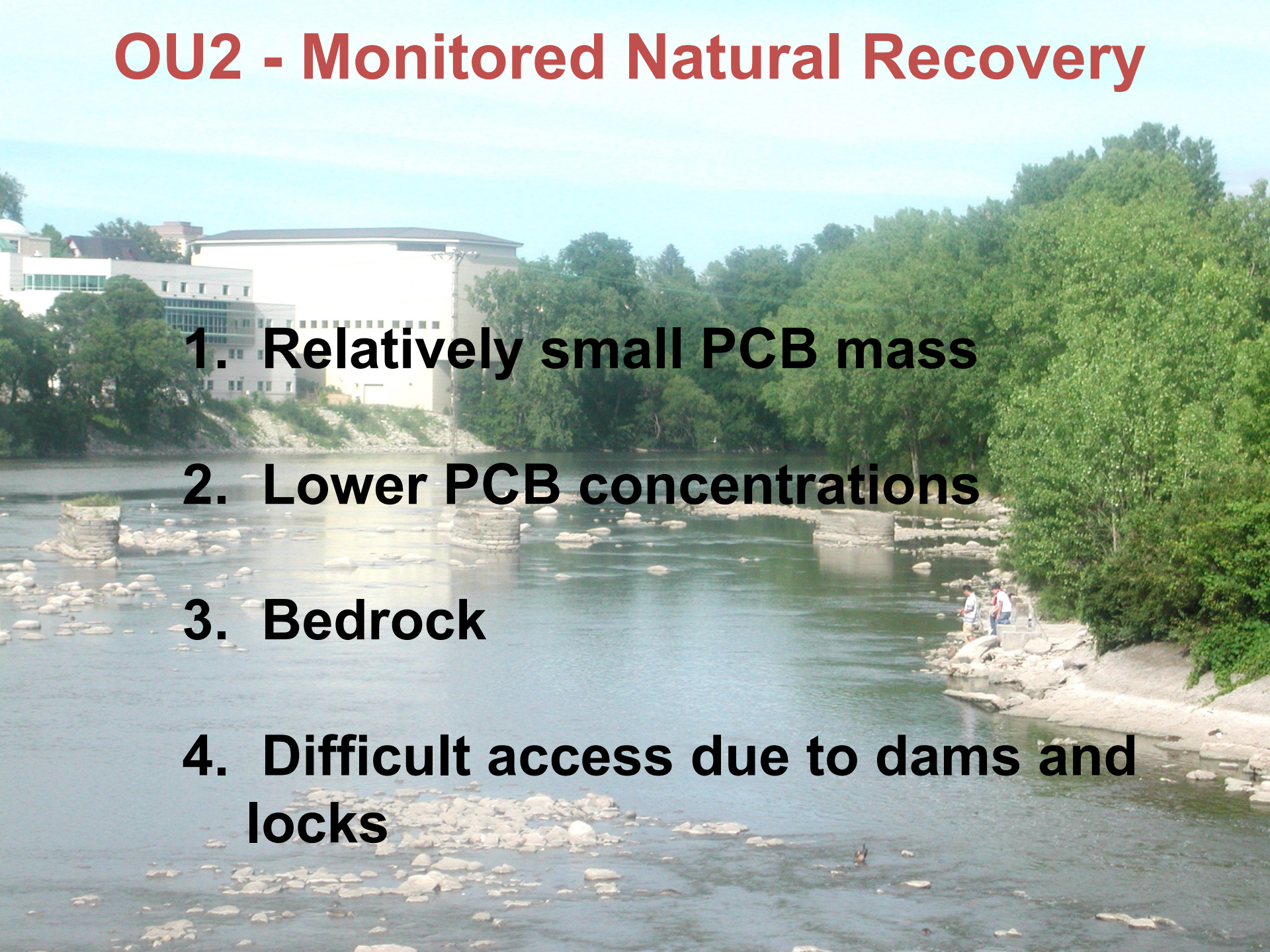
EPA and DNR have issued a set of joint cleanup decisions for the Site

About 4 million cubic yards of PCB-contaminated sediment will be dredged from the River

In other areas, the contamination will be contained in-place with engineered caps

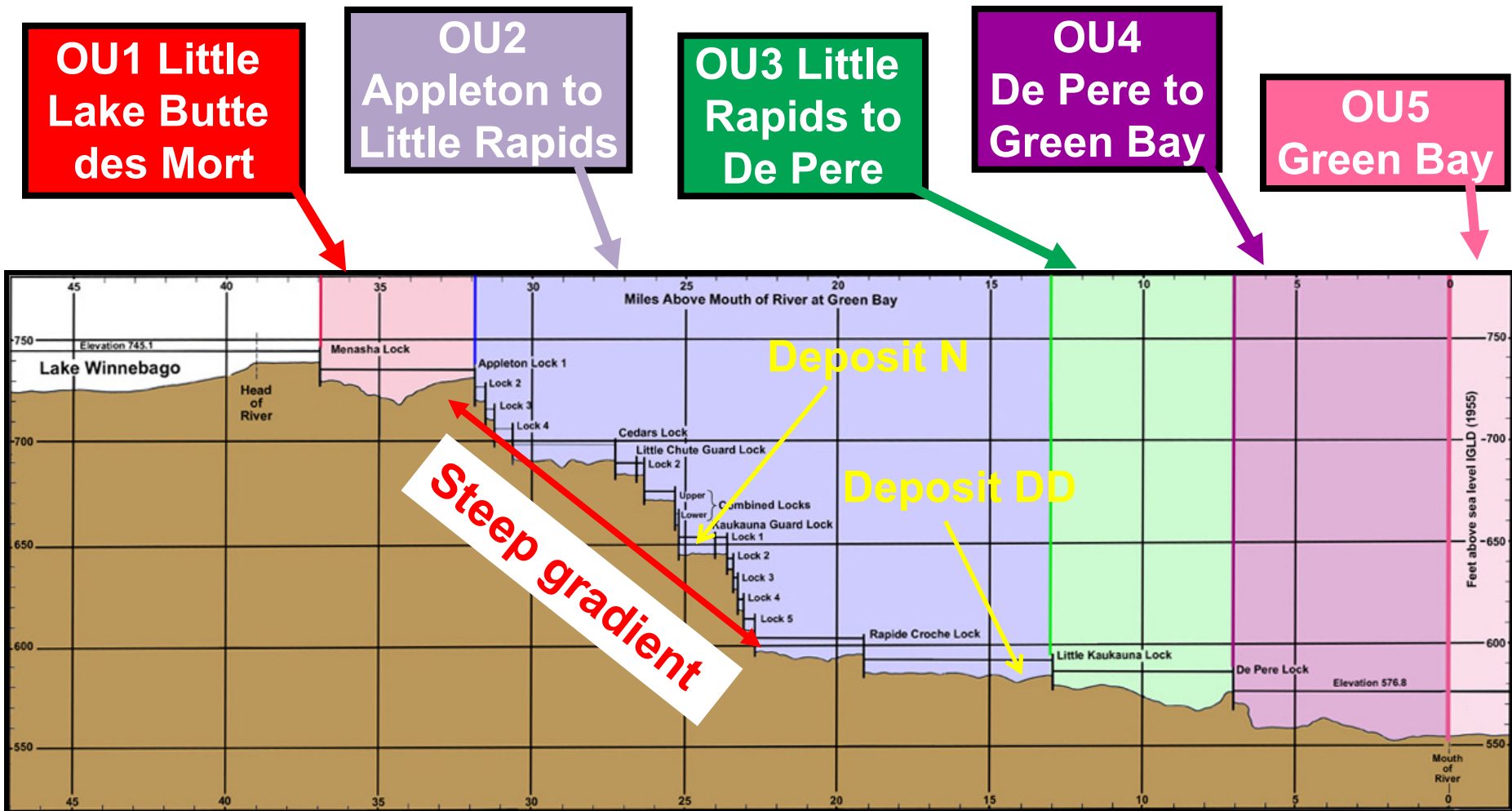


OU2 - Monitored Natural Recovery

- 1. Relatively small PCB mass**
 - 2. Lower PCB concentrations**
 - 3. Bedrock**
 - 4. Difficult access due to dams and locks**
- 
- The background image shows a wide river with a rocky bed. On the left bank, there is a large, modern white building with a curved roof. The right bank is covered in dense green trees. In the middle of the river, there are several stone structures that appear to be remnants of a dam or lock system. Two people are standing on the rocky shore on the right side of the river.

Lower Fox River Profile

High gradient + faster current = less deposition in OU 2



Changes To Original Plans

2002/2003

RODs

Dredging
with capping contingency

2007/2008 ROD

Amendments

Dredging

Capping

Sand covering

Cap monitoring &
maintenance

1 ppm PCB Action level unchanged

Fixing The Problem...

1) Dredging & disposal



2) Capping & Covering



Little Lake Butte des Morts



Photo from Ann Schell

Fox River Overview

Operable Unit	Start date	Completion date	Volumes addressed
OU 1	2004	2009	800,000
OU's 2-5	2007	2017	7,200,000
TOTAL	-----		8,000,000

2004 – 2008 OU 1 Dredging

Dredging



Dewatering (geotextile tubes)



Loading



Disposal



Photos courtesy of Boldt

“Spreading Armor Stone”



Photo courtesy of Boldt oversight team

Long-term Monitoring and Maintenance

- Surface water and fish monitoring
- Caps
 - Hydrographic surveys and cores
 - Evaluate physical integrity and chemical and containment
 - Maintenance if cap degraded
- Institutional controls



Cores To Verify Cap Construction Standards Are Met

1-RA-08-SP-A-4 N-6"-RS

Sand cover

Sediment

Dewatering And Sediment Treatment Facility



Plate And Frame Presses To Dewater Dredge Slurry



Photo courtesy of Boldt

Loading Sediment



Disposal

Photo courtesy of Boldt

Sediment Disposal



Photo courtesy of Boldt

Fox River ESD Feb 2010

- **Documented \$267 million cleanup cost increase**
- **No fundamental change to the scope of the cleanup**
- **No fundamental change to sediment cleanup levels**
- **No fundamental change to methods used to perform the cleanup**

Major Cost Increases

Cost category	Cost Increase	Reason(s)
Design and Infrastructure	\$71 million	Building needs, bulkhead buildout, sand removal system, insurance costs
Caps	\$83 million	Time and materials cost increases, overplacement needs
Mob and Demob	\$29 million	Generally underestimated previously
Non-TSCA Dredging, Dewatering, Transportation & Disposal	\$38 million	Greater tonnage than previously estimated
Shoreline caps	\$5 million	Labor and materials costs previously underestimated
Residual dredging	\$24 million	Not originally considered in previous costs
Long-term monitoring	\$5 million	Baseline monitoring indicated greater costs
Site support	\$43 million	Need for larger dewatering facility, including staffing and equipment needs
TOTAL	\$269 million	Note: considers <u>all</u> costs, including some decreases (see ESD, Table 5 for details)

Natural Resource Damage Compensation

- 110 projects funded (40 completed)
 - Land acquisition
 - Stream and wetland restoration
 - Land acquisition
 - Fish hatcheries
 - Public use
- \$58 million spent to-date
 - \$36 million by Potentially Responsible Parties
 - \$22 million by governmental parties



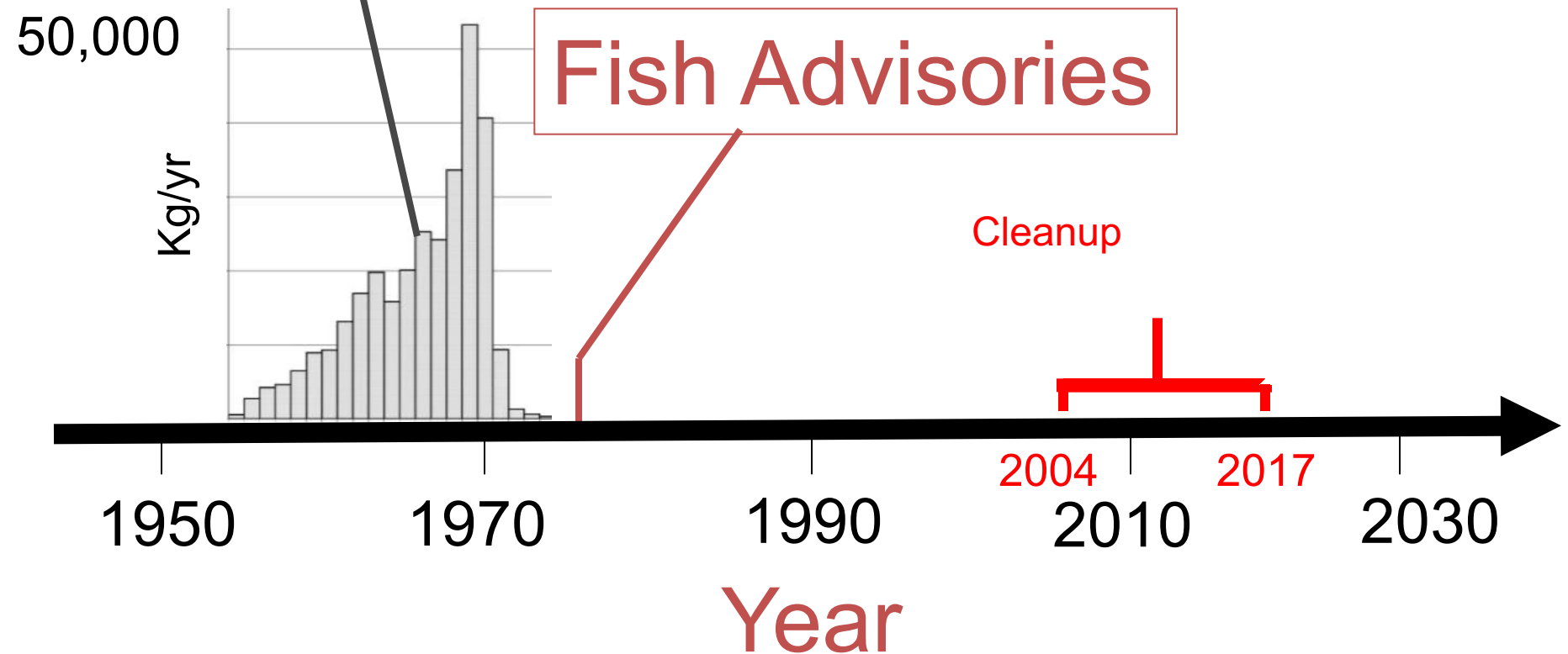
Cleanup Progress – Fox River

Year	OU 1		OU 2 - 5	
	Dredged	Capped	Dredged	Capped
2004	16,000 cy	----	----	----
2005	88,000 cy	----	----	----
2006	102,000 cy	----	----	----
2007	122,000 cy	----	132,000 cy	----
2008	42,000 cy	79 acres	----	----
2009	----	115 acres	544,000 cy	7 acres
2010	----	----	731,000 cy	----

Note: thin caps not included

Timeline

PCB discharges*



* From: WDNR, 1999, Technical Memorandum 2d (Figure 9)

Questions/Discussion

