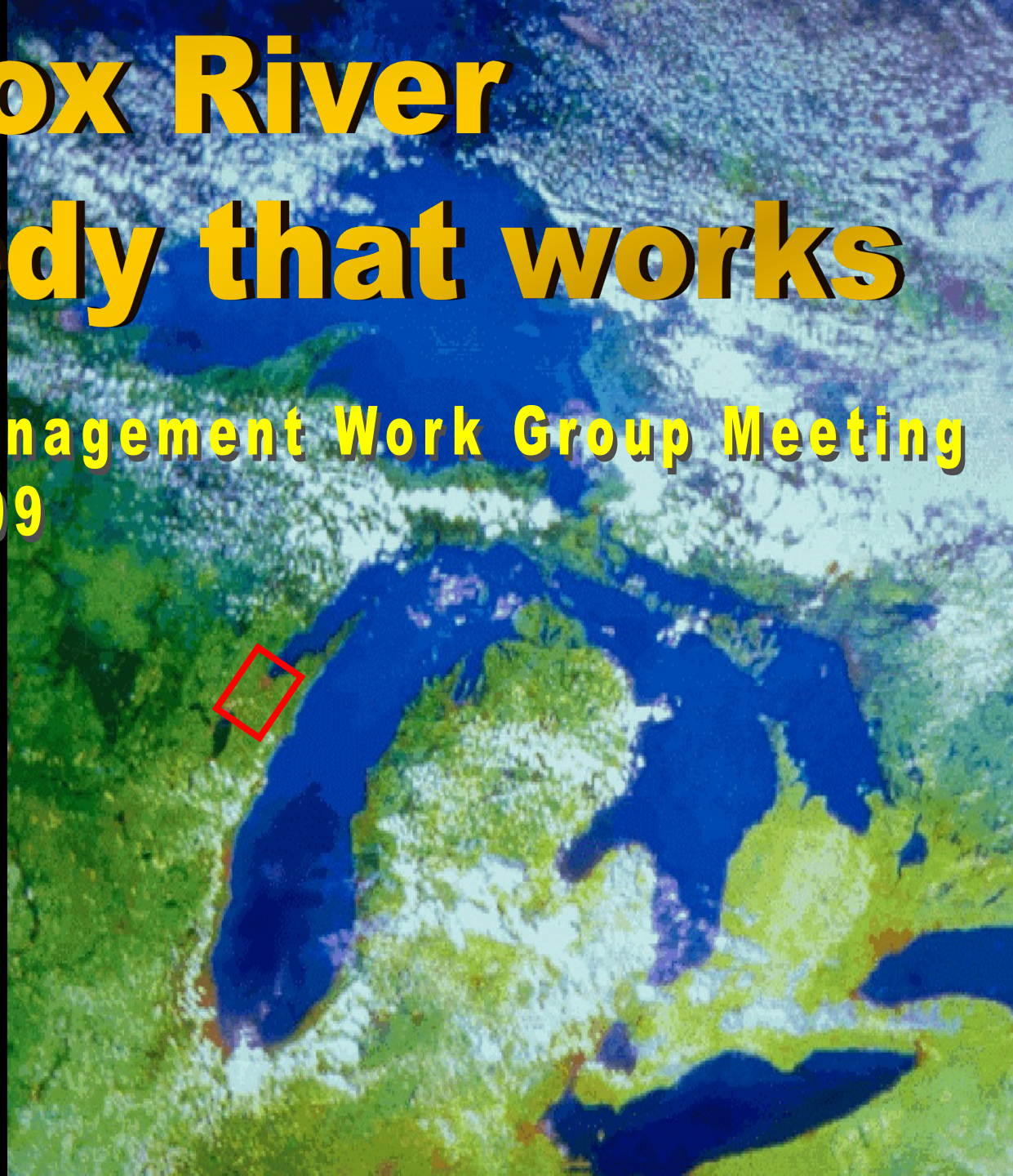
Fox River
A remedy that works

Sediment Management Work Group Meeting
April 28, 2009

Paul Montney
Georgia Pacific

James Hahnenberg
U.S. EPA



What?

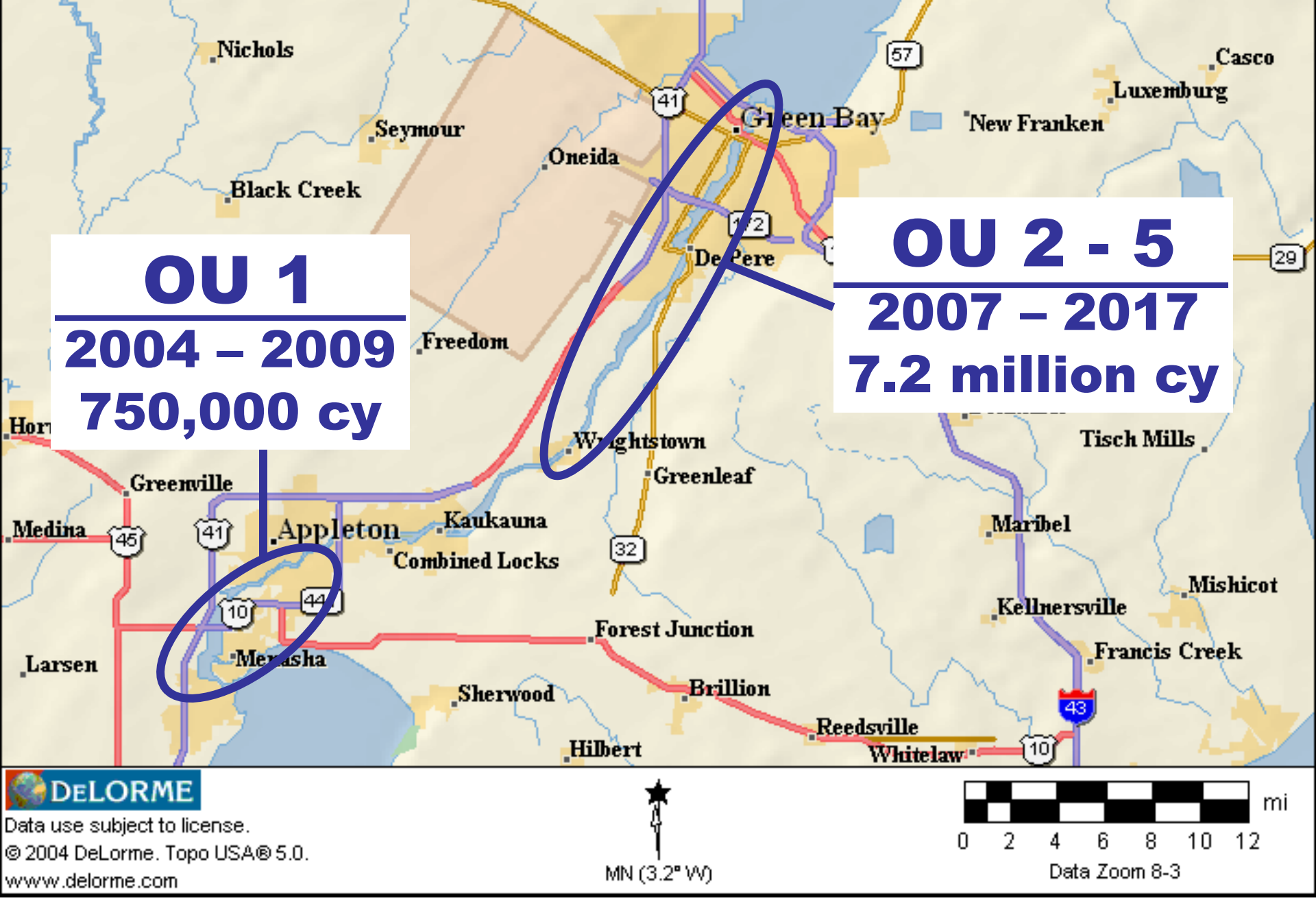
- The “team”
- Combination remedy
- Monitoring
- Issues

It takes a village...

		OU 1	OU 2 - 5
PRPS	Cooperating Companies	Glatfelter WTMI Menasha	API NCR GP
	Contractors	Brennan CH2MHILL Foth	Tetratech Brennan Boskalis-Dolman
Agencies		WDNR - EPA	
Agencies oversight		Boldt, NRT, etc.	

“Collaborative” process

- **Early & extensive Agency input into design**
- **Work Groups – empowerment**
- **Extraordinary effort but better, faster result**


OU 1
2004 – 2009
750,000 cy
OU 2 - 5
2007 – 2017
7.2 million cy
Nichols
Seymour
Black Creek
Oneida
Green Bay
New Franken
Casco
Luxemburg
De Pere
Freedom
Wrightstown
Greenleaf
Tisch Mills
Greenville
Medina
Appleton
Kaukauna
Combined Locks
Maribel
Mishicot
Kellnersville
Forest Junction
Francis Creek
Larsen
Menasha
Sherwood
Brillion
Reedsville
Hilbert
Whitelaw
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Progress

Operable Unit & Phase		Start date	Completion date	Volumes addressed (cubic yards
OU 1		**2004**	**2009**	**750,000**
OU 2 - 5	Phase 1	2007	2011	160,000
	Phase 2	2009	2017	7,040,000
TOTAL				7,950,000

Final phase
2009 - 2017

Decisions

2002/2003
Decisions

Dredging/disposal
(with capping backup plan)

2007/2008
Decision Amendments

Dredging/disposal

Engineered caps

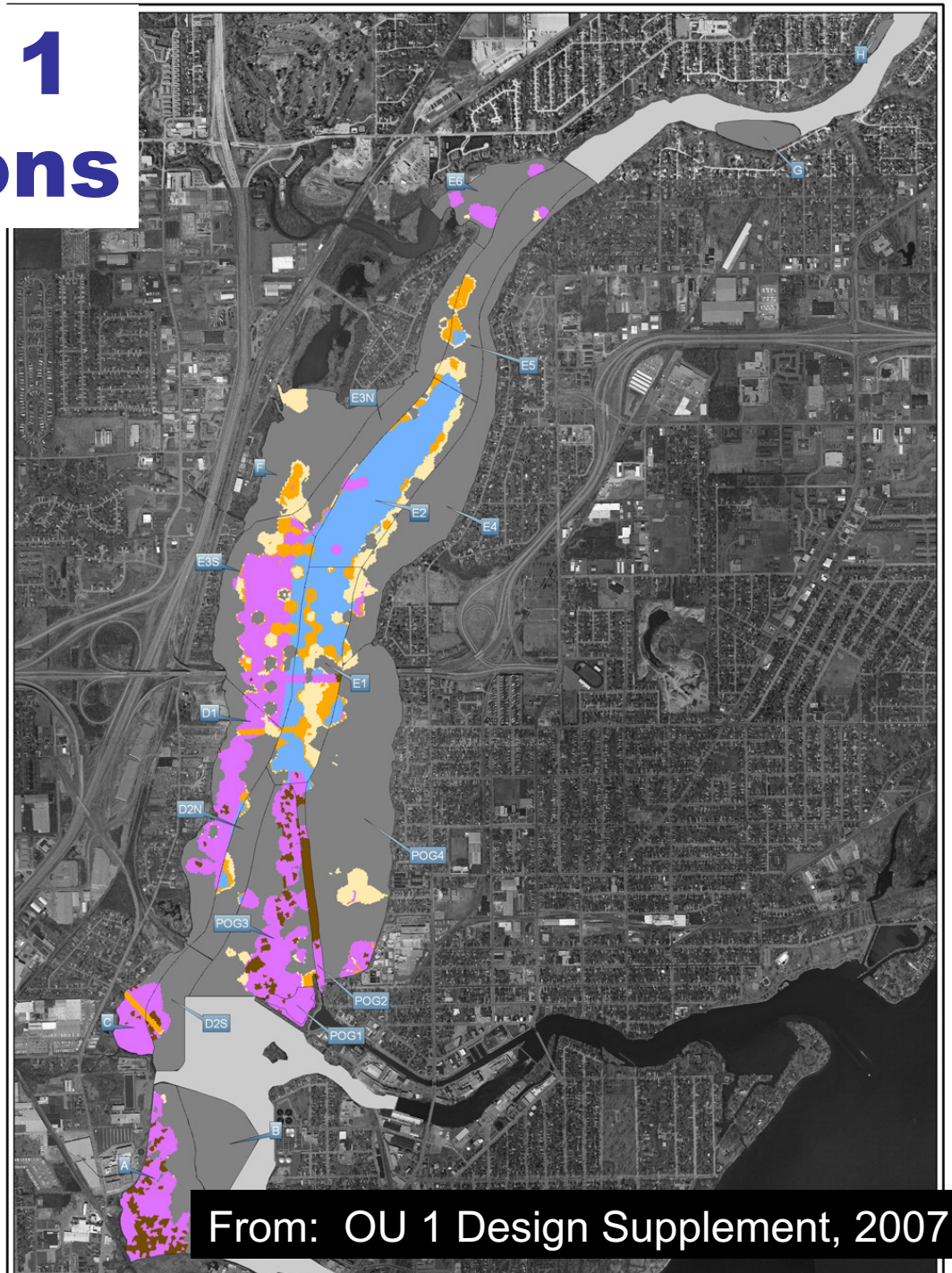
Sand covers

Long-term cap monitoring & maintenance

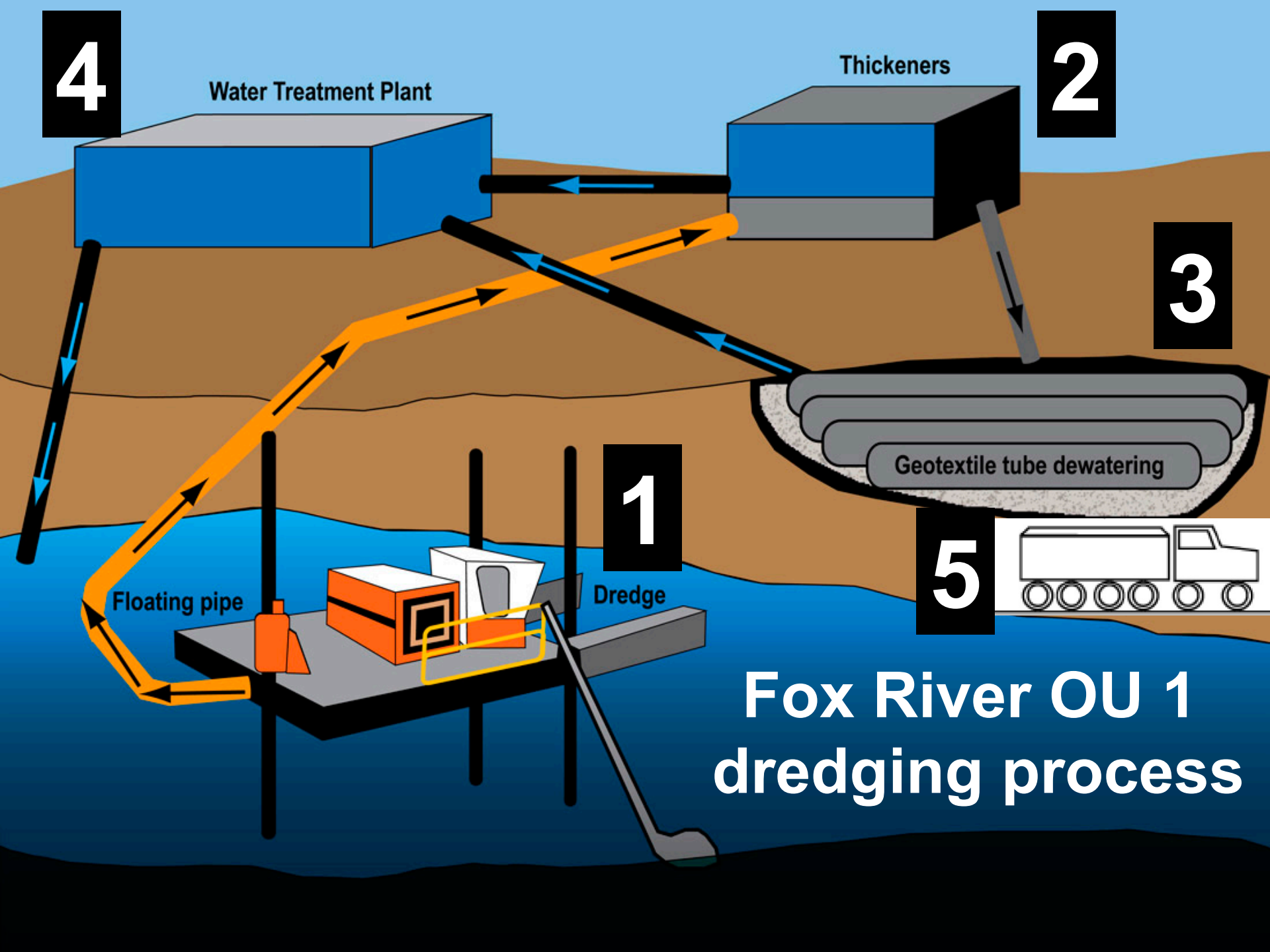
Fox River OU 1 remedial actions

Legend

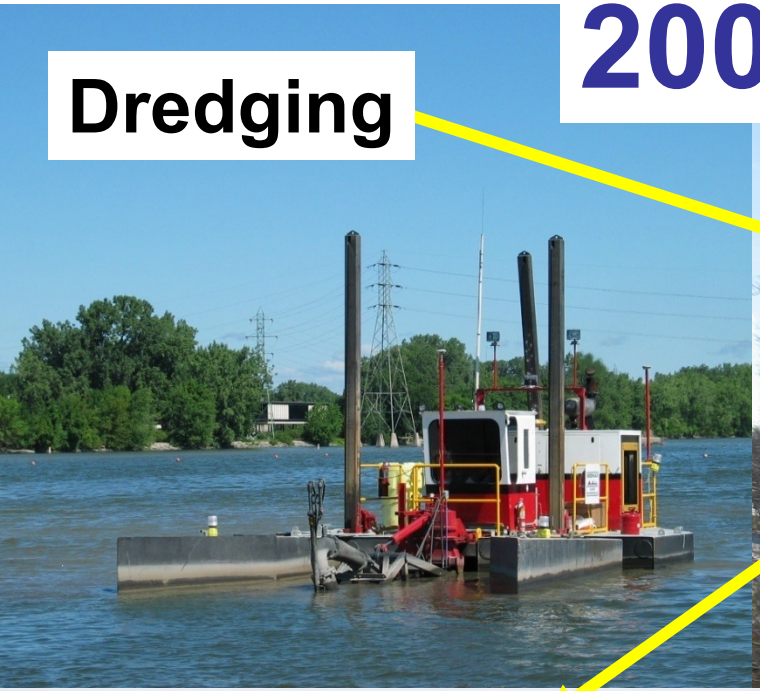
- Dredging
- Capping
- 3” 6” Sand cover



From: OU 1 Design Supplement, 2007


4
Water Treatment Plant
Thickeners
2
3
Geotextile tube dewatering
1
Floating pipe
Dredge
5
Fox River OU 1
dredging process

2004 – 2008 dredging



Engineered cap design

13” average

3” stone: operational & overplacement

4” stone: bioturbation & erosion protection

3” sand: operational & overplacement

3” sand: chemical isolation/operational/mixing layer

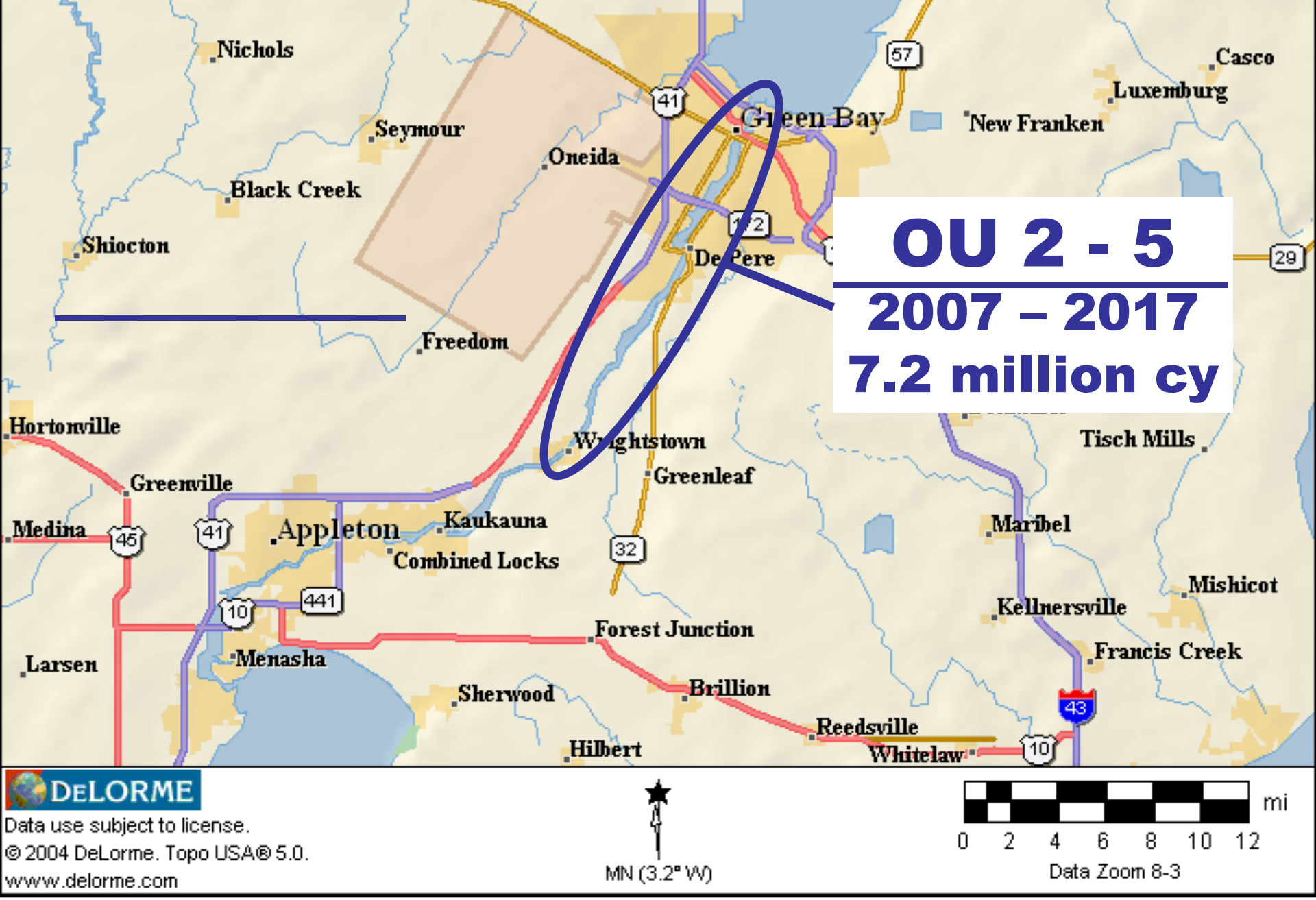
8” sediment: interface (PCBs 10 ppm)


“Throwing stone”
(cap armor stone)
Photo courtesy of Boldt

Cap armor stone thickness measurement devices

2009 - OU 1 complete

- 370,000 cy dredged
- 245,000 cy capped/covered over 214 acres (including 40 acres in 2009)
- Average surface PCB concentration goal of 0.25 ppm met (0.22 ppm predicted)


OU 2 - 5
2007 – 2017
7.2 million cy
Nichols
Seymour
Oneida
Black Creek
Shiocton
Freedom
Green Bay
New Franken
Casco
Luxemburg
De Pere
Wrightstown
Greenleaf
Tisch Mills
Hortonville
Greenville
Medina
Appleton
Kaukauna
Combined Locks
Maribel
Mishicot
Kellnersville
Francis Creek
Forest Junction
Larsen
Menasha
Sherwood
Brillion
Reedsville
Whitelaw
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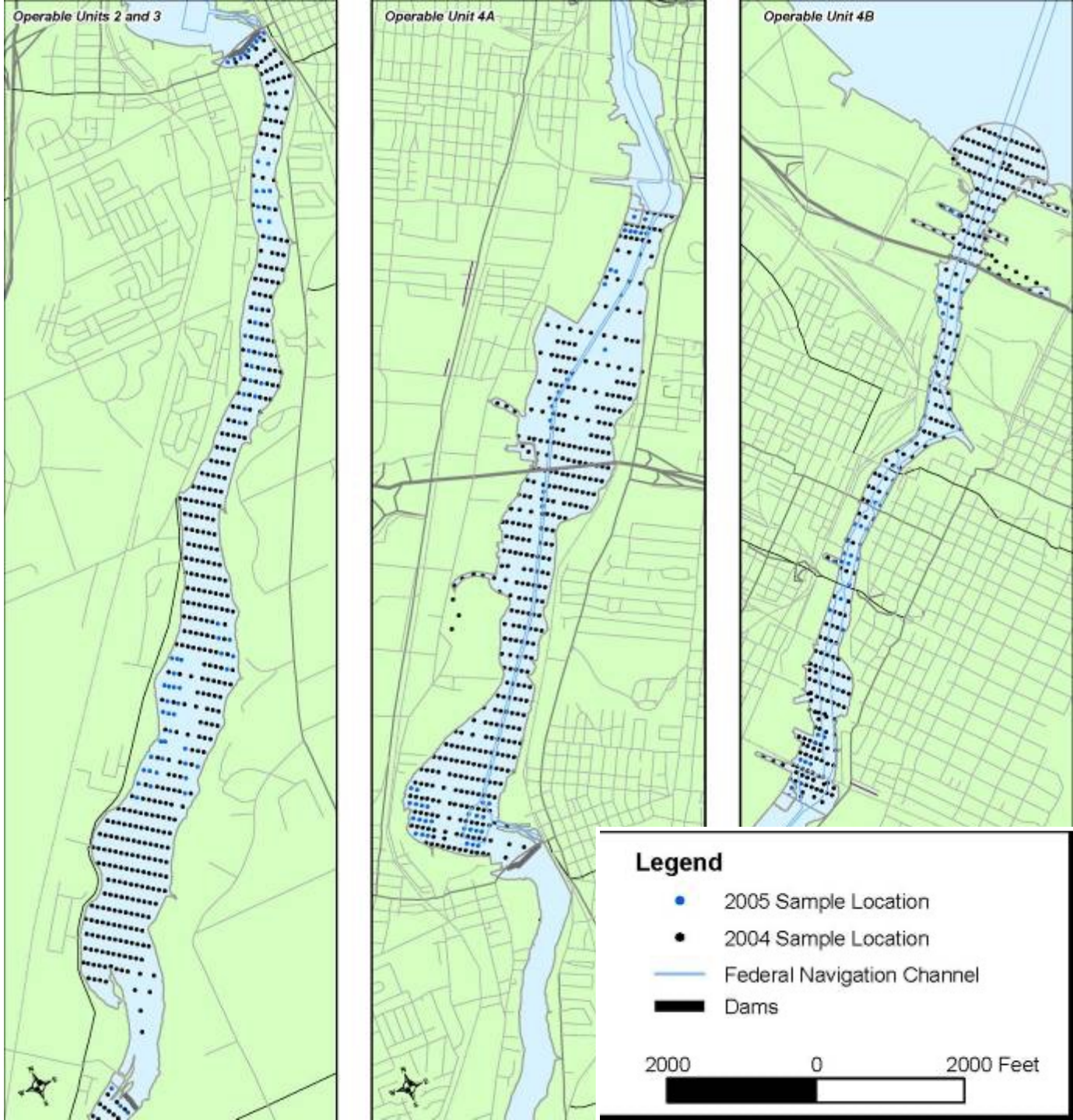
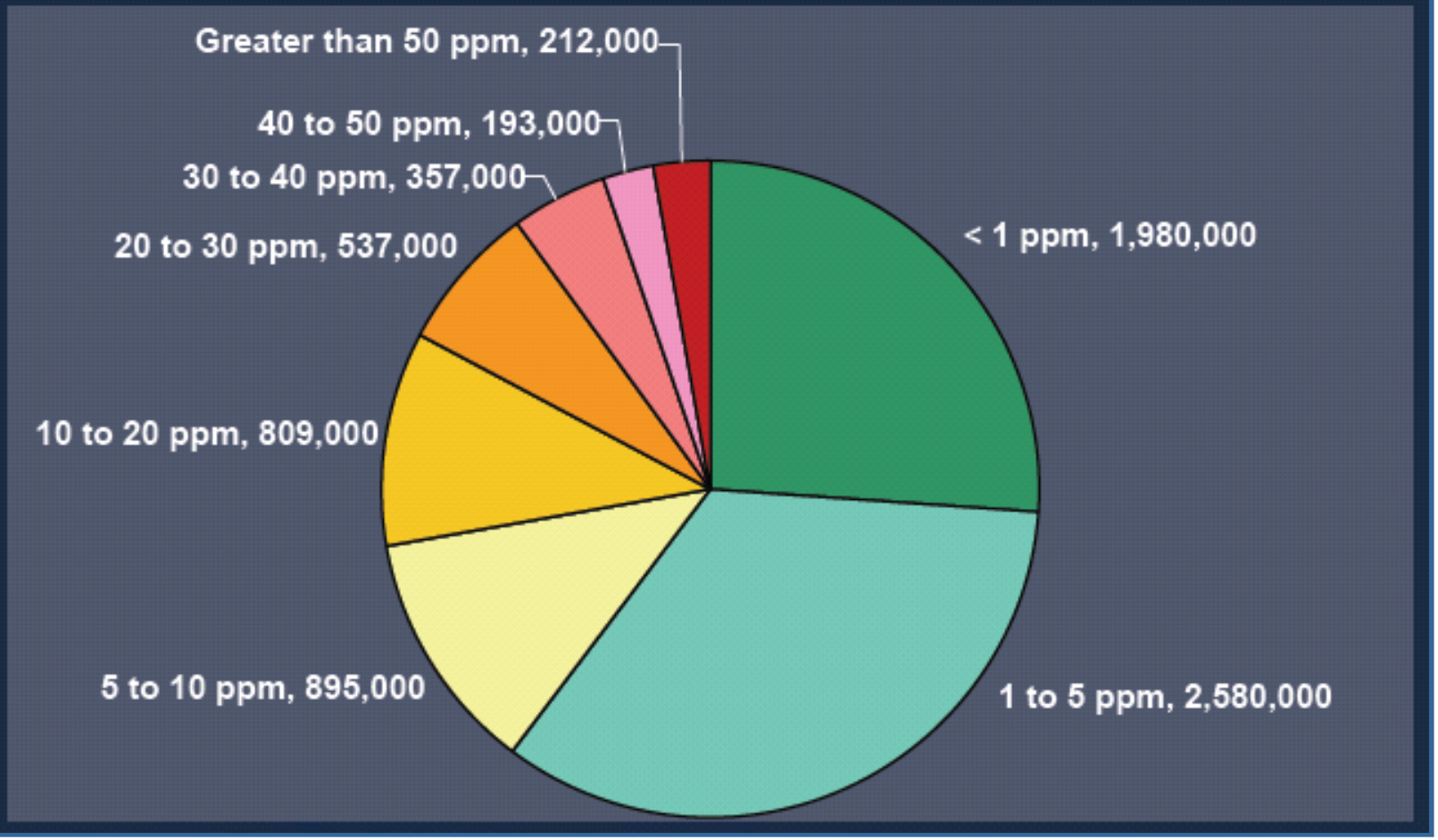
Extensive Core Sampling to Delineate PCBs (2004 & 2005 sampling)



PCB Levels in Dredge Prism

(values are estimated cubic yards of dredged sediment; 7.6 M cy total)



Basis for a Combined Remedy

- Intensive investigation and design work in 2004 and 2005 revealed new information to use in revising remedy
  - Some contaminated sediments are deeply buried beneath cleaner sediments
  - Several large areas have a relatively thin layer of sediments with 1-2 ppm PCBs

Basis for a Combined Remedy (cont.)

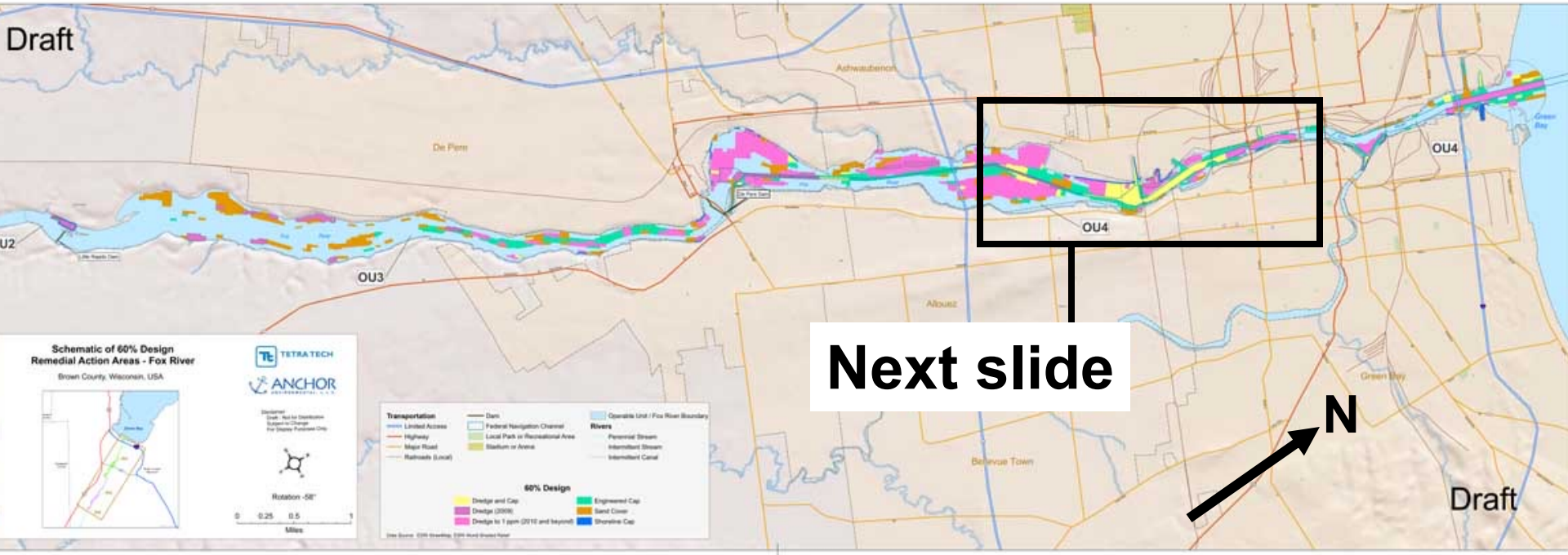
- Thick layers of sediment near some shoreline areas can't be dredged without undermining the shoreline

- "Hot spot" in OU-4 near De Pere Dam (NCR and US Paper early action)

Basis of Design Report Remedy Comparison

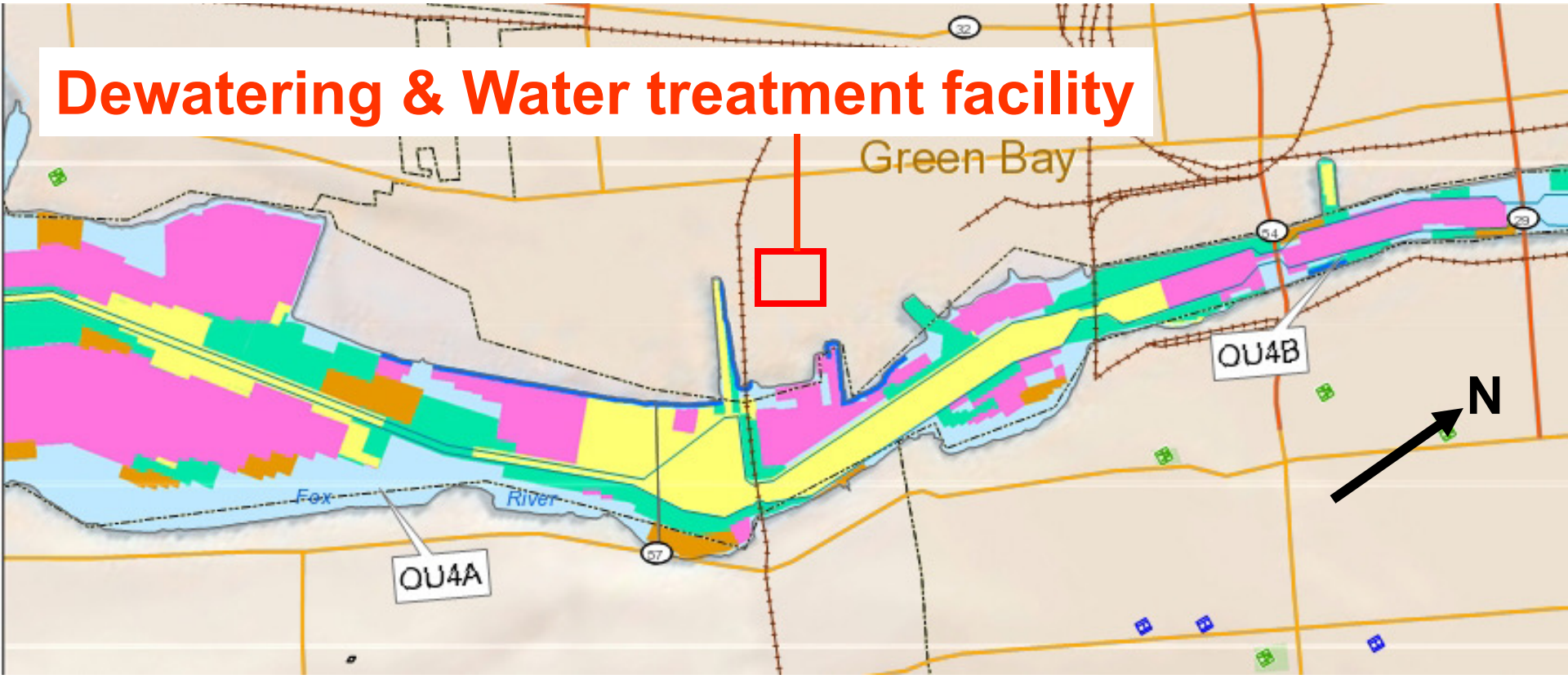
	ROD Remedy	Combined Remedy
SWAC (ppm)	0.25 – 0.26	0.25 – 0.26
Total PCB mass addressed	99%	99%
Near-surface PCB Mass removed	92%	92%
Total PCB mass removed	90%	74%
Dredge volume	7.6 mm cy	3.6 mm cy
Cap & cover volume	0.56 mm cy	1.05 mm cy
Estimated schedule	15 to 24 yrs	9 yrs

OU 2 - 5 planned remedial actions



Courtesy of Tetra Tech

OU 2 - 5 planned remedial actions



Dredging

Cap (sand and gravel)

Dredge and Cap

Cover (sand only)

Courtesy of Tetra Tech

OU 2 – 5 dewatering location before construction (2008)

Dewatering facility construction

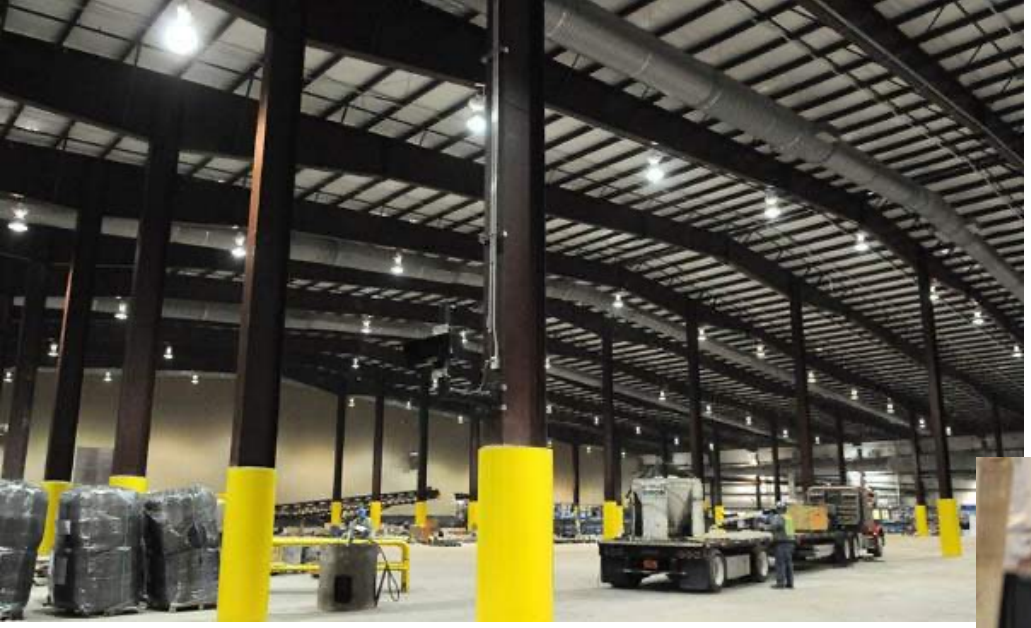
Dewatering and water treatment facility

Pre-thickener

Plate and frame presses

Photos courtesy of TetraTech

Plate and frame presses – OU 2 - 5



Filter cake storage area

Effluent pipeline

Air filters

Green Bay Press Gazette photos

Dredge cutterhead

Green Bay Press Gazette photo

Caps monitoring & maintenance

- Cores
- Geophysical surveys
- 30+ years

OU 2 - 5 cleanup schedule

Year	Dredging (cy's)	Capping/covering (acres)
2009	460,000	--
2010	660,000	37
2011	510,000	32
2012	660,000	43
2013	660,000	53
2014	610,000	66
2015	440,000	28
2016	--	25
2017	--	40

Breaking news: dredging started

Fox River dredging to begin this week

BY TONY WALTER • TWALTER@GREENBAYPRESSGAZETTE.COM • APRIL 27, 2009

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The Lower Fox River cleanup is expected to start making history this week.

The dredging, dewatering and transporting of PCB-contaminated sediment were scheduled to begin today, but a spokesman for the three major paper mills involved in the project said the work will probably start Tuesday instead.

Tetra Tech Inc., the general contractor hired by the paper mills to complete the work, was still without a long-term contract Friday.

♦ More on the Fox River cleanup.

The eight paper mills named by the U.S. Environmental Protection Agency as potential responsible parties in polluting the river, have been ordered by the government to start the dredging by Friday.

A worker welds at the dewatering facility at 1611 State St., Green Bay, in preparation for the Fox River PCB dredging project, which is scheduled to begin this week prior to the federal government's Friday deadline. H. Marc Larson/Press-Gazette

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Costs

- **OU 1: $100 million**
- **OU 2 – 5: $600 million**

Issues

- **Cap monitoring/maintenance & institutional controls**
- **Sediment disposal**
  - **"Workability" (OU 1 - geotextile tubes)**
  - **Community acceptance - especially TSCA**
- **Transportation**
- **Stakeholders**


Questions, compliments