



# Wisconsin Wastewater Operators Association

## Protecting Our Water Resources: The Future

Bill Hafs - NEW Water 10/2014





# The Fox River Contributes 1/3 of All Nutrients to Lake Michigan



Photo credit: Steve Seilo ([www.photodynamix.com](http://www.photodynamix.com))

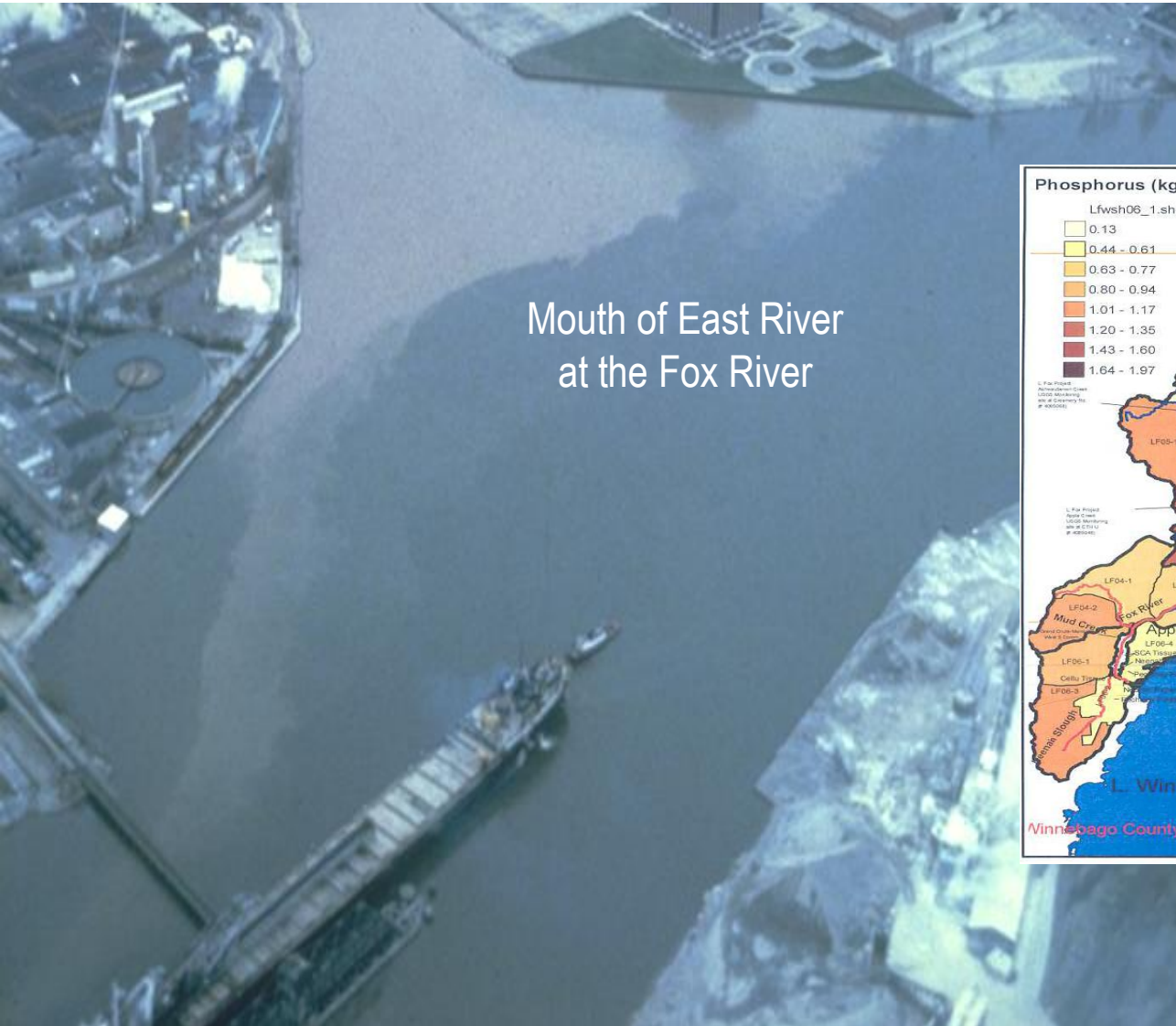


# Distinct Gradient of Water Pollution From Fox River to Water North of Little Sturgeon Bay



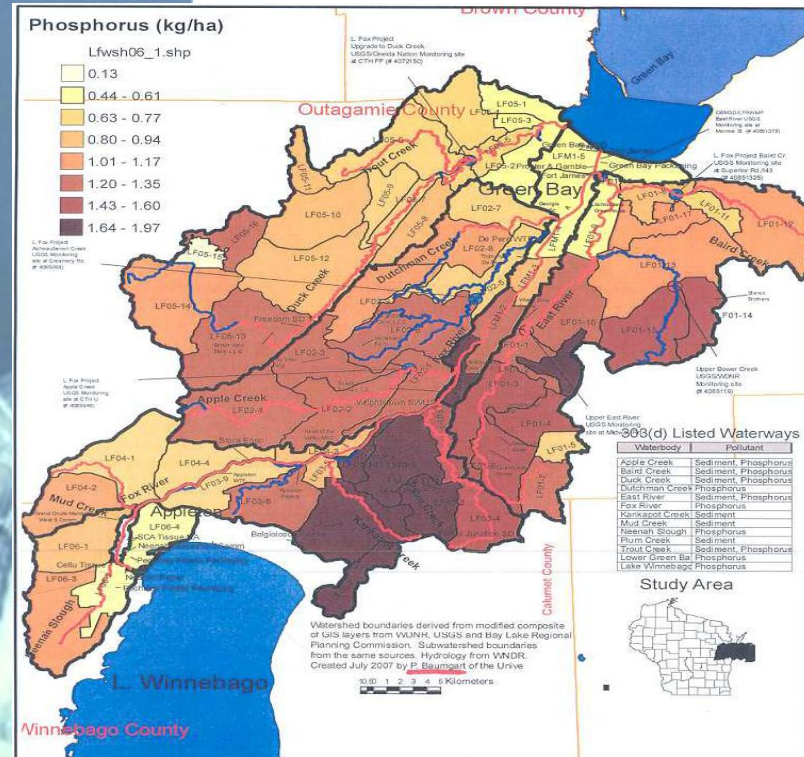


# Priority Sub Watersheds



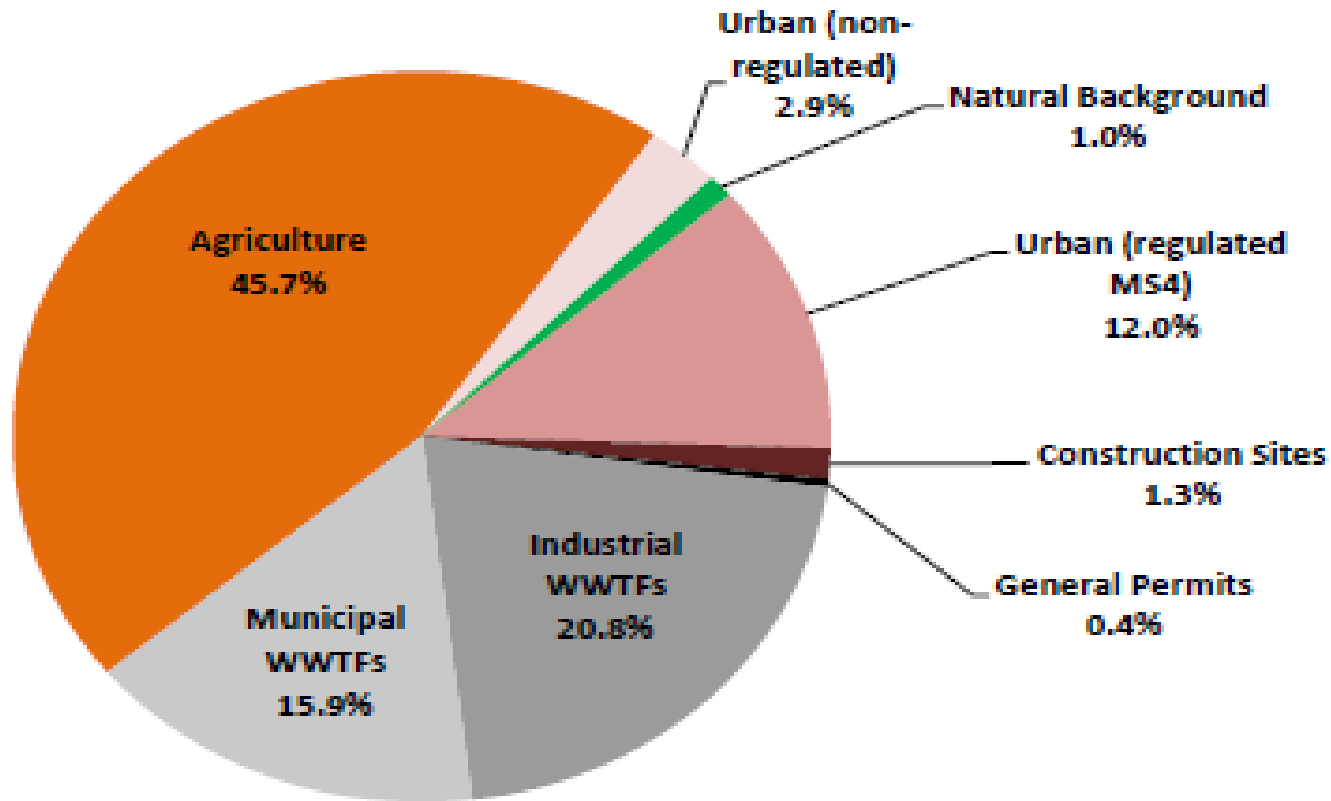
Mouth of East River  
at the Fox River

Map of Lower Fox River Basin





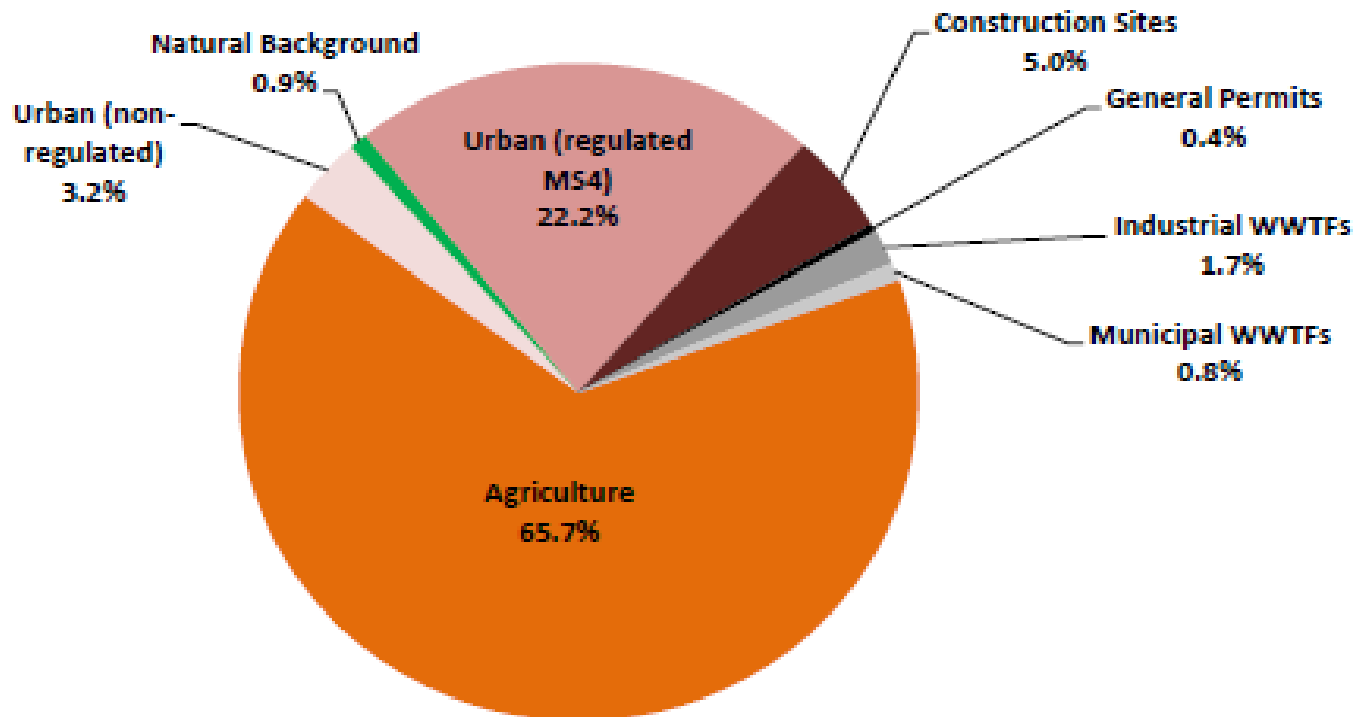
# Sources of Phosphorus in Lower Fox River (LFR) Basin



(Data Source: Total Maximum Daily Load - **TMDL**  
Watershed Plan for Lower Fox River March 2012)



# Sources of Total Suspended Solids in Lower Fox River Basin



(Data Source: Total Maximum Daily Load - **TMDL** Watershed Plan for Lower Fox River March 2012)



# Storm water runoff management



- Grass swales**
- Constructed wetlands**
- Infiltration basins**
- Pervious streets and lots**
- Bio retention**



Wet Pond at Commercial Site – DNR photo



Concrete pavers in parking lot–  
DNR photo



Infiltration Basin– DNR photo



# Wastewater Treatment



NEW Water Wastewater Treatment Facility



# Agriculture Runoff



**Nutrient Management**   **Livestock density**  
**Sustainable Agriculture**  
**Buffer Strips**  
**Grassed Waterways**  
**Barnyard runoff control**  
**Sod cover – Winter**  
**Soil Phosphorus levels**  
**Conservation farm plans**  
**Rotational Grazing**  
**Cover Crops**  
**Wetland Restorations**

Brown County photos



# Land Use Trends

Brown County total land area is approximately  
350,000 acres.

<u>Year</u>	<u>Land in Farms*</u>
1954	300,900 acres
1972	274,800 acres
1978	263,400 acres
1983	241,500 acres
2008	162,000 acres
2012	164,800 acres

Urban Sprawl



Source: 1991 Brown County Farmland Preservation Plan;  
USDA National Agricultural Statistical Service



# Hay Brown County

USDA National Agricultural Statistical Service

<u>Year</u>	<u>Acres</u> <u>Dry Hay</u>	<u>%</u>	<u>Crop</u> <u>Acres</u>	<u>Corn</u> <u>Acres (10 year ave.)</u>
1969	86,100	32%	270,000	1970's - 49,062 acres
1981	74,000	30%	250,000	1980's - 57,860 acres
1995	46,500	26%	180,000	1990's - 57,880 acres
2008	<b>33,600</b>	<b>21%</b>	162,000	2000's - 61,060 acres

**2010 – 2014: 67,650 acres**

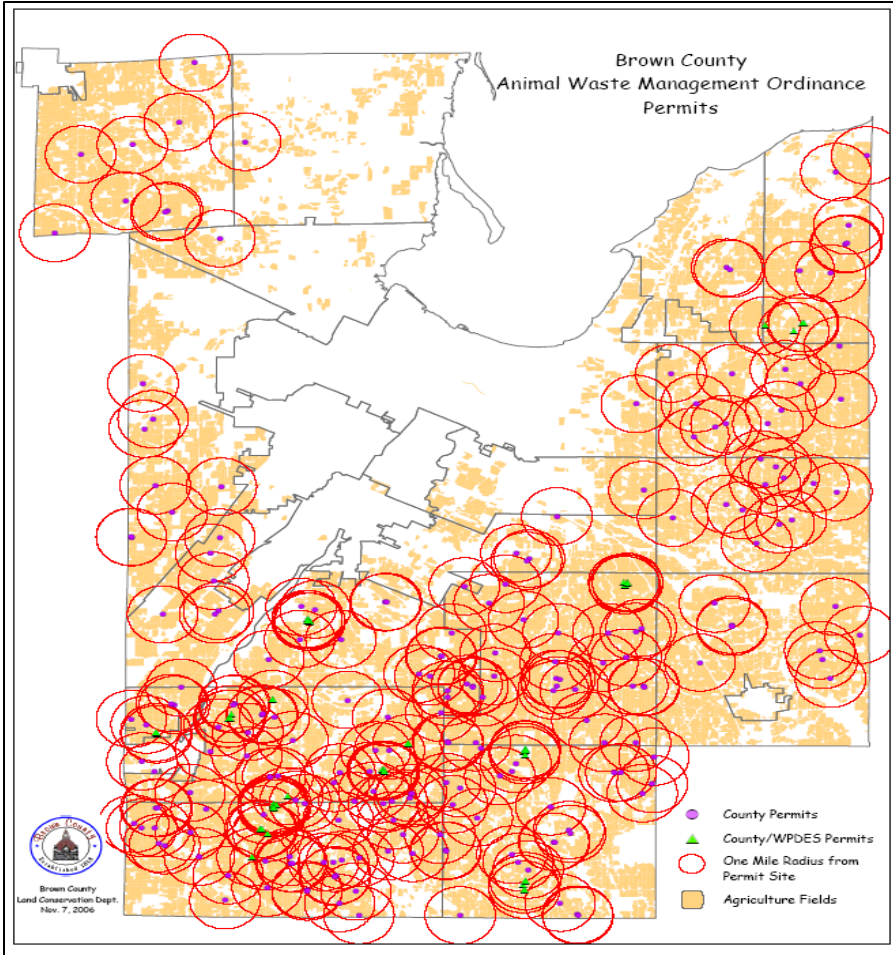






# Livestock Concentration

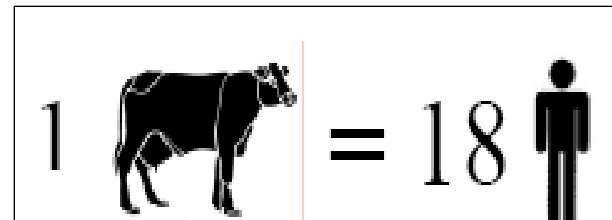
## 1.54 Acres cropland / cow



Source: Brown County

	<u>Cattle</u>	<u>Cropland</u>	<u>Acres/Cow</u>
Brown	105,000	162,000	<b>1.54</b>
Outagamie	85,000	194,700	2.29
Clark	136,500	235,800	<b>1.73</b>
Manitowoc	97,000	183,800	<b>1.89</b>
Calumet	60,000	120,900	<b>2.02</b>

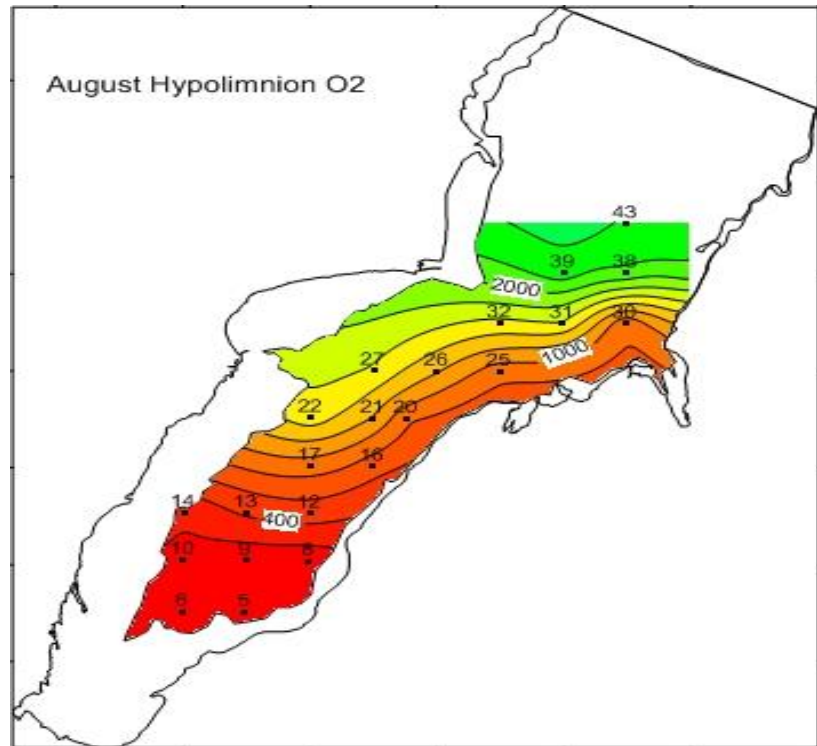
Source NASS.





# Green Bay has a Dead Zone

Oxygen		
July 17 thru Sept 12		
<u>Days &lt; 5 mg/L</u>	<u>Ave. DO</u>	
	<u>mg/L</u>	
1990:	4	3.8
2005:	17	3.1
2009:	28	3.5
2010:	39	1.7
<b>2011:</b>	<b>43</b>	<b>1.7</b>

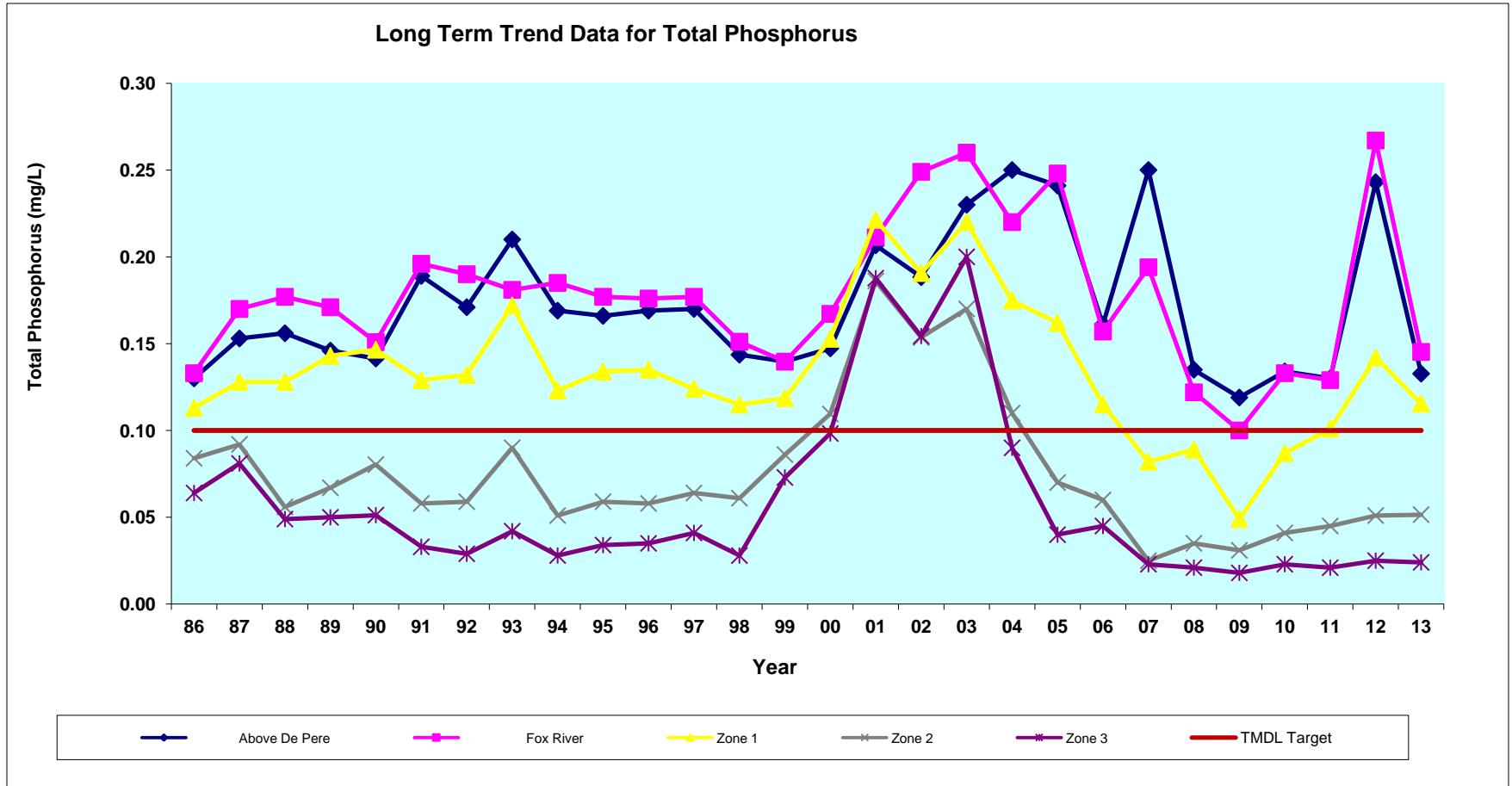


Oxygen depleted water in Green Bay has increased in size and duration.

Source: NEW Water Ambient Water Quality Monitoring , UWM.



# Long Term Phosphorus Trend

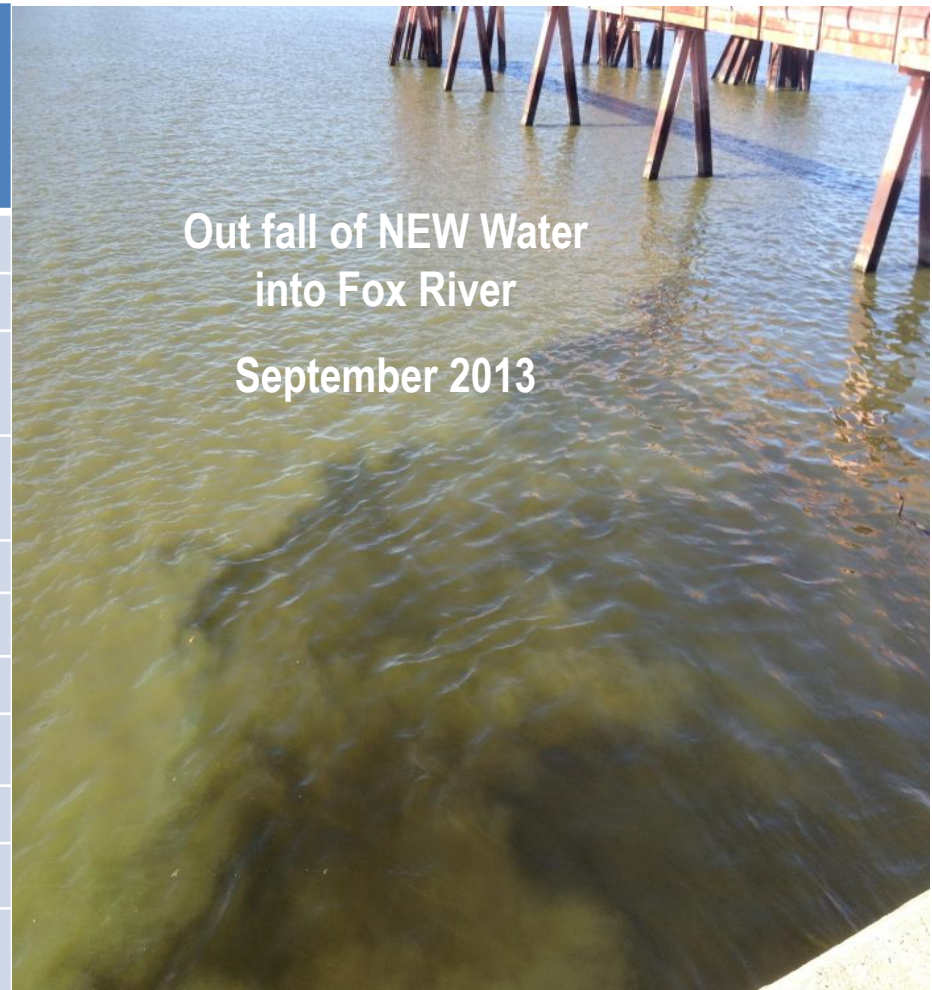


Source: NEW Water Ambient Water Quality Monitoring



# Total Phosphorus Loadings - TMDL

Source	Total Phosphorus (lbs./yr.)
Natural Background	5,609
Agricultural	251,382
Urban ( non-regulatory)	15,960
Urban Regulated (MS4)	65,829
Construction Sites	7,296
General Permits	2,041
Industrial WWTFs	114,426
Municipal WWTFs *	87,160
<b>Total In-Basin</b>	<b>549,703</b>
Lake Winnebago	716,954
<b>Total (In-Basin + Lake Winnebago)</b>	<b><u>1,266,657</u></b>



Out fall of NEW Water  
into Fox River  
September 2013

Source of tables: *Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay (March 2012)*



# NEW Water Background information

**31,624 lbs Phosphorus (P) discharge per year (Green Bay & De Pere Facilities) is less than 3% of total P entering Green Bay from Fox River (1.2 million lbs. P/ year).**

**9,332 lbs P reduction target required by Total Maximum Daily Load (TMDL) Watershed Plan at NEW Water.**

**\$223 – \$394 million dollars estimated cost for additional treatment to reduce P to target at NEW Water. (\$23,896 - \$42,220 cost per pound).**

**9,332 lbs reduction target is less than 1% of P entering Green Bay every year from the Lower Fox River Basin.**




NEW Water Wastewater Treatment Facility



# Economics of Phosphorus (P)

## Lower Fox River TMDL Estimated Capital Costs:

	<u>Estimated Costs</u>	<u>Sources P TMDL</u>
Municipal WWTF's:	\$400 – \$500 million ??	87,160 lbs/yr
<b>NEW Water:</b> (capital costs 2010 and 2025)	<b>(\$223 - \$394 million)</b>  (included as part of total)	<b>26,059 lbs/yr</b>
MS4's storm water: (2013 FWWA Conference)	\$200 - \$400 million	65,829 lbs/yr
Industrial WWTF's:	\$200 million ??	114,429 lbs/ yr
Agriculture	\$ ???	<b>251,382 lbs/yr</b>

**Total: \$800 Million - \$1.1 Billion**

**Note:** Brown County LWCD \$45 million dollars on all Agriculture BMP's, Staff, and Programs from 1983-2012.



# NEW Water WPDES Permit Timeline

- Year 1 - Operations & Needs Report is due.
- Year 2 - Alternatives evaluation update.
- Year 3 - Alternatives evaluation plan draft.
- Year 4 - Alternatives evaluation plan final.  
**Adaptive Management or Treatment.**
- Year 5 - Begin plan, apply for new permit.
- Year 7-9 - Meet new permit limits if treatment is selected.

If Adaptive Management is selected –  
Annual watershed reports are due.



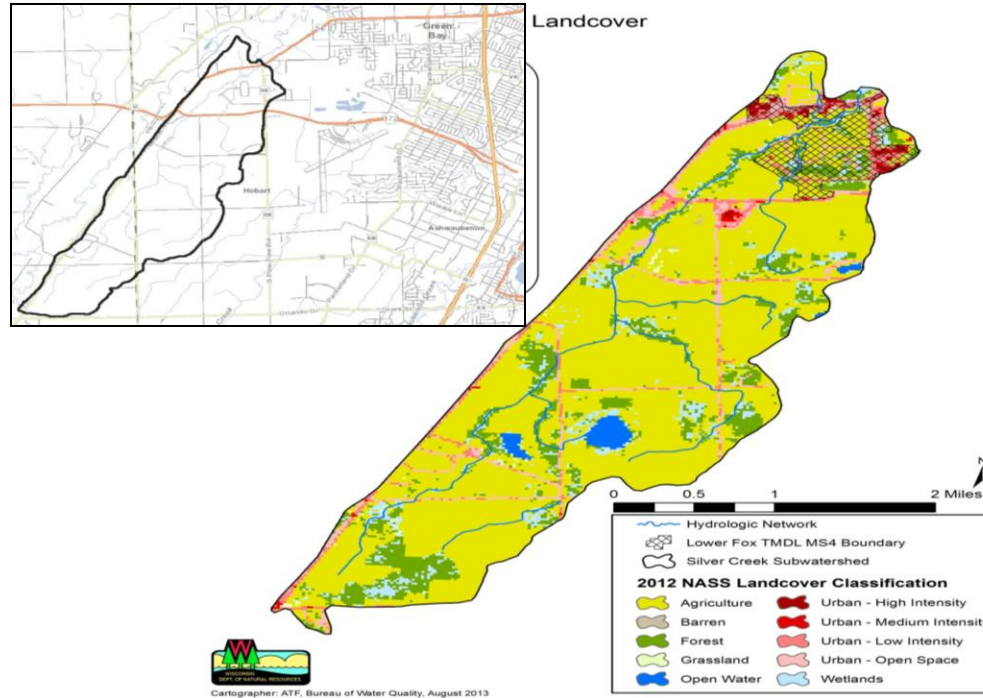


# Adaptive Management

- A voluntary option for point source facilities to comply with phosphorus limits in NR 217. (0.1mg/ L)
- Watershed approach where a point source can fund other point or nonpoint sources to control phosphorus.
- A strategy built on partnerships between point source facilities, municipalities, industry, landowners, private and public groups.

# Silver Creek Pilot Project

Silver Creek Watershed (LF05-8) a sub-watershed of the Lower Duck Creek (HUC12 040302040106)



<b>Watershed Area</b>	4799.8 acres (7.50 mi <sup>2</sup> )	
<b>MS4</b>	346 acres (7.2% of watershed)	
<b>Land cover</b> 2012 Cropland Data Layer USDA NRCS	Agricultural	<b>2296.4 acres (47.8%)</b>
	Forest	585.1 acres (12.2%)
	Grassland	12.3 acres (0.3%)
	Pasture	1065 acres (22.2%)
	Urban	503.9 acres (10.5%)
	Water	64.5 acres (1.3%)
	Wetlands	272.6 acres (5.7%)
<b>Stream Length</b>	<b>14.93 miles</b>	
<b>TMDL Phosphorus Baseline Load</b>	<b>3391 lbs. (0.71 lbs. per acre)</b>	



# Silver Creek Pilot Project 2013 - 2018

## Stream restoration in 5 years

- Evaluate Adaptive Management on small scale.
- Is .075 mg/L in Silver Creek attainable?
- Agreement with Oneida Tribe.
- Can stream be restored?
- Evaluate phosphorus reduction in cost per pound.
- Partnerships will be key.





NEW Water

Oneida Tribe

CH2M HILL

Ducks  
Unlimited

USGS

Local Governments

UW  
Green Bay

Nature  
Conservancy

USDA NRCS

US Fish & Wildlife  
Service

Agriculture & Private  
Agronomists

# Silver Creek Pilot Project Partnerships

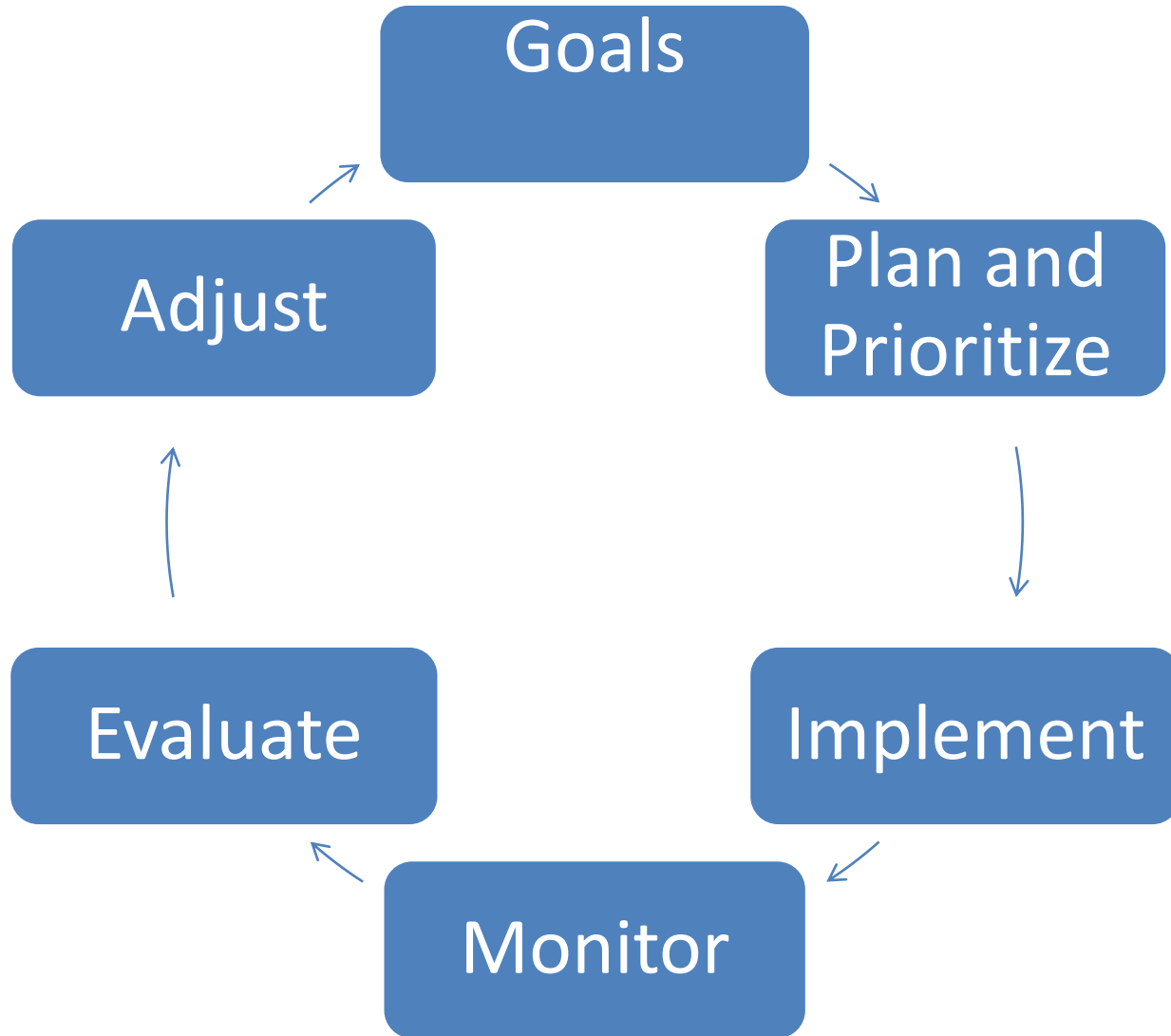


# Silver Creek Pilot Project 2013 -2018

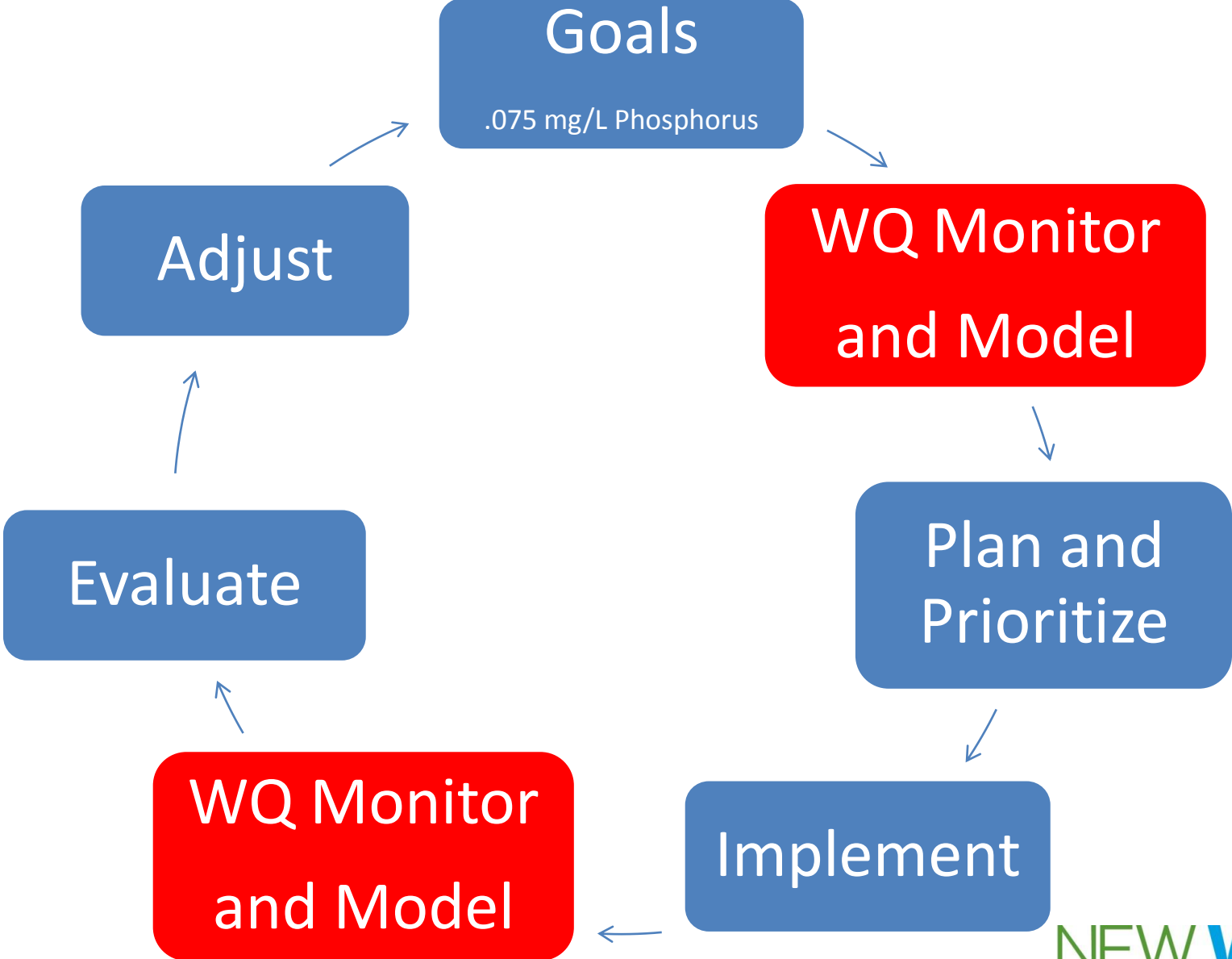
- Stream Monitoring USGS, UWGB, NEW Water.
- Steering Committee.
- Inventory of watershed.
- Implementation.
- Project evaluation.



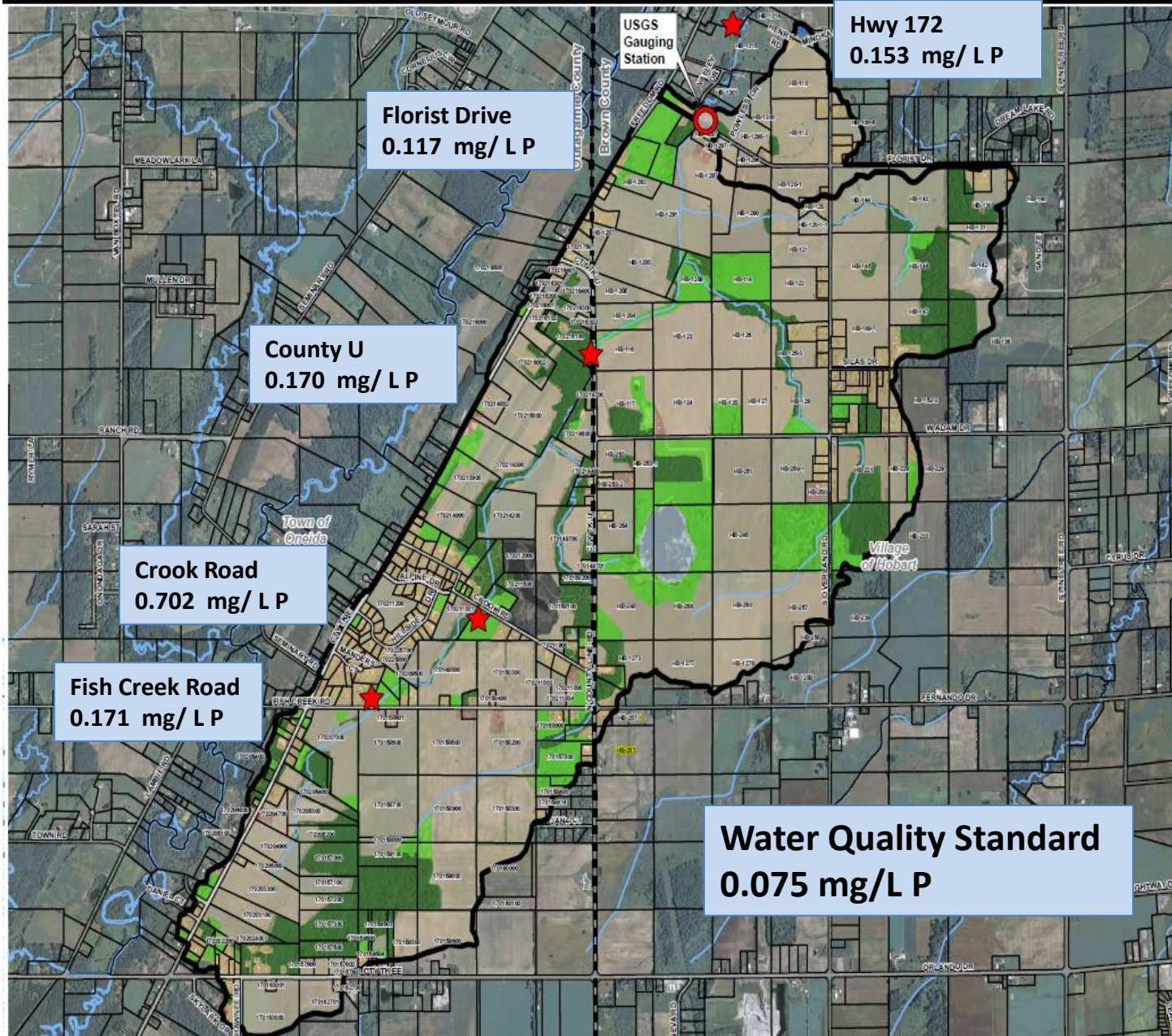
# Adaptive Management Model



# Revised Adaptive Management Model- Silver Creek



# Water Quality Monitoring Season Averages 6/14 – 10/14





# Silver Creek Pilot Project

- How much land will need to be taken out of production?
- What is economic cost to Agriculture?
- Sustainable **permanent** decisions.
- Spend the least amount of dollars to accomplish the greatest water quality.  
**Benefit our rate payers , community water quality.**
- Build watershed partnerships:  
**Industry, AG, Storm water, Wastewater, Community leaders.**

# Silver Creek

## SILVER CREEK PILOT PROJECT KICKS OFF

With phosphorus and nutrient run-off in the news these days, NEW Water is working on its own phosphorus reduction plan, in order to meet its permit requirements with the Wisconsin Department of Natural Resources (DNR).

In 2018, NEW Water will be required to further reduce the amount of phosphorus it discharges into the Fox River, which is 31,624 pounds per year, or less than 3% of the overall phosphorus in the Bay, according to the DNR. NEW Water would need to build a new facility to further reduce phosphorus discharge, which is estimated to cost more than \$220 million. In lieu of that, the DNR is allowing point sources, such as NEW Water, to pursue Adaptive Management (AM), which would allow the facility to work with the community to reduce phosphorus.

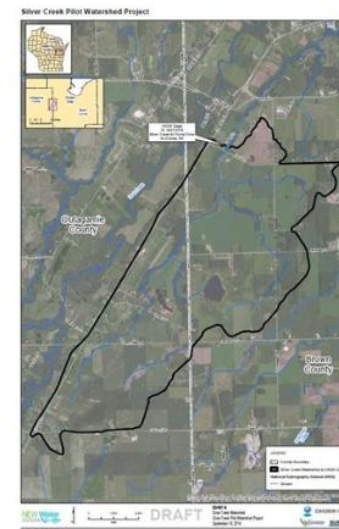
"This is a community-wide problem needing a community-wide solution," said Bill Hafz, Director of Environmental Program Services. "To meet our permit requirements for phosphorus discharge at NEW Water, we are implementing a pilot project in Silver Creek, and we have assembled a great team of partners."



### Additional Information

- [Silver Creek Kick Off Meeting Presentation](#)
- [Project Charter](#)
- [Landowner Factsheet](#)
- [Map: Water Quality Sampling Locations and Land Use](#)

### Silver Creek Project Map



<http://www.newwater.us/projects/silver-creek-project/>



# Lower Fox River Challenges

**15 Sub-watersheds in LFR basin.**

**20 Permitted Industrial WWTFs.**

**14 Permitted Municipal WWTFs.**

**42 units of government.**

**15 WPDES permitted CAFOs.**

**TMDL phosphorus reduction goal = 59%.**

**TMDL TSS reduction goal = 55%.**



**Reduced Cropland &  
Increased Livestock density.**

**NR151 and NR243 were  
developed before Water  
Quality Standards.**

# Challenges associated with Change

## Mayor Asks City-Wide Reorganization

16 Jan 1946

### Lively Council Session Likely

12-13-1946

Storm Sewers Will Be One of Topics Making For Heated Discussion

Optimism making for some of the best of the session for the city council, which will meet for a regular session Tuesday night at 8 o'clock. The mayor will make the opening address and the council will discuss the storm sewer problem. It is expected that the council will also discuss the city's financial condition and the city's general administration.

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### Wants Sewer Probe;

#### Tells Council One Department Should Handle Street Work

The mayor will make a formal report to the council on the city's financial condition and the city's general administration. The mayor will also discuss the city's financial condition and the city's general administration.

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## Monroe Paving Request Given City Approval

13 March 1946

### Council Authorizes State Commission To Ask Federal Aid

Resolutions authorizing the city clerk to sign a request to the state highway commission for a state-aided paving of Monroe avenue from Main to Fortier street and a second authorizing the mayor to conduct an investigation of the city's sewer system were passed unanimously by the city council Tuesday night.

The resolution to authorize the mayor to conduct an investigation of the sewer system was presented by the sewer and water committee. It authorizes him to swear in and subpoena witnesses and hold meetings to determine the reasons for difficulties caused by sewer.

The council previously had approved a report by the committee that such an investigation be held. At the last meeting, a comprehensive report on the combined systems of the city and the metropolitan sewerage district was presented to the council by City Engineer F. J. Steeno and Supl.



WILLIAM E. O'BRIEN

## Sewer System Study Planned

Head of Employment Service Engaged to Make Investigation

William E. O'Brien, Wisconsin director of the United States Employment service and a profes-

## Mayor Plans Probe Of Sewer System

1 Jan 1946

### Declares We Will Not Quit Until Sure Everything Possible Is Being Done

All aspects of Green Bay's perennial problem, flooded basements and streets, were probed during a meeting of the sewer and water committee of the city council Tuesday night at the city hall. During a four and a quarter hour session when the mayor, members of the committee, several council-

## City Drenched By Downpour

6/11/48

### Second Cloudburst in Two Weeks Fills Many Basements With Water

The second two-inch downpour for Green Bay in less than two weeks again flooded basements, overflowed highways, and made itself a general nuisance today. However, since it was almost unaccompanied by wind, and with little lightning, damage was far less than in the two-day storm that preceded Memorial day.

More than two inches of rain fell between 3 a. m. and noon, and from the time the fall started Wednesday afternoon, the weather bureau recorded a total of 2.59 inches, only a fraction of an inch below the Memorial day rainfall.

Highway 57 closed between DuBois and



# A PRACTICAL PROBLEM

The first of this series of advertisements published by the two best sulphite pulp manufacturers treated the general subject of stream pollution and its three major aspects: (1) **SODIUM BACTERIA**, a public health hazard; (2) **ALGAE**, water plants of objectionable color; and (3) **OXYGEN REDUCTION**, which forces fish to migrate to search of water containing more air.

Oxygen reduction causes principally three varied types of stream pollution. This advertisement, the second of the series, gives significant facts dealing specifically with spent sulphite liquor as brought out by testimony in last week's water pollution hearing. These are fact and frank evidence to a handful of questions which open-minded citizens of the Valley are asking.

## FACT No. 2

**WHY NOT SPENT SULPHITE LIQUOR IN THE STREAM?** In making sulphite pulp, the cellulose fibers are freed by removing the relative part of the wood and then these fibers are washed with thousands of gallons of water per ton of product. To dispose of this quantity of liquid the mill has to take the stream. No other general method exists for disposing of it.

**WHY NOT SEEK A BETTER WAY?** Again in Wisconsin for more than 60 years there has been searching for a practical solution of the sulphite liquor problem. In 1925 the Wisconsin sulphite pulp manufacturers teamed up for more intensive cooperative research into the new waste problem and for more effective cooperation with the State Committee on Water Pollution.

**WHY HASN'T THE PROBLEM BEEN SOLVED?** Plainly, this problem is extremely difficult. To avoid the industry for not having found the answer is like condemning medical science for not having solved cancer. Many of the methods that have been suggested simply would not do the job. None of the apparently obvious methods of treating spent sulphite liquor actually works, such as filtering it, settling it, or pouring it over streambeds.

Specialized sewage treatment is incapable of handling spent sulphite liquor although municipal sewage treatment plants accept most other industrial wastes. The Green Bay mills, while paying their share of the city sewage plant's expense, although it does not accept their waste. In the work they spend their own money to search for a way to process sulphite liquor as a real treatment with polluting pulp at the present time.

## But Progress Is Being Made

Greater advances have come since 1929 than in all previous years. Final plans, experimental plants, and a commercial experimental plant are now testing whether various processing procedures are economically practical. One time and further study can provide the answer.

**NORTHERN PAPER MILLS**  
N. L. BOES, Executive Vice-President

**HOBORG PAPER MILLS**  
J. M. CORNWAT, President

# WHAT IS POLLUTION?

Outdoorsmen, public officials, and industry share equally in their desire to clean up Wisconsin's waters. They have honest differences about how particular treatments should be outlined. These facts emerged from the hearings conducted in Green Bay last Wednesday by the State Committee on Water Pollution.

Many citizens seem with good reason to have this feeling. They gained new insight into the problem of stream improvement, particularly in the Lower Fox river and Lower Green bay.

Facts on stream improvement are important to all the people of the Valley. To bring this information to the citizens, the Wisconsin Sulphite Pulp Manufacturers will publish in paid advertisements in this newspaper significant facts which the testimony at these hearings brought out. This is the first advertisement of the series.

## FACT NO. 1

These 400,000 gallons that come regularly in these waters are described by the word "pollution." To understand the answer it is necessary to think of these clean waters. They are:

**Bacteria in the water.** These are the only organisms that endanger human health. They come from human and animal wastes, principally from manure and sewage. Of all microorganisms in the river, only one subgroup tends to average completely before passing to the water.

**Algae, the tiny blue-green plants that live, grow, and die in water mass.** Jaws of algae grow in Lake Winnebago and near down the river. They cause much of the summer algal nuisance in these waters.

**Oxygen reduction.** This is caused chiefly by industrial wastes being up dissolved oxygen which has not other marine life work. These wastes containing sodium sulfide, discharge into the stream spent sulphite liquor which contains sulfur. This sulfur acts to use up oxygen and actually causes 40% of the oxygen reduction in the river. If enough oxygen is that dissolved, fish migrate to water containing more air, and where they are unable to get to better water they suffocate. The most serious oxygen reduction occurs in the area in the hot summer months, and in parts of the lower bay in winter.

## The Truth About Sulphite Liquor!

Sulphite liquor is a waste substance containing no germs. It does not put any bacteria in the water.

Sulphite liquor is no way endangers human health. It cannot cause typhoid, dysentery, cholera, or any other communicable disease.

Sulphite liquor does not increase algae in the water. Most of the algae in the Fox river and Lower Green Bay flow down

from Lake Winnebago, where there is no sulphite liquor.

Under some conditions sulphite liquor may cause or contribute to an unpleasant odor.

Treatment of spent sulphite liquor is important to the stream for fish present, public health, and certainly of course from the public health problem of treating sewage.

**NORTHERN PAPER MILLS**  
N. L. BOES, Executive Vice-President

**HOBORG PAPER MILLS**  
J. M. CORNWAT, President

# THE LOGICAL APPROACH

Previous advertisements of this series by the two best sulphite pulp manufacturers covered two important points about stream pollution: (1) That those different kinds of pollution enter in the Lower Fox river and Lower Green Bay of them, only oxygen reduction comes from mill wastes. (2) That the problem of spent sulphite liquor in the stream is extremely difficult but the mills have made more progress toward a solution.

Spent sulphite liquor in streams. The most hopeful approach is to find out the nature. This advertisement, third of the series, gives significant facts which have been brought out about current progress.

What their efforts when they teamed up in 1929. First they studied what had been done, and several research along lines that led to the State Committee on Water Pollution. At several points:

progress was on the way primarily by the industry under the leadership of Paper Chemistry in America and to give laboratory reports with results: (a) Increasing sulphite liquor in the water; (b) Increasing sulphite liquor in the water; (c) Increasing sulphite liquor in the water; (d) Increasing sulphite liquor in the water.

CF has been carried further. At that, in the laboratory, the system had to be investigated to give reports, which are being

ABLE RESULTS led the industry to hold a pilot plant at the Winnebago Aqueduct and make small quantities of pulp which would be used as a replacement for the normal stock. As a result, Wisconsin sulphite pulp manufacturers spent \$200,000 and built a pilot plant to process half the sulphite liquor from one pulp mill at Winnebago.

## East Project Now Stands

That eventually this process may be scientifically successful. Knowledgeable metallurgists in an experimental plant — and much steel, made no previously tested design. Any such kind now from experimental to commercial production is certain to be of high level. As yet no one can know for sure what the real result

ILLS  
and

**HOBORG PAPER MILLS**  
J. M. CORNWAT, President

**NEW Water**  
The brand of the Green Bay  
Metropolitan Sewerage District

6/17/58  
cc - Lat Schreyvogel  
DJM

# GREEN BAY PI

FRIDAY EVENIN

A DAILY THOUGHT: Some of the songs sung in Babylon when Israel but refines gold. I will sing unto th

## Eau de East River

The Green Bay Board of Health does not approve nor disapprove the proposed plan to deodorize East River. We assume from that terse statement that the board does not regard the sprinkling of perfume on the water to be important in the matter of protecting the health of the public.

The company seeking the contract to treat the river claims its plan for chemical treatment of the river will stop the objectionable odor within a week. If not, it will agree to the cancellation of the contract. That seems fair enough and there should be no objection to such a contract if the people are agreed that it is worth \$100 per day to keep the odor down during the summer.

However, there are certainly a great many people who will agree with Alderman Wilner Burke who objects to spending money for temporary relief when money is needed for engineering studies which might well bring permanent relief. The work of the committee which has been studying the East River problem for several months seems to have proved quite conclusively that there are no sewers carrying materials likely to pollute the water into East River. There may be some dumping of various kinds of refuse and the

# 'East River Perfume' Helps Cover the Odor But the Nose Knows That Old Scent Remains

P.G.  
4/1/58

By HARRY MAIER  
Press-Gazette Staff Writer

"The assignment for the day from the city editor was get a reaction" story to the odor treatment program being conducted on the East River.

We eagerly grabbed at this assignment while making note of that fact that our backyard butted against the river and writing such a story would be a snap.

The assignment stemmed from the fact that the city-approved treatment of the East River had been under way for several days and many questions were being raised regarding the success of the liquid spray, too.

Preparations for getting the story were simple. The starting point was our backyard in the 1200 block of St. Clair Street.

First we observed the wind direction, noting at the time it was blowing the East's odors toward the

North Side. This brought a smile, knowing that the other side of the river was in pain at the moment.

Things started happening almost immediately, however. First the wind began a slow swing to the opposite direction. As it did so the all too familiar smell of the river began creeping across the yard.

Our pencil swiftly went into action, making notes of the time, position of the sun, speed of wind and intensity of the odor.

The odor was almost unbearable, but several summers of residing along the East made us conditioned to the problem.

After noting the situation, we decided to go to work to check with the unfortunate on the other side of the stream. We had no trouble. Everyone was willing to offer a comment.

Starting with Norm Pigeon at the Star Printing

Co., located at Main Street and the river, and working east to the D-X service station, we were able to come up with the reaction of individuals for the story.

Pigeon admitted the chemical for a fet that thing always.

Gille, age Two George S Hintz and said they river od though M she was after liv river for

Ed We Restaurant couldn't the chem said ate the odor had been Jim Mc Donald L Corners

as "sickening" and "rotten." Other employees at the company agreed little improvement had been made.

Harold Hurkman of Hurkman's Market, 1436 Main St., said the smell was bad

## East River Perfuming Only Helps Cover Odor

the chemical had improved the situation.

### Not As Noticeable

Richard Crowl of Helgeron Plumbing Co., Mrs. L. Parmentier of Mecca School of Music and Miss Kitty Goch of Sue and Kit's Eat Shop, all along or near the river said they either hadn't noticed the odor this year, or else the chemical had reduced its intensity.

No one was of the opinion that the problem is licked, and everyone wants a more permanent solution.

By that time we resumed personal observations of the slow moving river.

The odor was becoming almost unbearable when a little boat came chugging up the river with some important looking persons aboard. They passed slowly, quite intent on the project at hand.

It didn't take long for the breeze to pick up the new smell—resembling a high-class perfume shop in Paris. We immediately questioned which odor was better.

At least the offensive odor was stopped, but soon we noticed it only was temporary and the much stronger "East smell" soon regained its first place standing as the leading odor in the area.

### To Assess Results

Expressing an official view on the East River situation, Earl Mohr, deputy

health commissioner and a member of the city's Water Pollution committee, said the committee would wait until the present 10-day trial period is over before making a decision on whether the treatment should be continued.

He said his department is making an hourly check, 24 hours a day, of the sulfide content in the water and the odor in the air. He also is receiving daily reports from several persons who reside along the river as to conditions.

One of the major problems faced is the continuous fluctuation in the level of the water. Mohr noted that Thursday the level varied by two feet, meaning that the surface water moved several miles.

He said the oil base chemical to freshen the air is supposed to be applied on a daily basis since it was started last Tuesday.

### To Report Findings

Mohr will turn his findings over to the local committee and the State Water Pollution Committee. The latter group approved the contract with Airkern, Inc., a local firm which is attempting to combat the odors.

The project costs the city \$100 per day with a maximum fee of \$10,000 for this year. The city has the right to cancel the contract at any time.

Burke's idea is obviously the best since it is a standard and tried method of housekeeping. However, we are not urging it now as a means of blocking the chemical treatment. That is obviously the only hope of relief this summer and it could have some good results in promoting a permanent remedy. The East River problem is not a new thing in Green Bay. Thirty years ago the river was an open sewer with a stench that few people could tolerate even for the brief period required to cross the river on a bridge. The Metropolitan Sewage Disposal Plant has done much to improve the situation. There is much more to be done. Perhaps after the people have seen the results of the chemical treatment and have felt the cost of keeping the odor down they will be in the mood to do something further about it.

# 1967: Big Changes Coming – Joint Treatment of Municipal and Industrial Waste

GREEN BAY, WIS., THURSDAY EVENING, SEPTEMBER 21, 1967

## Possible Breakthrough Seen In Treatment of Mill Wastes

### Experiment in Green Bay Points to Solution of Major Pollution Source

By JIM RIPLEY  
Press-Gazette Staff Writer

Recent scientific experiments in Green Bay have indicated the Fox River Valley area may be on the threshold of a breakthrough in the fight to abate pollution of the Fox River and

If the experiments demonstrate that it is feasible to treat the paper mill effluents at the Green Bay plant, the commission hopes to enter into agreements with the mills whereby the industry will pay an equitable share of the cost of the new treatment plant and its operation.

Thurs., Dec. 18, 1969 Green Bay Press-Gazette

## Sewage Plant Can Handle Paper Mill Wastes, Study Shows

By RAY PAGEL  
Press-Gazette Staff Writer  
One big step in the Green Bay joint waste treatment proposal

tract were advised Wednesday of the successful completion of the research program that began in 1964.

pilot systems was set up at the MSD plant. Karl G. Voelkel was director of the project.

Michigan Enforcement Conference.

Cohen said he has mentioned this point to DNR officials at

Green Bay Press-Gazette Thurs., Nov. 21, 1968

## Firm Hired To Plan New Sewage Plant

The Metropolitan Sewerage District Commission took steps Wednesday toward the construction of a new sewerage treatment plant in Green Bay within the next three years.

The commission hired Donahue & Associates, consulting engineers, to begin preliminary studies for plant expansion and instructed Manager David W. Martin to seek a cost distribution consultant to complete studies for equitable cost distribution by the end of next year.

The commission approved Speer & Associates to handle a \$1.7 million bond sale Dec. 30 for East and West Tower Drive sewer expansions. The bond sale will be held Dec. 30 at noon in the city hall and the commission will hold its next meeting on Dec. 10 at 1:30 p.m.

Elwood Barco, vice president of Speer & Associates, said the total bonds would amount to \$2,350,000 after the sale.

The commission approved purchase of a machine lathe for \$3,490, and a centrifuge for \$400.

Karl Voelkel, reporting on the combined treatment research tests for activated sludge process to receive pulp and paper mill wastes, said experiments were now in the fourth run and that the first two show that the contact stabilization unit appears to be best for BOD and suspended solids removal. He said the tests were to be run under five different conditions and should be completed in January. Four paper mills and MSD are making the joint experiments.

Green Bay Press-Gazette Friday, January 6, 1967

## \$251,250 Grant Okayed for MSD

### Funds Allow Test of New Process To Treat Industrial, City Waste

A \$251,250 federal grant has been given the Green Bay Metropolitan Sewerage District to test a new process for treating paper mill wastes.



# Can We Protect Lake Michigan From Green Bay?





# Buffer Strips – Before/ After Installation



Source: Brown County

Site 1 before buffer strip



# Buffer Strip - After Installation



Source: Brown County

**Site 1 after buffer strip**



## Before Buffer Strip Installation



Source: Brown County

**Site 2 before buffer strip**



# Buffer Strip After Installation



Source: Brown County

**Site 2 after buffer strip**



# Before Buffer Strip Installation



Source: Brown County

Site 3 before buffer strip



# Buffer Strip After Installation



Site 3 after buffer strip



# Thank You

- The work you do with Water Quality is most important and appreciated.
- You are Stewards of Our Water 24/7/365.
- To conclude I want to share a video with you that I found inspirational and relevant:  
<http://www.youtube.com/watch?v=WmVLcj-XKnM&feature=youtu.be>



# Questions?

**Bill Hafs** |  
**Director of Environmental Programs**  
Green Bay Metropolitan Sewerage District



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