Muncie
SANITARY DISTRICT

Bureau of Water Quality
5150 W. Kilgore Ave.
Muncie, IN 47304
765.747.4896

Bureau of Water Quality
Annual Industrial Pretreatment Report
2016

Prepared by:
Rick Conrad, Director
March 2017

Permit No. IN0025631

BUREAU OF WATER QUALITY

WATER QUALITY TESTING AND ENFORCEMENT

5150 W. Kilgore Avenue
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DIRECTOR

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Muncie
SANITARY DISTRICT
BUREAU OF WATER QUALITY

March 20, 2017

Natalie Maupin, State Pretreatment Coordinator
IDEM
Office of Water Quality
100 N. Senate Avenue
Indianapolis, IN 46204-2251

Ms. Maupin,

Re: Annual Pretreatment Report for Muncie, IN
Permit No. IN0025631

Please find attached the Annual Report for the City of Muncie covering year 2016. Muncie's Pretreatment Program is administered by the Muncie Sanitary District's Bureau of Water Quality under the authority of the Indiana Department of Environmental Management and the USEPA Region V. Included in the report is a narrative, the required attachments, and completed report forms.

Please contact me with any questions.

Sincerely,

Rick Conrad
Director

cc: Muncie Sanitary District Board of Sanitary Commissioners
EPA Region V

INTRODUCTION

Since the establishment of the Bureau of Water Quality (the Bureau) in 1972, the Muncie Sanitary District has been a pioneer in local water pollution testing and enforcement. The implementation of cooperative industrial pretreatment programs, emergency spill response related to stream pollution control, chemical and microbial analysis of the Muncie Water Pollution Control Facility (MWPCF) and its feeding and receiving streams, and annual assessments of the health of fish, aquatic insects, mussels, and in-stream habitat continues to exceed the minimum legal requirements mandated by National Pollutant Discharge Elimination System (NPDES) permits. This commitment to producing a complete picture of water quality has led to dramatic improvements in the West Fork of White River in Delaware County and has made the Muncie Sanitary District's Bureau of Water Quality a model for local wastewater pretreatment and water quality management worldwide.

In the early 1970s, the White River in Muncie was terribly polluted. As with many cities in Indiana, widespread industrialization had taken a serious toll on water quality. Combined sewer overflows (CSOs), battery and transmission plants, tool and die shops, and many other point source stressors that discharged to the river either directly or indirectly had gone unregulated. The resulting water quality degradation was the consequence of chemical pollutants whose sources were most commonly associated with the practice of dumping untreated wastewater directly into the river. Toxic pollutants such as ammonia, cyanide, and lead were in such high concentrations in the White River that it was once unsuitable for all but the most tolerant forms of aquatic life and unusable for human recreation.

Before the Clean Water Act gave municipalities the legal authority to require pretreatment standards, the Bureau was already working with local industries to maintain voluntary compliance with its pretreatment standards. Both the City of Muncie and its industries have invested greatly in their pretreatment programs. The industrial community has spent over $14.5 million dollars within the Muncie Sanitary District for pretreatment equipment from the time the Bureau was established in 1972 through 2016. Of the Bureau's annual budget, which amounts to just under $1 million, approximately 80% is allocated specifically for the industrial pretreatment program. The Bureau employs an Industrial Pretreatment Coordinator, a staff of chemists for laboratory analyses, a surveillance section for collection of water samples, and a biological section for assessing the health of aquatic life. Each section performs specific tasks related to the pretreatment program.

Even as early in its history as 1982, when many cities were just beginning to establish their own pretreatment programs, the Bureau was already seeing measurable improvements in the quality of wastewater being collected and discharged by the MWPCF. Some of the changes could only be seen through chemical analyses; the reduction in metal concentrations reaching the MWPCF equates to removing as much as 65 tons of heavy metals every year. More visible changes could be seen in the wildlife. Since the Bureau's first biological assessments over thirty years ago, the number of fish in White River downstream of the MWPCF has doubled, and sensitive species like the smallmouth bass, long-ear sunfish, and many freshwater mussels have returned. Some of the changes required no scientific observation at all. The White River, which once ran orange and whose stream bottom was once nothing but sludge, had become clear and its substrate once again contained a healthy mixture of sand, gravel, and cobble.

Pretreatment Section.—The Bureau's pretreatment program has been federally mandated through the United States Environmental Protection Agency (EPA) and the Indiana Department of Environmental Management (IDEM) to ensure the safe and effective operation of the MWPCF and to protect the quality of the facility's receiving stream. Publicly owned treatment works are designed to remove contaminants and harmful pathogens commonly associated with residential wastewater; however, many facilities, including the MWPCF, also service local industries whose wastewaters may contain uniquely toxic compounds capable of interfering with, passing through, or accumulating in the sewage sludge of the treatment facility. Through the pretreatment program, the Bureau serves as the Control Authority responsible for ensuring that local industries comply with the regulatory requirements of the EPA, IDEM, and Muncie's local

Pretreatment Ordinance. Major responsibilities of the program include:

- permitting local industries
- sampling and analyzing industrial wastewater
- requiring industries to self-monitor their wastewaters
- requiring industries to implement spill response plans and pollution prevention (P2) management plans
- sampling and analyzing the MWPCF's influent, effluent, and biosolids
- sampling and analyzing the MWPCF's receiving stream

Industrial compliance is maintained nearly entirely through cooperation; however, the Bureau has the authority to issue enforcement actions including administrative orders, fines, and/or the termination of service to the MWPCF.

Surveillance Section.—The Bureau's Surveillance Section is made up of three degreed personnel and is responsible for the collection of representative samples to be analyzed primarily by the in-house laboratory. Available sampling equipment allows for the collection of grab or composite samples collected from industries, the MWPCF, and local surface waters. The Surveillance Section has had capital equipment investments totaling approximately $200,000 over the past 20 years. Available equipment includes 14 programmable ISCO auto samplers as well as a fleet of four vehicles for obtaining samples and for responding to emergency spills.

During 2016, the Surveillance Section collected a total of 967 samples during 70 scheduled and unscheduled sampling events at permitted industries.

Laboratory Section.—The Bureau's laboratory is well equipped to ensure the accuracy, precision, and legal defensibility of its results. The qualified staff includes those with degrees in chemistry, biology, and environmental management. Bureau personnel attend professional seminars and workshops to stay up-to-date on current regulations, laboratory techniques, and other topics related to pretreatment. In the last ten years, over $1 million has been invested in renovating and upgrading the laboratory. Equipment available to the staff includes a SmartChem 140 Discrete Chemical Analyzer (2005), Inductively Coupled Plasma Atomic Emission Spectrophotometer (2001), a Graphite Furnace, and trace-metal free digestion fume hoods.

In 2016, the Bureau Laboratory Section was awarded its 24th Indiana Water Environment Federation Laboratory Excellence Award based on quality assurance/quality control, record keeping, general procedures, safety, specific analytical procedures, facilities, and instrumentation. The Laboratory Section is responsible for analyzing daily samples (365 days per year) taken from the MWPCF influent, effluent, and process waters. The Laboratory Section also analyzes samples from industries, local streams and rivers, and various local community driven projects aimed at improving water quality in and around the White River. Samples are taken for a wide range of parameters including metals, nutrients, and bacteriological contaminants. In all, over twenty-one thousand analyses are run in the Bureau's laboratory each year.

Biological Section.—The Bureau is one of only a handful of pretreatment programs in the country that incorporates biological assessments as an integral component of its receiving stream monitoring. The biological section and its pair of degreed aquatic biologists assess the health of fish, aquatic insects, and mussels from sites throughout Muncie to identify changes in water quality.

While chemical analyses provide a snapshot of water quality, organisms that spend most or all of their lives in the water are indicative of the combined influences on a stream; therefore, assessment of the integrity of biological communities represents a holistic measure of water quality with the ability to detect synergistic and antagonistic effects of the myriad compounds which may threaten the environment. Fish and benthic macroinvertebrates (i.e. aquatic insects and mussels), are core indicators of the biological integrity of streams. Community level analysis of these groups provides a measure of ecological sustainability that integrates all components of water pollution.

The biological section also conducts habitat assessments, thus incorporating all facets of water quality restoration as described by the Clean Water Act which has set the goal of restoring the "physical, chemical, and biological integrity" of the nation's waterways.

Fats Oils and Grease.—In 2016, the Bureau continued its relatively new fats, oils, and grease (FOG) control program. Though not specifically toxic to aquatic life, FOG is a serious threat to water quality because it increases the likelihood and duration of combined sewer overflows. It may also cause basement back-ups and can cost hundreds of thousands of dollars annually to clean from sewer lines. It is estimated that the FOG Program prevents roughly 125,000 gallons of grease from entering the collection system each year.

Stormwater Management.—The Bureau also coordinates the local MS4 storm water department; a joint effort between Delaware County, the Town of Yorktown, the City of Muncie/Muncie Sanitary District, and Ivy Tech Community College of Muncie. As industrial pollution has been abated, the impact of stormwater runoff has become one of the most significant impacts that municipalities impart on their waterways. Specifically, the Bureau oversees construction compliance inspection and illicit discharge detection and elimination.

Public Outreach.—Education and outreach are fundamental components of improving water quality, and in 2016 the Bureau contributed to a number of activities designed to teach or involve the public with water quality restoration and conservation. These activities included video taped interviews with Ball State University journalism students, demonstrations of biological sampling at local high schools and middle schools, and maintenance of a permanent website hosted by the Muncie Sanitary District that describes the history of the Bureau and improvements in the water quality of the White River. Presentations to local industries have covered pretreatment regulations, sample collection and preservation techniques, laboratory quality assurance/quality control, storm water regulations, and many others. Additionally, the Bureau works to maintain a presence in the community through presentations for local civic, educational, and governmental groups.

Cooperative Projects.—In 2016 the Bureau continued or began work on cooperative projects with other City of Muncie, Muncie Sanitary District, or community organizations related to monitoring water quality. These include the Muncie Water Pollution Control Facility's Long Term Control Plan requirement to investigate the impacts of combined sewer overflows in White River and Buck Creek, annual biological monitoring throughout Delaware County, the Town of Yorktown, City of Muncie, and the Muncie Sanitary District, and annual monitoring for the Sanitation Department's industrial storm water permit. The Bureau also helps support the monitoring of water quality for the Upper Mississinewa Watershed Partnership.

Future Initiatives.—Future initiatives for the Bureau include addressing new compounds of emerging concern. New compounds are continuously being developed for industry, medicine, and home use. As detection limits decrease, many of these chemicals have been found in wastewaters, surface waters, and even drinking waters across the country. Constant vigilance is required to keep pace with this increasingly diverse group of pollutants with as yet unknown impacts in the environment.

The Bureau will seek to find additional grant-funded projects that focus on the removal of endocrine disruptors from the Muncie Sanitary District collection system and local streams. We will continue to look for other various grant-funded projects that overlap work already being done by the Bureau or the Muncie Sanitary District. And we will continue to find new venues for public outreach and education.

As it has for the past 45 years, the Bureau will continue to work with industries and private citizens to ensure that Muncie remains a leader in water quality management by ensuring that the resources of the White River remain healthy for the people of Muncie and Indiana.

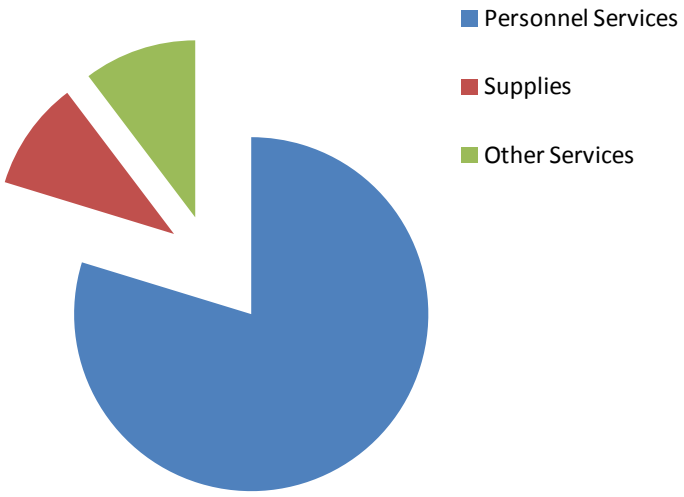
ANNUAL BUDGET

Personnel Services		
Salary and Wages	$	660,000.00
Social Security	$	40,920.00
Medicare Expense	$	9,570.00
P.E.R.F.	$	67,650.00
Health Insurance	$	170,000.00
Life Insurance	$	1,500.00
Unemployment Compensation	$	5,000.00
Total	**$**	**954,640.00**

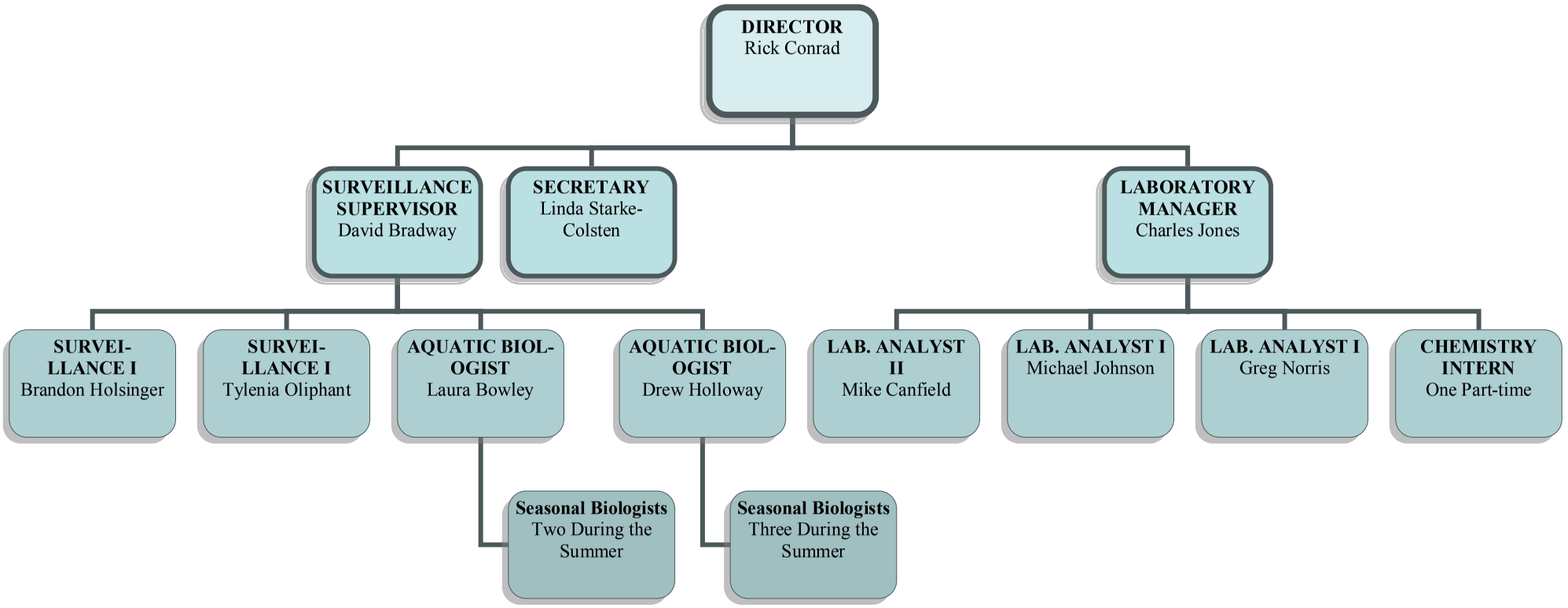
Supplies		
Office Supplies	$	5,000.00
Material, Supplies, Equipment	$	75,000.00
Vehicle Repair	$	4,000.00
Safety Equipment	$	1,000.00
Equipment Repair	$	20,000.00
Clothing	$	3,000.00
Computers, Parts and Support	$	3,000.00
Fuels, Oils	$	8,000.00
Total	**$**	**119,000.00**

Other Services		
Travel Fees and Seminars	$	10,000.00
Electric	$	20,000.00
Gas	$	-
Water	$	-
Phone	$	10,000.00
Laboratory Fees	$	75,000.00
Promotion of Business	$	2,000.00
Monthly Services	$	10,000.00
Total	**$**	**127,000.00**

GRAND TOTAL	**$**	**1,200,640.00**



ORGANIZATIONAL STRUCTURE



ATTACHMENT I - Industrial Discharge Permits

SIU	Date Permit Issued	Date Modified	Date Permit Expires
C&J Plating Co.	4/5/2015		4/4/2020
CamTool, Inc.	7/13/2012		7/12/2017
Delaware Dynamics, LLC	4/28/2013		4/27/2018
East Central Recycling	5/13/2012	11/26/2014	5/12/2017
Exide Technologies	10/15/2013		10/14/2018
GKN Aerospace Muncie, Inc.	9/17/2013		9/16/2018
GK Technologies/Indiana Steel & Wire	6/24/2015		6/23/2020
H&H Commercial Heat Treating Co., Inc.	5/26/2015		5/25/2020
Haylex Manufacturing, LLC	10/17/2013		10/16/2018
Maxon Corporation	9/20/2014		9/19/2019
Mid-City Plating Co., Inc.	5/15/2016		5/14/2021
Mid-West Metal Products	6/13/2016		6/12/2021
Muncie Hard Chrome, Inc.	10/23/2013		10/22/2018
Phillips Pattern and Castings, Inc.	1/20/2017		1/19/2022
Progress Rail Manufacturing Corp.	8/30/2016		8/29/2021
Witt Galvanizing-Muncie	7/30/2013		7/29/2018

In 2016, the Bureau reissued three discharge permits to industries following expiration of their existing permits. All permits are issued for a maximum of five years. Muncie had a total of 16 permitted industries during 2016.

ATTACHMENT II - Inspection and Monitoring

SIU	No. of BWQ Inspections	BWQ Compli-ance Monitor-ing	Industrial Self -Monitoring
C&J Plating Co. (C)	1	44	Bureau
CamTool, Inc.	1	42	40
Delaware Dynamics, LLC	1	0	0
East Central Recycling	1	48	81
Exide Technologies	1	53	1,521
GKN Aerospace Muncie, Inc.	1	48	560
GK Technologies/Indiana Steel & Wire	1	115	1,031
H&H Commercial Heat Treating Co., Inc.	1	65	49
Haylex Manufacturing, LLC	1	62	Bureau
Maxon Corporation	1	87	336
Mid-City Plating Co., Inc.	1	44	49
Mid-West Metal Products	3	44	62
Muncie Hard Chrome (C)	1	40	Bureau
Phillips Pattern and Castings, Inc.	1	80	40
Progress Rail Manufacturing Corp.	1	155	237
Witt Galvanizing-Muncie (C)	1	40	Bureau
Totals	19	967	4,006

(C) Denotes a facility with closed-loop systems. As of January 2016, three (17.6%) industries in Muncie had closed-loop systems as part of the pollution prevention (P2) program.

In some instances, the Bureau conducts the required industrial self-monitoring; typically only when the facility is closed-loop. The industry may be required to sample in the event a problem develops.

ATTACHMENT III - Compliance and Enforcement

Significant Industrial User	Always Compliant	Minor Non-Compliance	Significant Non-Compliance	On Compliance Schedule	Back In Compliance	Publicized Non-Compliance
C & J Plating Co.	X					
CamTool, Inc.		X			X	
Delaware Dynamics, LLC	X					
East Central Recycling	X					
Exide Technologies	X					
GKN Aerospace Muncie, Inc.		X			X	
GK Technologies/Indiana Steel & Wire		X			X	
H&H Commercial Heat Treating Co., Inc.		X			X	
Haylex Manufacturing, LLC	X					
Maxon Corporation	X					
Mid-City Plating Co., Inc.	X					
Mid-West Metal Products	X					
Muncie Hard Chrome, Inc.		X			X	
Muncie Precision Hard Chrome	X					
Phillips Pattern and Castings, Inc.	X					
Progress Rail Manufacturing Corp.	X					
TFX Plating Company, LLC	X					
Witt Galvanizing-Muncie	X					

The “always compliant” column includes those permitted industries that may have exceeded their discharge permit limits a relatively small number of times in relation to all sample results for that industry. For example, if a few self-monitoring samples out of a total of 100 samples taken during the year were non-compliant, the Bureau would not consider this frequency as in Minor Non-Compliance (MNC). An MNC occurs when an industry develops a problem and the Bureau works with them to correct the problem before it becomes SNC.

ATTACHMENT IV
Public Notification,
SNC Legal Notice

During 2016, Muncie had no industries in SNC. The Bureau also issued a total of six (6) verbal telephone notices to five (5) different permitted industries. The Bureau works diligently to help industries avoid SNC status by ensuring that each facility is aware of the consequences of non-compliance before issues arise. However, the Bureau also believes that enforcement responses, including administrative fines, are a vital and effective tool to discourage future non-compliances. Beginning in 2011, the Bureau began complimenting this strategy with an annual award which is presented to those industries which maintain compliance throughout the year. Nine (9) of the sixteen (16) permitted industries will receive the award this year.

Having no industries in SNC, we believe the Bureau and the industrial community, through their time, efforts, and financial investments, have created a Pretreatment Program that is working effectively to protect the pollution control facility and the White River.

ATTACHMENT V
Work Plan for 2016

SIU	Permit Expiration Date	BWQ Compliance Monitoring	SIU Self-Monitoring	Minimum Inspection Frequency
C&J Plating Co.	4/4/2020	Quarterly	Bureau	Yearly
CamTool, Inc.	2/19/2017	Quarterly	Quarterly	Yearly
Delaware Dynamics, LLC	4/27/2018	Quarterly	Each Batch	Yearly
East Central Recycling	5/12/2017	Quarterly	Monthly	Yearly
Exide Technologies	10/14/2018	Quarterly	Daily	Yearly
GKN Aerospace Muncie, Inc.	9/16/2018	Quarterly	Weekly	Yearly
GK Technologies/Indiana Steel & Wire	6/23/2020	Quarterly	Daily	Yearly
H&H Commercial Heat Treating Co., Inc.	5/25/2020	Quarterly	Quarterly	Yearly
Haylex Manufacturing, LLC	10/16/2018	Quarterly	Bureau	Yearly
Maxon Corporation	9/19/2019	Quarterly	Quarterly	Yearly
Mid-City Plating Co., Inc.	5/14/2016	Quarterly	Weekly	Yearly
Mid-West Metal Products	6/12/2016	Quarterly	Each Batch	Yearly
Muncie Hard Chrome	10/23/2018	Quarterly	Bureau	Yearly
Phillips Pattern and Castings, Inc.	1/19/2017	Quarterly	Quarterly	Yearly
Progress Rail Manufacturing Corp.	8/29/2016	Quarterly	Quarterly	Yearly
Witt Galvanizing-Muncie	7/29/2018	Quarterly	Bureau	Yearly

The Compliance Monitoring Frequency column is only the minimum amount to be accomplished by the Bureau. During 2016, the Bureau conducted 108 sampling visits on the permitted industries, including both Categorical and Non-Categorical.

ATTACHMENT VI
Pretreatment Performance Summary

I. GENERAL INFORMATION

Control Authority Name:	**Bureau of Water Quality, MSD**	NPDES No.:	**IN 0025631**
Address:	**5150 W. Kilgore Ave.**	Reporting Period:	**2016**
City:	**Muncie**	No. Categorical Users:	**12**
Contact Person:	**Rick C. Conrad, Director**	No. Non-categorical SIUs:	**4**
Contact Telephone:	**765.747.4896**		

II. SIU COMPLIANCE	Categorical SIUs	Non-categorical SIUs
No. of SIUs Submitting BMRs/No. Required	0/0	0/0
No. of SIUs Submitting 90-day Compliance Reports/No. Required	0/0	0/0
No. of SIUs Submitting Quarterly Reports/No. Required	12/12	4/4
No. of SIUs Meeting Compliance Schedule/No. Required	0/0	0/0
No. of SIUs in SNC/No. Of SIUs	0/12	0/4
Proportion of SNCs for all SIUs	0/16 = 0.0%	

III. COMPLIANCE MONITORING PROGRAM		
No. of Control Documents Issued/No. Required	3/3	0/0
No. of Non-sampling Inspections Conducted	36	5
No. of Sampling Visits Conducted	70	38
No. of Facilities Inspected (Non-sampling)	12	4
No. of Facilities Sampled	12	4

IV. ENFORCEMENT ACTIONS		
Compliance Schedules Issued/Schedules Required	0/0	0/0
Notices of Violation Issued to SIUs	1	0
Administrative Orders Issued to SIUs	0	0
Civil Suits Filed	0	0
Criminal Suits Filed	0	0
Significant Violators (newspaper list attached)	0	0
Amount of Penalties Collected (Total Amount/No. of Users assessed)	$0/0	0
Verbal Notifications	6	0
Other Actions	0	0

I certify that the information contained is complete and accurate to the best of my knowledge:

_____ _____

Authorized Representative — Date

Rick Conrad, Director

GROUNDWATER REMEDIATION AND DEWATERING

An additional focus of the Bureau of Water Quality's Pretreatment Program is the permitting and monitoring of groundwater remediation and dewatering projects within the MSD. Although this function is not a part of our USEPA and IDEM approved Local Pretreatment Ordinance, the necessity to monitor these cleanup projects relates back to our objectives of protecting the MWPCF and waters of the State of Indiana within the MSD jurisdictional boundaries.

During 2016, there were five (5) active remediation projects which included the cleanup of four (4) contaminated groundwater sites associated with gasoline service stations and one (1) permitted remediation project involving the cleanup of contaminated groundwater from their non-categorical industrial plume. The Bureau typically requires these remediation projects be monitored as below:

Parameter	Typical Limit
Flow	Varies (gallons/day)
Benzene	5.0 ug/L
Ethylbenzene	700 ug/L
Toluene	1000 ug/L
Total Xylene	10,000 ug/L
Total Lead	15.0 ug/L
Oil and Grease	10.0 mg/L
Napthalene	100 ug/L
MTBE	Report

Additionally, the BWQ permitted the dewatering of two (2) construction sites at the MWPCF where PCBs had previously been detected in the soil. These sites were both sampled for PCBs and total toxic organics. These permits were reviewed by IDEM.

The Director of the Bureau has the discretion of adding additional parameters to this list if deemed necessary to protect the MWPCF and/or the White River and its tributaries. All other parameters not specifically listed in the Groundwater Discharge Permits, but contained in the Muncie Code of Ordinances, Chapter 53 Pretreatment Ordinance are also in effect. However, no monitoring for any other parameters is required unless deemed necessary by the Director. Underground Remediation Discharge permit limits have been exceeded a total of zero times in 2016. When permit violations occur, the remediation units for these facilities must shut down processes until the problem is corrected and they have submitted acceptable analytical results to the Bureau prior to being allowed to restart.

The Bureau will continue to monitor groundwater remediation projects and make every attempt to ensure these types of discharges go to the MWPCF rather than to a receiving stream. This allows for additional treatment by the MWPCF of any contaminants that may pass through the remediation units. A summary of the groundwater remediation units currently permitted by the Bureau can be found on the following page.

UNDERGROUND REMEDIATION AND DEWATERING PERMITS
IN 2016

Facility Location	Permit Issued	Permit Expires	Monitoring Frequency
Duffy Tool & Stamping, L.L.C. 3224 S. Meeker Ave. UR 2012-001	2/6/2017	2/5/2019	Monthly
Hoosier Pete # 11 Port & Hoyt Hoosier Pete 2535 Hoyt Ave. UR 2014-001	3/14/2014	3/13/2019	Monthly
Speedway #5005 32104 N. Wheeling Ave. UR 2014-002	4/17/2016	3/31/2018	Monthly
G&G Bulk Fuel Facility 220 E. Centennial Ave. UR-2016-004	4/1/2016	3/31/2018	Monthly
SSN Petroleum (formerly Speedway #8097) 4324 S. Madison Ave. UR 2015-003	7/6/2015	7/7/2018	Monthly
Muncie Water Pollution Control Facility 5150 W. Kilgore Ave. DW-2016-001	11/8/2016	11/8/2017	Monthly
Muncie Water Pollution Control Facility 5150 W. Kilgore Ave. DW-2016-002	11/8/2016	4/21/2017	Monthly

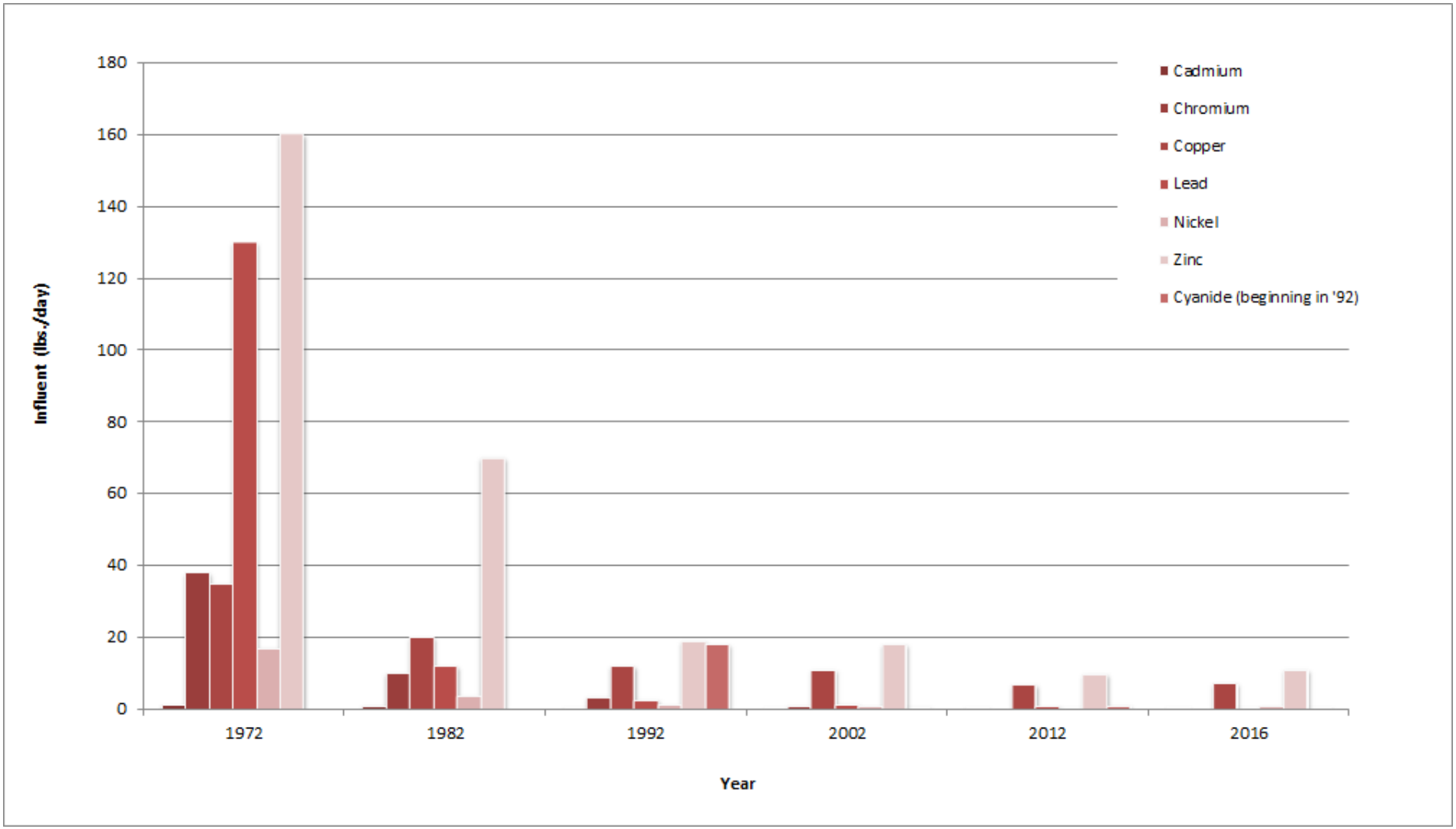
MWPCF INFLUENT/EFFLUENT METALS, CYANIDE

The effectiveness of Muncie's Pretreatment Program can be graphically represented by plotting data commonly associated with industrial wastewaters in the MWPCF influent and effluent. A major portion of wastewater entering the MWPCF from the industrial base is from metal finishing processes. The following graphs illustrate the most commonly discharged metals and cyanide in the influent and effluent of the MWPCF. The graphs show a dramatic decrease in these pollutants since the 1970s. In the last decade, metals concentrations are so low, that it has become nearly impossible to accurately detect annual trends or account for the causes of yearly fluctuations. The largest influence on yearly variation is often the laboratories calculation of their minimum detection limits (MDLs) for each parameter. Each analytical method has a lower limit for detection depending largely on the piece of equipment being used. A series of quality control tests using blanks and known quantities are used to determine the lowest concentration that can reliably be detected. Though these detection limits may change by less than one hundredth of a milligram from year to year, the concentrations of metals present in the wastewater are now so close to the MDLs that our annual averages are often more influenced by our annual determination of these MDLs than they are of the "true" average of a concentration for a metal. Cyanide, lead, sliver, and chromium concentrations, for example, are often less than these detection limits. These results, which are also called censored data, fall somewhere between *true* zero and our MDL, but we cannot say precisely where. While it is excellent that metals concentrations are so low, it does make data analysis very problematic.

In the following sections, substantial reductions of regulated parameters are evident in the MWPCF influent and effluent. The graphs of metals are mass-based (i.e. pounds per day) which helps eliminate the influence of flow variations at the plant. This is particularly important because the plant is a combined system meaning its flow is highly influenced by rainfall. Using pounds per day, we can more accurately document the decrease in loadings to the MWPCF and the West Fork of the White River.

Since the creation of the Bureau in 1972, the amount of toxic metals entering the MWPCF has been reduced as a result of our Pretreatment Program by an average of approximately 500 tons annually, which equates to preventing approximately 200 tons annually from reaching the river.

MWPCF INFLUENT
1972 to 2016, Selected Years



MWPCF EFFLUENT
2016

Following the establishment of the Bureau in 1972, our Industrial Pretreatment Program has helped reduce toxic chemicals discharged to the White River by an estimated 60 tons annually. This greatly reduces pollution in the water, in the sediment of the streambed and in the tissue of aquatic life.

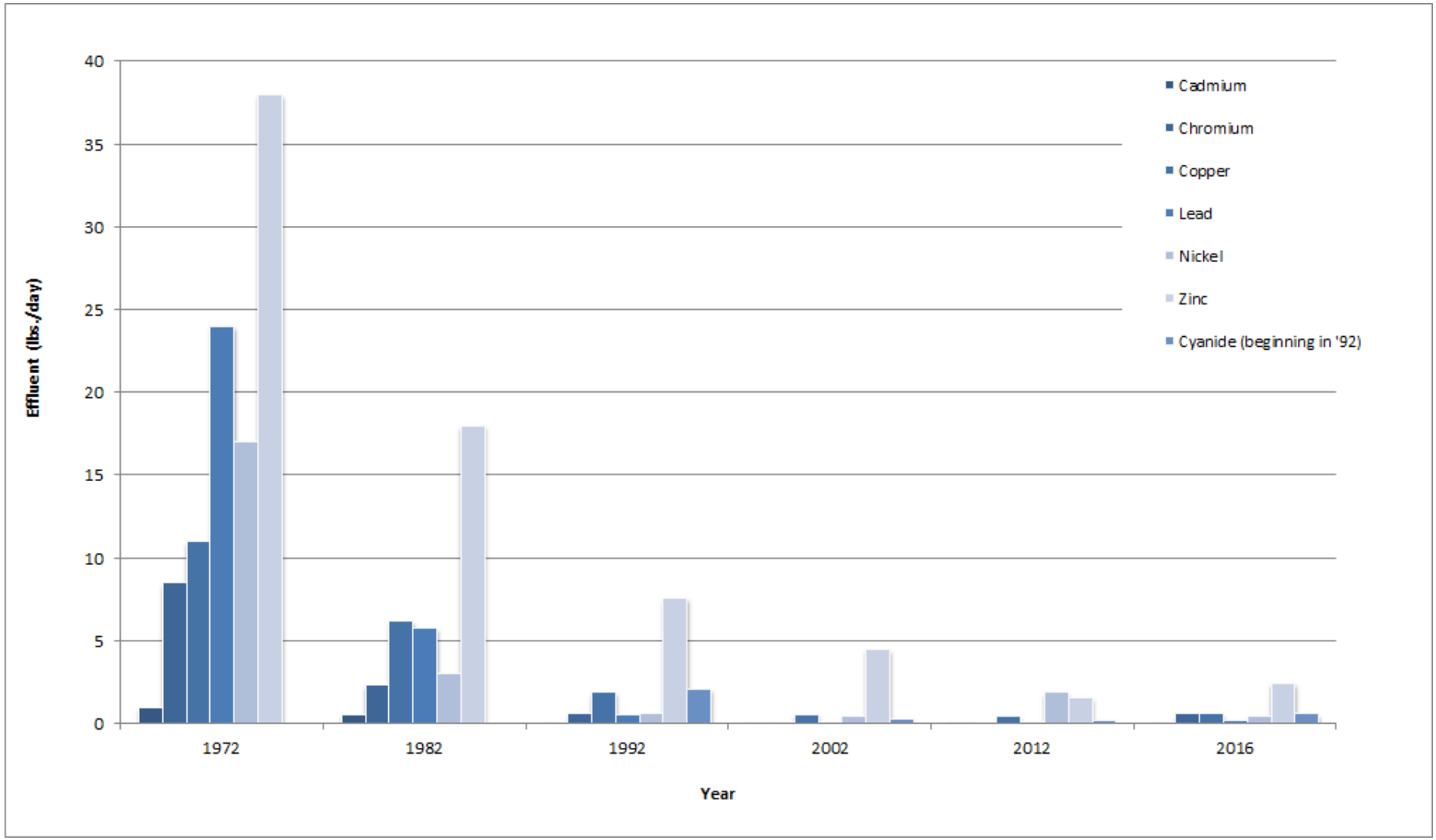
The graphs on the following pages describe trends in the concentrations of metals in the MWPCF effluent. We observe the concentrations of toxic metals discharged to the river are decreasing, demonstrating an effectively functioning industrial pretreatment program.

Below are the summary statistics for metals detected in the effluent in 2016. The results below represent only those for which there was an influent and effluent sample collected on the same day in order to most accurately describe percent removals. Additional samples may have been required by the permit depending on the parameter.

Parameter	No. of Samples Analyzed	Percentage of Censored Results*	Laboratory MDL (mg/L)	Mean Daily Concentration (mg/L)	Standard Deviation (mg/L)	Maximum Daily Concentration (mg/L)	Daily Limit (mg/L)	Percent Removal
Cyanide, Amenable	8	100%	0.003	< 0.003	NA	NA	0.008	NA
Cyanide, Total	6	67%	0.003	< 0.003	NA	0.003	report	NA
Silver	8	38%	0.00006	0.0001	0.000045	0.00015	report	66%
Cadmium	8	0%	0.00002	0.00036	0.00025	0.0007	0.004	27%
Chromium	8	63%	0.0004	<0.00125	NA	0.0038	report	68%
Copper	48	0%	0.0006	0.0039	0.0017	0.0071	0.05	91%
Nickel	8	0%	0.0007	0.0024	0.0017	0.004	0.12	55%
Lead	48	29%	0.0004	0.0010	0.0012	0.0045	0.021	65%
Zinc	8	0%	0.001	0.0175	0.0058	0.0230	0.44	69%

*Censored results are those which are less than the minimum detection limit (MDL), and are therefore must be reported as "less than the MDL." When censored data were present, the mean was calculated using the non-censored results and reported as "less than" this result. Standard deviation was not calculated.

MWPCF EFFLUENT
1972 to 2016, Selected Years



MWPCF BIOSOLIDS
METALS, CYANIDE

Biosolids (sometimes referred to as sludge) represent the non-liquid waste produced by the MWPCF. Most metals adhere to solids, so as the treatment facility removes metals from its wastewater, it is accumulating them in its biosolids. The pound-loading of metals in the biosolids should decrease as a Pretreatment Program becomes more effective. The installation of pretreatment equipment and implementation of pollution prevention efforts by the industrial community (e.g., chemical substitution, better housekeeping, changes in production methods and others) should help reduce the concentrations of metals and other pollutants in the biosolids. Muncie no longer land-applies its biosolids to fields, and the biolsolids are now disposed of at a municipal landfill. This has greatly reduced the concern over potentially exceeding any limits for pollutants in the biosloids, but concentrations and trends can still be useful in evaluating the performance of the pretreatment program.

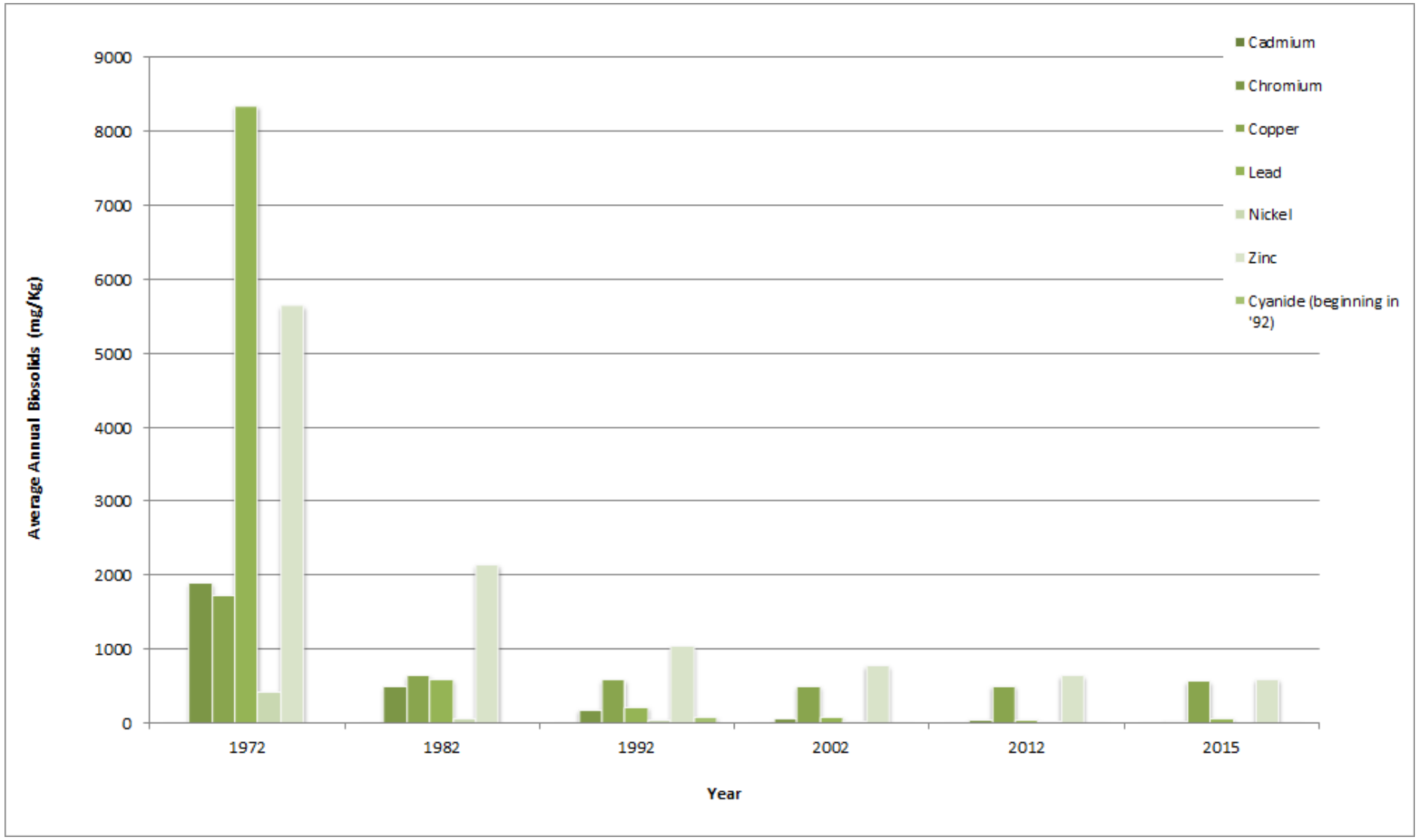
The following table and graph summarize the dry weight of metals and cyanide in the plant's biosolids. Since the 1970s, metals and cyanide have decreased substantially until tapering off in the last few decades. More recently, annual fluctuations are most likely attributed to stormwater entering the MWPCF through combined sewers contributing more pounds of cadmium, lead, and zinc during wet years as opposed to dry years and/or elevated cyanide loadings resulting from the rock salt applied to roads and parking lots during years with more snowfall events. In previous years, many of the total toxic organics found not only in the biosolids, but also in the influent could be attributed to improper disposal of Household Hazardous Waste (HHW). With Muncie's aggressive recycling program, all residents of Delaware County are offered free disposal of hazardous waste, at the East-Central Recycling Facility (one of our permitted industries). As stated above, these yearly fluctuations are expected in a mature Pretreatment Program.

MWPCF BIOSOLIDS
Summary Statistics for 2016

Parameter	No. of Samples Taken in 2015	Method Detection Limit*	Mean (mg/Kg)	Standard Deviation (mg/Kg)	Maximum Result (mg/Kg)
Percent Total Solids	12	0.1	3.35	0.31	3.88
Percent Volatile Solids	12	0.1	47.18	1.88	51.3
Mercury in Sludge by CVAA	6	2.48	0.70	0.45	1.19
Silver in Sludge by ICP	12	7.6	4.02	0.79	5.5
Arsenic in Sludge by ICP	12	0.004	27.81	3.43	34.5
Cadmium in Sludge by ICP	12	1.37	4.69	2.30	11.5
Chromium in Sludge by ICP	12	0.003	36.68	3.63	40.5
Copper in Sludge by ICP	12	0.006	580.00	61.82	693
Molybdenum in Sludge by ICP	12	0.006	15.64	2.61	20.1
Nickel in Sludge by ICP	12	2.15	25.78	2.51	30
Lead in Sludge by ICP	12	0.005	54.24	4.86	62.1
Antimony in Sludge by ICP	12	0.021	3.60	0.60	4.76
Selenium in Sludge by ICP	12	2.05	18.51	5.98	29.9
Zinc in Sludge by ICP	12	3.51	684.08	66.27	778
Cyanide,Total in Sludge	12	0.006	4.80	1.26	6.62

*Method Detection Limit varies with analysis

MWPCF BIOSOLIDS
1972 to 2016, Selected Years



BIOMONITORING

Of all of the testing conducted by the Bureau, whole effluent toxicity (WET) testing is perhaps the most straight-forward to understand. For over two decades, Muncie has been conducting this form of biomonitoring in which daphnia (*Ceriodaphnia* sp.), and minnows (*Pimephales promelas*) are exposed to the effluent of the plant and observed for negative impacts. These tests are conducted on these species on a biannual basis, and we have passed each test with a 100% No Observed Effect Level since 1990. In addition, the Bureau voluntarily supplements these tests with a whole effluent test on a *Selenastrum sp.* (an algae). Though not required by the permit, the Bureau believes adding an algae species may be beneficial for identifying impacts of pollutants that may selectively impact photosynthesizers (i.e. algaecides from cooling towers).

TOXIC ORGANIC POLLUTANTS

As part of the monitoring requirements detailed by our NPDES permit, the Bureau conducts an annual scan for organic pollutants in the influent, effluent, and biosolids of the MWPCF. A summary of this report for 2016 can be found on the following pages. Though the pollution control facility is not specifically designed to remove organic compounds, removal efficiencies appear to be relatively high as most of the compounds found in the influent are absent from the effluent.

The Bureau has long recognized the potential threat posed by organic pollutants and has continued to surpass the minimum monitoring required by law. This includes annual monitoring of a handful of industries, selected on a rotating basis, to ensure they are effectively prohibiting the discharge of these toxic organics in their waste stream. Periodic sampling of storm water run-off, including run-off from large parking lots, are also included as these are each sources of organic compounds found in the wastewater treatment plant.

Finally, samples from the White River are also included in annual organic compound scans to estimate the influence on the receiving stream and to help locate potential sources. Commonly detected compounds include chloroform and bromodichloromethane, which are byproducts of the chlorination of tap water. In most cases, the concentrations of compounds were below detection limits, but those few that were detected were extremely low in concentration (in the microgram per liter range).

INFLUENT

Volatile Priority Pollutants - EPA 624 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

Tentatively Identified Volatile Priority Pollutants - EPA 624 (ug/L)

Parameter	Feb.	Aug.
BENZENE	-	6.98
xx ACETONE (2-PROPANONE)	-	56

Semi-Volatile Priority Pollutants (Base/Neutral/Acid) - EPA 625 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

Tentatively Identified Semi-Volatile Priority Pollutants (Base/Neutral/Acid) - EPA 625 (ng/uL)

Parameter	Feb.	Aug.
xx 2-PROPENOIC ACID, 2-METHYL…	0.11	-
ETHANOL, 2-BUTOXY-	0.06	-
xx 2-BUTENOIC ACID, METHYL ESTER	0.05	-
1H-CYCLOPROPOA[a]NAPHTHALENE…	0.03	-
CYCLOPENTANE	0.09	-
DODECANAMINE	0.04	-
DODECANOIC ACID	0.04	-
TETRADECANOIC ACID	0.04	-
x HEXADECANOIC ACID	0.4	0.08
x OLEIC ACID	0.29	-
xx OCTADECANOIC ACID	0.2	0.08
OCTADECADIENOIC ACID	0.05	-
PENTADECATRIEN-2-ONE…	0.05	-

Polychlorinated biphenyls (PCBs) - EPA 608 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

*Values Estimated, TIC by GC/MS

x Indicates parameter was also detected in 2014

xx Indicates parameter was also detected in 2014 and 2015

EFFLUENT

Volatile Priority Pollutants - EPA 624 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

Tentatively Identified Volatile Priority Pollutants - EPA 624 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

Semi-Volatile Priority Pollutants (Base/Neutral/Acid) - EPA 625 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

Tentatively Identified Semi-Volatile Priority Pollutants (Base/Neutral/ Acid)-EPA 625 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

Polychlorinated biphenyls (PCBs) - EPA 608 (ug/L)

Parameter	Feb.	Aug.
NONE DETECTED	-	-

*Values Estimated, TIC by GC/MS

x Indicates parameter was also detected in 2015

xx Indicates parameter was also detected in 2014 and 2015

BIOSOLIDS

Volatile Priority Pollutants - EPA 624

Parameter	Feb.	Aug.
	ug/Kg (wet)	ug/Kg (wet)
TOLUENE	30	-

Tentatively Identified Volatile Priority Pollutants - EPA 624

Parameter	Feb.	Aug.
	ug/Kg (wet)	ug/Kg (wet)
NONE DETECTED	-	-

Semi-Volatile Priority Pollutants (Base/Neutral/Acid) - EPA 625

Parameter	Feb.	Aug.
	ng/uL (wet)	ng/uL (wet)
NONE DETECTED	-	-

Tentatively Identified Semi-Volatile Priority Pollutants (Base/Neutral/Acid) - EPA 625

Parameter	Feb.	Aug.
	ug/Kg (wet)	ug/Kg (wet)
SULFUR, MOL.	-	3.5
2, 6, 10-DODECATRIEN-1-OL, 3,…	-	2.3
CHOLESTANE, 4, 5-EPOXY…	-	26.1
2H-QUINOLIZINE, 1, 3, 4, 6, 7, 9…	-	3.1
2, 5-CYCLOHEXADIENE-1, 4-DION…	-	2.7
2, 6-PYRIDINEDIOL, 3-[(O-HYD…	-	5.6
TROGER'S BASE	-	10.8
PREGN-4-ENE-3, 20-DIONE…	-	2.1
CHOLESTAN-3-ONE, 4, 4-DIMETH	-	5.3
2-PENTENIMIDIC ACID, N-(4-M…	-	2.2
1, 1'-BIPHENYL, 2,4-DICHLORO…	-	2.1

Polychlorinated biphenyls (PCBs) - EPA 608

Parameter	Feb.	Aug.
	ug/Kg (wet)	ug/Kg (wet)
NONE DETECTED	-	-

*Values Estimated, TIC by GC/MS

x Indicates parameter was also detected in 2015

CONTAMINANTS OF EMERGING CONCERN

Public concern regarding endocrine disrupting compounds, specifically those related to pharmaceutical and personal care products, has piqued in recent years. In response, the Bureau has implemented a limited monitoring program aimed at identifying the presence of these substances in local wastewaters and waterways. The table on the following page lists the compounds which were investigated as well as their concentrations in Muncie's wastewater treatment plant and in the White River throughout Muncie. Relatively high concentrations of acetaminophen, caffeine, and ibuprofen were detected in the wastewater influent. However, in spite of the fact that the treatment plant is not specifically designed to remove these types of wastes, the removal efficiency appears remarkably high for those compounds which were more concentrated in the wastewater than they were in the river.

The small number of samples taken prevents any detailed statistical analyses of loading or removal efficiencies; however, more rigorous sampling seems unwarranted at this time for three main reasons. First, these tests are extremely expensive. Analysis of pharmaceuticals requires specialized equipment to detect such small concentrations, and it quickly becomes cost prohibitive to conduct as many samples as would be necessary to illustrate the nuanced variability we are frequently able to describe with the more conventional pollutants such as ammonia and metals. Secondly, we can already reasonably estimate the presence and concentrations of pharmaceuticals in and around Muncie based on research conducted elsewhere in the country simply based on Muncie's population. And finally, the demonstrated threat from exposure to pharmaceuticals appears to be extremely low. As an example, for someone to consume the equivalent of a one-time dose of Tylenol, he or she would have to drink 300 gallons of water directly from the river every day for the rest of his or her life. Most of the communities in this area do rely upon the White River as a drinking water source, but only following additional treatment which has been shown to further reduce the concentrations of these chemicals.

To be clear, it is not our contention that this subject is not important. With so much left unknown about these compounds and their possible interactions in the environment, we are merely suggesting that efforts be focused less on re-reporting numbers which have very little meaning to the public other than to incite worry.

With this in mind, the Muncie Sanitary District has decided to focus its efforts in two general directions. The first emphasizes investigating the possible responses of aquatic organisms in the environment. Specifically, we are working to develop a more practical detection method that is sensitive to a wider array of endocrine disrupting compounds, and one that will simultaneously demonstrate an impact on the environment (as opposed to simply demonstrating presence). The preliminary results of this work are promising. Morphological measurements of a sentinel species of fish have shown small but detectable effects that have been correlated to the presence of estrogenic compounds.

The second part of the effort was an acknowledgment that the concentrations of these compounds could be reduced, and that there was no reason to wait and see if any of these compounds is someday proven to be harmful to humans or the environment before taking action to reduce their presence in waterways. To this end, the Muncie Sanitary District has been sponsoring "drug drops" where residents can safely dispose of their unused medicines. The district has also developed educational programs directed at the public and local pharmacies to discourage flushing of unwanted medicines; the most controllable means of contamination of waterways.

PHARMACUETICALS SAMPLING 2015

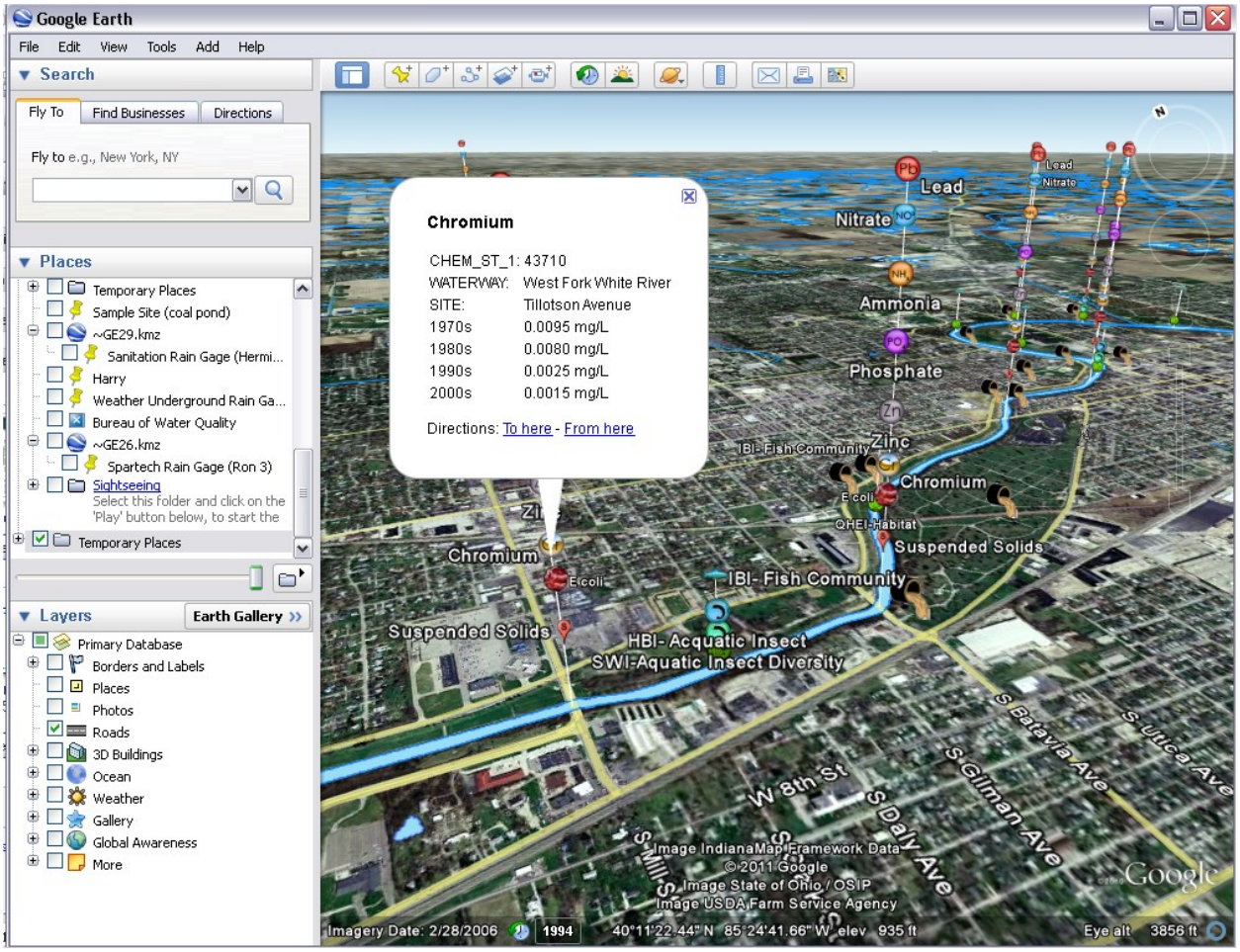
all values in ng/L

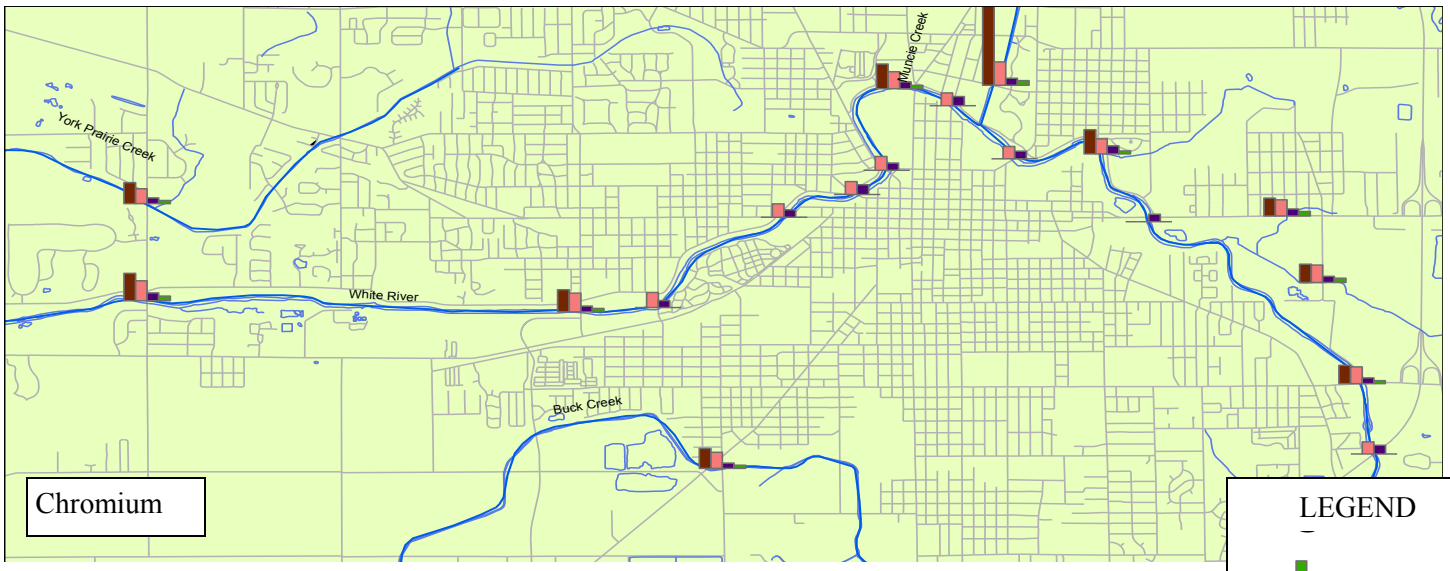
Drug Name	Plant Influent	Plant Effluent	**Percent Removal**	York-Prairie Cr.	White River	Muncie Cr.
Acetominophen	79	<0.010	**>99%**	0.087	<0.010	0.018
Caffeine	39	0.025	**>99%**	0.16	<0.025	0.11
Carbamazepine	0.43	0.21	**51%**	<0.010	0.036	<0.010
Cotinine	1.6	0.01	**>99%**	<0.010	<0.010	<0.010
DEET	8.4	0.031	**100%**	0.043	0.067	<0.025
Diclofenac	0.15	0.016	**89%**	<0.010	<0.010	<0.010
Gemfibrozil	1.4	0.029	**98%**	<0.010	<0.010	<0.010
Ibuprofen	12	0.01	**>99%**	0.012	<0.010	0.019
Lincomycin	<0.010	<0.010	**-**	<0.010	<0.010	<0.010
Metrprolol	0.78	0.35	**55%**	<0.010	0.094	<0.010
Sulfadimethoxine	<0.010	<0.010	**-**	<0.010	<0.010	<0.010
Sulfamethazine	<0.010	<0.010	**-**	<0.010	<0.010	<0.010
Sulfamethoxazole	2.1	0.35	**83%**	<0.010	0.019	<0.010
Sulfathiazole	<0.010	<0.010	**-**	<0.010	<0.010	<0.010
Triclosan	0.46	0.025	**>99%**	<0.025	<0.025	<0.025
Trimethoprim	0.88	0.045	**95%**	0.025	<0.010	<0.010

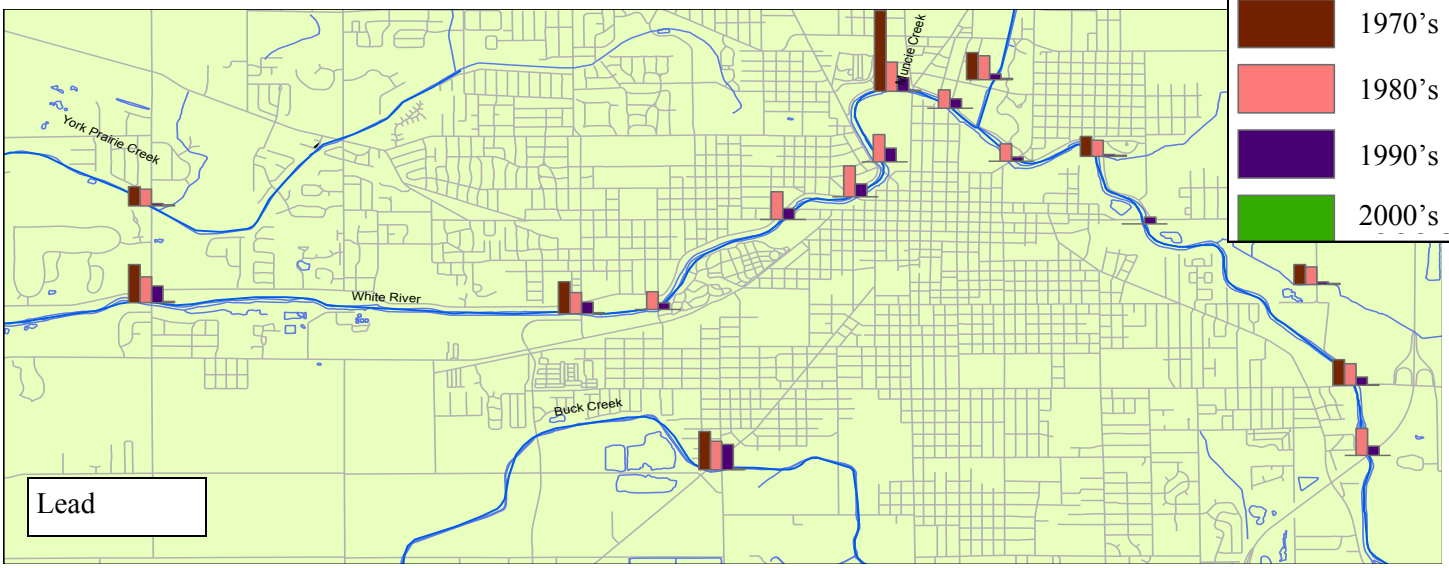
STREAM SAMPLING

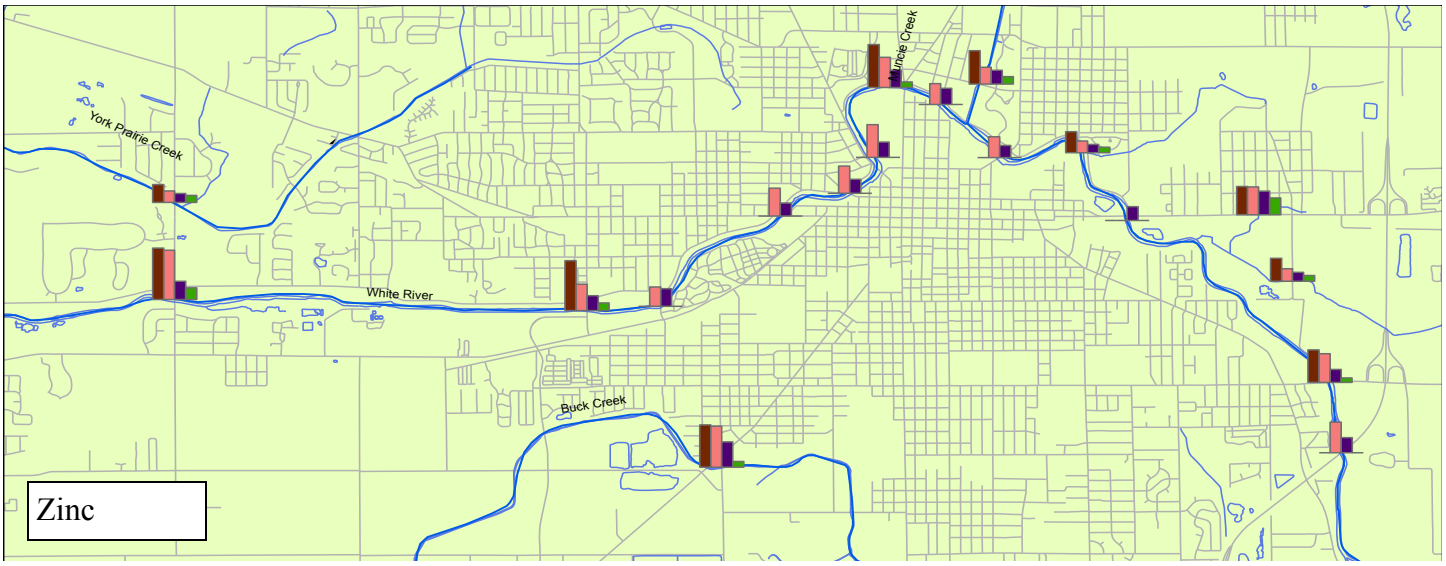
One of the first actions taken by the Bureau following its establishment was to begin a monitoring program that would characterize the condition of the White River throughout Muncie. This monitoring, which includes 16 sites sampled on a monthly basis, has continued largely unchanged for almost 40 years. The changes that have been seen over this time have been vital not only in identifying problems with water quality, but also in identifying successes. The reduction in nearly all parameters of concern have been dramatic, and the reduction in metals in particular, speaks volumes about the effectiveness of the pretreatment program.

Today, we take advantage of numerous avenues for disseminating this information to the public. Accessibility to a wealth of information is now available in many formats including geographic information system (GIS) linked databases and GoogleEarth™ online formats. Every effort is made to inform the local residents and anyone with access to the internet of the tremendous improvement in water quality that has occurred in Muncie.









LEGEND

1970's

1980's

1990's

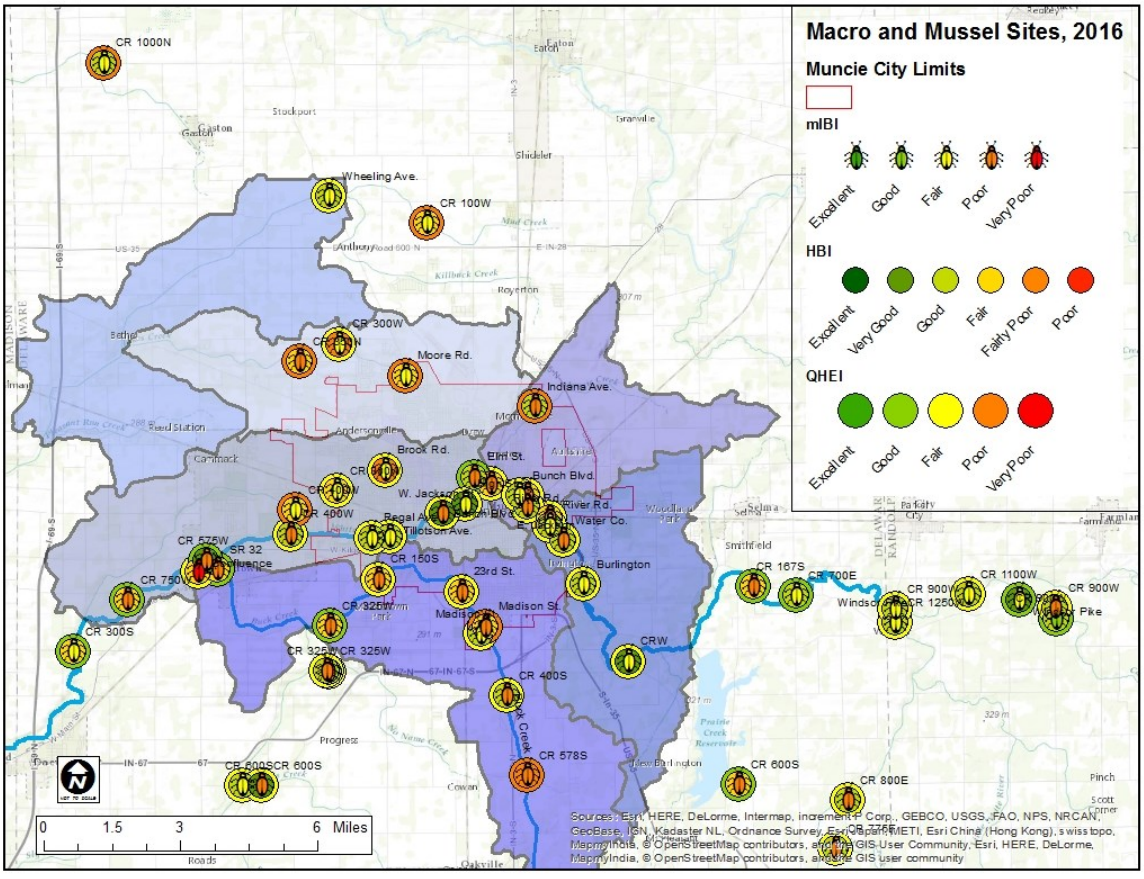
2000's

AQUATIC LIFE SAMPLING

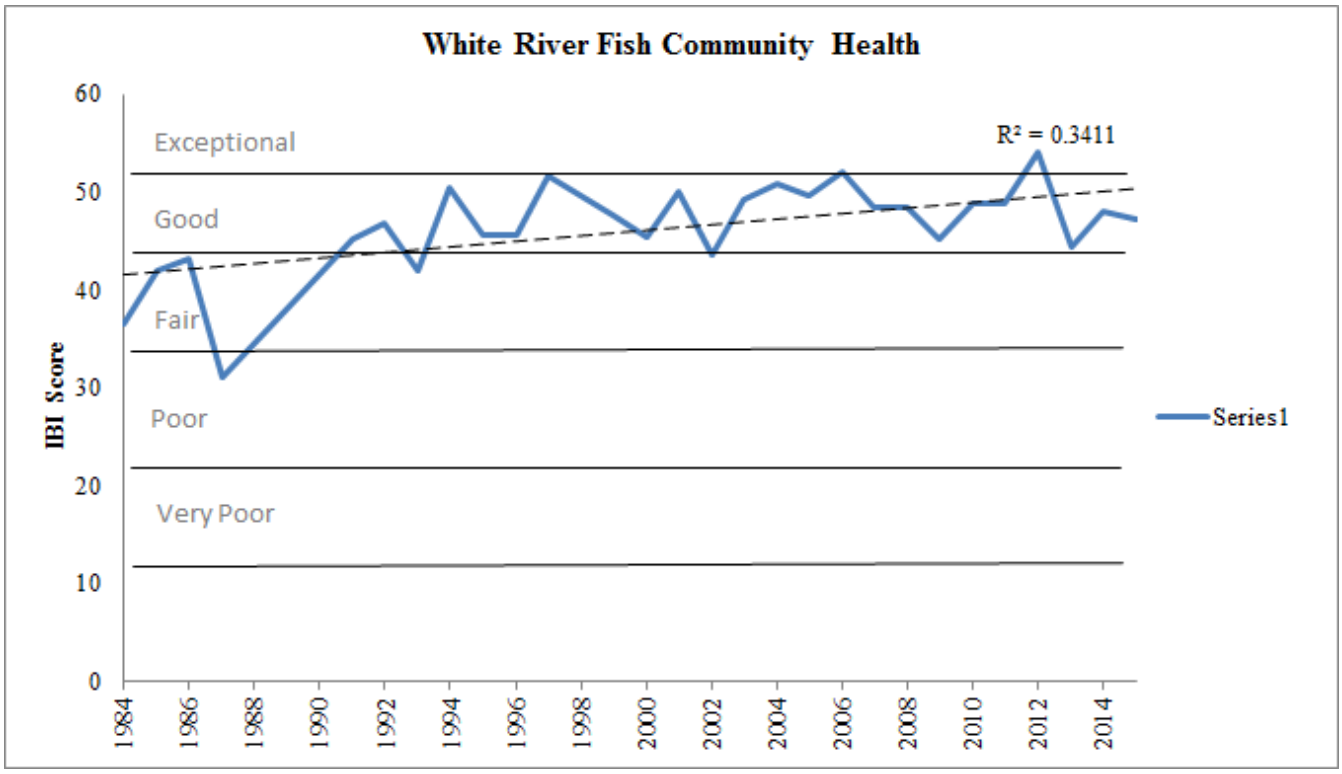
Although the threats to water quality are diverse and complex, historical water management policies have been relatively simple and narrow. Chemical testing, bioassays, and other related laboratory procedures intended to provide empirical and legal validity to assessments often substitute probable cause-effect relationships for direct observation. This monitoring approach has three main deficiencies; 1) it is limited to instantaneous measurements producing mere "snapshots" of a highly variable chemical timeline, 2) it is unable to reveal the synergistic impacts imparted to aquatic organisms in a natural system, and 3) nonpoint sources that are unrelated to chemical toxicity are not well addressed.

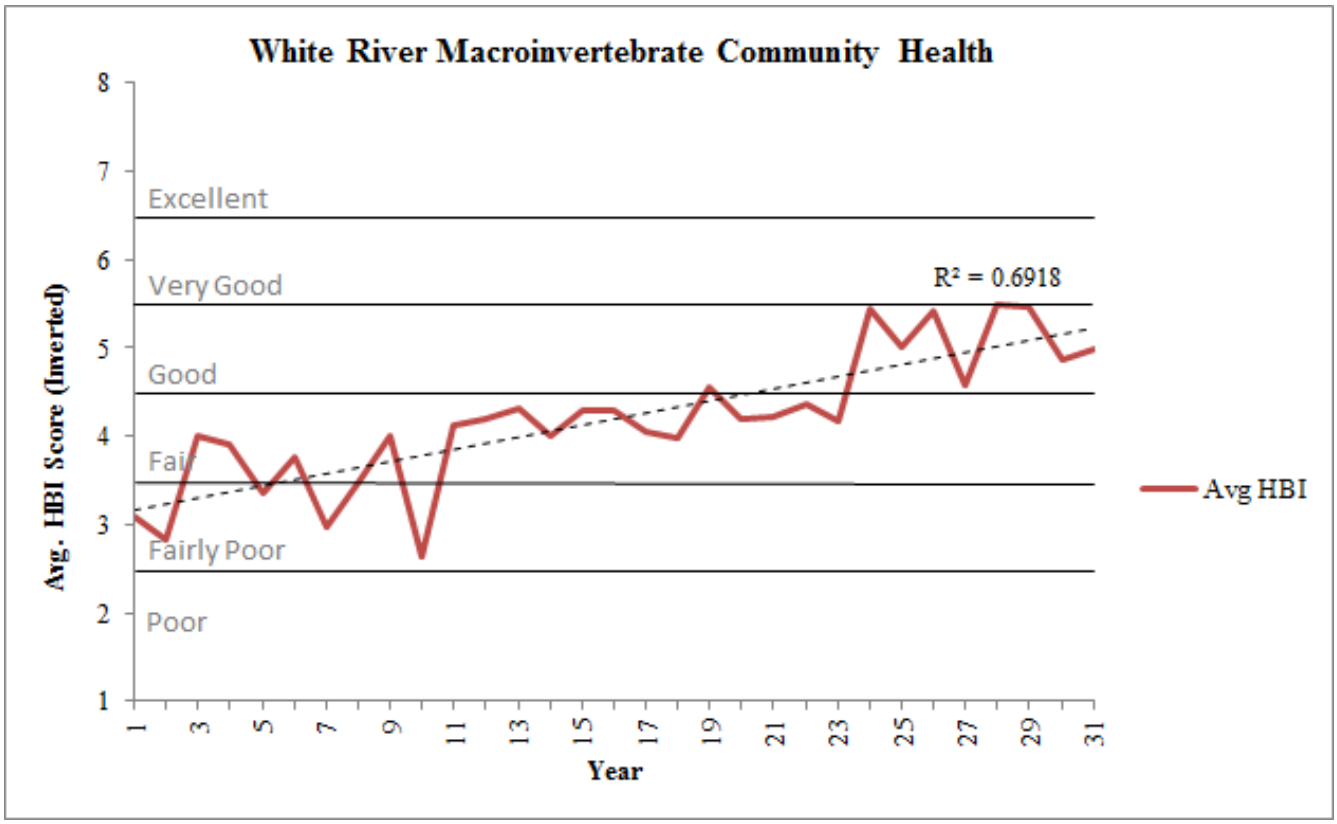
The addition of biological integrity as a fundamental goal of water quality programs has encouraged the development of biological criteria (biocriteria) to assess the health of aquatic life. Fish, benthic macroinvertebrates, and periphyton are core indicators of the biological integrity of streams. Community level analysis of these groups provides a measure of ecological sustainability that integrates all components of water pollution.

Biocriteria are not intended to replace chemical sampling, but rather to supplement it by providing the most accurate means of detecting and measuring overall water quality. The following graphs summarize the effectiveness of Muncie's Pretreatment Program on the biology of the White River just downstream of the wastewater treatment plant outfall. The index of biotic integrity (IBI) quantifies fish community health, and the Hilsenhoff biotic index (HBI) quantifies aquatic macroinvertebrate health. Detailed reports are completed every year by the Bureau's biologists and have been a powerful means of communicating the condition of the White River to the public. Some of this work is summarized in the following figures, and detailed annual reports are available on our website.



Macroinvertebrate community and habitat sites sampled by the Bureau in 2016.





The plots above are based the average biotic index score for a number of sites samples along the White River in Muncie. Detailed biology reports are prepared annually and are available by contacting the Bureau or by visiting the Bureau website.