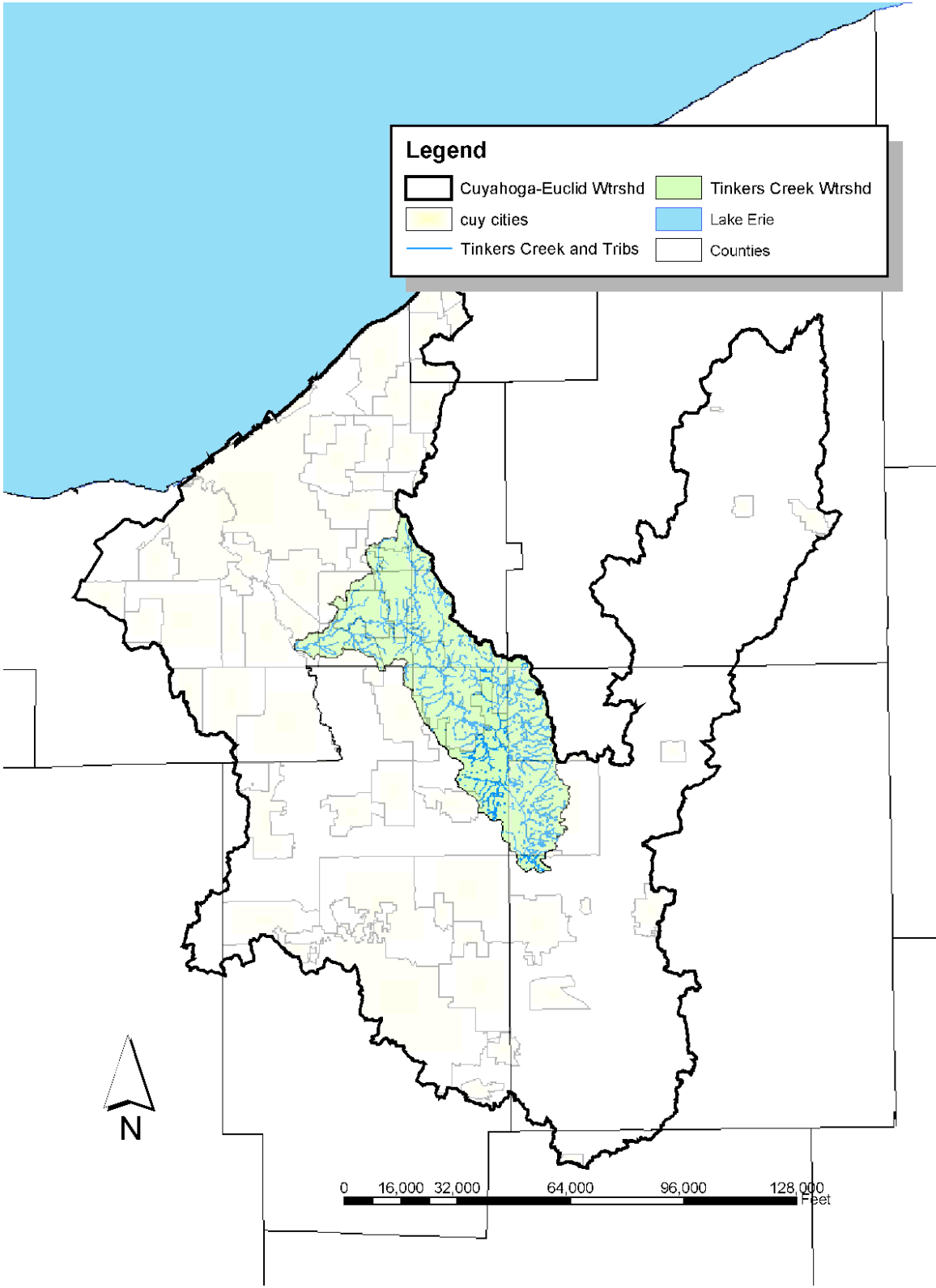
Tinkers Creek

Stressor Identification Project

June 17, 2010
9:30-10:00 am

Bill Zawiski
Ohio EPA



Total Maximum Daily Loads for the Lower Cuyahoga River

Final Report

prepared by

Ohio Environmental Protection Agency
Division of Surface Water

September 2003

The Lower Cuyahoga River Total Maximum Daily Load (TMDL) report was approved by U.S. EPA on September 26, 2003.

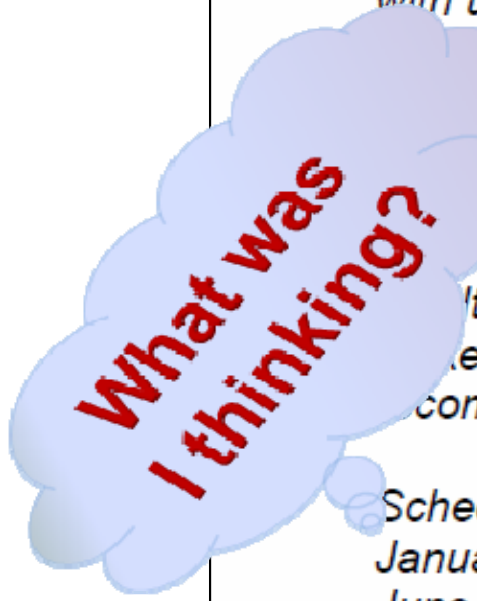
Appendix C. Adaptive Management Implementation Plan for the Tinkers Creek Subbasin

Due to continued unidentified sources and causes of non attainment in this watershed, adaptive management has been chosen as a valid and workable implementation plan for restoration of water quality. The adaptive management plan will consist of two general phases which will be described in greater detail below.

6.1.2 Proposed NPDES Language

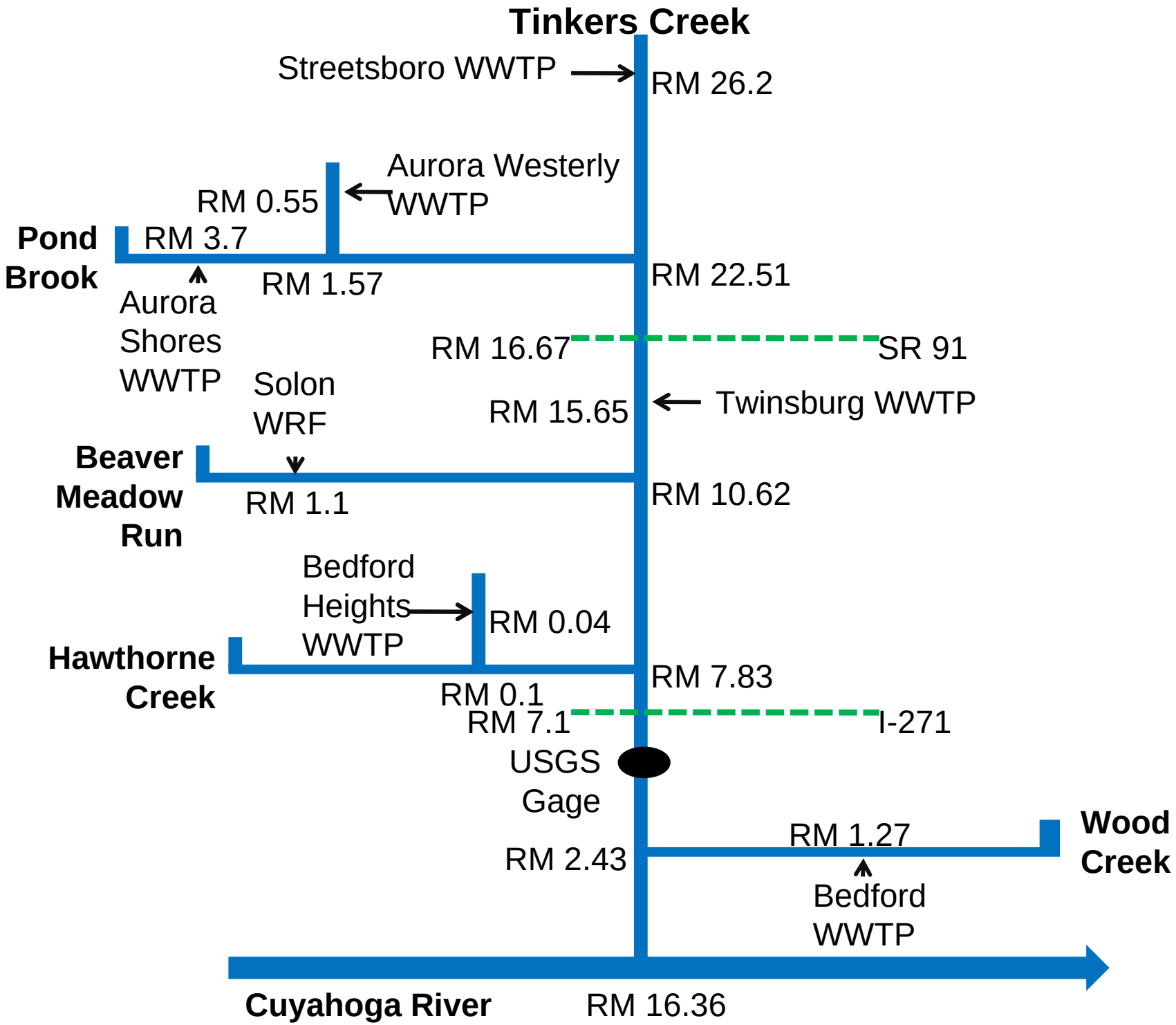
All NPDES permits within the Tinkers Creek watershed shall be modified or issued with the following proposed language:

"The Lower Cuyahoga TMDL, identified the Tinkers Creek subbasin as an area with unidentified sources of stressors resulting in NONATTAINMENT of Ohio Quality Standards. A process known as adaptive management will be used er data, identify stressors, and implement appropriate controls needed to water quality in the Tinkers Creek subbasin. The permit holder shall be a r of the Tinkers Creek Restoration Group and be included in all ations for activities pertaining to this project. Should stressor identification lt in additional pollutant loading recommendations for permittees in the kers Creek subbasin this permit shall be modified to reflect those commendations.



Schedule:

January - December 2004	*Gather Data*
June 2004 - June 2006	*Conduct Stressor Identification*
June 2006	*Begin to Implement Management Plan"*


Tinkers Creek
Streetsboro WWTP
RM 26.2
Aurora Westerly WWTP
RM 0.55
Pond Brook
RM 3.7
RM 1.57
RM 22.51
Aurora Shores WWTP
RM 16.67
SR 91
Solon WRF
RM 15.65
Twinsburg WWTP
Beaver Meadow Run
RM 1.1
RM 10.62
Bedford Heights WWTP
RM 0.04
Hawthorne Creek
RM 0.1
RM 7.83
RM 7.1
I-271
USGS Gage
RM 1.27
Wood Creek
RM 2.43
Bedford WWTP
Cuyahoga River
RM 16.36

2000 Tinkers Creek (19-007) - WWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status	Comment
29.1[w]/28.3	32*	--	48	52.5	PARTIAL	Seasons Road
25.0[w]/25.2	24*	--	46	34.5	**NON**	
17.5[w]/18.0	25*	5.3*	40	50.0	**NON**	At Whitlach Development
14.3[w]/14.3	28*	6.4*	40	56.0	PARTIAL	Adj. East Idlewood
8.5[w]/8.5	21*	5.5*	44	76.5	**NON**	Dst. Inland Reclamation
6.9[w]/7.2	28*	7.5[ns]	G	71.0	PARTIAL	Dst. Hawthorn Creek
0.1[w]/0.1	32*	6.1*	36	78.0	PARTIAL	At mouth

Pond Brook (19-008) - MWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status[b]	Comment
3.8[H]/3.8	36	--	F	44.0	FULL	Ust. Shores WWTP
-/1.4	--	--	28	--	(FULL)	SR 82 (wetland area)

Beaver Meadow Run (19-046) - WWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status	Comment
1.2[H]/1.2	34*	--	F*	57.0	**NON**	Ust. Solon WWTP
0.2[H]/0.2	38[ns]	--	F*	70.5	PARTIAL	Old

Hawthorne Creek (19-064) - WWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status	Comment
0.7[H]/0.7	32*	--	MG	60.0	PARTIAL	

Wood Creek (19-043) - LRW Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status	Comment
0.2[H]/0.1	20*	--	F	62.5	FULL	At mouth

2006-2007 Tinkers Creek (19-007) - WWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status[b]	Comment
28.8[H]/-	34[ns]			53.0	(FULL)	Seasons Road
24.4[H]/-	26*			63.0	**(NON)**	Ust.
16.7[W]/-	30*	6.6*		55.0	**(NON)**	Ust. SR 91
14.3[W]/-	29*	6.8*		70.5	**(NON)**	Adj. East Idlewood
11.0[W]/-	26*	5.3*		73.5	**(NON)**	
10.1[W]/-	28*	6.6*			**(NON)**	In Glenwood at power line crossing
6.4[W]/-	20*	6.3*		88.5	**(NON)**	Ust. SR 8
2.2[W]/-	38	7.6		76.0	(FULL)	Ust. and Wood Creek confluence
0.1[W]/-	40	8.3		78.0	(FULL)	At mouth

Pond Brook (19-008) - MWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status[b]	Comment
4.3[H]/-	38			44.5	(FULL)	Ust.
0.9[H]/-	30			28.0	(FULL)	Dst. SR 82

Beaver Meadow Run (19-046) - WWH Use Designation

Fish/Invert.	IBI	MIwb	ICI	QHEI	Status[b]	Comment
1.2[H]/-	28*			77.0	**(NON)**	Ust. WWTP discharge
0.1[H]/-	24*			77.0	**(NON)**	At mouth

Hawthorne Creek (19-064) - WWH Use Designation

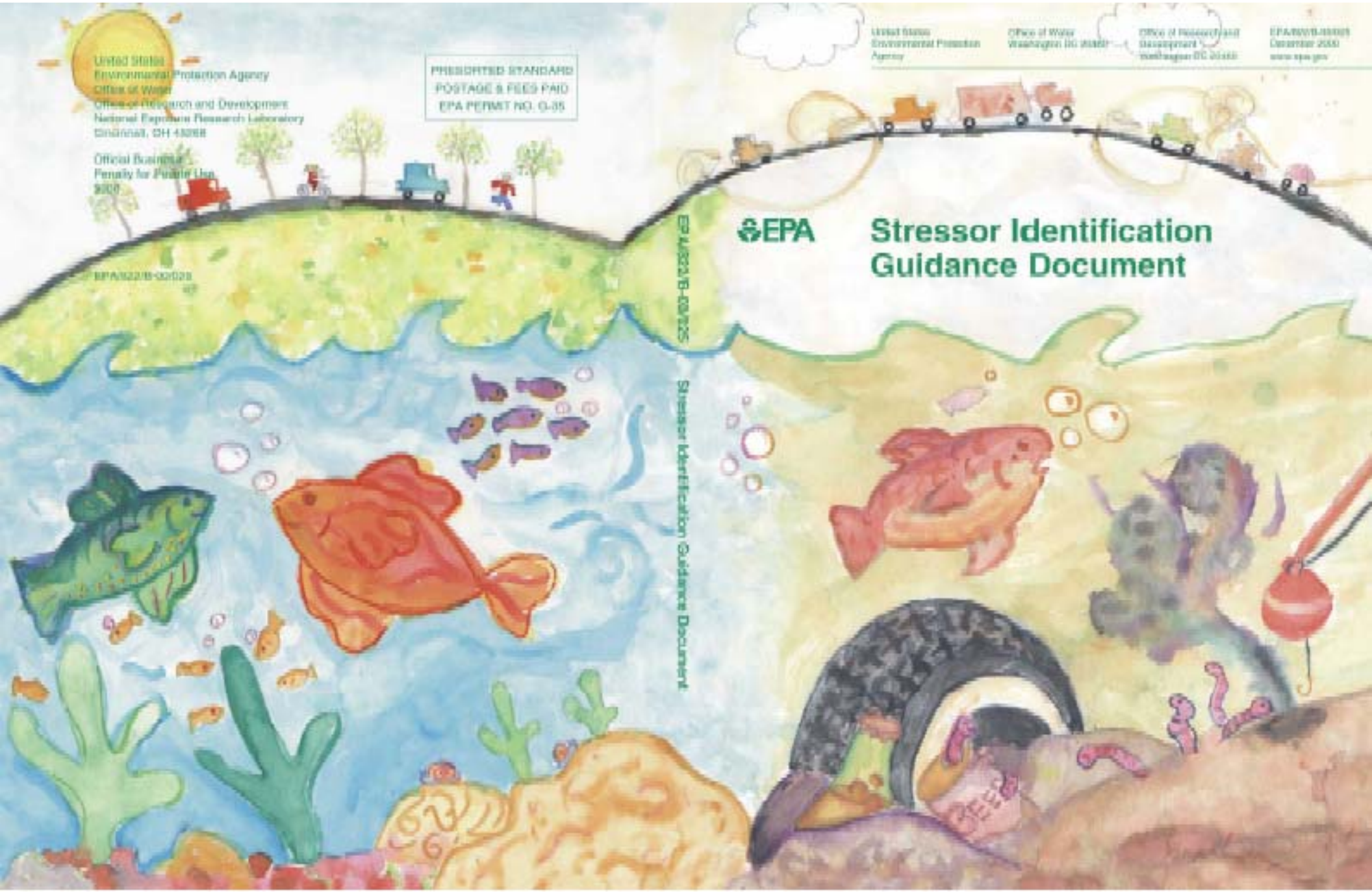
Fish/Invert.	IBI	MIwb	ICI	QHEI	Status[b]	Comment
0.8[H/]-	30*			70.5	**(NON)**	
0.1[H]/-	24*			67.0	**(NON)**	At mouth

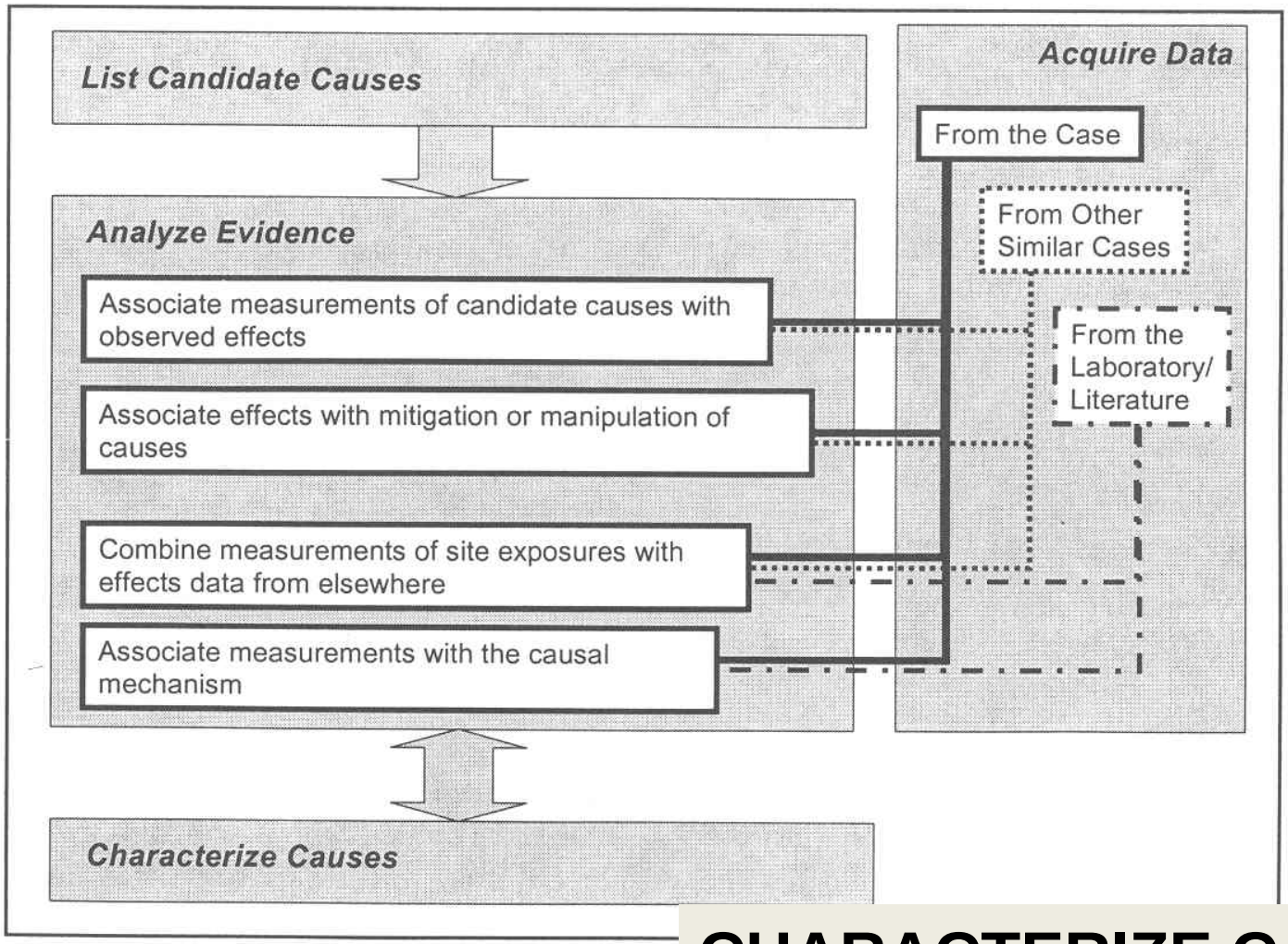
Initial Candidate Causes (From TMDL)

Organic Enrichment/ Dissolved Oxygen
Metals
Unknown Toxicity
Nutrients
Habitat
Ammonia
Habitat Alteration
Oil & Grease
Siltation
Suspended Solids

Identified Stressors (by stressor study group)

- Metals
- Turbidity
- Oil & Grease
- Pharmaceuticals
- Land Use
- TSS / Siltation
- Conductivity / Salt
- Recolonization
- Legacy
- Zircoa
- Conventional Nutrients


United States
Environmental Protection Agency
Office of Water
Office of Research and Development
National Exposure Research Laboratory
Cincinnati, OH 45268
Official Business
Penalty for Private Use
$300
PRESORTED STANDARD
POSTAGE & FEES PAID
EPA PERMIT NO. G-35
EPA/822/B-00/025
EPA/822/B-00/025
Stressor Identification Guidance Document
United States
Environmental Protection
Agency
Office of Water
Washington DC 20460
Office of Research and
Development
Washington DC 20460
EPA/822/B-00/025
December 2000
www.epa.gov
EPA
Stressor Identification
Guidance Document



Use existing data.

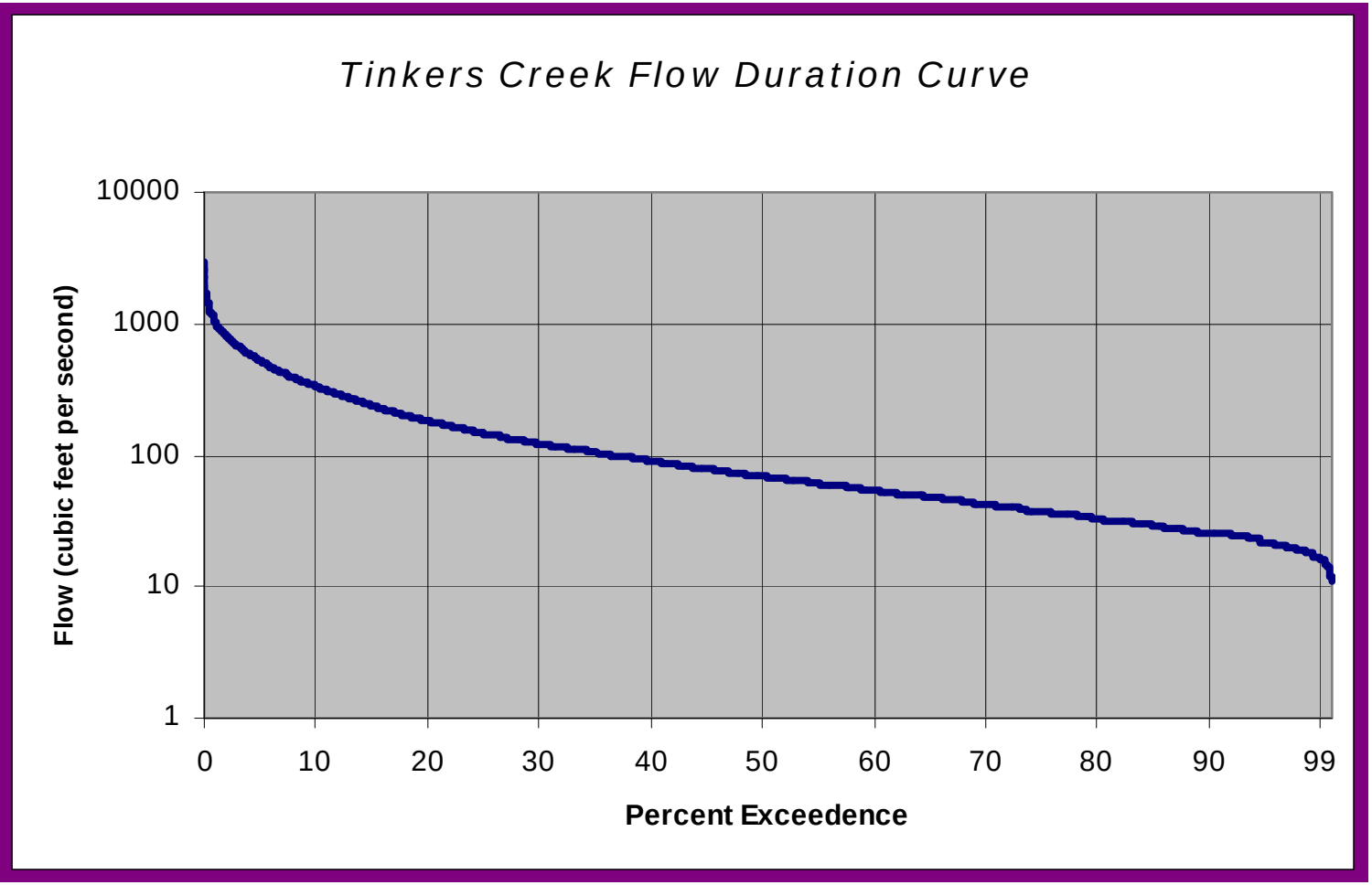
Identify data gaps.

Gather new data.

CHARACTERIZE CAUSES

Eliminate | **Diagnose** | **Strength of Evidence**

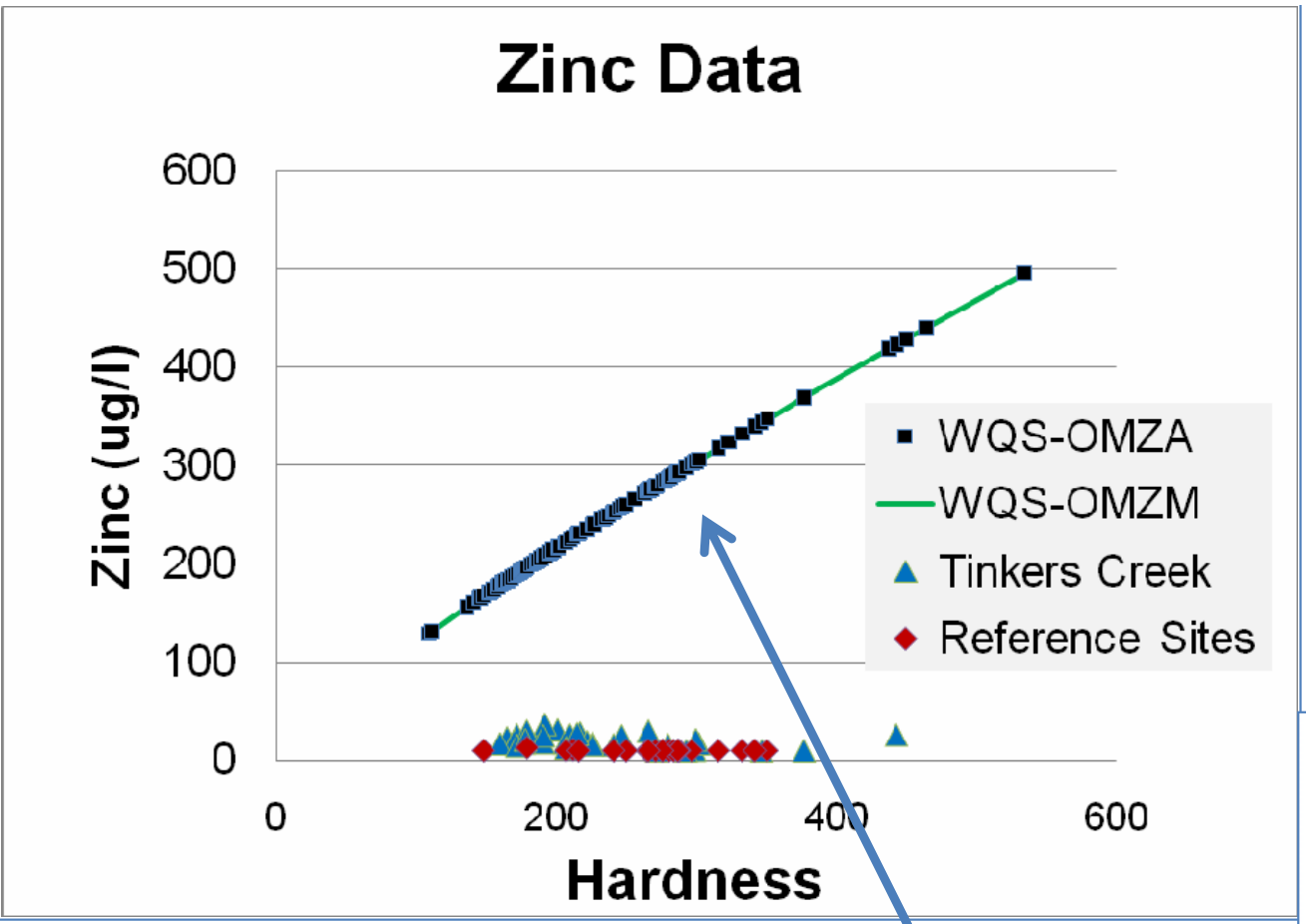
Identify Probable Cause



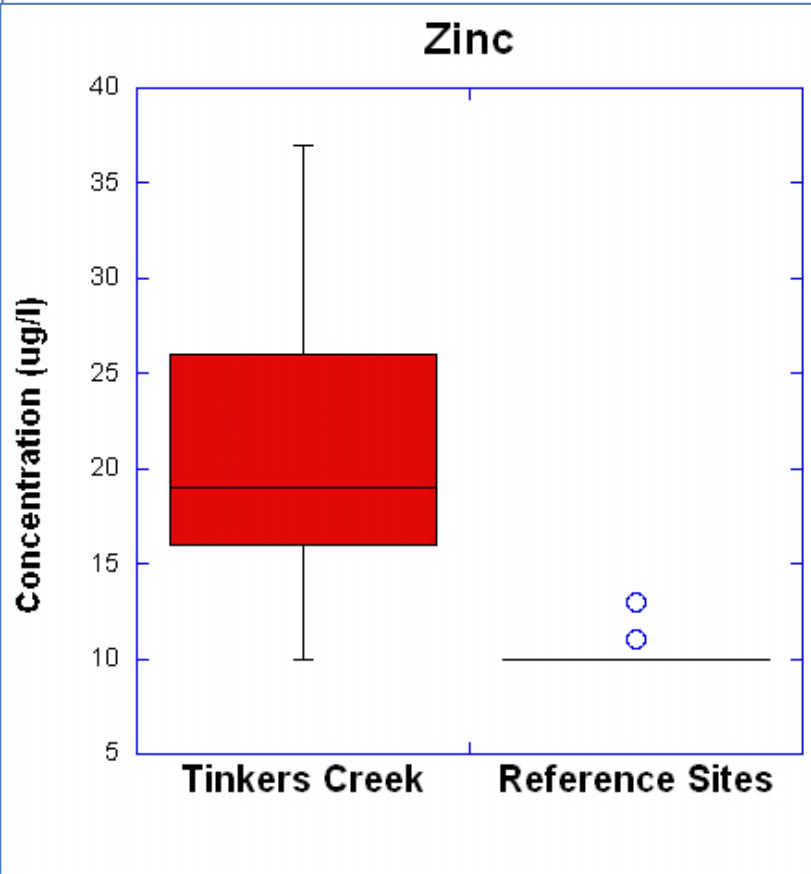
Flow

Patterns

Aurora Shores	City of Solon Water Reclamation	
Bedford Heights WWTP	Streetsboro WWTP	
City of Twinsburg WWTP	Aurora Westerly WWTP	
Flow at Gage	**23.9 MGD**	**36.97 CFS**
2000's Summer	**73.9%**	percent effluent at gage
Bedford WWTP	**3.2 MGD**	**4.95 CFS**
2000's Summer	**76.3%**	percent effluent at Canal Road



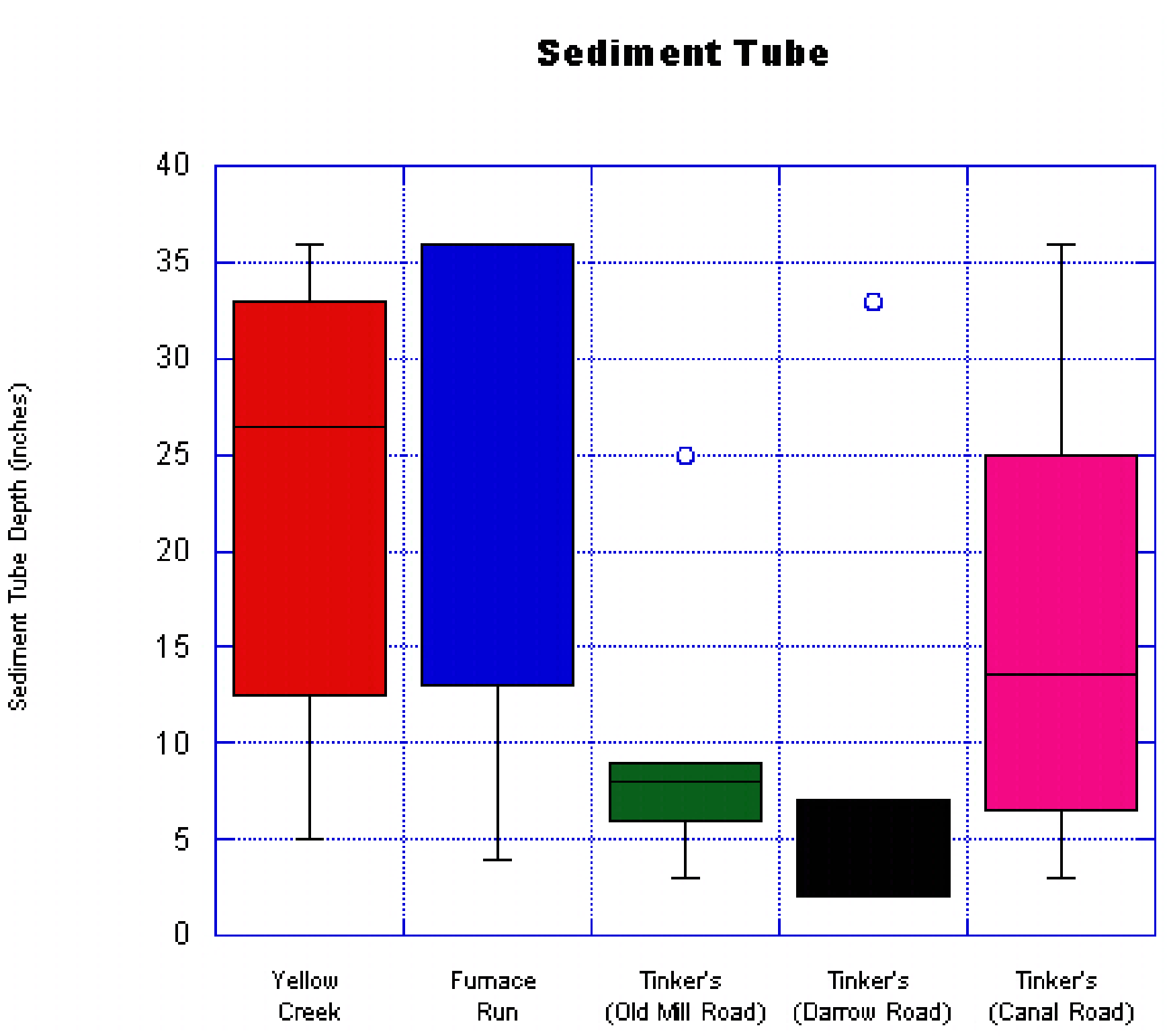
All sampled metals evaluated.



Wilcoxon-Mann-Whitney Rank Sum Test
Group 1: Tinkers Creek
Group 2: Reference Sites

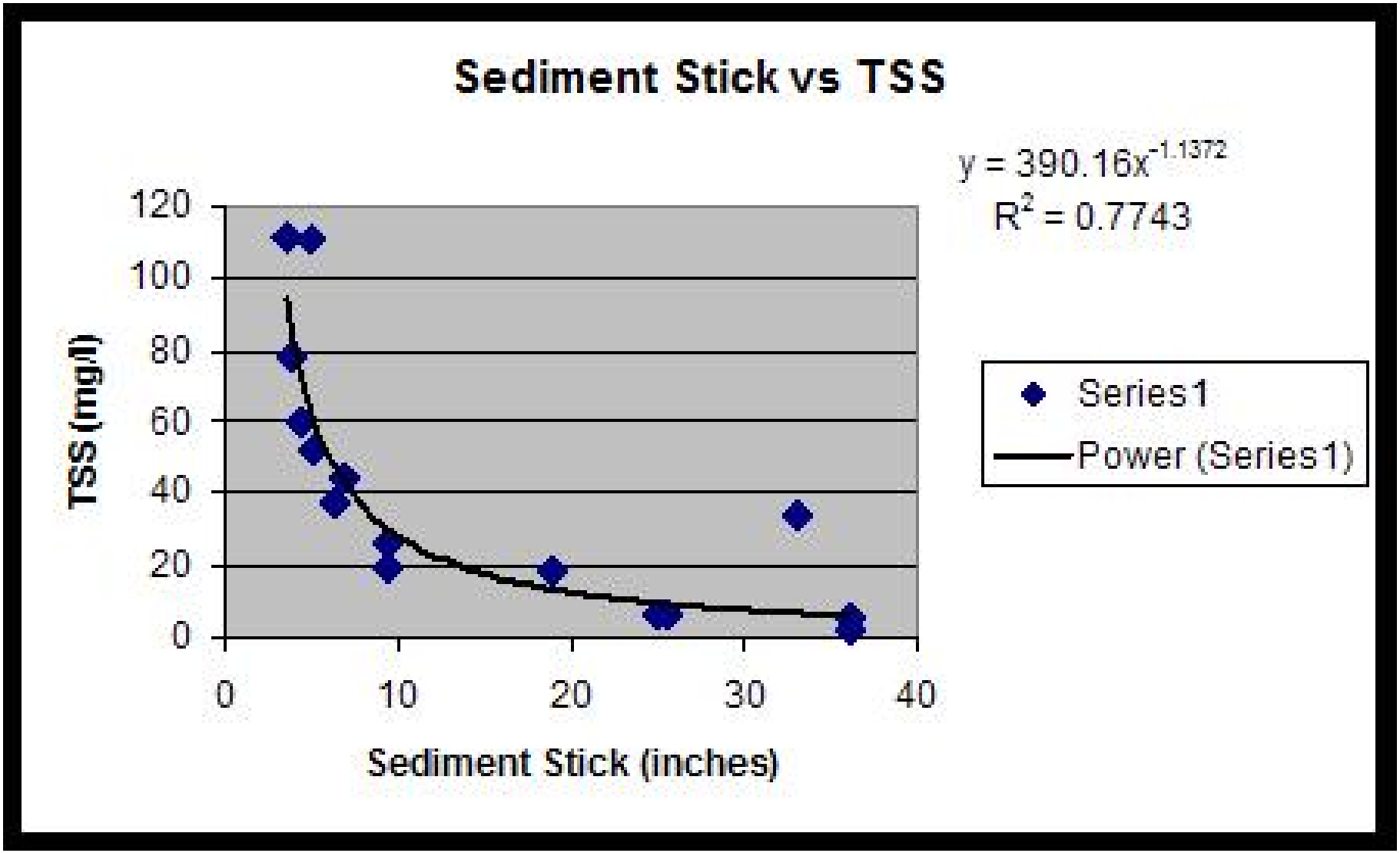
P Value < .0001

They are different!
But all are well below the WQS!


Sediment Tube
Sediment Tube Depth (inches)
40
35
30
25
20
15
10
5
0
Yellow Creek
Furnace Run
Tinker's (Old Mill Road)
Tinker's (Darrow Road)
Tinker's (Canal Road)

Candidate Cause

Suspended Solids



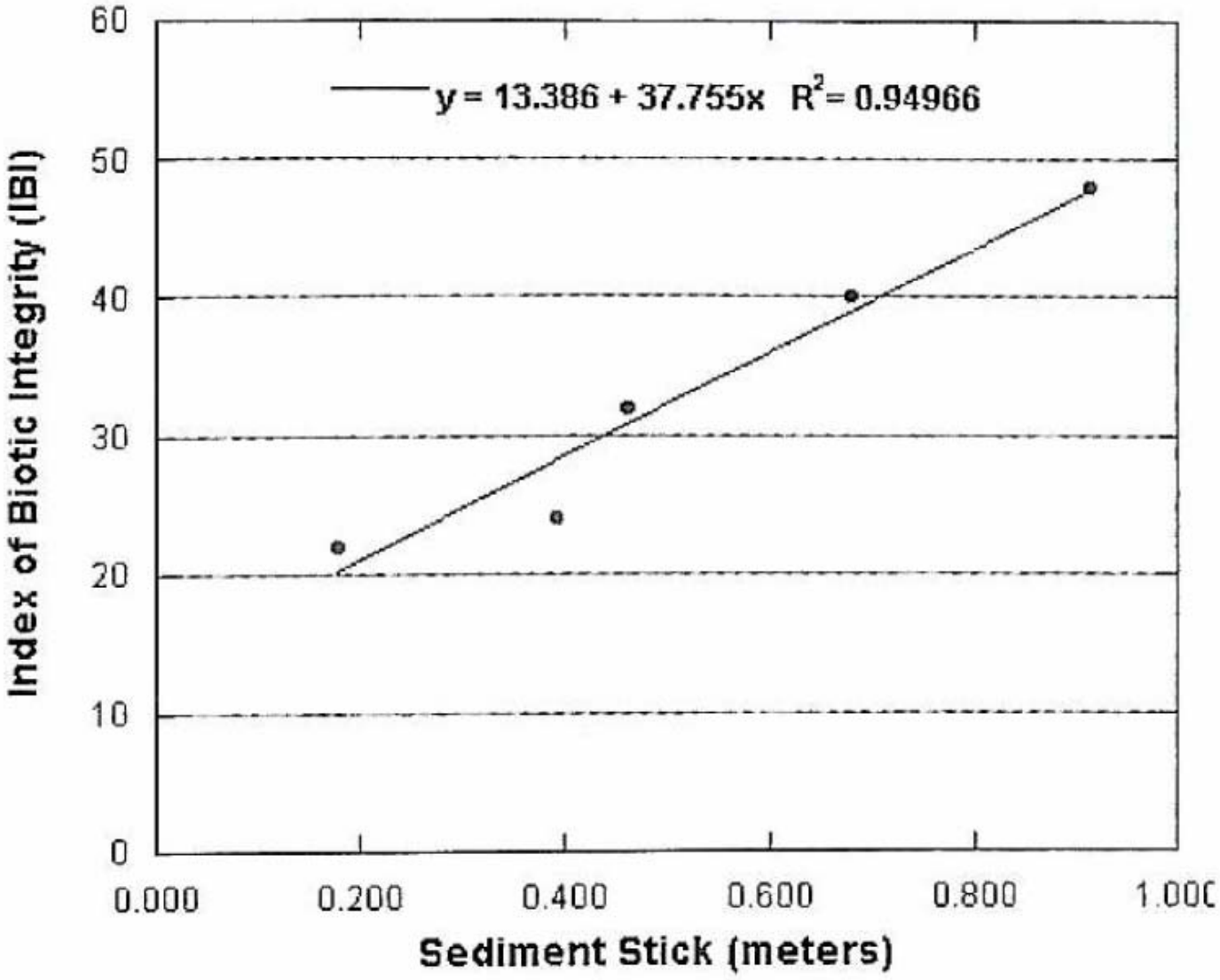
BRIEF NOTE

Transparency Tube Monitoring as an Indicator of Fish Community Health

Bill Zawiski[1], Division of Surface Water, Ohio Environmental Protection Agency, Twinsburg, OH

Abstract: Transparency tubes have been shown to be useful tools for suspended solids estimation in flowing waters. Suspended
mental Protection Agency shows a
ionship.

OHIO J SCI 107 (4): 82-83, 2007



Interesting correlation

Conforms to other findings in literature

OhioEPA

State of Ohio
Environmental Protection Agency

Division of Surface Water

Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index (QHEI)

OhioEPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: ☐

Stream & Location: _____ *RM:* _ _ _._ *Date:* _ _/ _ _/ 06

Scorers Full Name & Affiliation: _____

River Code: _ _ _ - _ _ _ - _ _ _ *STORET #:* _ _ _ _ _ _ *Lat./ Long.:* (NAD 83 - decimal °) _ _ . _ _ _ _ /8_ . _ _ _ _ *Office verified location* ☐

1] *SUBSTRATE* Check *ONLY* **Two** substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	____	____	☐☐ HARDPAN [4]	____	____
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____
☐☐ COBBLE [8]	____	____	☐☐ MUCK [2]		
☐☐ GRAVEL [7]	____	____	☐☐ SILT [2]		
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]	____	____	(Score natural s		

Check ONE (*Or 2 & average*)

ORIGIN	QUALITY
☐ LIMESTONE [1]	☐ HEAVY [-2]
☐ TILLS [1]	☐ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]

SILT

Substrate ☐

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0] sludge fro

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3: **0**-Absent; quality; **2**-Moderate amounts, but n quality; **3**-Highest quality in moderate or greater amounts (e.g., diameter log that is stable, well developed rootwad in deep / fas

____ UNDERCUT BANKS [1]
____ OVERHANGING VEGETATION [1]
____ SHALLOWS (IN SLOW WATER) [1]
____ ROOTMATS [1]
____ POOLS > 70
____ ROOTWADS
____ BOULDERS

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each categ

SINUOSITY	DEVELOPMENT	CHANNELI
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR N

Comments

4] *BANK EROSION AND RIPARIAN ZONE* Check O

River right looking downstream

L	R	EROSION
☐	☐	NONE / LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY / SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE > 50m [4]
☐	☐	MODERATE 10-50m [3]
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW < 5m [1]
☐	☐	NONE [0]

Comments

5] *POOL / GLIDE AND RIFFLE / RUN QUALITY*

MAXIMUM DEPTH Check **ONE** (*ONLY!*)
- ☐ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2
- ☐ POOL WIDTH = RIFFLE WIDTH [1
- ☐ POOL WIDTH > RIFFLE WIDTH [0

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Riffle / Run Maximum 8 ☐

Comments

6] *GRADIENT* (ft/mi)
DRAINAGE AREA (mi²)

☐ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: ____ %GLIDE: ____
%RUN: ____ %RIFFLE: ____

Gradient Maximum 10 ☐

Table 2. General narrative ranges assigned to QHEI scores. Ranges vary slightly in headwater (≤ 20 sq mi) vs. larger waters.

Narrative Rating	QHEI Range	
	Headwaters	Larger Streams
Excellent	≥ 70	≥ 75
Good	55- to 69	60 to 74
Fair	43 to 54	45 to 59
Poor	30 to 42	30 to 44
Very Poor	< 30	< 30

Habitat Data

		QHEI	Substrate	Cover	Channel	Riparian	Pool	Riffle
Average	Group 1	50.1	4.3	12.0	10.5	7.5	8.5	0.9
	Group 2	61.3	14.6	9.3	13.3	7.2	6.4	3.3
	Group 3	74.6	15.4	14.9	16.0	6.7	10.3	4.4
	Targets	**60.0**	**13.0**		**14.0**			
Median	Group 1	51.3	4.0	12.0	11.8	7.3	8.0	0.0
	Group 2	60.3	15.5	10.0	13.5	6.5	6.0	3.0
	Group 3	73.5	16.0	15.0	16.0	6.5	11.0	4.0

	% Sites FULL Attainment	%Sites PARTIAL Attainment	%Sites NON Attainment
Group 1	0.0	12.5	87.5
Group 2	22.2	44.4	33.3
Group 3	26.3	15.7	57.8

Good

Really Good!

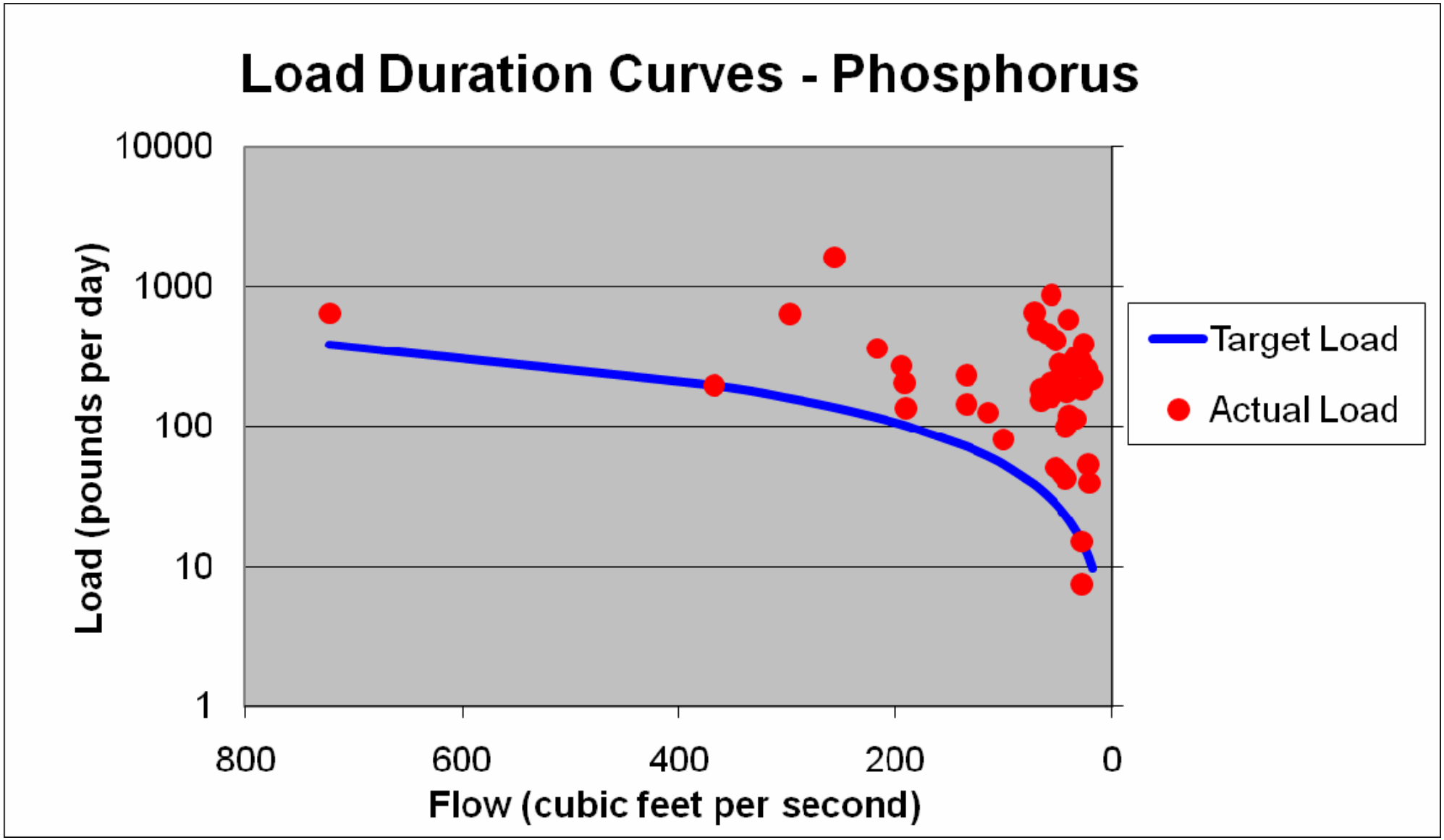
Not So Good

Nutrients

Phosphorus	Average Values (mg/l)	Median Values (mg/l)	Maximum Values (mg/l)
Tinkers Creek	**0.24**	**0.23**	**0.38**
Reference Sites	0.09	0.08	0.22
Tinkers Tributaries	0.19	0.08	0.98
Aurora Branch	0.11	0.09	0.46
Target Values	**0.10**		

Nitrate	Average Values (mg/l)	Median Values (mg/l)	Maximum Values (mg/l)
Tinkers Creek	3.35	2.89	8.87
Reference Sites	0.57	0.41	1.76
Tinkers Tributaries	1.32	0.47	8.74
Aurora Branch	0.97	0.69	3.82
Target Values	**1.05**		

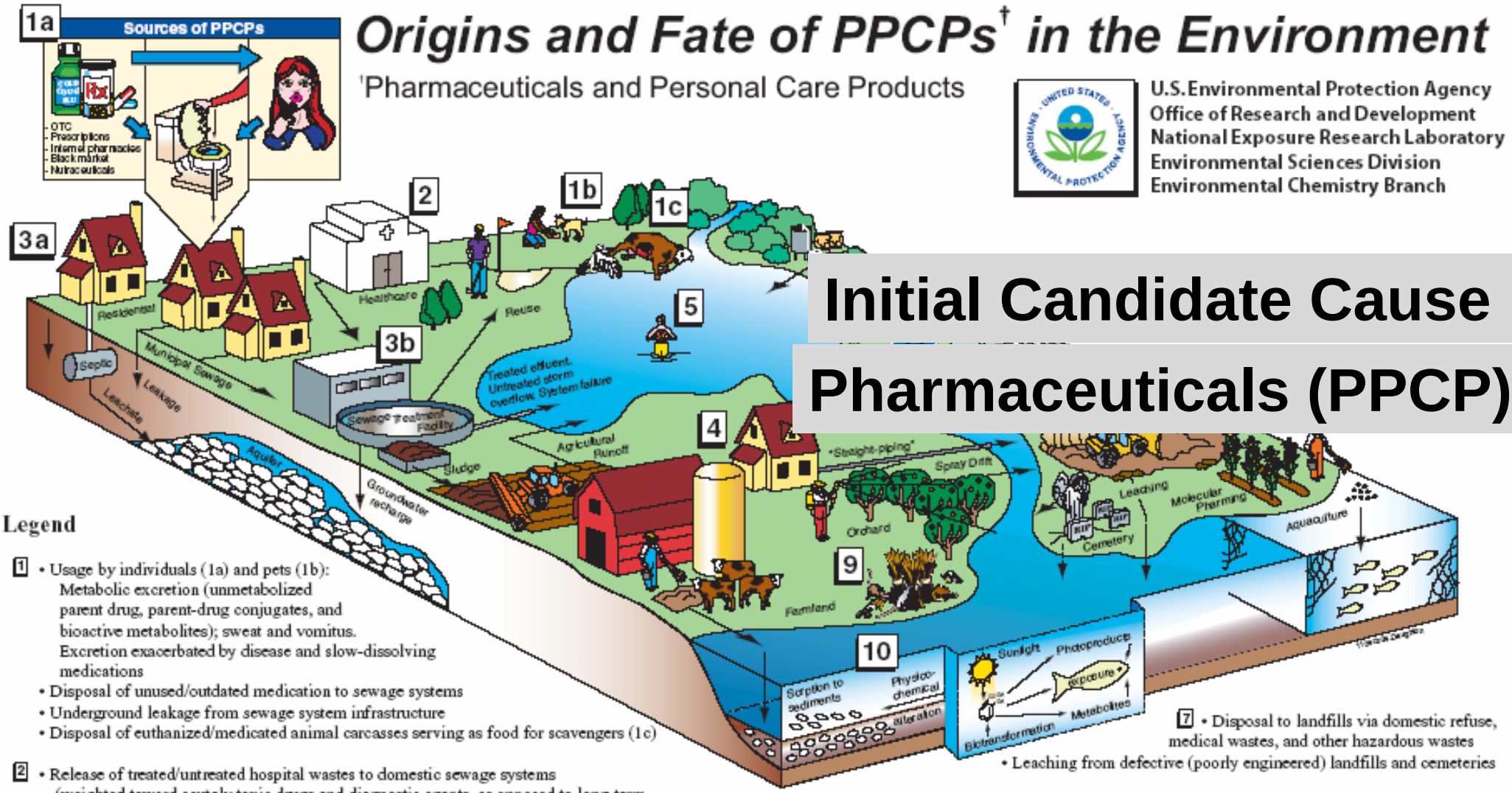
Target Value 0.10 mg/l



Origins and Fate of PPCPs† in the Environment

†Pharmaceuticals and Personal Care Products

U.S. Environmental Protection Agency
Office of Research and Development
National Exposure Research Laboratory
Environmental Sciences Division
Environmental Chemistry Branch



Initial Candidate Cause Pharmaceuticals (PPCP)

Legend

1 • Usage by individuals (1a) and pets (1b): Metabolic excretion (unmetabolized parent drug, parent-drug conjugates, and bioactive metabolites); sweat and vomitus. Excretion exacerbated by disease and slow-dissolving medications
• Disposal of unused/outdated medication to sewage systems
• Underground leakage from sewage system infrastructure
• Disposal of euthanized/medicated animal carcasses serving as food for scavengers (1c)

2 • Release of treated/untreated hospital wastes to domestic sewage systems (weighted toward acutely toxic drugs and diagnostic agents, as opposed to long-term medications); also disposal by pharmacies, physicians, humanitarian drug surplus

3 • Release to private septic/leach fields
• Treated effluent from domestic sewage treatment plants discharged to surface waters or re-injected into aquifers (recharge)
• Overflow of untreated sewage from storm events and system failures directly to surface waters

4 • Transfer of sewage solids ("biosolids") to land (e.g., soil amendment/fertilization)
• "Straight-piping" from homes (untreated sewage discharged directly to surface waters)
• Release from agriculture: spray drift from tree crops (e.g., antibiotics)
• Dung from medicated domestic animals (e.g., feed) - CAFOs (confined animal feeding operations)

5 • Direct release to open waters via washing/bathing/swimming

6 • Discharge of regulated/controlled industrial manufacturing waste streams
• Disposal/release from clandestine drug labs and illicit drug usage

7 • Disposal to landfills via domestic refuse, medical wastes, and other hazardous wastes
• Leaching from defective (poorly engineered) landfills and cemeteries

8 • Release to open waters from aquaculture (medicated feed and resulting excreta)
• Future potential for release from molecular pharming (production of therapeutics in crops)

9 • Release of drugs that serve double duty as pest control agents: examples: 4-aminopyridine, experimental multiple sclerosis drug → used as avicide; warfarin, anticoagulant → rat poison; azacholesterol, antilipidemics → avian/rodent reproductive inhibitors; certain antibiotics → used for orchard pathogens; acetaminophen, analgesic → brown tree snake control; caffeine, stimulant → *coqui* frog control

10 Ultimate environmental transport/fate:
• most PPCPs eventually transported from terrestrial domain to aqueous domain
• phototransformation (both direct and indirect reactions via UV light)
• physicochemical alteration, degradation, and ultimate mineralization
• volatilization (mainly certain anesthetics, fragrances)
• some uptake by plants
• respirable particulates containing sorbed drugs (e.g., medicated-feed dusts)

Christian G. Daughton, U.S. EPA-Las Vegas

January 2004

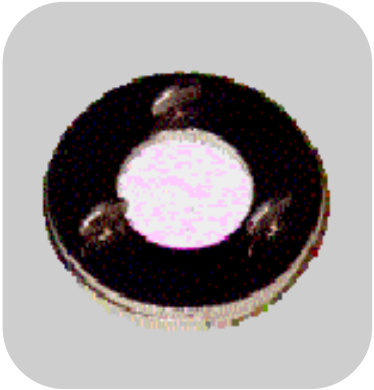
http://epa.gov/nerlesd1/chemistry/pharma/images/drawing.pdf

USGS
science for a changing world

In cooperation with the Ohio Water Development Authority; National Park Service; Cities of Aurora, Bedford, Bedford Heights, Solon, and Twinsburg; Portage and Summit Counties; and in collaboration with the Ohio Environmental Protection Agency

Occurrence of Organic Wastewater Compounds in the Tinkers Creek Watershed and Two Other Tributaries to the Cuyahoga River, Northeast Ohio

Polar Organic Chemical Integrative Sampler (POCIS)



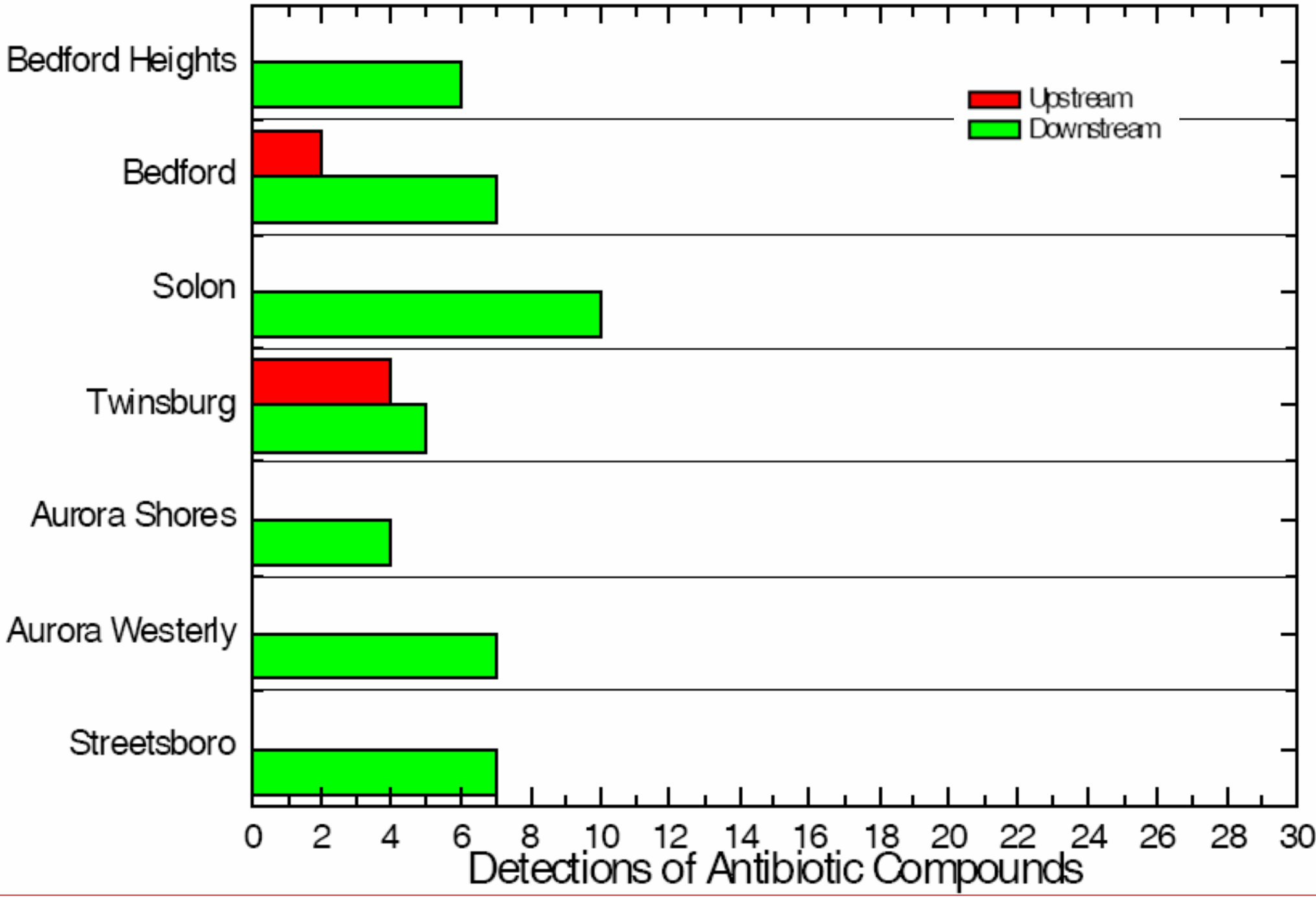
The POCIS was designed to sequester and concentrate waterborne polar organic chemicals.

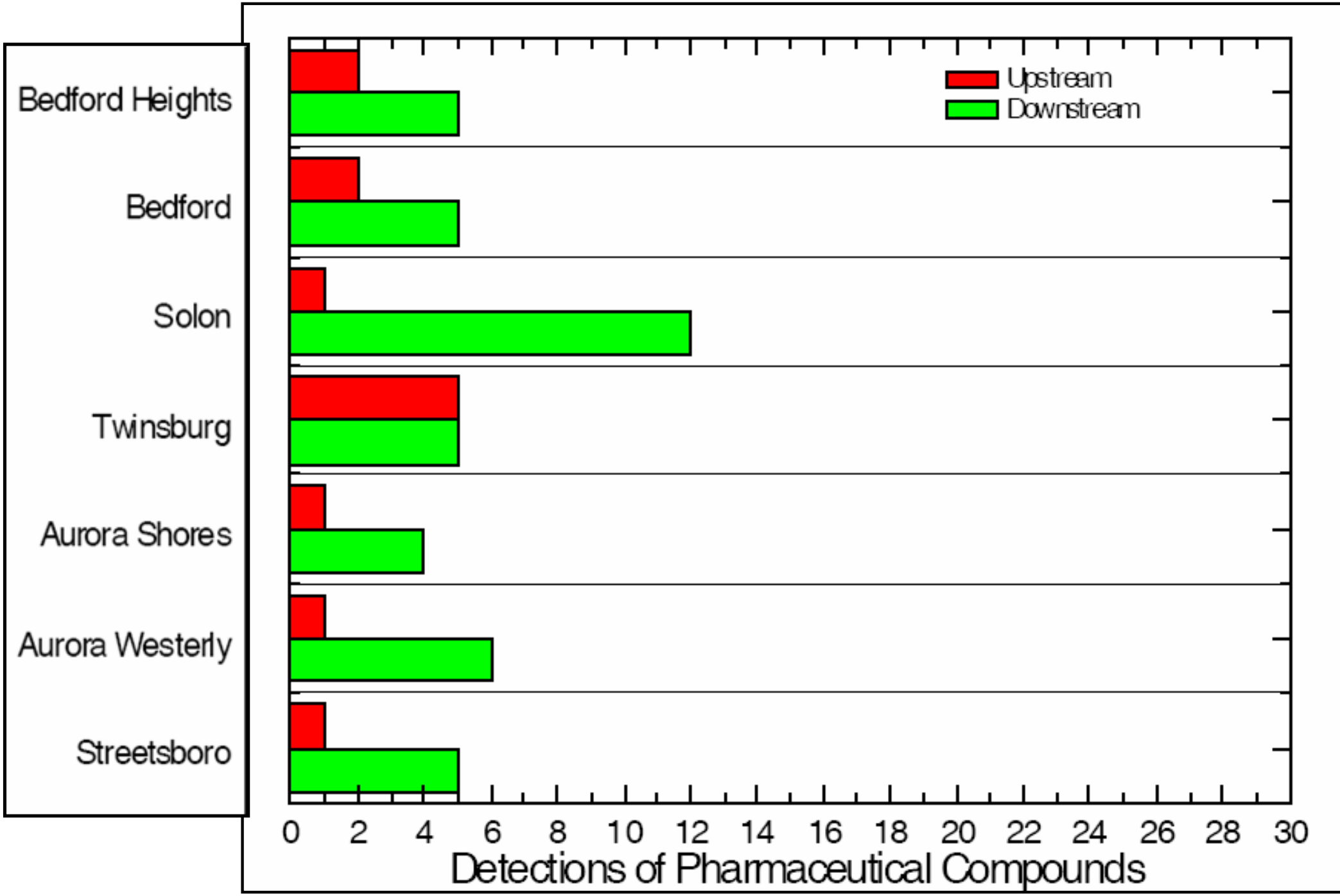
It consists of a microporous polyethersulfone membrane enveloping various solid phase sorbents and/or mixtures of sorbents.

Its versatility allows for the sequestering medium to be tailored to specific applications.

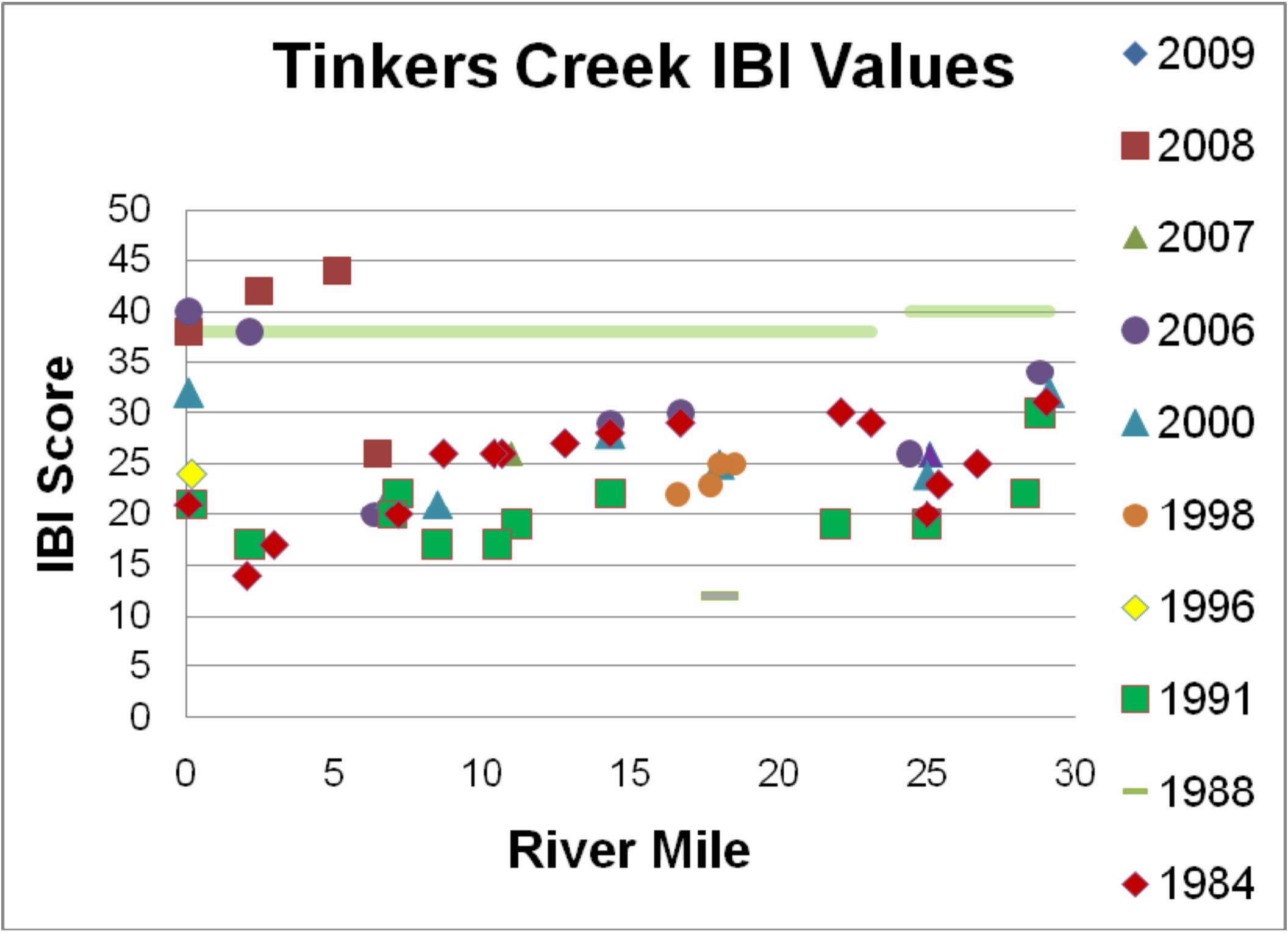
The technology is currently under U.S. Patent protection (patent number 6,478,961) and is commercially available through EST Laboratories, St. Joseph, MO.

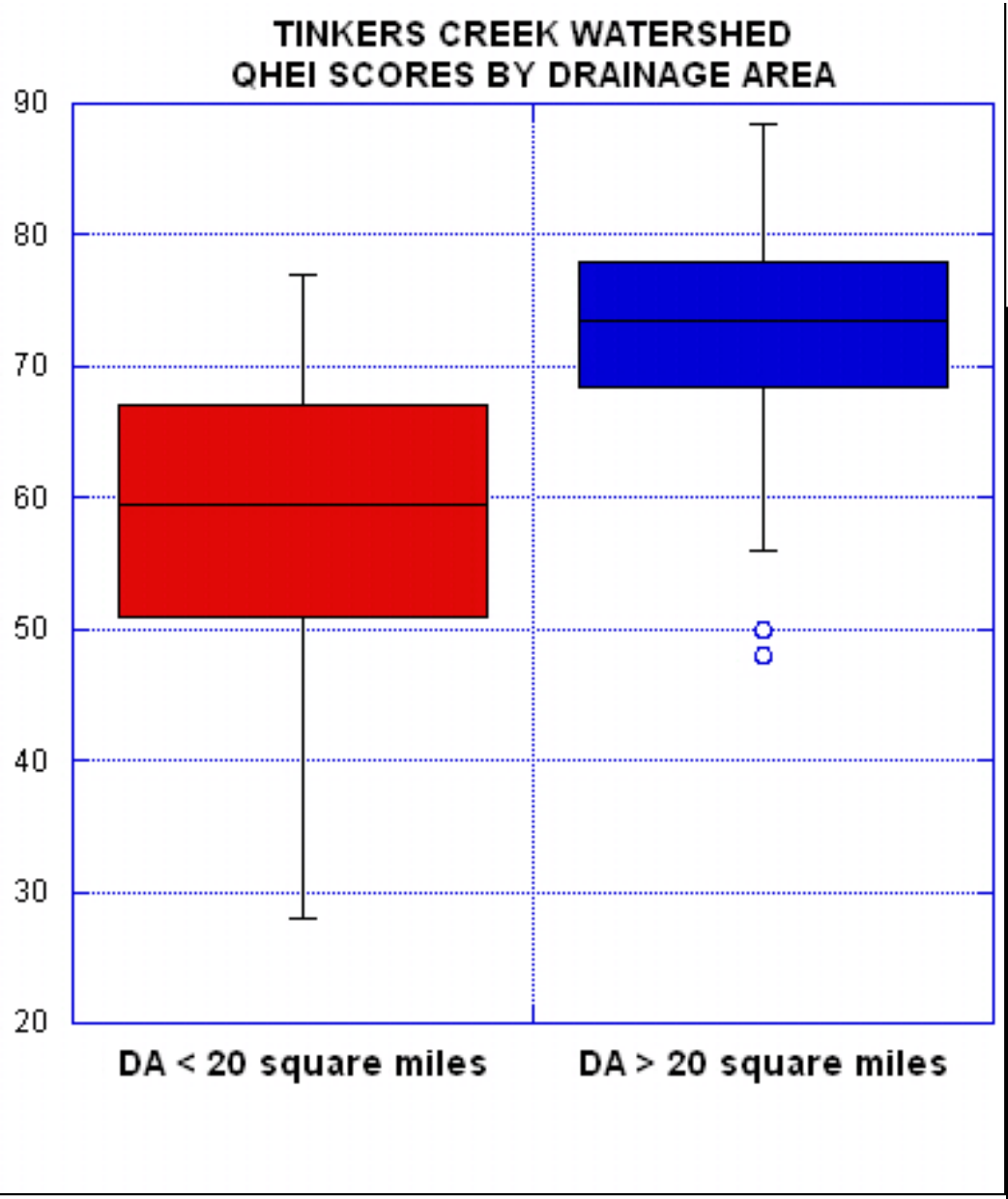
Alvarez et al. 2004 *Environ Toxicol Chem* 23:1640-1648

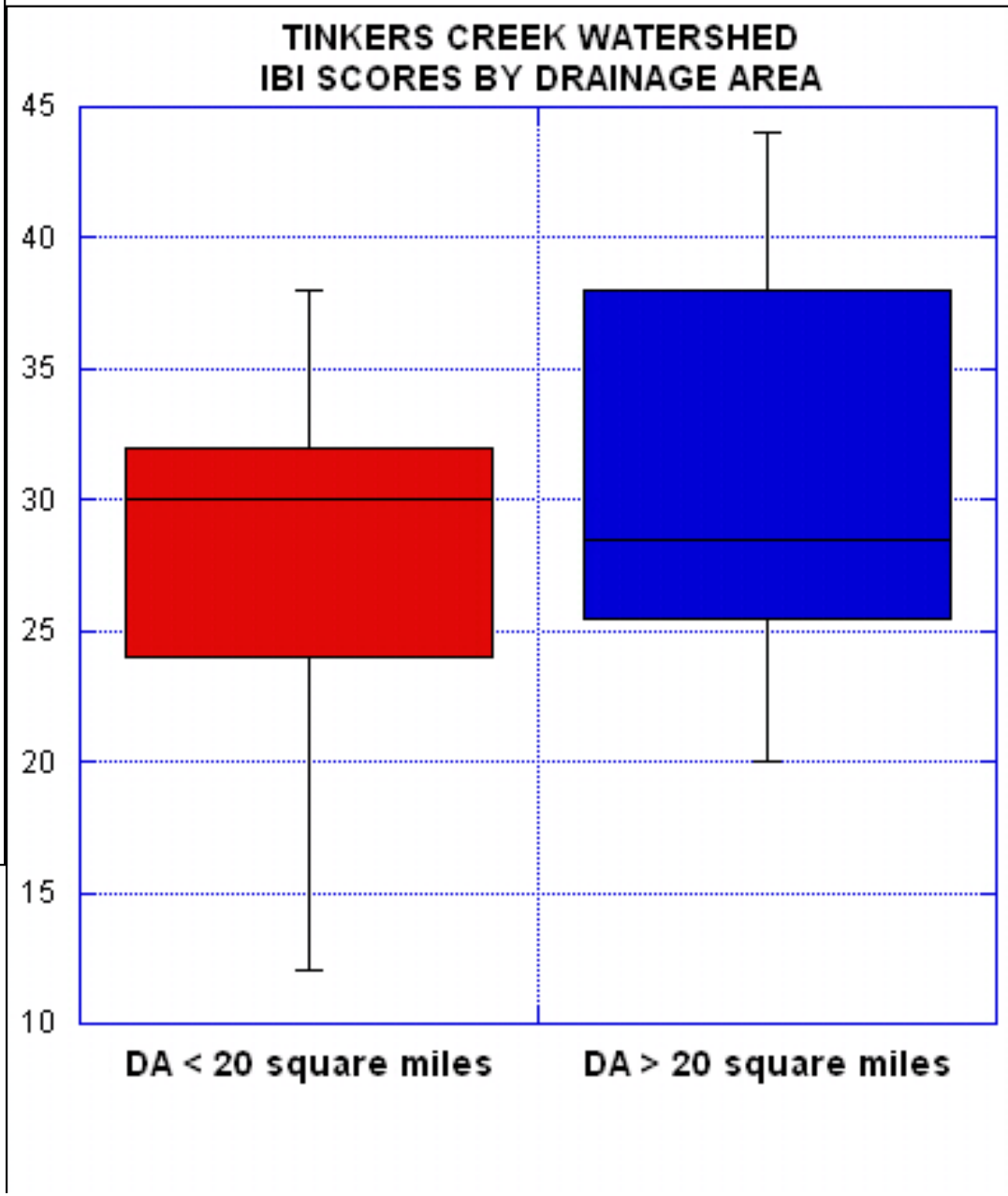

Bedford Heights
Bedford
Solon
Twinsburg
Aurora Shores
Aurora Westerly
Streetsboro
Upstream
Downstream
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Detections of Antibiotic Compounds


Bedford Heights
Bedford
Solon
Twinsburg
Aurora Shores
Aurora Westerly
Streetsboro
Upstream
Downstream
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Detections of Pharmaceutical Compounds


Skinny Belly
Unlike Billy!!!!!!!!!


Tinkers Creek IBI Values
IBI Score
50
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
River Mile
2009
2008
2007
2006
2000
1998
1996
1991
1988
1984


TINKERS CREEK WATERSHED
QHEI SCORES BY DRAINAGE AREA
90
80
70
60
50
40
30
20
DA < 20 square miles
DA > 20 square miles


TINKERS CREEK WATERSHED
IBI SCORES BY DRAINAGE AREA
45
40
35
30
25
20
15
10
DA < 20 square miles
DA > 20 square miles

Plant	Permit Expiration
Aurora Shores	3/31/2010
Aurora Westerly	7/31/2008
Bedford Heights	7/31/2008
Bedford	1/31/2008
Solon	7/31/2009
Streetsboro	7/31/2008
Twinsburg	7/31/2008

What does the TMDL say?
It presents an allocation for phosphorus of 59 lbs/day
The allocation was done only for plants >1MGD

So…..

Plants >1MGD

Plant	Flow
Aurora Westerly	1.4
Bedford Heights	7.5
Bedford	3.2
Solon	5.8
Streetsboro	4
Twinsburg	4.95
TOTAL	26.85

Load = Flow (MGD) X Concentration (mg/l) X 8.34

59 lb/day = 26.85 (MGD) X Concentration (mg/l) X 8.34

$$\frac{59 \text{ lb/day}}{26.85 \text{ (MGD)} \times 8.34} = \text{Concentration (mg/l)}$$

0.26 mg/l = Concentration

YIKES!!!

Monitoring Data

Loads in kg/day

Plant	Flow	P Conc	P Load	NO3 Conc	NO3 Load	Flow(CFS)
Aurora Shores	0.249	3.00	2.831	15.0	14.156	0.385
Aurora Westerly	1.06	0.70	2.812	7.9	31.537	1.640
Bedford Heights	2.25	0.40	3.411	22.4	191.016	3.481
Bedford	2.28	0.60	5.219	13.9	120.113	3.527
Solon	3.82	0.64	9.266	5.3	76.732	5.910
Streetsboro	2.67	0.43	4.351	20.5	207.446	4.130
Twinsburg	2.77	0.65	6.824	17.1	179.521	4.285

Plants above gage

Plant	Flow	P Conc	P Load	NO3 Conc	NO3 Load	Flow(CFS)
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Streetsboro	2.67	0.43	4.351	20.5	207.446	4.130
Twinsburg	2.77	0.65	6.824	17.1	179.521	4.285
	12.819		**29.495**		**700.407**	**19.831**

Plant	7 day limit	30 day limit	"New Permit Limits" 7 day and 30 day limit
Aurora Shores	***1.5***	***1***	0.7
Westerly	1.5	1	0.7
B.Heights	1.5	1	0.7
Bedford	1.5	1	0.7
Solon	1.5	1	0.7
Streetsboro	1.5	1	0.7
Twinsburg	1.5	1	0.7

% Permit Reduction **31%**

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the
Tinkers Creek Watershed Wastewater Treatment Plant (WWTP) Dischargers:

1. **Aurora Westerly WWTP**
2. **Bedford WWTP**
3. **Bedford Heights WWTP**
4. **Portage County Streetsboro-Hudson WWTP**
5. **Solon Water Reclamation Facility**
6. **Summit County Aurora Shores WWTP**
7. **Twinsburg WWTP**

OEPA Permit No.:

1. **3PD00046 (Aurora Westerly)**
2. **3PD00005 (Bedford)**
3. **3PD00006 (Bedford Hts.)**
4. **3PK00014 (Portage Co. Streetsboro)**
5. **3PD00019 (Solon)**
6. **3PG00030 (Summit Co. Aurora Shores)**
7. **3PD00039 (Twinsburg)**

Application No.:

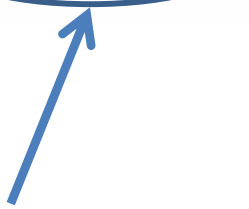
1. **OH0098043 (Aurora Westerly)**
2. **OH0024040 (Bedford)**
3. **OH0024058 (Bedford Hts.)**
4. **OH0090131 (Portage Co. Streetsboro)**
5. **OH0027430 (Solon)**
6. **OH0033871 (Summit Co. Aurora Shores)**
7. **OH0027863 (Twinsburg)**

Public Notice No.:

1. **08-12-027 (Aurora Westerly)**
2. **08-12-028 (Bedford)**
3. **08-12-025 (Bedord Heights)**
4. **08-12-026 (Portage C. Streetsboro)**
5. **08-12-023 (Solon)**
6. **08-08-028 (Summit Co. Aurora Shores)**

Table - Final Outfall - 001 - Final

Effluent Characteristic	Discharge Limitations							Mon
	Concentration Specified Units				Loading* kg/day			Measuring
Parameter	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly	Frequency
00010 - Water Temperature - C	-	-	-	-	-	-	-	1/Day
00095 - Specific Conductance at 25 Degrees C - Umho/cm	-	-	-	-	-	-	-	1/Week
00300 - Dissolved Oxygen - mg/l	-	5.0	-	-	-	-	-	1/Day
00530 - Total Suspended Solids - mg/l	-	-	18	12	-	395.2	263.5	3/Week
00552 - Oil and Grease, Hexane Extr Method - mg/l	10	-	-	-	-	-	-	1 / 2 Weeks
00610 - Nitrogen, Ammonia (NH3) - mg/l	-	-	2.3	1.2	-	50.5	26.3	3/Week
00610 - Nitrogen, Ammonia (NH3) - mg/l	-	-	8.7	4.1	-	191	90.01	3/Week
00630 - Nitrite Plus Nitrate, Total - mg/l	-	-	-	-	-	-	-	1/Month
00665 - Phosphorus, Total (P) - mg/l	-	-	0.7	0.7	-	15.4	15.4	1/Week



Tighter phosphorus limits. Still above TMDL load allocation.

II. TMDL Implementation Schedule

As soon as possible, but not later than the dates developed in accordance with the following schedule, the permittee shall achieve an allowable maximum DAILY total phosphorus load of 5.781 kg/day. The permittee may achieve the allowable DAILY total phosphorus load limit by reducing phosphorus loads discharged through wastewater treatment plant station number 3PD00019 001 and/or by utilizing water quality credits accrued through participation in a water quality trading program approved by the Director under chapter 3745-5 of the Ohio Administrative Code.

1. The permittee shall immediately begin an evaluation of the capability of the existing treatment facilities to reduce the effluent loadings of total phosphorus. Both operational procedures, unit process configuration, and other appropriate measures shall be evaluated.

Nutrient Trading Plan

2. Not later than 6 months from the effective date of this permit, the permittee shall implement measures identified in the evaluation that can reasonably be expected to maximize the ability of the existing treatment facilities to achieve the DAILY total phosphorus load limit of 5.781 kg/day. Permits to Install shall be obtained if necessary.

3. Not later than 12 Months from the effective date of this permit, the permittee shall submit to the Ohio EPA Northeast District Office a status report on the capability of its existing facilities to achieve the DAILY total phosphorus load limit of 5.781 kg/day. (Event Code 95999)

4. If the 12 Months status report shows that the existing facilities would not be able to achieve the DAILY total phosphorus load limit of 5.781 kg/day through treatment, then not later than 24 months from the effective date of this permit, the permittee shall submit one of the following to the Ohio EPA Northeast District Office: (Event Code 1299)

a. A water quality trading management plan that is consistent with the provisions of section 3745-5-06 of the Ohio Administrative Code. If the permittee will be participating in watershed trading, where trading activities will occur between two or more NPDES permit holders and one or more nonpoint sources, the water quality trading management plan may be submitted by the persons, organization, agency or qualified soil and water

So Where Are We?

1. Metals are not a major problem
2. Nutrients are elevated
3. Physical habitat has some problems
4. Turbidity is a problem
5. Waterfall is a migration barrier---but similar fish species above and below falls
6. We know more than when we started!

So Where Are We?

1. NPDES Permits have been adjusted
2. Water Quality Trading Plan is being developed
3. Pharmaceutical collection programs underway
4. Ohio EPA developed a common fact sheet for dischargers
5. Additional work still being done
6. Land use is important
7. We still need to know more!

Important Messages:

Communicate!

We can work together towards a common goal!