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1989 BIOLOGICAL AND WATER QUALITY STUDY OF THE GREAT MIAMI RIVER BASIN RM 0.9-92.6 (BUTLER, HAMILTON, MONTGOMERY AND WARREN COUNTIES, OHIO), AND TREND ASSESSMENT: 1980-1989 - (USED AS A REFERENCE IN OU 5 RI - APPENDIX B)

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REPORT

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1989 Biological and Water Quality Study of the Great Miami River Basin RM 0.9-92.6 (Butler, Hamilton, Montgomery, and Warren Counties, Ohio) and Trend Assessment: 1980 to 1989

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INTRODUCTION

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The first comprehensive water quality survey conducted by Ohio EPA of the lower segment of the Great Miami River Basin (River Mile 92.6-0.9) occurred during the summer months of 1980. Ohio EPA reported the findings (1984) of the survey which is referenced for additional information throughout this report. Since 1980 significant pollution abatement measures were implemented in the basin which have resulted in improvements in river water quality.

The construction of the Miami Conservancy District, North Regional Wastewater Treatment Plant in 1981 replaced the Ohio Suburban plant and eliminated discharges from Vandalia, Tipp City and Huber Heights. A pretreatment program was also established at the North Regional Plant to control industrial discharges.

r upgrades and expansions occurred in 1988 at wastewater nt plants in the communities of Dayton, Miamisburg and rollton. Montgomery County Western Regional plant also

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upgraded in 1988, as well as the plant in Brookville which discharges to Wolf Creek, a tributary of the Great Miami River.

Since the 1980 survey the city of Middletown has eliminated several combined sewer overflows and modified its handling of solids and the city of Hamilton has modified the treatment an disposal of sludge. Industrial pretreatment programs were instituted in Dayton, Montgomery County, West Carrollton, Middletown and Hamilton.

The expansion of MCD Franklin and Butler County LeSourdsville regional facilities eliminated smaller wastewater discharges from the communities of Carlisle, Trenton, Monroe and the Lebanon Correctional Institution.

Several industries also installed improved treatment facilities during the time between the 1980 and 1989 surveys. These industries include Appleton Papers, West Carrollton Parchment, Armco Steel (Middletown), Champion Papers and U.S. D.O.E. Fernald Environmental Management Project (formerly U.S. D.O.E. Feed Materials Production Center).

During the summer of 1989, OEPA staff returned to the Great Miami River mainstem between river miles (RM) 0.9 and 92.6, the lower Mad River and Stillwater River. Survey work was also done in the Whitewater River mainstem. Twenty-nine sites were selected for chemical sampling, 37 sites for macroinvertebrate assessment and 70 sites to assess fish populations. In 1990 and 1991 water quality modeling work was performed in the Great Miami and Whitewater Rivers, but some of this data was not available for this document.

The objectives of the 1989 survey were to:

* biologically evaluate the existing Warmwater Habitat use designation of the Great Miami River.
* determine the impacts from point sources of pollution on the aquatic communities in the Great Miami River as measured by the biological communities and chemical/physical monitoring.
* determine the success of pollution control strategies by comparing historical biological sampling results from 1980 and pollution loadings with 1989 sampling results with special emphasis on the Dayton and Franklin Regional WWTP.
* evaluate the biological response of the aquatic community in the vicinity of the 1988 fish kill and the DP&L Hutchings Peaking Station.
* discover and document previously unknown sources of water quality impacts.

The findings of this evaluation may factor into regulatory actions taken by Ohio EPA (e.g. NPDES permits) and eventually be incorporated into the State water quality management plans and the biennial 305(b) report.

CONCLUSIONS

Aquatic Life Use Attainment

The 1989 study documented 11.3 miles of the river fully attaining warmwater habitat (WWH) use designation for aquatic life, 60.9 miles partially attaining, and 19.1 miles not attaining. This is an improvement over the 1980 data which documented only 0.1 miles fully attaining WWH use designation, 22.7 partially attaining and 68.5 miles not attaining. The data indicates the greatest impact to the river during the 1989 survey was primarily due to nutrient enrichment from sewage treatment plants. Use attainment is listed in Table 1.

Historical Trends

Compared to the 1980 Ohio EPA biological and chemical survey, the 1989 data of the Great Miami River has exhibited a significant improvement in the lower mainstem. The 1989 macroinvertebrate data (ICI) documented an improvement of 94%, the modified index of well being (MIwb) documented an improvement of 87% and the fish (IBI) diversity data an improvement of 36%. The IBI is generally the last biological indicator to document improvement in a stream basin that is primarily impacted by sewage.

July 8, 1986, a CSX train derailed over Bear Creek, a tributary which joins the Great Miami River near Miamisburg. The train was carrying phosphorus, sulphur and animal fat, which were released due to the derailment. On exposure to the air the phosphorus became flammable. A massive fishkill occurred in Bear Creek and Great Miami. Ohio Department of Natural Resources field staff estimated the fish kill to be over 75,000 (ODNR 1986), stretching from Bear Creek down the Great Miami River to Middletown. Remediation of this site was not concluded until 1991.

An investigation during 1987 discovered the release of polychlorinated biphenyls (PCB) into Wolf Creek from old transformers at the abandoned Dayton Tire Plant. Further sampling of sediments and fish tissue in Wolf Creek and the Great Miami River revealed PCB contamination of sediment, carp and catfish tissue. A fishing advisory was issued by the Ohio Department of Health in the Great Miami River from the dam upstream of Monument Street to the confluence with the Ohio River.

During 1988, the State of Ohio experienced a severe drought. The Great Miami River was greatly effected by the drought which resulted in the biota being more prone to the effects of wastewater and thermal dischargers. Because many sewage treatment plants completed improvements by July of 1988, the effects of the drought on the stream biota were probably not as severe as potentially could have been. Several fishkills were documented in the river during this period, the largest being over 260,000 fish (ODNR, 1988), resulting from the thermal discharge from the DP&L Hutchings Station near Miamisburg.

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Table 1. Summary of the biological use attainment status for sampling locations in the Great Miami River based on collections made July - September, 1989. Attainment status follows guidance provided in Ohio EPA (1987).

River Mile Fish/Invert	IBI	Modified Iwb	ICI	QHEI	Attainment Status[a]	Comments[b]
		Eastern Corn Belt Plains				
91.0/91.1	39[ns]	8.8	56	70	FULL	Dst. Little York Rd.
88.1/ -	50	9.0	-	91	(FULL)	Dst. Powell Rd. (Superfund)
87.0/ -	38[ns]	9.0	-	72	(FULL)	Ust. MCD N. Regional WWTP
86.5/85.9	48	9.4	48	67	FULL	Dst. MCD N. Regional WWTP
82.9/ -	32*	8.3[ns]	-	36	(PARTIAL)	Ust. Steele Dam - Impounded
82.0/ -	39[ns]	9.3	-	48	(PARTIAL)	Dst Steele Dam, Ust. Mad R.
80.4/80.6	47	9.7	50	63	FULL	Ust. Wolf Ck
80.1/80.0	50	9.7	46	67	FULL	Dst. Wolf Ck
77.9/ -	34*	8.5	-	52	(PARTIAL)	Ust. Tait Dam - Impounded
76.9/76.5	35*	8.2	50	62	PARTIAL	Ust. Dayton WWTP
76.1/ -	33*	9.5	-	-	N/A	Dayton WWTP Mix Zone
76.0/ -	36*	9.0	-	66	(PARTIAL)	Rest of Zone
75.9/75.8	37*	9.4	50	-	(PARTIAL)	Dst. Dayton WWTP
74.8/ -	28*	7.7*	-	55	**(NON)**	Ust. Holes Ck.
73.3/ -	24*	6.5*	-	50	**(NON)**	Dst. Holes Ck. - Impounded
- /72.4	-	-	56	-	N/A	Appleton Paper Mix Zone
71.9/72.3	32*	8.8	40	84	PARTIAL	Dst. Appleton Paper
71.6/ -	36*	8.9	-	-	(PARTIAL)	Ust.Mont.Co.W. Regional
71.1/ -	32*	8.8	-	68	N/A	Mont.Co.W. Reg. mix zone
71.0/ -	34*	7.6*	-	-	**(NON)**	Rest of Zone
70.9/ -	34*	7.7*	-	-	**(NON)**	Dst.Mont.Co.W. Regional
70.1/69.8	29*	6.6*	50	68	PARTIAL	Farmersville-W. Carr. Rd.
- /69.3	-	-	54	-	(FULL)	Dst. Owl Ck.
68.6/68.8	28*	7.3*	42	90	PARTIAL	Dst. W.Carrollton WWTP
- /67.1	-	-	52	-	(FULL)	Ust. Linden Ave.
65.9/ -	19*	6.7*	-	54	**(NON)**	Ust. Miamisburg WWTP-pooled
65.0/ -	19*	6.1*	-	-	N/A	Miamisburg WWTP Mix Zone
64.9/ -	19*	6.6*	-	34	**(NON)**	Dst. Miamisburg WWTP-pooled
64.0/64.3	27*	8.3	54	82	PARTIAL	Dst. DP&L Hutchings Dam
63.3/62.6	33*	7.2*	50	76	PARTIAL	Ust. Chautauqua Dam

Table 1(cont.). Summary of the biological use attainment status for sampling locations in the Great Miami River based on collections made July - September, 1989. Attainment status follows guidance provided in Ohio EPA (1987).

River Mile Fish/Invert	IBI	Modified Iwb	ICI	QHEI	Attainment Status[a]	Comments[b]
			Eastern Corn Belt Plains			
62.1/60.2	28*	6.9*	48	66	PARTIAL	Ust. Franklin WWTP
59.6/59.6	27*	7.9*	44	-	N/A	Franklin WWTP Mix Zone
59.5/ -	30*	8.0^{ns}	-	56	(PARTIAL)	Rest of Zone
59.4/	32*	8.2^{ns}	-	-	(PARTIAL)	Dst. Franklin WWTP
58.4/ -	29*	7.7*	-	59	**(NON)**	Dst. Clear Creek
55.9/55.0	35*	9.3	48	87	PARTIAL	Dst. SR. 4
52.4/ -	23*	8.4^{ns}	-	-	**(NON)**	Ust Hyd. Canal Confluence
52.0/51.5	26*	6.6*	48	-	PARTIAL	Dst.Hyd. Canal Confluence
51.4/ -	32*	7.9*	-	-	N/A	Armco Middletown, 001
51.3/ -	25*	6.8*	-	56	**(NON)**	Rest of Zone
51.2/50.9	27*	7.8*	48	-	PARTIAL	Dst.Armco Middletown, 001
50.0/ -	31*	8.2^{ns}	-	61	(PARTIAL)	Ust. Elk Creek
49.1/49.3	31*	8.5	48	63	PARTIAL	Ust. Middletown WWTP
48.2/48.2	36*	8.1^{ns}	50	-	N/A	Middletown WWTP Mix Zone
48.1/ -	35*	7.8*	-	-	**(NON)**	Rest of Zone
48.0/	37*	8.1^{ns}		81	(PARTIAL)	Dst. Middletown WWTP
47.5/47.4	33*	7.9*	44	86	PARTIAL	Dst. Dicks Creek
45.5/ -	33*	8.3^{ns}	-	85	(PARTIAL)	Dst. LeSourdsville WWTP
42.3/43.0	26*	5.6*	48	55	**NON**	Ust. Hamilton Hyd. Canal
40.9/38.8	37*	8.9	50	92	PARTIAL	Ust. Armco, New Miami
38.5/38.7	25*	8.2^{ns}	24*	66	N/A	Armco New Miami, 001
38.4/ -	28*	7.2*	-	-	**(NON)**	Rest of Zone
38.3/ -	25*	8.0^{ns}	-	-	**(NON)**	Dst. Armco, New Miami
37.0/36.9	31*	8.1^{ns}	50	41	PARTIAL	Dts. Hamilton Hyd. Canal
- /34.3	-	-	48	-	(FULL)	Dst. Hamilton Dam
/34.1	-	-	46	-	(FULL)	Dst. Hamilton Dam
33.9/33.9	30*	8.5	32^{ns}	47	PARTIAL	Ust. Hamilton WWTP
33.7/ -	26*	9.1	-	86	N/A	Hamilton WWTP Mix Zone
33.6/ -	27*	8.1^{ns}	-	-	(PARTIAL)	Rest of Zone
33.5/32.7	29*	8.8	46	74	PARTIAL	Dst. Hamilton WWTP

Table 1(cont.). Summary of the biological use attainment status for sampling locations in the Great Miami River based on collections made July - September, 1989. Attainment status follows guidance provided in Ohio EPA (1987).

River Mile Fish/Invert	IBI	Modified Iwb	ICI	QHEI	Attainment Status[a]	Comments[b]
			Eastern Corn Belt Plains			
32.0/ -	23*	8.7	-	-	N/A	Fairfield WWTP Mix Zone
31.9/ -	29*	8.9	-	-	(PARTIAL)	Rest of Zone
31.8/ -	29*	9.0	-	-	(PARTIAL)	Dst. Fairfield WWTP
28.9/30.0	28*	9.0	42	76	PARTIAL	Adj. American Aggregates
28.7/ -	28*	7.9*	-	-	**(NON)**	Adj. East River Road
25.8/26.3	28*	7.7*	48	59	PARTIAL	At St. Rt. 126
			Interior Plateau			
23.4/22.5	25*	7.9*	50	75	**NON**	Ust. DOE Fernald
21.2/ -	25*	7.9*	-	51	**(NON)**	Dst. DOE Fernald
20.1/ -	33*	7.8*	-	74	**(NON)**	Dst. Paddys Run
15.6/18.7	27*	8.6	G	-	(PARTIAL)	Ust. Miamitown
14.8/14.9	25*	8.1*	52	75	**NON**	Dst. Miamitown+Taylor Ck.
11.6/ 9.5	25*	8.1*	48	60	**NON**	Ust. Chevron Refinery
8.2/ 8.3	33*	8.8	42	77	PARTIAL	Dst. Chevron Refinery
6.3/ 5.8	29*	7.8*	50	-	PARTIAL	Dst. Whitewater River
0.9/ -	34[ns]	7.8*	-	-	(Partial)	Confluence with Ohio R.

a - Use attainment status based on one organism group is parenthetically expressed.
b - Sites used for mixing zone impact analyses are not used to determine use attainment status.
* - Significant departure from ecoregion biocriteria; poor and very poor results are underlined.
ns - Nonsignificant departure from ecoregion biocriteria (4 IBI or ICI units; 0.5 Iwb units)

Ecoregion Biocriteria: Eastern corn Belt Plains (ECBP)

INDEX - Site type	WWH	EWH	MWH(c)
IBI - Boat	42	48	30
Mod. Iwb - Boat	8.5	9.6	6.6
ICI	36	46	N/A

Ecoregion Biocriteria: Interior Plateau (IP)

INDEX - Site type	WWH	EWH	MWH(c)
IBI - Boat	38	48	30
Mod. Iwb - Boat	8.7	9.6	6.6
ICI	30	46	N/A

(c) - Modified Warmwater Habitat for impounded areas.

The 1989 fish data is believed to reflect in part the results of the 1986 CSX train derailment and the 1988 drought. This would help to explain why the Modified Index of Well being (MIwb) has improved significantly from the 1980 data yet the number of fish and the diversity (expressed as the IBI) has not kept pace with the MIwb.

RECOMMENDATIONS

Aquatic Life Use Designation: Recommended Changes

Great Miami River Mainstem

The existing WWH use designation is considered appropriate for the length of the mainstem studied during the 1989 survey based on the full or partial attainment of 79% of the river miles surveyed during 1989. Modifications to the stream channel were not sufficient to change the use designation due to their localized nature.

Future Monitoring Needs

Correct spacing

* Additional sediment sampling for heavy metals, organic compounds, PCBs and pesticides is needed in the basin to determine background levels as well as possible contamination from municipalities, industry, CSO discharges and nonpoint source pollution.

* The source of elevated zinc in the Middletown and Miamisburg areas needs to be better defined.

* The source of elevated phosphorus in the Miamisburg area needs to be defined.

* The cause of biological impairment near the Armco, New Miami plant needs to further investigated.

* The water quality of Bear Creek and the Great Miami in the vicinity of Bear Creek need to be determined.

* Additional sampling for organic compounds in the water column is required.

* Fish tissue sampling for organic compounds, heavy metals, PCBS and pesticides should be conducted. The Great Miami River is heavily fished and this information is very important for the protection of human health.

* Radionuclide testing of fish and sediments near the DOE facilities of Mound in Miamisburg and near Fernald.

STUDY AREA

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The Great Miami River drainage basin covers 5385.3 square miles in Ohio and Indiana (1437.4 mi^2 in Indiana) (ODNR, 1960) (Fig.1).

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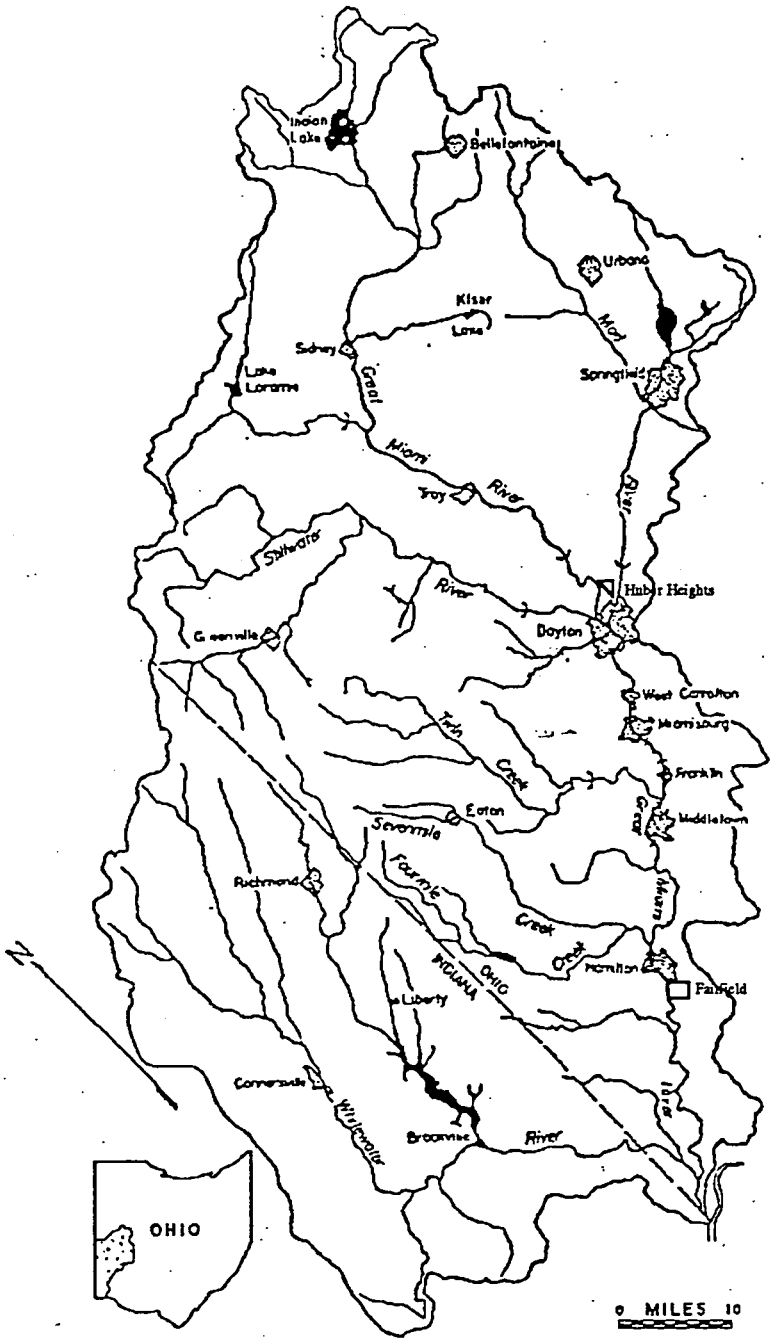

Fig 1. Great Miami River Drainage Basin

The mainstem of the river is 170.3 miles in length with an average gradient of 3.9 feet per mile (ODNR, 1960). The section of the Great Miami River mainstem examined during the summer of 1989 extends from the Taylorsville Dam near Vandalia (RM 92.6) in Montgomery County to just upstream of the confluence with the Ohio River (RM 0.9) in Hamilton County. It flows through portions of Montgomery, Warren, Butler, and Hamilton counties. Major tributaries include the Stillwater, Mad, and Whitewater Rivers, as well as Twin, Seven Mile, and Four Mile Creeks. Several of these tributaries will be assessed in separate studies from the 1989 assessment. Only limited samples were taken from the Mad River, Stillwater River and Whitewater River during the 1989 Great Miami study. The aquatic life use designation for much of the Great Miami River is Warmwater Habitat (WWH). One stretch (RM 95.7-92.6) of the river is designated as Exceptional Warmwater Habitat (EWH) and State Resource Waters (SRW). The river is also designated as agricultural and industrial water supply and primary contact recreation.

Land use along the river ranges from urban/industrial to rural/agricultural. In Montgomery County the river flows through or is adjacent to the cities of Huber Heights, Dayton, Moraine, West Carrollton, and Miamisburg (total population 258,966). In Warren County the river flows through Carlisle and Franklin (total population 16086). In Butler county the river flows through the boundaries of Middletown, Trenton, New Miami, Hamilton, and Fairfield (total population 155,863). In Hamilton County the only incorporated area adjacent to the river is Cleves (population 2208). This portion of the Great Miami River is developed with urban areas and industrial sites. Most industries and municipalities utilize groundwater as a principal water source but discharge treated waste to the river. Surface runoff from urban areas and industries along the river is not treated or impeded prior to entering the river.

In Ohio the majority of the Great Miami River watershed lies within the Eastern Cornbelt Plains ecoregion. Landforms have been shaped by glaciation which left flat to gently rolling terrain, glacial till, and in some places exposed limestone. Soils in the watershed tend to be neutral to slightly alkaline and drainage varies from well drained to very poorly drained depending on parent material and topography. The river lies within a broad valley with a wide floodplain. The lower portion of the watershed flows through the Interior Plateau ecoregion and becomes more hilly as the river progresses to the confluence with the Ohio River.

Sections of the river have been channelized, stabilized and had vegetation (canopy) removed to prevent flooding and erosion with the effect being a reduction in natural sinuosity of the channel and loss of protective vegetative cover. Several lowhead dams have been built along the main course of the river for either recreational or industrial usage.

The entire length of the Lower Great Miami River overlies the Great Miami River Buried Valley Aquifer System. This aquifer consists of an ancient river valley which was filled with sand, gravel and clay till deposited by glaciers. These deposits are as much as 200 feet thick and provide the principal source of water supply for residents and industries of the area and the Great Miami River is the primary recharge system for these wells. For this reason the aquifer was designated as a Sole Source Aquifer by USEPA in 1988. This designation provides for review of any federally funded projects over the aquifer which may impact on the quality of the water. In addition to this protection, many communities have enacted or are considering enactment of wellhead protection legislation.

METHODS

All chemical, physical, and biological field/laboratory data processing and data analyses methods and procedures adhere to those specified in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices (Ohio Environmental Protection Agency, 1989a) and Biological Criteria for the Protection of Aquatic Life, Volumes II-III (OEPA, 1987; 1989b; 1989c), and The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application (Rankin, 1989) for aquatic habitat assessment.

Fish were sampled two to three times by pulsed DC electrofishing using the boat method (500 meter zones). Macroinvertebrates were sampled using modified Hester/Dendy multiple plate artificial substrate samplers and supplemented with a qualitative assessment of the available natural substrates. Chemical assessments were based on comparisons with the Ohio Water Quality Standards, Ohio Administrative Code (OAC) 3745-1, effective May 1, 1990. Sites sampled during 1989 are listed in Table 2. Sites sampled by the Modeling Section in 1990 and 1991 are listed in Table 2a.

Attainment/non-attainment of aquatic life uses is determined by using Ohio's biological criteria (OEPA, 1987a; 1987b; 1989b; 1989c; 1990). The biological community performance measures that are used include the Index of Biotic Integrity (IBI) and the Modified Index of Well-Being (MIwb), both of which are based on fish community characteristics, and the Invertebrate community Index (ICI) which is based on macroinvertebrate community characteristics.

The IBI and ICI are multi-metric indices patterned after an original IBI described by Karr (1981) and Fausch, et. al. (1984). The MIwb is a measure of fish community abundance and diversity using numbers and weight information; it is a modification of the original Index of Well-Being applied to fish community information from the Wabash River (Gammon, 1976; Gammon, et. al., 1981).

Performance expectations for the basic aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH],

and Modified Warmwater Habitat [MWH] were developed using the regional reference site approach (Hughes, et. al., 1986; Omernik, 1988). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley, 1981).

Attainment of an aquatic life use is **Full** if all three indices (or the ones available) meet the applicable criteria, **Partial** if one or more attains and at least one does not attain, and **NON** if all three fail to meet the applicable criteria or when one organism group indicates poor or very poor performance, even if the other group is attaining the applicable criteria.

Physical habitat is evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Rankin, 1989). Various attributes of the available habitat are scored based on their overall importance to the establishment of viable, diverse aquatic fauna. Evaluations of type and quality of substrate, amount of instream cover, channel morphology, extent of riparian canopy, pool and riffle metrics used to determine the QHEI score which generally ranges from 20 -100. The QHEI is used to evaluate the characteristics of a stream segment, not just the characteristics of a single sampling site. As such, individual sites may have much poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat provided water quality conditions are similar. QHEI Scores from hundreds of segments around the state have indicated that values higher than 60 are generally conducive to the establishment of warmwater faunas while those scores in excess of 75-80 typify habitat conditions which can support exceptional fauna.

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Table 2. List of OEPA sampling locations (water chemistry-C, sediment-S, organics-O, macroinvertebrate-B and fish-F) in the Great Miami River Basin, Survey 1989.

Stream River Mile	Type of Sampling	Latitude/Longitude	Landmark	USGS 7.5min. Quad.Map
Great Miami River				
92.6	O,S,C	39°52'21"N,84°09'48"W	Taylorsville Dam N.	Dayton
91.1	B	39°51'16"N,84°10'18"W	dst. Little York Rd.	"
91.0	F	39°51'10"N,84°10'25"W	dst. York Rd.	"
88.1	F	39°49'50"N,84°09'17"W	dst. Powell Landfill	"
87.15	O,C	39°49'13"N,84°09'23"W	Needmore ~~Ave.~~ Rd	"
87.0	F	39°49'10"N,84°09'22"W	ust. North Reg.WWTP	"
86.5	F	39°48'50"N,84°09'13"W	dst. North Reg.WWTP	"
85.9	B	39°48'19"N,84°09'11"W	adj. Dayton wellfield	"
85.20	O,C	39°47'56"N,84°09'45"W	dst. North Reg.WWTP	"
83.57	C	39°47'28"N,84°11'30"W	Keowee St./N. Dixie	"
82.9	F	39°47'00"N,84°01'58"W	ust. Steele Dam	"
82.0	F	39°46'25"N,84°11'30"W	dst. Steele Dam	"
80.65	B,C	39°45'55"N,84°11'55"W	Monument Ave.	"
80.4	F	39°45'37"N,84°12'23"W	ust. Wolf Cr.	"
80.1	F	39°45'20"N,84°12'18"W	dst. Wolf Cr.	"
80.0	B,C	39°45'20"N,84°12'14"W	dst. Wolf Cr.	"
77.9	F	39°43'49"N,84°12'07"W	ust. Tait Dam	"
77.24	S,C,O	39°43'52"N,84°12'57"W	Broadway St.	S.Dayton
76.9	F	39°43'52"N,84°12'51"W	ust. Dayton WWTP	"
76.5	B	39°43'27"N,84°13'40"W	adj. W. River Rd. @ gage	"
76.1	F	39°43'11"N,84°13'43"W	dst. Dayton WWTP	"
76.0	F	39°43'04"N,84°13'39"W	dst. Dayton WWTP	"
75.8	B,S	39°42'53"N,84°13'42"W	adj. E. River Rd.	"
74.8	F	39°41'23"N,84°13'56"W	ust. Holes Cr.	"
74.5	F	39°40'58"N,84°12'53"W	dst. Holes Cr.	"
73.77	O,C	39°41'15"N,84°13'52"W	Sellars Rd.	"
73.3	F	39°40'47"N,84°14'28"W	dst. Holes Cr.	"
72.4	B	39°40'57"N,84°14'56"W	dst. Appleton Paper WWTP	"
72.3	B	39°41'00"N,84°14'58"W	dst. " "	"
71.9	F	39°41'16"N,84°12'46"W	dst. Appleton Paper WWTP	"
71.6	F	39°41'23"N,84°15'16"W	ust. MontCo.W.Reg.WWTP	Miamisburg
71.1	F	39°41'16"N,84°15'38"W	dst. MontCo.W.Reg.WWTP	"
71.0	F	39°41'12"N,84°15'58"W	dst. MontCo.W.Reg.WWTP	"
70.9	F	39°41'07"N,84°15'51"W	dst. MontCo.W.Reg.WWTP	"
70.1	F	39°40'35"N,84°15'55"W	ust. Frmsvlle-W.Carr.Rd	"
69.87	B,C	39°40'28"N,84°15'52"W	Frmsvlle-W.Carr.Rd.	"
69.3	B	39°40'03"N,84°15'58"W	dst. Owl Cr.	"
68.8	B	39°39'49"N,84°16'27"W	dst. W.Carrollton WWTP	"
68.6	F	39°39'59"N,84°16'05"W	dst. W.Carr. WWTP	"
67.1	B	39°38'32"N,84°17'29"W	ust. Linden Ave	"
66.90	C	39°38'26"N,84°17'32"W	Linden Ave.	"
65.9	F	39°37'27"N,84°17'55"W	ust. Miamisburg WWTP	"
65.70	C	39°37'28"N,84°17'57"W	ust. DPL Htchgs Plnt	Franklin
65.0	F	39°36'54"N,84°17'37"W	dst. Miamisburg WWTP	"
64.9	F	39°36'47"N,84°17'32"W	dst. Miamisburg WWTP	"
64.3	B	39°36'20"N,84°17'08"W	dst. DP&L Hutchings	"
64.0	F	39°36'17"N,84°17'07"W	dst. Hutchings Dam	"
63.3	F	39°35'42"N,84°17'31"W	ust. Chautauqua Dam	"
62.58	B,C,O	39°35'15"N,84°17'18"W	Chautaugua Dam	"
62.1	F	39°34'53"N,84°17'35"W	ust. Franklin	"
60.58	S,C	39°33'47"N,84°18'18"W	Old RT.123-Franklin	"
60.2	B	39°33'31"N,84°18'32"W	adj. Oxford Rd.	"
59.5	F,B	39°33'56"N,84°19'19"W	dst. Franklin WWTP	"
59.4	F	39°33'25"N,84°19'25"W	dst. Franklin WWTP	"
59.6	F	39°03'50"N,84°19'13"W	dst. Franklin WWTP	"

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Table 2. List of OEPA sampling locations (water chemistry-C, sediment-S,organics-O, macroinvertebrate-B and fish-F) in the Great Miami River Basin, Survey 1989.

Stream River Mile	Type of Sampling	Latitude/Longitude	Landmark	USGS7.5min. Quad.Map
58.4	F	39°32'54"N,84°20'01"W	dst. Clear Cr.	"
57.55	C	39°32'41"N,84°20'55"W	adj. S.R.73-Cnty Park	"
55.9	F	39°32'47"N,84°22'33"W	ust S.R. 4	"
55.0	B	39°32'19"N,84°23'11"W	dst SR 4	"
52.64	C	39°31'13"N,84°24'46"W	S.R. 122	Middletown
52.4	F	39°31'06"N,84°24'49"W	dst. SR 122	"
52.0	F	39°30'44"N,84°25'02"W	ust. Middltown Dam	"
51.5	B	39°30'14"N,84°25'04"W	ust. Armco 001	"
51.4	F	39°30'15"N,84°25'03"W	dst. Armco-Middltown	"
51.3	F	39°30'13"N,84°25'04"W	dst. Armco-Middltown	"
51.2	F	39°30'09"N,84°25'06"W	dst. Armco-Middltown	"
50.9	B	39°29'19"N,84°25'24"W	dst. Armco-Middletown	"
50.0	F	39°29'33"N,84°26'11"W	ust. Elk Cr.	"
49.27	C,S,O,B	39°28'53"N,84°26'34"W	S.R. 73	"
49.1	F	39°28'50"N,84°26'32"W	dst. SR 73	"
48.2	B,F	39°28'39"N,84°25'34"W	dst. Middltown WWTP	"
48.1	F	39°28'35"N,84°25'30"W	dst. Middltown WWTP	"
48.0	F	39°28'30"N,84°25'29"W	dst. Middltown WWTP	"
47.5	F	39°28'07"N,84°25'31"W	dst. Dicks Cr.	"
47.4	B	39°27'58"N,84°25'35"W	dst. Dicks Cr.	"
45.75	O,S,C	39°26'38"N,84°26'10"W	ust. Lesrdsvlle WWTP	Trenton
45.5	F	39°26'40"N,84°26'18"W	dst. Lesrdsvlle WWTP	"
43.23	C	39°25'30"N,84°28'30"W	Liberty Frfld Rd.	"
42.3	F	39°25'16"N,84°29'41"W	dst. B&O	"
43.0	B	39°25'41'N,84°28'48"W	dst. Wayne-Madison Rd.	"
40.9	F	39°26'12"N,84°31'16"W	ust. Armco, New Miami	"
38.8	B	39°25'28"N,84°32'21"W	ust. Armco 001, New Miami	"
38.7	B	39°25'28"N,84°32'23"W	Armco 001 mix. zone	"
38.5	F	39°25'29"N,84°32'21"W	dst. Armco 001	"
38.4	F	39°25'32"N,84°32'26"W	dst. Armco 001	"
38.3	F	39°25'33"N,84°32'33"W	dst. Armco 001	"
37.20	C	39°24'45"N,84°33'23"W	Hamilton Dam	Hamilton
37.0	F	39°24'36"N,84°33'28"W	dst. Hydraulic Canal	"
35.69	O,C	39°23'40"N,84°34'18"W	S.R. 128	"
34.1	F,B	39°22'30"N,84°34'34"W	adj. Neilan Rd.	Greenhills
34.3	B	39°22'29"N,84°34'04"W	dst. new lowhead dam (Hamilton)	"
34.0	F	39°22'13"N,84°34'09"W	dst. Ham. WWTP	"
33.9	B,F	39°22'10"N,84°34'17"W	dst. " "	"
33.8	F	39°22'09"N,84°34'20"W	dst. " "	"
32.7	B	39°21'21"N,84°35'13"W	@ Joyce Park	"
32.0	F	39°20'55"N,84°35'36"W	dst. Fairfield WWTP	"
31.9	F	39°20'51"N,84°35'36"W	dst. " "	"
31.8	F	39°20'47"N,84°35'35'W	dst. " "	"
29.97	O,C,B	39°19'59"N,84°36'41"W	American Agg's RR Bridge	"
28.9	F	39°19'27"N,84°36'37"W		
28.7	F	39°19'01"N,84°36'36"W	adj. E. River Rd.	"
26.21	B,C	39°18'12"N,84°38'35"W	S.R. 126	Shandon
25.8	F	39°18'07"N,84°38'39"W	dst. Ross	"
23.4	F	39°17'08"N,84°39'16"W	ust. Fernald	"
22.5	B	39°16'07"N,84°39'25"W	Sportsman Club	"
21.2	F	39°15'48"N,84°40'48"W	dst. US DOE	"
20.1	F	39°15'50"N,84°41'33"W	dst. Paddy's Run	"
19.90	C	39°41'44"N,84°41'44"W	dst. Paddy's Rn-128	Shandon
18.7	B	39°14'50"N,84°42'23"W	ust. Miamitown	"
15.6	F	39°13'09"N,84°42'14"W	ust. Miamitown bridge	"
14.8	F	39°12'26"N,84°40'52"W	dst. Taylor Cr.	"
11.6	F	39°11'33"N,84°45'32"W	ust. Chevron Oil	"

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Table 2. List of OEPA sampling locations (water chemistry-C, sediment-S,organics-O, macroinvertebrate-B and fish-F) in the Great Miami River Basin, Survey 1989.

Stream River Mile	Type of Sampling	Latitude/Longitude	Landmark	USGS 7.5min. Quad.Map
10.70	C	39°11'29"N,84°45'29"W	ust. Chevron-S.R. 128	Addyston
9.50	B	39°10'47"N,84°44'53"W	adj. E.Miami River Rd.	"
8.3	B	39°09'59"N,84°45'36"W	dst. US 50 8.2	"
8.2	F	39°09'56"N,84°45'48"W	dst. dst. Chevron Oil	"
6.3	F	39°09'44"N,84°47'19"W	dst. Whitewater River 5.8	"
5.8	B	39°09'23"N,84°47'25"W	ust. Lost Bridge	"
5.56	O,C	39°09'10"N,84°47'44"W	Lost Bridge	Addyston
0.90	F	39°06'43"N,84°49'37"W	river mouth	"
Whitewater River				
8.39	C	39°14'56"N,84°49'11"W	Indiana Border	"
7.70	B	39°14'44"N,84°48'39"W	ust. Harrison WWTP	"
7.20	F	39°14'13"N,84°48'27"W	dst. Harrison WWTP	"
7.04	C,B	39°14'15"N,84°48'27"W	Willow Lane	"
5.4	F	39°13'32"N,84°47'24"W	dst. Harr.Sand&Gravel	"
2.0	F	39°11'25"N,84°47'39"W	ust. Suspension Bridge Rd.	"
1.50	B,C	39°10'59"N,84°47'34"W	Suspension Bridge	Hooven
Mad River				
81.53,0.50	B,F	39°46'07"N,84°10'40"W	Keowee St.	N.Dayton
81.53,0.40	B	39°46'21"N,84°11'31"W	ust. Webster St.	"
81.53,0.28	C	39°46'06"N,84°11'01"W	Webster St.	"
Stillwater River				
82.57,1.4	B	39°47'48"N,84°12'23"W	dst. Siebenthaler Rd.	"
82.57,0.32	C	39°50'16"N,84°13'55"W	Ridge Ave.	"

Table 2a. List of OEPA modeling section, sampling locations (modeling-M,effluent chemistry-E) in the Great Miami River Basin survey 1990.

Stream River Mile	Sampling Type	Latitude/Longitude	Landmark	USGS 7.5min. Quad. Map
Great Miami River				
91.54	M	39°51'16"84°10'18.5"	ust.Little York bridge	N.Dayton
52.43	M	39°30'45"84°25'05"	dst.Central Ave.bridge	Middletown
51.45	M,E	39°30'16"84°25'2.8"	Armco 001	"
49.27	M	39°30'45"84°25'05"	dst.S.R 73 bridge	Trenton
48.29	M,E	39°28'42"84°25'41.5"	Middletown WWTP	"
48.1	M,E	39°28'35"84°25'30"	Crystal Tissue 001	"
47.61	M	39°28'38"84°25'16"	Dicks Creek	"
45.7	M	39°26'36"84°26'11.3"	Gregory Creek	"
45.66	M	39°26'39"84°26'27"	ust.Lesrdsville WWTP	"
45.65	M,E	39°26'37"84°26'16.3"	Lesrdsville WWTP	"
43.22	M	39°25'30"84°28'30"	dst Liberty-Frfld Rd.	"
41.9	M	39°23'22"84°34'21"	ust.Ham.Hydraulic Canal	Hamilton
38.74	M,E	39°25'29"84°32'15.8"	Armco/New Miami 001	"
38.58	M	39°25'30"84°32'25.8"	dst. Rt. 127	"
38.38	M	39°25'34"84°32'15.8"	Four Mile Creek	"
36.88	M	39°24'27"84°33'38"	ust. Champion Paper.	"
35.37	M	39°23'22"84°41'51"	USGS gage @ Prshng Ave.	"
34.1	M	39°22'19"84°34'12.8"	ust. Ham. WWTP	"
34.0	M,E	39°22'13"84°34'14"	Ham. WWTP effluent	Greenhills
32.05	M	39°20'56"84°35'36.5"	ust. Fairfield WWTP	"
32.0	M,E	39°20'55"84°35'35.5"	Fairfield WWTP	"
30.76	M	39°20'16"84°36'14.9"	@ gravel pit W. of Frfld.	S.Dayton
28.45	M	39°19'5."84°36'52.2"	East of Ross u.s. Bank	Addyston
Mad River				
81.48/0.28	M	39°46'07"84°10'37"	dst. Keowee Bridge	N.Dayton
Stillwater River				
82.57/0.40	M	39°50'16"84°13'55"	ust. Ridge Ave.Bridge	"
Elk Creek				
49.8,1.49	M		Howe Rd.	Trenton

RESULTS AND DISCUSSION

Chemical/Physical Water Quality

Great Miami River Mainstem

Selected data from twenty-nine chemical/physical sampling stations in the Great Miami River (GMR) Basin, Taylorsville Dam (RM 92.46) to Elizabethtown (5.56) are summarized in Table 3. Results from the basin survey primarily demonstrated parameter concentrations below Ohio's Water Quality Standards (WQS) for Warmwater habitat Use Designation (maximum and 30-day average limits). Elevated values and WQS exceedences of metals, nutrients and organic compounds (Table 4) occurred intermintently and were frequently noted downstream of industries and municipalities.

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Table 3. Selected parameter results (mean/minimum-maximum) of chemical/physical sampling in the Great Miami River Basin study area, 1989.

Stream RM	No. Samples	Temp. (°C)	D.O(mg/l)	pH(S.U)	Conductivity umhos/cm
Great Miami River					
92.46	6	21(13-25)	9(7.2-13)	8.5(8.4-8.6)	666(620-745)
87.15	6	21(13-24)	9(8.2-10)	8.5(8.4-8.7)	662(588-741)
85.20	6	22(13-25)	9.3(8.4-11.2)	8.6(8.5-8.6)	658(586-743)
83.57	6	21(13-24)	9.1(8-12.1)	8.6(8.5-9.0)	657(546-764)
80.65	6	20(14-26)	10.1(7-13.1)	8.5(8.3-8.7)	676(634-716)
77.24	6	21(15-25)	9.1(7.4-10.7)	8.5(8.4-8.7)	674(626-731)
73.77	6	22(16-25)	8.6(7.3-10.3)	8.5(8.3-8.7)	706(640-777)
69.87	6	22(17-26)	9.0(7.4-11.7)	8.5(8.3-8.9)	736(664-834)
66.90	6	23(16-27)	9.5(8.3-10.5)	8.6(8.4-8.8)	742(687-835)
65.70	6	22(16-27)	9.3(8.2-10.3)	8.5(8.4-8.7)	747(673-820)
62.58	6	22(16-28)	9.4(8.1-10.8)	8.6(8.4-8.9)	737(649-816)
60.58	6	23(15-26)	8.8(8.1-9.7)	8.6(8.4-8.9)	735(648-824)
57.55	6	22(15-25)	8.6(7.3-10.6)	8.5(8.3-9.0)	744(649-840)
52.64	6	22(15-26)	9.3(8.1-11.5)	8.6(8.4-9.0)	726(625-828)
49.27	6	22(15-26)	9.1(7.8-12.3)	8.6(8.4-9.0)	719(632-821)
45.75	6	22(15-25)	9.2(7.6-12.8)	8.5(8.3-9.0)	723(644-829)
43.23	6	22(15-25)	9.1(7.0-14.6)	8.5(8.4-9.0)	721(635-834)
37.20	7	22(16-27)	*9.8(8.3-11.1)	8.6(8.3-8.9)	711(640-814)
35.69	7	23(16-27)	*10(8.2-13.4)	8.6(8.3-9.0)	692(627-816)
29.97	7	23(20-27)	*9.7(8.0-11.6)	8.5(8.3-8.9)	704(626-822)
26.20	7	22(16-27)	*9.4(8.0-10.7)	8.6(8.3-9.0)	693(612-814)
19.90	7	22(16-26)	*9.1(8.4-10.1)	8.5(8.3-8.8)	777(589-1255)
10.70	7	25(16-27)	*9.3(8.4-10.6)	8.5(8.1-9.0)	682(567-800)
5.60	7	22(15-26)	*9(7.6-9.9)	8.5(8.3-8.7)	640(543-728)
Mad River					
81.5/0.28	6	20(14-23)	10(8.7-12.7)	8.4(8.4-8.5)	692(684-701)
Stillwater River					
82.57/0.32	6	21(13-24)	7.6(5.5-9.5)	8.4(8.3-8.5)	635(511-730)
WhiteWater River					
8.4	7	20(14-23)	7.9(7.0-9.3)	8.3(8.3-8.4)	536(513-582)
7.0	7	20(20-23)	7.7(6.6-8.3)	8.3(8.2-8.3)	540(416-599)
1.5	7	20(20-24)	7.8(6.9-8.6)	8.3(8.3-8.4)	539(443-588)

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Table 3. continued.

Stream RM	No. Samples	NH3-N(mg/l)	Phos-T(mg/l)	CBOD5(mg/l)	Hardness-T (mg/l) CaCO3
Great Miami River					
92.46	6	0.06(.05-.12)	0.24(.15-.37)	1.6(1-3.5)	345(312-361)
87.15	6	0.05	0.21(.14-.26)	1.7(.1-2.7)	341(300-363)
85.20	6	0.05	0.20(.11-.28)	2.1(1-3.5)	340(298-381)
83.57	6	0.06(.05-.12)	0.26(.11-.38)	2.3(1-4.9)	336(295-347)
80.65	6	0.05	0.21(.12-.34)	1.5(1-2.7)	354(325-375)
77.24	6	0.05	0.16(.06-.25)	1.5(1-3)	349(318-368)
73.77	6	0.56(.05-.09)	0.36(.18-.46)	2.0(1-4.7)	339(312-362)
69.87	6	0.05(.05-.08)	0.41(.23-.60)	2.0(1-4.7)	342(308-359)
66.90	6	0.05(.05-.06)	0.47(.29-.57)	2.0(1.3-3.0)	339(312-365)
65.70	6	0.05(.05-.06)	0.63(.28-1.62)	2.1(1.2-3.5)	339(310-364)
62.58	6	0.05	1.3(.25-4.56)	2.1(1.2-3.9)	341(305-367)
60.58	6	0.05(.05-.07)	0.43(.24-.61)	1.9(1.1-4.1)	352(333-374)
57.55	6	0.06(.05-.07)	0.526(.25-1.01)	1.8(1-4.3)	349(329-366)
52.64	6	0.05(.05-.06)	0.38(.24-.53)	2.0(1.1-5.1)	352(326-405)
49.27	6	0.04(.05-.06)	0.37(.22-.47)	2.0(1.1-4.8)	341(294-373)
45.75	6	0.10(.05-.15)	0.33(.21-.41)	2.1(1-6.0)	338(308-358)
43.23	6	0.10(.05-.16)	0.34(.22-.46)	2.3(1.2-6.7)	335(301-358)
37.20	7	0.06(.05-.11)	0.337(.24-.39)	2.6(1.3-6.4)	334(305-372)
35.69	7	0.05(.05-.07)	0.31(.05-.43)	2.9(1.3-7.5)	326(293-347)
29.97	7	0.06(.05-.07)	0.34(.20-.44)	2.4(1.4-5.2)	340(305-364)
26.20	7	0.05(.05-.07)	0.34(.20-.45)	2.6(1-6.7)	332(296-356)
19.90	7	0.05(.05-.7)	0.34(.24-.42)	2.4(1.3-6.4)	327(287-367)
10.70	7	0.05(.05-.7)	0.35(.24-.49)	2.2(1-3.1)	328(280-362)
5.60	7	0.05(.05-.06)	0.26(.16-.39)	1.8(1-1.7)	314(274-356)
Mad River					
81.5/0.28	6	<0.05	0.17(.10-.24)	1.2(1.0-2.0)	347(295-375)
Stillwater River					
82.5/0.32	6	<0.05	0.87(.11-.22)	1.3(1.0-2.0)	336(295-377)
Whitewater River					
8.4	7	0.05(0.05-0.06)	0.8(0.05-0.11)	<1.0	294(271-316)
7.0	7	0.07(0.05-0.10)	0.14(0.05-.41)	<1.0	296(274-317)
1.5	7	0.05(0.05-0.06)	0.08(0.05-0.14)	<1.0	299(269-323)

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Table 3. continued.

Stream RM	No. Samples	Cadmium-T (ug/l)	Chromium-T (ug/l)	Lead-T (ug/l)	Nickel-T (ug/l)	Zinc-T (ug/l)
92.46	6	<0.2	<30.0	3(3-2)	<40.0	13(10-25)
87.15	6	"	"	2.0	"	12(10-15)
85.20	6	"	"	2.0	"	10.0
83.57	6	"	"	2(2-3)	"	10.0
80.65	6	"	"	2.0	"	16(10-45)
77.24	6	"	"	3(2-3)	"	11(10-15)
73.77	6	"	"	2(2-3)	"	14(10-25)
69.87	6	"	"	17(10-35)	"	17(10-35)
66.90	6	"	"	18(10-35)	"	18(10-35)
65.70	6	"	"	11(10-15)	"	11(10-15)
62.58	6	"	"	21(10-45)	"	12(10-15)
60.58	6	"	"	11(10-15)	"	11(10-15)
57.55	6	"	"	15.0	"	11(10-15)
52.64	6	"	"	10.0	"	10.0
49.27	6	"	"	20.0	"	20(10-35)
45.75	6	"	"	13(10-20)	"	13(10-20)
43.23	6	"	"	18(10-35)	"	18(10-35)
37.20	7	"	"	11(10-20)	"	11(10-20)
35.69	7	"	"	13(10-15)	"	13(10-15)
29.97	7	"	"	13(10-20)	"	13(10-20)
26.20	7	"	"	11(10-20)	"	11(10-20)
19.90	7	"	"	22(10-65)	"	22(10-65)
10.70	7	"	"	11(10-20)	"	11(10-20)
5.60	7	"	"	11(15-10)	"	11(15-10)
Mad River						
81.5/0.28	6	<0.2	<30.0	<2.0	<40.0	12(10-15)
Stillwater River						
82.5/0.32	6	<0.2	<30.0	<2.0	<40.0	15(10-20)
Whitewater River						
8.4	7	<0.2	<30	<2	<40.0	<10
7.0	7	"	"	"	"	"
1.5	7	"	"	"	"	"

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Table 4. Significant parameter concentrations and river mile /total samples observed during July 7-September 28, 1989 in the Great Miami River Basin study area.

River Mile-Location	pH (S.U)	Phos. (mg/l)	Iron (ug/l)	Zinc (ug/l)	Lead (ug/l)	+Organic (ug/l) VOC	++BNA(NP)
Great Miami River							
RM 92.6-Taylorsville	0/6	0/6	**4/6	0/6	0/6	0/1	0/1
RM 87.15-Needmore	0/6	0/6	**4/6	0/6	0/6	0/1	1/1
RM 85.20-DstN.Reg.WWTP	0/6	0/6	**4/6	0/6	0/6	0/1	1/1
RM 83.57-Keowee/NDixie	0/6	0/6	**3/6	0/6	0/6	0/1	0/1
RM 80.65-Monument	0/6	0/6	**4/6	e*1/6	0/6	0/1	0/1
RM 77.24-Broadway	0/6	0/6	**4/6	0/6	0/6	0/1	1/1
RM 73.77-Sellars	0/6	0/6	**4/6	0/6	0/6	1/1	1/1
RM 69.87-Frms-W.Carr	0/6	0/6	**4/6	e*1/6	0/6	0/1	0/1
RM 66.90-Linden	0/6	0/6	**4/6	e*1/6	0/6	0/1	0/1
RM 65.70-UstDPL Htchngs	0/6	e*1/6	**4/6	0/6	0/6	0/1	0/1
RM 62.58-Chautaqua Dam	0/6	e*1/6	**4/6	e*1/6	0/6	1/1	0/1
RM 60.58-Old Rt 123	0/6	e*0/6	**4/6	0/6	0/6	0/1	0/1
RM 57.55-Adj S.R 73	0/6	e*1/6	**4/6	0/6	0/6	0/1	0/1
RM 52.64-S.R 122	*1/6	0/6	**4/6	0/6	0/6	0/1	0/1
RM 49.27-S.R 73	0/6	0/6	**4/6	e*1/6	0/6	0/1	0/1
RM 45.75-UstLesvlleWWTP	0/6	0/6	**4/6	0/6	0/6	0/1	0/1
RM 43.23-Lib-Ffld Rd	0/6	0/6	**4/6	e*2/6	0/6	0/1	0/1
RM 37.20-Hamilton Dam	0/7	0/7	**5/7	0/7	0/7	0/1	0/1
RM 35.69-S.R 128	*1/7	0/7	**5/7	0/7	0/7	1/1	0/1
RM 29.97-A.Agg RRbridge	0/7	0/7	**5/7	0/7	0/7	0/1	0/1
RM 26.21-S.R 126	0/7	0/7	**5/7	0/7	0/7	0/1	0/1
RM 19.90-Dst Pddy's Run	0/7	0/7	**5/7	e*2/7	0/7	0/1	0/1
RM 10.70-Ust Chvron-128	0/7	0/7	**5/7	0/7	0/7	0/1	0/1
RM 5.56-Lost Bridge	0/7	0/7	**5/7	0/7	*1/7	0/1	0/1
Whitewater River							
RM 8.39-Indiana Border	0/7	0/7	**2/7	0/7	0/7	0/1	0/1
RM 7.04-Willow Lane	0/7	0/7	2/7	ec2/7	0/7	0/1	0/1
RM 1.50-Sspensn bridge	0/7	0/7	2/7	ec3/7	0/7	0/1	0/1
Stillwater River							
RM 82.57,0.32-RidgeAve.	0/7	0/7	**5/7	0/7	0/7	0/1	0/1
Mad River							
RM 81.53,0.28-WebsterSt.	0/7	0/7	**2/7	0/7	0/7	0/1	0/1
Totals (&)	2/186	4/186	115/186	14/186	1/186	3/186	4/186
	1%	2%	60%	7%	1%	2%	2%

* -violation of water quality standard "maximum" limit
** -exceedence of water quality standard "30-day average" limit
e* -elevated concentration
\+ -values denote presence only-concentrations are below standards
++ -NP=Non-Priority Pollutants for BNAS
ec -Indicates an exceedence of numerical criteria for prevention of chronic toxicity (ccc) and of WQS-30-day average

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Segment 1 (RM 92.46-69.87) exhibited elevated levels of zinc at 25% of the sampling sites while organic compounds appeared at 63% of the sites sampled within this reach.

Segment 2 (RM 69.87-45.75) revealed increased presence of zinc (37% of sites), a decreased detection of organic compounds (13%) and the first and only elevation of phosphorus levels appearing at 50% of the sampling sites (four consecutive sites below Miamisburg Wastewater Treatment Plant). No "Third Quarter" phosphorus data was reported by Miamisburg Wastewater Treatment Plant (WWTP) in 1989. There is a possibility that the elevated phophorus levels are related to the reminants of the contamination of soils and groundwater caused by the 1986 CSX train derailment that occurred ~~in~~ near Miamisburg.

Segment 3 (RM 45.75-5.56) demonstrated diminished presence of zinc while occurrence of organic compounds remained at 13% of sites sampled.

Sampling day stream **flow measurements** (Table 5) recorded for the duration of the survey demonstrate variability of 200-500% per gaging station. Average discharge rates for 1989 exceeded averages of preceding years (excluding 1986) dating back to 1983 (Fig. 2). Recorded flows in 1989 at Taylorsville, Miamisburg and Hamilton United States Geological Survey (USGS) gages principally were 15% above historical averages dating back six years (1983) yet nearly 2% below 1980 average flows.

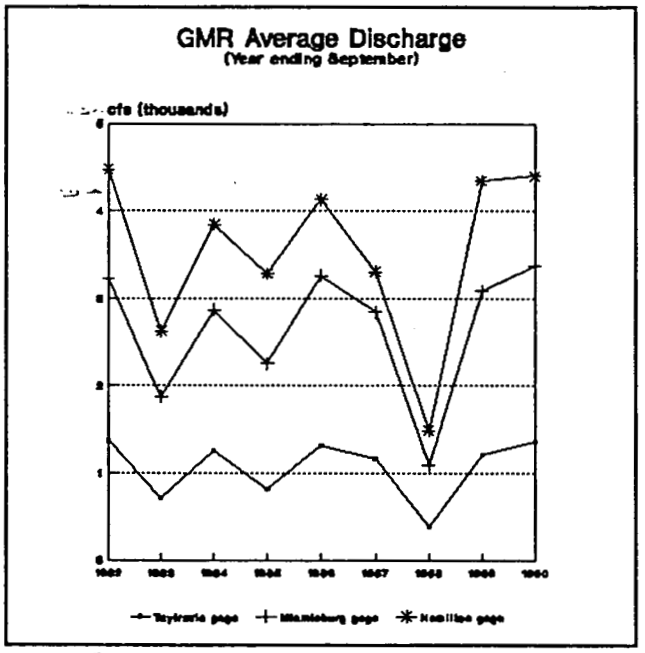

Fig 2

Mixing zone data collected below ten entity outfalls' (9 POTW, 1 industry) with few exceptions exhibited a majority of values within WQS "Inside Mixing Zone Maximum"("Inside Mixing Zone" standards not available for all parameters). Fairfield WWTP sustained elevated values for 37% of the parameters analyzed. Elevated parameters included conductivity, $CBOD_5$, nitrogen parameters and phosphorus. Harrison WWTP results revealed elevated values of conductivity, ammonia (NH_3-N) and Total Kjeldahl Nitrogen (TKN) and below average values for dissolved oxygen (D.O). Elevated values for cyanide and phenolics were noted in Middletown's mixing zone. All ten entity mixing zone results exceeded iron concentrations (doubled/tripled existing background concentrations) for **"Outside** Mixing Zone-30 day average".

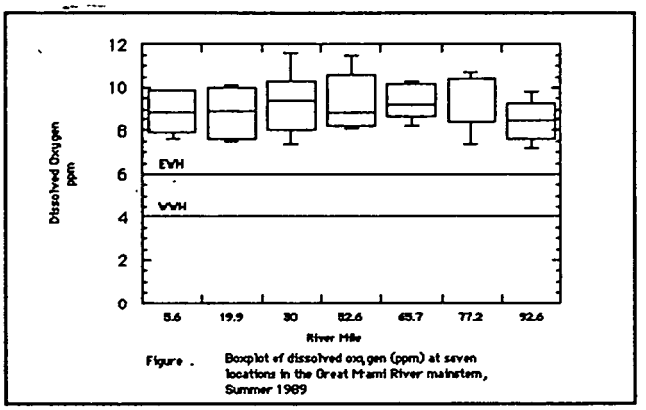

Figure . Boxplot of dissolved oxygen (ppm) at seven locations in the Great Miami River mainstem, Summer 1989

Fig 3

Dissolved oxygen **(D.O)** levels (Fig.3) in the GMR mainstem averaged 9.5 ppm while declining to an average of near 7.7 ppm in the Stillwater and Whitewater River. Notable D.O decline in the GMR occurred from RM 80.7-73.8 and is attributed to congested industrial, municipal and storm sewer input in the Dayton area. The most eminent decline in D.O (6.6, 6.7) on the Whitewater River occurred downstream of Harrison WWTP. Whitewater Aggregates, Inc. located in this vicinity experienced numerous or even continuous releases of sediments from their gravel wash water lagoons. They were notified of our observance of this and corrective actions to permanently eliminate the discharge were to have taken place.

Lead levels *exceeding* WQS "maximum limits" occurred once throughout the survey near the confluence of the Whitewater River downstream of the Chevron Oil Refinery. According to OEPA Division of Emergency and Remedial Response (DERR), leaking underground storage tanks permeating subsoils and petroleum product spills saturating perimeter soils with contaminants such as lead, copper and zinc, have occurred over the past four-five decades at the Chevron facility. Sorption exerting its dominance on the distribution of all three metals in the environment will generally influence the removal of these metals from the water column near their source. Therefore, assessing impacts of these metals on the water quality below this facility through water column sampling is most probably ineffectual in determining true pollutant loading (EPA-440/079-029).

Iron levels *exceeded* WQS "30-day average" of 1.0 mg/l (WQS limits set for conditions conducive for aquatic life habitats) throughout the study area. Background concentrations of this magnitude are fairly common to Ohio streams and are largely due to prominent iron content of the local geology. Iron bearing industrial effluent contribute to the excessive levels as POTW mixing zones sampled in 1989 reached levels greater than two to three times those recommended for habitable conditions for aquatic life (Outside Mixing Zone-30-day average). Although iron is not considered toxic in many forms, the right conditions can promote a "toxic" condition (toxic substances-WQS-3745-1-02) by changing the pH of the water to a toxic level (<6.0 - >9.0). All 1989 pH concentrations and most historical data fall within acceptable ranges. Furthermore deposition of iron hydroxides (naturally occurring and components of industrial and municipal effluent) on the gills and eggs of fish can cause blocking of fish respiratory channels and reduction of fish populations (California State Water Resources Control Board, 1971).

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Intermittent appearance of elevated **zinc** values along much of the study area (although below WQS maximum limits) is of concern as zinc, although only slightly toxic as an isolate, is very toxic when combined with other substances. The greatest presence of zinc detected in water column sampling occurred near RM 45.8 (Middletown) correlating with peak sediment concentrations also noted in that area.

Whitewater River

Water Quality Standards (maximum limits) *exceedences* were limited to iron appearing at one of three sampling sites. Zinc levels approaching WQS maximum limits appeared at two of three sites sampled downstream Harrison WWTP. Harrison WWTP has reported NPDES violations including violations of zinc. No detectable levels of zinc occurred upstream Harrison WWTP. Concentrations of zinc noted at the two sites downstream Harrison WWTP exceeded numerical criteria for the prevention of *chronic toxicity*.

Mad and Stillwater Rivers

Iron exceeded WQS "maximum criteria" limits at both sites. The Stillwater River demonstrated higher iron concentrations and more frequent observance of elevated concentrations of iron. Exceedences of iron limits occurred more than twice as often in the Stillwater than in the Mad River possibly due (along with other factors) to a higher concentration of suspended solids present in the Stillwater River.

Loadings - 1989

The lower mainstem of the GMR received point source discharge of wastewater from approximately 79 facilities in 1989 (Table 6) This is approximately the same number of dischargers reported in the 1980 GMR Comprehensive Water Quality Report (CWQR). Of the 79 facilities, roughly 69% are industrial facilities and 31% a combination of publically owned treatment works (POTW's), semi-public and federal facilities.

Table 6. List of facilities currently discharging to the mainstem of the Great Miami River.

Facility	Facility NPDES Permit No.
A.C. Smith	1IN00015
Aeronica Inc.	1I000003
Appleton Paper-West Carrollton	1IA00004
Armco Steel-Hamilton	1ID00002
Armco Steel-Middletown	1ID00001
B.F. Goodrich Co.	1I000021
Beecham Home Improvement	1IF00013
Billy Estes Oil Co. Bulk Station No. 8555	1IG00007
Butler Co. Water Association	1IX00053
Cargill Starch and Syrup	1IN00044
Champion-Knightsridge Plant	1IN00151
Champion Paper-Hamilton Mill	1IA00009
Chrysler-Dayton #1	1IN00089
Chevron USA-Cincinnati Refinery	1IG00000
Citric Acid Mfg.	1IN00016
Columbia Oil Co.	1IG00022
Crystal Tissue Co.	1IA00000
DP&L-Hutchings	1IB00004
Dayton Mental Health Center	1IB00017
Dayton WWTP	1PF00000
Delco-Moraine-Env. Engineering	1IN00030
D.O.E. Fernald Env. Management Project	1I000004
D.O.E. Mound	1Io00005
Duriron Co.	1IQ00005
Ernst Aggregates Inc.	1IJ00137
Evanston Estates STP	1PG00011
Fairfield STP	1PD00003
Franklin Regional WWTP	1PD00004
Frontier West WWTP	1PG00059
General Housewares Corp.	1IS00003
General Motors-Dayton Operations	1IN00040
General Motors-Harrison Radiator	1IN00031
General Motors-Moraine #3	1Io00008
General Motors-Vandalia	1Io00009
Hamilton Die-Casting Inc.	1IN00076
Hamilton Electric Plant	1IB00008
Hamilton Power Plant	1IB00016
Hamilton South Water Plant	1IW00060
Hamilton WWTP	1PE00002
Howard Paper-North Plant	1IN00060
Island Lake-C/O Village Center Pharm.	1PV00021
Ivex-coated Products-Troy	1IN00064
Jackson Center STP	1PB00036
Kimberly-Clark Corp.	1IF00009
Laeinal Components, Inc.	1IN00038
Layhigh Estates WWTP	1PZ00002
Lesourdsville Reg. WWTP	1PK00011
Logan Co.-Russells Point Plant	1PK00002
Medalist Ind.	1IQ00003
Miami Co.-Deer Cliff Run	1PG00075
Miami River Stone Co.	1IJ00033
Miamisburg STP	1PD00017
Miamiview Apartments	1PR00095
Miamiview Ash Landfill	1IB00018
Miamiview Estates MHP	1PV00018
Middletown STP	1PE00003

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Table 6. List of facilities currently discharging to the mainstem of the Great Miami River.

Facility	Facility NPDES Permit No.
Monarch Machine Tool Co.	1IS00010
Monroe Municipality	1IZ00020
Monsanto Co.	1IN00008
Mont.Co. West. Reg. WWTP	1PL00002
Municipal Electric Plant	1IB00008
New Miami Water Treatment Plant	1IX00090
Northwood Stone & Asphalt	1IJ00019
Piqua Minerals	1IJ00011
Piqua Power Plant	1IB00010
Piqua WWTP	1PD00008
Proctor & Gamble Co.	1IN00010
Quincy STP	1PB00036
Shenandoah STP	1PH00021
Sidney WWTP	1PD00009
Sorg Paper Co.	1IA00008
Standard Register Co.	1IN00025
Stevens Aviation, Inc.	1IG00014
Tecumseh High School STP	1PT00042
Troy WWTP	1PD00019
U.S. Chrome Corp. of Ohio	1I000039
Walnut Grove MHP WWTP	1PV00065
West Carrollton-City	1PD00014
Westbrook Village MHP	1PV00023
Woodsdale Generating Station	1IB00026

As a requirement of their NPDES permit, each point source entity is required to monitor its discharges for specific pollutants and report results to OEPA on a monthly basis. Point source effluent loadings (kg/day) for reported parameters are summarized into average " Third Quarter and Annual loadings". A complete list of entities (due for permit renewal in 1991-92) and their self-monitoring data are listed in Appendix A and B.

Although direct inferences of water quality cannot always be made from such data, loadings were reviewed to determine potential impacts on water quality. Perhaps the most beneficial utilization of loading data is the comparison of relative loadings between facilities (Fig. 47). By reviewing the monitoring data, facilities with the greatest potential for impacting the receiving waters can be singled out and their proximity to degraded reaches of the river noted.

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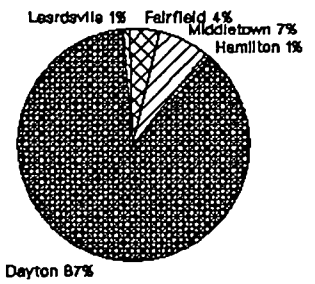
NH3-N Effluent Loading
1980 POTW Third Quarter

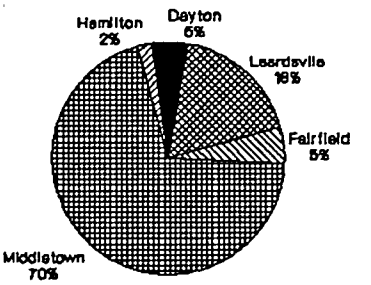


Total Load (kg/day) = 3032

average values

Fig 4

NH3-N Effluent Loading
1989 POTW Third Quarter

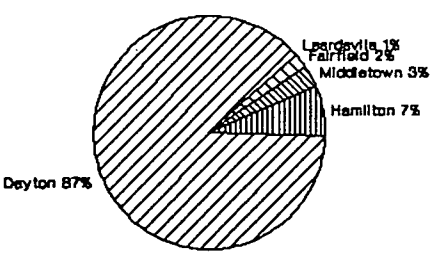


Total Load (kg/day) = 517

average values

Fig 5

TSS Effluent Loadings
1980 POTW Third Quarter

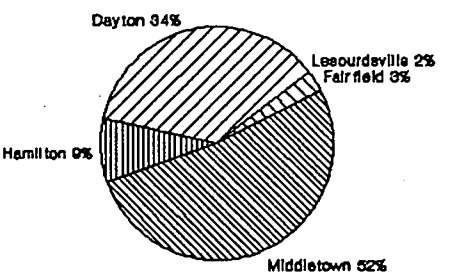


Total Load (kg/day)=11,813

average values

Fig 6

TSS Effluent Loadings
1989-POTW Third Quarter



Total Load (kg/day)=3273

average values

Fig 7

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Average **"annual loading"** data for flow from eight POTWs clearly demonstrates Dayton WWTP (Fig 8) contributing the bulk (50%) of wastewater discharge (correlating to size of service area) to the GMR. In general, all POTW's increased flow within the last decade with the most significant increase noted at Lesourdsville WWTP (160%), West Carrollton WWTP (55%) and Hamilton WWTP (32%). Elevated average annual loadings for ammonia were reported by Middletown, Franklin and Lesourdsville WWTP's. All three facilities had NPDES ammonia violations in 1989. Lesourdsville WWTP has experienced repeated problems with ammonia violations after connecting in Lebanon Correctional Institute, Village of Monroe, Otterbein Home and approximately ten package plants in 1988. Metal-loading comparisons between various facilities demonstrated minute variability in metal concentration/flow data. The exception being Hamilton WWTP whose lead loading exceeded all others, however no lead violations were reported by Hamilton in 1989. **"Third quarter"** average effluent loadings for 1989 in comparison with flow show elevated zinc levels for Montgomery County Western Regional while again Hamilton demonstrated elevated lead levels.

Spacing

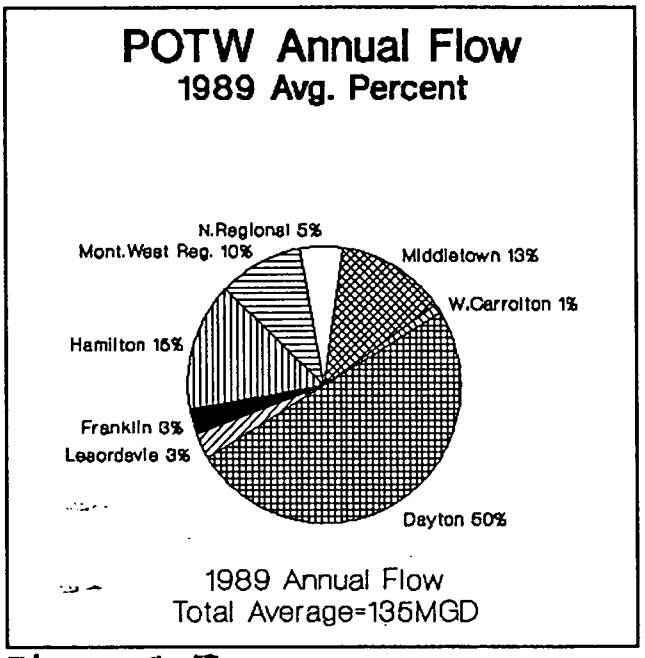

Figure 8

Several other industrial facilities in the lower GMR basin contributing metals and other treated waste to the Great Miami River include Armco Middletown, DOE-FMPC (DOE-FEMP 9-91), Albright & Wilson and Chevron. Monthly Operating Reports (MORs) from these facilities exhibited loadings of zinc and lead. G.M Delco and and West Carrollton Parchment reported discharges of metals such as chromium, cadmium and nickel. Additionally, municipal WWTP's (particularly Dayton, Hamilton and Middletown) receive substantial quantities of industrial wastes responsible for concentrations of heavy metals (cadmium, chromium, lead) and other parameters such as phenolics and cyanide.

Average "Third quarter and Annual" loading data for various facilities in 1989 exhibit variability in flow and parameter concentration. Reductions in flow at some facilities followed by increases in parameter values correspond to varying facility conditions occurring at the plant and in the effluent (pH, temp., washouts). Certain parameter concentrations reflect recovery and stability of treatment plant organisms which respond to these variances thus determining treatment ability.

Table 7. *Chemical/physical parameters measured in the Great Miami River Basin study area, 1989.

-Flow (field)	-Total Hardness
-Dissolved Oxygen (field)	-Total Iron
-Temperature (field)	-Total Lead
-Conductivity (lab)	-Total Zinc
-Total Suspended Solids (TSS)	-Total Copper
-Chemical Oxygen Command (COD)	-Total Cadmium
-5-day Carb. Biochemical Oxygen Demand	-Total Nickel
-Ammonia-Nitrogen (NH3-N)	-Total Chromium
-Nitrate-Nitrogen (NO3-N)	-Total Calcium
-Nitrite-Nitrogen (NO2-N)	-Total Magnesium
-Total Kjeldahl Nitrogen (TKN)	-Total Cyanide
-Total Phosphorus (P-T)	-Total Phenolics

*Scans for Base-Neutral and Acid Extractables (BNA's) and Volatile Organic Compounds (VOCs) were performed at the following Great Miami River locations: RM's 5.6, 30.0, 35.7, 45.8, 49.3, 62.4, 73.8, 77.2, 85.2, 87.15, 92.6
Armco Steel-Middletown

* New plant combining Huber Heights and Ohio Suburban WWTP's

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Table 5. Sampling Day Flow Measurments (cfs) at USGS Gages within the Great Miami River Basin, 1989.

Stream Name USGS Gage	7/6	7/20	8/3	8/15	9/6	9/14	9/28
Great Miami River							
Taylorsville	599	1420	422	316	464	844	276
Dayton	1570	2570	1040	788	1320	1770	785
Miamisburg	2010	2140	1360	1090	1680	2240	1030
Hamilton	2630	2030	1090	1300	1900	2220	1300
Mad River							
Near Dayton	386	512	255	218	286	586	422
Stillwater River							
Englewood	329	1310	178	88	386	686	189

Sediment Quality

Sediment samples were collected from five GMR mainstem locations (Table 6). Sampling locations were principally located downstream from significant point discharges (RM 77.2, 75.8, 60.6, 49.3, 45.8).

Sediment metal concentrations in the mainstem range from non-elevated to highly elevated using classification criteria described by Kelly and Hite (1984). Values presented in Table 6 for three GMR sampling sites (RM 75.8, 60.0, 49.3) have been established as Eastern Cornbelt Plain (ECBP) reference sites. This criteria was compiled for approximately 70 sites in the ECBP ecoregion (North from Erie County, gradual south/southeast course through southwest Ohio counties, see "Ohio Water Quality Inventory") and is available in OEPA's Storet database. Criteria for nickel is not available for reference using "Kelly and Hite," however, observance of 1989 concentrations demonstrate a gradual increase in concentration as waters flowed downstream through industrialized areas.

Elevated and highly elevated lead concentrations were detected at all sampling locations. The highest concentration, observed below Dayton at RM 77.2, existed downstream of numerous automotive and truck production industries.

Elevated zinc levels were noted downstream from the cities of Miamisburg and Middletown. The highest concentration appeared at RM 45.8 below the confluence of Elk Creek, Crystal Tissue, Middletown WWTP, and Armco Steel-Middletown. Intermittent violations of zinc loading (due to bypassing) have been reported by Armco Middletown over a number of years.

Although sediment collection was not extensive the data derived

though analysis is used as an indicator of accumulative effects of point and non-point pollution. Many substances not detected by water columnn sampling or true concentrations of substances not represented by aqueous analysis appear in sediments posing a threat to aquatic biota through direct or indirect contact.

Table 8. Concentrations (mg/kg dry weight) of heavy metals in sediments at five locations in the Great Miami River during the 1989 survey. All parameter concentration rankings, excluding Nickel, were based on the stream sediment classification system described by Kelly & Hite (1984)

RM	Arsenic (Total)	Cadmium (Total)	Chromium (Total)	Copper (Total)	Iron (Total)	Lead (Total)	Nickel (Total)	Zinc (Total)
Great Miami River								
77.2	1.34[a]	0.503[b]	8.45[a]	23.4[a]	6660[a]	65.3[d]	10.9	80.0[a-b]
75.8	2.93[a]	0.697[b]	3.64[a]	34.7[a]	8720[a]	40.8[c]	17.3	96.0[b]
49.3	2.61[a]	0.526[b]	10.1[a]	30.0[a]	9500[a]	54.1[c]	17.1	113.0[c]
60.6	3.59[a]	0.696[b]	8.83[a]	27.0[a]	11600[a]	45.5[c]	18.9	105.0[c]
45.8	4.35[a]	0.694[b]	9.70[a]	31.3[a]	13000[a]	42.4[c]	20.5	157.0[c]

a non-elevated
b slightly elevated
c elevated
d highly elevated
e extremely elevated

Note: The Kelly and Hite classification system addresses relative concentrations but does not directly assess toxicity.

Physical Habitat for Aquatic Life

The aquatic habitat of the Great Miami River was evaluated using the Qualitative Habitat Evaluation Index (QHEI) at 47 mainstem sites during fish sampling. The QHEI considers six major features of instream habitat (substrate, cover, channel morphology, riparian zone, pool/run/riffle quality, and local gradient) and has a practical scoring range of 20 - 100. Appendix C lists the physical characteristics for the Great Miami River during the 1989 survey.

The Qualitative Habitat Evaluation Index (QHEI) scores in the study area of the Great Miami River (RM 91.0 - 8.2) ranged from 91 (excellent habitat) to 34 (poor habitat) (Table 9). Much of the habitat of the middle stretch of the Great Miami is heavily influenced by stream modifications and the urbanized areas of Dayton, Moraine, West Carrollton, Miamisburg, Franklin, Middletown, Hamilton and Fairfield. The river has been channelized through many of the urbanized areas and the banks levied to prevent

flooding.

Table 9. Average QHEI scores for eleven relatively homogenous habitat segments of the Great Miami River mainstem based on sampling conducted during July - October 1989.

Location and Description	River Mile	QHEI	Ave. QHEI
Seg. 1: Little York Rd. to Dst. MCD N. Reg. WWTP, RM 91.0 to RM 86.5	91.0 88.1 87.0 86.5	70 91 72 67	75
Seg. 2: Ust. and Dst. Steele Dam, RM 82.9 to RM 82.0	82.9 82.0	36 48	42
Seg. 3: Ust. Wolf Ck. to Dst. Holes Ck., RM 80.4 to RM 73.3	80.4 80.1 77.9 76.9 76.0 74.8 73.3	63 67 52 62 66 55 50	57
Seg. 4: Dst. Appleton Paper to Farmersville-W. Carrollton Rd. RM 71.9 to RM 68.6	71.9 71.1 70.1 68.6	84 68 68 90	78
Seg. 5: Ust. Miamisburg WWTP to Dst. Miamisburg WWTP, RM 65.9 to RM 64.9	65.9 64.9	54 34	44
Seg. 6: Dst. DP&L Hutchings Dam to Dst. SR 4, RM 64.0 to RM 55.9	64.0 63.3 62.1 59.5 58.4 55.9	82 76 66 56 59 87	71
Seg. 7: Dst. Hamilton WWTP to Dst. Chevron Refinery, RM 33.5 to RM 8.2	33.5 28.9 25.8 23.4 21.2 20.1 14.8 11.6 8.2	74 76 59 75 51 74 75 60 77	69

Nine lowhead dams were present along the mainstem of the river in the study area at the time of the 1989 study (Table). Lowhead

dams have been constructed for either recreational purposes or water diversion for industrial or public usage. The Chautauqua Dam, also referred to as the Erie Canal dam, was partially removed prior to the survey and completely removed after the survey was completed. An additional dam was under construction during the survey just upstream of the city of Hamilton WWTP and during 1991 another lowhead dam was constructed at RM 86.8 to ensure flow to the recharge lagoons of the Dayton North Well field.

Table 10. Lowhead dams, retarding basins and diversion dams in the study area of the 1989 Great Miami River survey.

River Mile	Modification Type	Site Description
92.6	retarding basin	Taylorsville Dam
86.8**	lowhead dam	Dayton, north well field dam
82.17	lowhead dam	Dayton, steel dam
80.7	lowhead dam	Dayton, Monument Street
77.3	lowhead dam	DP&L, Tait Station Dam
72.1	lowhead dam	West Carrollton Dam
64.4	lowhead dam	DP&L, Hutchings Station Dam
62.58*	lowhead dam	Chautauqua Dam
56.7	diversion dam	Middletown Hydraulic Canal
51.7	lowhead dam	Middletown Dam
41.5	diversion dam	Hamilton Hydraulic Canal
37.2	lowhead dam	Hamilton, upst canal return
33.4**	lowhead dam	Hamilton, upst WWTP

* dam removed after survey completed
** dams completed after survey completed

The sites receiving lower habitat scores were influenced by stream modifications from either channelization, low head dams and the impounded areas upstream of these dams or instream gravel operations (Table 10). These sites exhibited heavy siltation and embeddedness of stream substrates, absence of natural substrates or continuous destruction of the substrate stability (gravel mining), creating poor habitat for fish and macroinvertebrate populations. Sites which were left natural and those which were recovering from previous disturbances exhibited good to excellent habitat for the aquatic biota.

Macroinvertebrate Communities

The macroinvertebrate results (Table 11) of the Great Miami River

were compiled from 38 sites sampled during the 1989 survey, spanning two ecoregions, Eastern Corn Belt Plain and Interior Plateau. The total number of invertebrate taxa collected from natural substrates and artificial substrate samplers placed in the Great Miami ranged from 32 at RM 14.9 to 59 at RM 47.4. Mayfly nymphs, caddisfly larvae, and tanytarsini species diversity was generally good to exceptional throughout most of the river. The Invertebrate Community Index (ICI values) ranged from 32ns to 56, indicated good to exceptional community quality for all sites except at RM 38.7 where the ICI value fell to 24 (Fig.9). This value is a significant departure from the ICI ecoregion biocriteria value of 36 for the Eastern Corn Belt Plains.

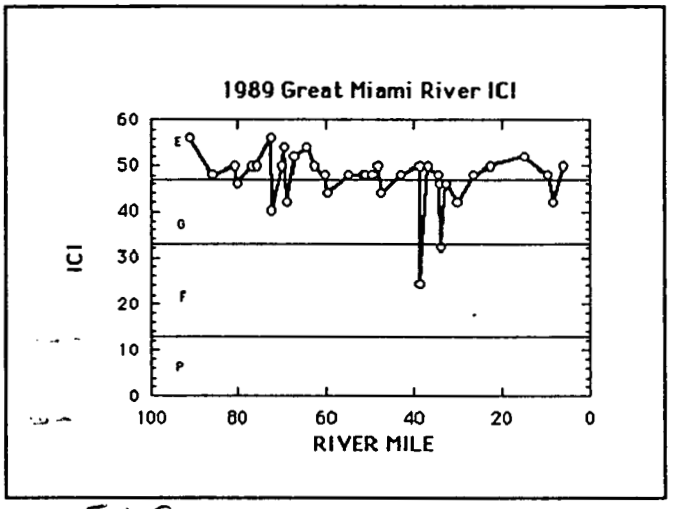

Fig. 9

Upstream of this reach of the river where the ICI value was 38.7 the stream has been diverted into two channels due to the Hamilton hydraulic canal, near RM 42. This diversion has reduced the volume of the flow in both channels, hence reducing the velocity. The macroinvertebrate community at RM 38.7, in the main channel of the river, expressed a poor community of caddisfly, mayfly and tanytarsini taxa. The population at this location was composed of 63.5 percent pollution tolerant taxa, the majority of which (85.3 percent) were dipteran/non-insect species, dominated by oligochaete taxa. This site was located in the mixing zone of outfall 001 of the Armco Steel plant in New Miami (Hamilton plant), in a very low flow region. Another macroinvertebrate site was placed upstream of outfall 001 at RM 38.8. This site was located downstream of outfalls 002, 003, and 004 of the Armco plant yet exhibited a high ICI value of 50 and a very good diversity of caddisfly and mayfly taxa. Zero percent of the population at RM 38.8 was composed of pollution tolerant taxa. Because of the high ICI value of RM 38.8, the low value of RM 38.7 does not appear to be a result of the lower flow in this portion of the river, but rather a result of outfall 001 of the Armco New Miami (Hamilton) Plant. The next site downstream sampled for invertebrates was RM 36.9 exhibited an ICI value of 50, indicating recovery.

No other site during the survey documented as great of an impairment to the invertebrate population as RM 38.7. Four other sites (RM 80.0, 72.3, 34.1, and 33.9) exhibited communities of slightly

Table 11. Summary of macroinvertebrate data collected from artificial substrates (quantitative data) and natural substrates (qualitative data) in the Great Miami River study area, July - September 1989.

Stream River Mi	Narrative Evaluation[a]	Quantitative Evaluation ICI	No.Quan Taxa	Relative Density	No.Qual Taxa	Qual EPT[b]
91.1	Exceptional	56	40	9860	36	14
85.9	Exceptional	48	32	9132	31	13
80.6	Exceptional	50	42	5674	37	16
80.0	Exceptional	46	33	3108	38	16
76.5	Exceptional	50	29	10424	40	16
75.8	Exceptional	50	30	5313	24	12
72.4	Exceptional	56	38	7966	37	15
72.3	Good	40	33	5331	41	14
69.8	Exceptional	50	28	8271	39	16
69.3	Exceptional	54	32	6185	21	12
68.6	Good	42	25	5951	26	12
67.1	Exceptional	52	29	5355	35	13
64.3	Exceptional	54	28	5045	36	13
62.6	Exceptional	50	26	6699	41	16
60.2	Exceptional	48	28	4521	40	14
59.6	Good	44	29	9184	39	9
55.0	Exceptional	48	28	8918	38	13
51.5	Exceptional	48	29	5986	28	11
50.9	Exceptional	48	27	5978	32	12
49.3	Exceptional	48	29	3206	38	10
48.2	Exceptional	50	28	3562	46	14
47.4	Good	44	36	3375	42	12
43.0	Exceptional	48	31	5788	39	13
38.8	Exceptional	50	33	4658	39	13
38.7	Fair	24*	34	2907	30	6
36.9	Exceptional	50	28	4136	25	10

Table 11 (cont.) Summary of macroinvertebrae data collected from artificial substrates (quantitative data) and natural substrates (qualitative data) in the Great Miami River study area, July - September 1989.

Stream River Mi	Narrative Evaluation[a]	Quantitative Evaluation ICI	No. Quan Taxa	Relative Density	No.Qual Taxa	Qual EPT[b]
34.3	Exceptional	48	27	6583	31	10
34.1	Exceptional	46	33	5151	31	13
33.9	Marg. Good	32ns	31	2723	22	8
32.7	Exceptional	46	22	6858	36	13
30.0	Good	42	32	35464	27	11
26.3	Exceptional	48	24	5386	26	9
22.5	Exceptional	50	24	6630	35	16
18.7	Good	-	-	-	29	12
14.9	Exceptional	52	24	4517	25	11
9.5	Exceptional	48	27	6372	32	11
8.36	Good	42	26	3437	24	9
5.8	Exceptional	50	37	3854	29	13

a A qualitative narrative evaluation based on best professional judgement is used when quantitative data is not available to calculate the Invertebrate Community Index (ICI) scores.

b EPT=total Ephemeroptera (mayflies), Plectoptera (stoneflies) and Trichoptera (caddisflies)

* significant departure from ecoregion biocriteria (>4 ICI units)

ns Nonsignificant departure from biocriteria (<4 ICI units)

higher pollution tolerant taxa and/or an increase in dipteran/non-insect populations, although the ICI values at these sites (46, 40, 46, and 32ns) were indicative of good to exceptional quality, all acceptable under the biological criteria for WWH.

River mile 80.0 (downstream of the confluence of Wolf Creek in Dayton) documented an ICI value of 46, however five percent of the macroinvertebrate population was composed of pollution tolerant taxa and the caddisfly diversity dropped. Yet, mayfly and tanytarsini diversity remained high and other dipteran/non-insect taxa did not increase. The dominant taxa, Rheotanytarsis exiguus group, indicated a type of organic enrichment pollution rather than that of

a toxic nature. A similar shift in the community upstream of Wolf Creek was also noted at RM 80.6, indicating nutrient enrichment.

Downstream of Appleton Paper in West Carrollton (RM 72.3, ICI 40), the mayfly community dropped significantly to make up only 3.5 percent of the macroinvertebrate community. The caddisfly population also was impaired, only comprising 17.9 percent of the community, but the tanytarsini population was in good standing, comprising 44.3 percent of the population. Indicators of nutrient enrichment, other dipteran/non-insect populations increased at this location to make up 33.8 percent of the population of which 44 percent was composed of the Rheotanytarsis exiquus group, again indicating nutrient enrichment rather than a pollutants of a toxic nature.

River Mile 33.9, sampled downstream of the dam in Hamilton just upstream of the City WWTP exhibited an ICI value of 32ns and documented an increase in the dipteran/non-insect populations. The caddisfly population slightly decreased at RM 33.9 and pollution tolerant macroinvertebrates increased to comprise five percent of the community, the dominant taxa were indicative of nutrient enrichment. Based of the composition of the community, and the ICI of 32, the results are not considered a significant departure from the WWH criteria. River mile 33.9 is located downstream of a large storm sewer outfall. Historically, it had been noted that this outfall had discharged sewage and industrial waste. These discharges were eliminated by the city of Hamilton in 1989-90.

TREND ASSESSMENT
1980 through 1989
1980/1989

Chemical/Physical Water Quality

Great Miami River-Mainstem
Data chronicled from the **1980** GMR survey demonstrated numerous concentrations of metals, nutrients and other parameters exceeding WQS maximum levels. Substantial industrial contribution, inadequate POTW and industrial wastewater treatment processes, unmonitored and poorly maintained on-site systems resulted in significant levels of in-stream toxicity and other noticeable impacts.

Significant improvements in the GMR instream quality demonstrated in 1989, can be attributed largely to improvements in municipal and industrial wastewater treatment processes. Plant upgrades are summarized below.

A listing of major facility construction upgrades and expansions are presented in Table 12.

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Table 12. Significant operational improvements to POTW facilities and other dischargers to the GMR mainstem and tributaries, 1985-1990.

Year/Month	Entity
1985/April	*North Regional WWTP
1986/summer	DOE Mound
1988/July	Dayton WWTP
1988/July	Mont. Co. W. Reg. WWTP
1988/summer	Hamilton WWTP
1988/August	Union WWTP
1988/August	New Lebanon WWTP
1988/August	Miamisburg WWTP
1988/October	Englewood WWTP
1988/winter	Appleton Paper
1988/1989	MCD Franklin WWTP
1989/January	West Carrolton WWTP
1989/April	Miami Paper
1989/August	West Carrolton Parchment
1990/spring	Middletown WWTP
1991/winter	Armco Steel-Middletown

* New plant combining Huber Heights and Ohio Suburban WWTP's

Survey data collected from the Great Miami River in 1980 and 1989 and self-monitoring data submitted by the entities for various years (Appendix A,B) were used for trend analysis. Survey data comparing GMR 1980 and 1989 results demonstrates a **reduction** in concentration of various parameters over nine years. Figure 10,11,12 exhibits comparisons of three parameters (phosphorus, ammonia, cyanide). Comparison of 1980 and 1989 intensive survey results for ammonia show substantial reductions in concentrations throughout the mainstem. Slight increases in ammonia concentrations were observed below Lesourdsville Regional WWTP in 1989, where repeated violations of NPDES ammonia limits have been reported by the facility since 1988. Dissolved oxygen levels were higher in 1989 (Fig 13) averaging 9.5 mg/l, well above WQS "Criteria for Warmwater Habitat (WWH) and Exceptional Warmwater Habitat (EWH)".

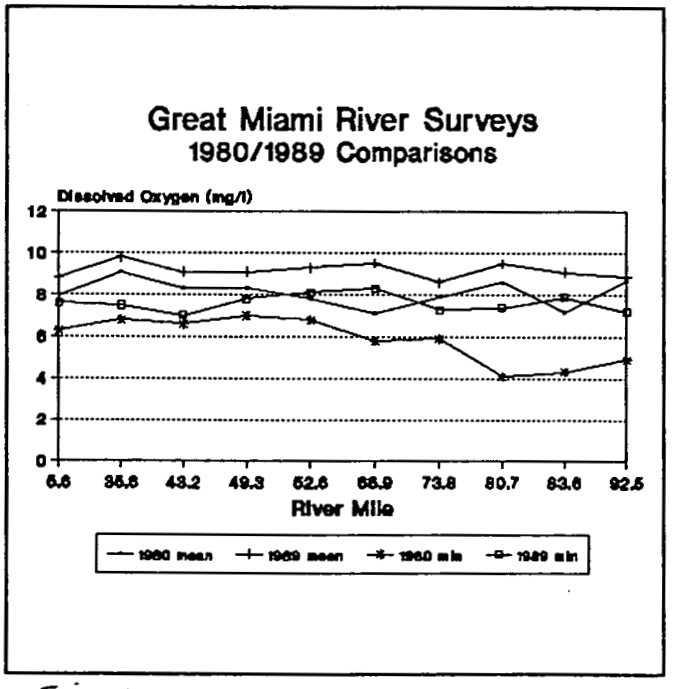


Fig 13

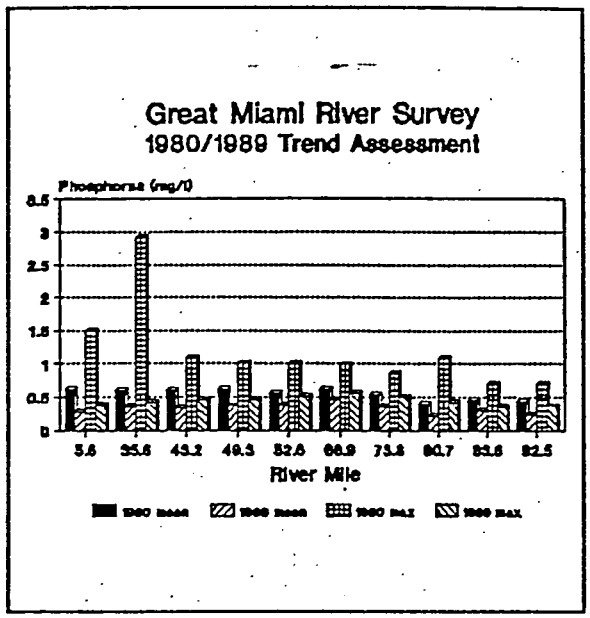

Great Miami River Survey
1980/1989 Trend Assessment
Phosphorus (mg/l)
3.5
3
2.5
2
1.5
1
0.5
0
5.6
35.6
43.2
49.3
52.6
66.9
73.5
80.7
83.6
92.5
River Mile

Fig 10

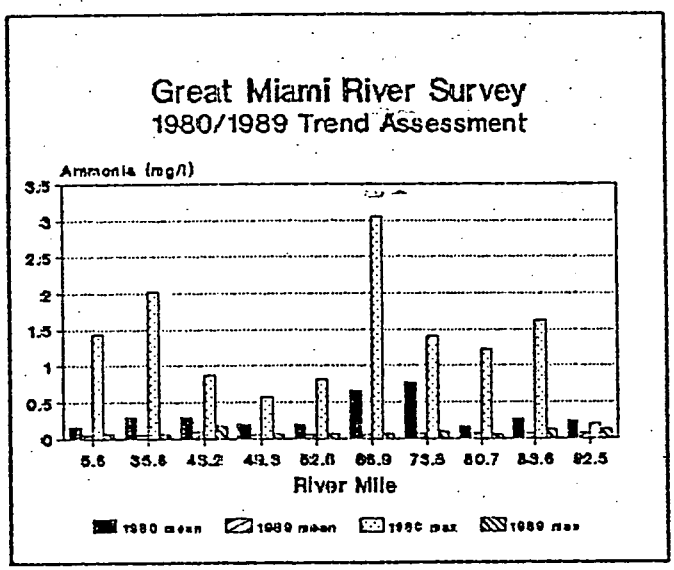
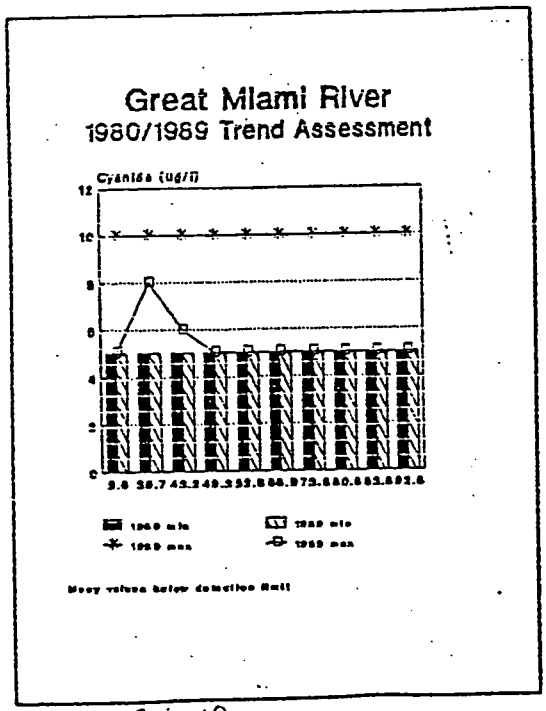

Great Miami River Survey
1980/1989 Trend Assessment
Ammonia (mg/l)
3.5
3
2.5
2
1.5
1
0.5
0
5.6
35.6
43.2
49.3
52.6
66.9
73.5
80.7
83.6
92.5
River Mile
1980 mean
1989 mean
1980 max
1989 max

Fig 11


Great Miami River
1980/1989 Trend Assessment
Cyanide (ug/l)
12
10
8
6
4
2
0
1989 min
1980 min
1989 max
1989 mean
Many values below detection limit

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Phosphorus levels notably decreased 33% over levels seen in 1980 when levels reached 2.9 mg/l. Survey phosphorus levels increased slightly in 1989 below Miamisburg WWTP where elevated levels also appeared in Miamisburg's Compliance Sampling results in 1988 (3.4 mg/l). Bioassay sampling results (24hr composite) in 1990 revealed a phosphorus concentration of 0.5mg/l. This reach of the Great Miami River was also the site of contamination by phosphorus from the CSX train derailment in 1986. There is a possibility that contaminated soils, goundwater and sediments in area upstream of the DP&L Hutchings dam were suspended during the high flows of 1989 and appeared in the water column.

All **metal** results in 1989 were markedly **lower** than results reported in 1980. Figure 14-17 demonstrates concentrations for four heavy metals. Copper levels decreased 24% while cadmium levels dropped 75% over 1980 results. Zinc concentrations, while still evident in the 1989 survey, exhibited a 50% reduction in the water column. Most elevated concentrations of zinc appeared downstream of a concentration of industry and municipal treatment facilities in the Middletown area making determination of the source near impossible. However, speculation based on self-monitoring and violation reports notes Armco Steel-Middletown (RM 51.0) reporting several year's bypassing of wastewater containing elevated zinc values. Metals detected in water column sampling can actually be remnants of past entity violations in an area where suspended solids are high and resuspension of sediment particles in a waterbody likely.

modify

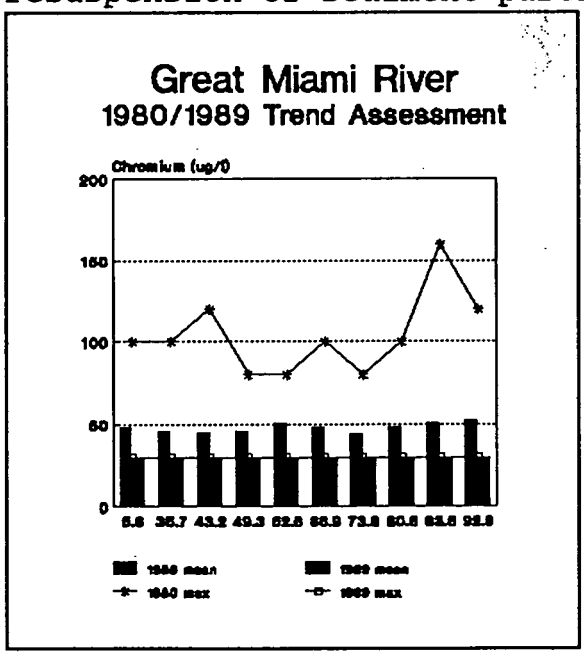

Fig 14

modify

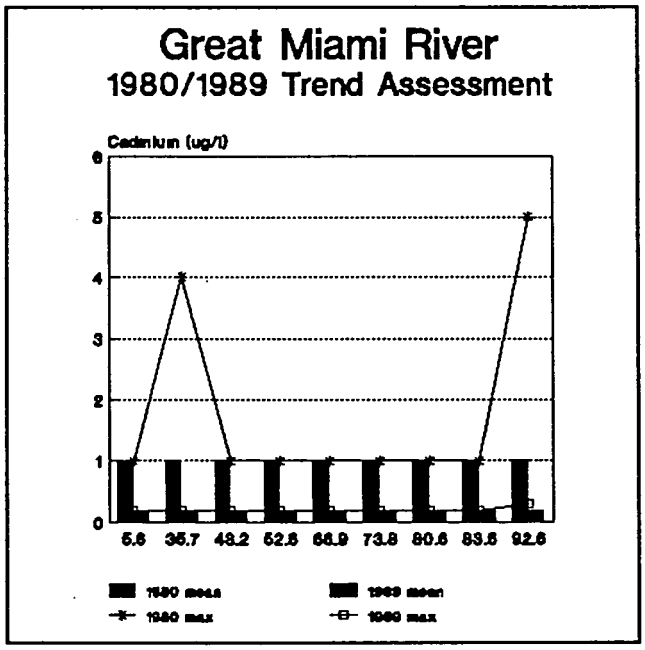

Fig 15

modify

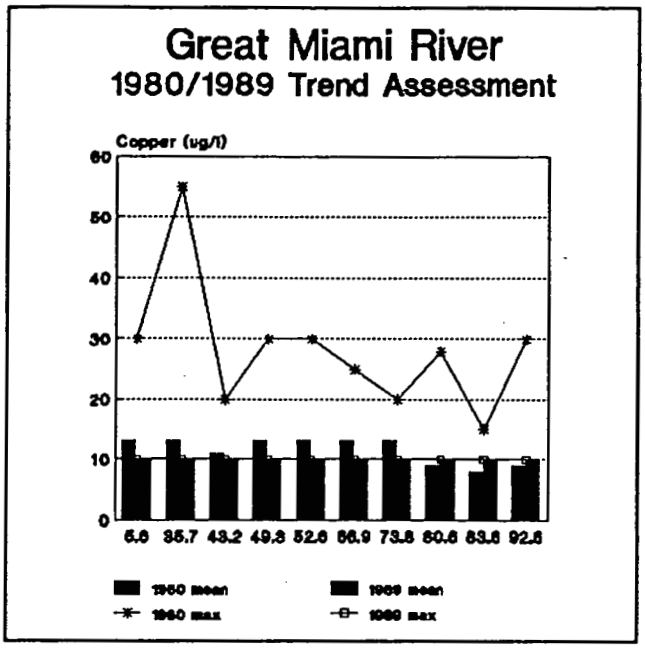

Fig 16

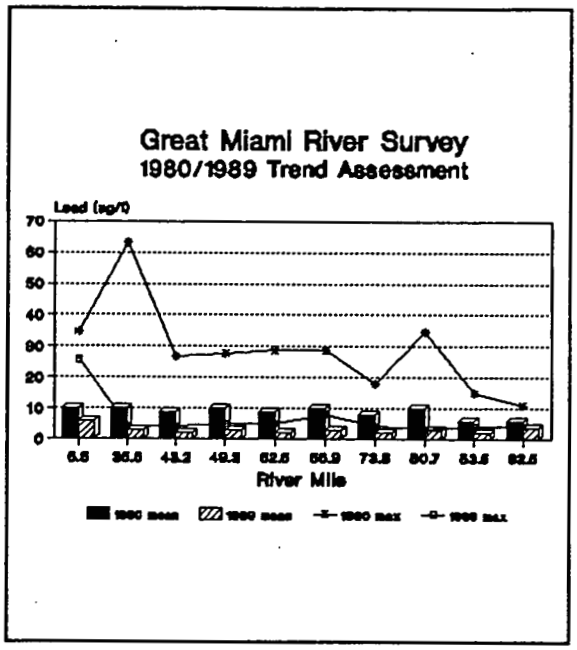

Fig 17

Reasons for improved water quality in the GMR can be contributed to many factors. Pursuant the Clean Water Act section 301 (i) all POTWs were required to have completed upgrades by July 1, 1988 meeting the National Goal of Secondary Treatment. Principally, this requirement affected smaller operations that had not upgraded mainly due to economical restraints. Federal grant monies made available to these lower priority plants provided necessary funding needed to meet the deadline. Best Available Treatment (BAT) and Best Control Technology (BCT) effluent standards were introduced in the mid-eighties creating pretreatment programs whereby significant reduction in heavy metals and toxic organics were noted in industrial discharges to POTWs.

Furthermore, evolutionary improvements in record keeping and laboratory analytical capabilities over time account for documentation of water quality improvements noted over the last nine years. During the 1980 survey, many detection limits for analytical methods were significantly higher than those achievable during the 1989 survey (ie. Cadmium, during 1980 was analyzed with a detection limit of 2 mg/l. In 1989 that same parameter was analyzed using 0.2 ug/l detection limit). Because of this, many parameters were documented at a much higher concentration in 1980 than in 1989. With improvement of laboratory capabilities, the 1989 chemical results appear to provide a more accurate record of actual concentrations. spacing

Further improvements in the GMR instream water quality may be brought about by continually changing regulatory actions aimed at reducing pollutant loading in the basin. Recently (Nov. 17, 1990) U.S. EPA released the final ruling on NPDES permit application for **Stormwater Regulations** in response to 1987 Clean Water Act (CWA) Ammendments. This regulation is aimed at requiring NPDES

applicants to include stormwater discharges associated with point and some non-point activity. Current monitoring requirements promulgated by the U.S. EPA effective August 23, 1990 modified NPDES application requirements to include **whole effluent toxicity testing** and evaluation of **pretreatment** limits and programs . Recently a greater emphasis on sediment, fish tissue, low-level toxics and biogenetics analysis has developed in hopes of providing a better window through which chronic and acute effects of pollutants on instream health and aquatic food chains can be assessed.

Problems still exist in the lower GMR basin with the presence of smaller on-site treatment systems servicing residential and small business (body shops, hair salons) that discharge minimally treated effluent to the mainstem and tributaries of the GMR. Urban and agricultural runoff from livestock and municipal waste treatment systems are common sources of high coliform, ammonia, oil and grease and suspended solids levels and continue to impact waterways in the basin. Bypassing of effluent (due to high flows, mechanical failures and operator error), stormwater outfalls, combined sewer overflows (CSOs) and other relief points continue to influence water quality of the mainstem and tributaries.

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Loading-Trend Assessment

Data available from select years in the 1970's and 1980's generally suggest improved effluent quality over the past decade. However incomplete self-monitoring data (due largely to NPDES monitoring changes and some sporadic reporting) impeded accurate data interpretation for a detailed historical perspective. **Reduction** of metal and nutrient loadings have been noted throughout the reach

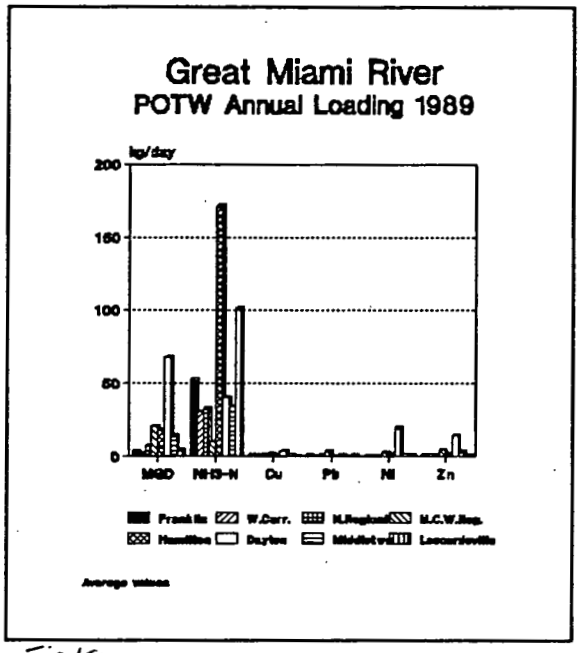

Fig 18

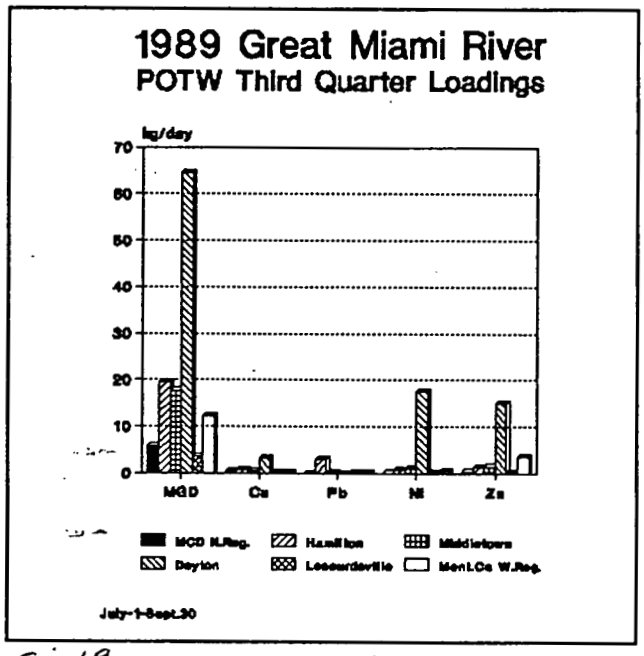

Fig 19

(Fig. 18-19). Preeminent loading results were contrasted to demonstrate variability between two POTWs with similar flows.

Lesourdsville WWTP and Miamisburg WWTP comparison (Fig 20) illustrates Miamisburg's gradual decline and Lesourdsville's increase in ammonia loading over a six year period. Lesourdsville's reported violations increased in 1988 and continued into 1989 appearing to correlate with a 31% increase in influent in 1988-89 while Miamisburg's last account of exceeding their NPDES limits for ammonia occurred in 1987.

In a similar comparison (Fig 21) since 1988, Harrison WWTP ammonia loadings have increased coinciding with their reported violations in 1987, 1988 and 1989. West Carrollton WWTP NPDES results in the past five years reveal a gradual decline in ammonia loadings with no reported violations. West Carrollton WWTP, on the other hand, has reported repeated violations of copper in 1988, 1989 and 1990. Survey results in 1989 for copper values at sites below West Carrollton WWTP do not reveal elevated concentrations.

Again, metals demonstrate a high affinity for organic matter, clays and minerals. True concentration or presence of metals will not be accurately represented by water-column sampling, hence an important argument for needing more frequent sediment analyses. This would provide a better holistic perspective on impacts to waterbodies.

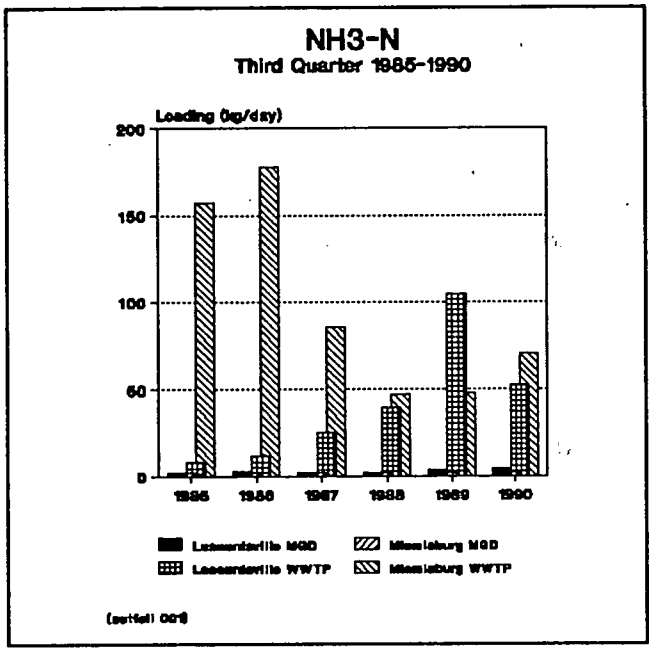

Fig 20

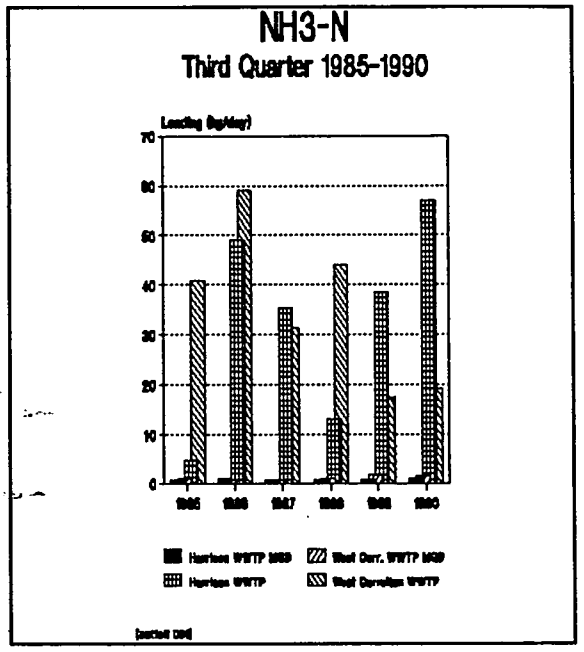

Fig 21

Biological-Trend Assessment

Since the 1980 survey, the attainment status has improved significantly for the mainstem of the river. Based on existing aquatic life use designations, changes in the attainment status during the nine year period consist of increases in the miles fully attaining from 0.1% in 1980 to 12% in 1989. River miles partially attaining increased from 25% in 1980 to 67% in 1989. And in 1989 a marked improvement in quality was noted when the river miles of non-attainment decreased from 75% in 1980 to 21% in 1989.

Table 13 documents aquatic life use attainment in the Great Miami River from 1976-1989 based on collections from similar sampling locations. Not all of the biological indices (IBI, MIwb, and ICI) documented equal rates of improvements between 1980 and 1989 (Figs. 22-24). Both the ICI and MIwb improved significantly, 94% and 87% respectively, but the IBI only documented an improvement of 36%.

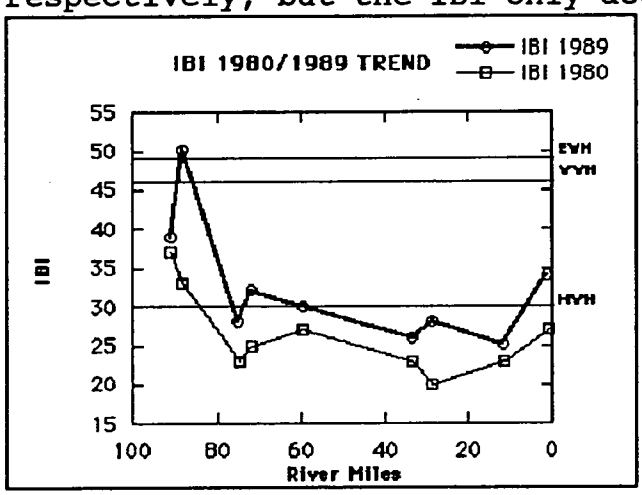

Fig 22

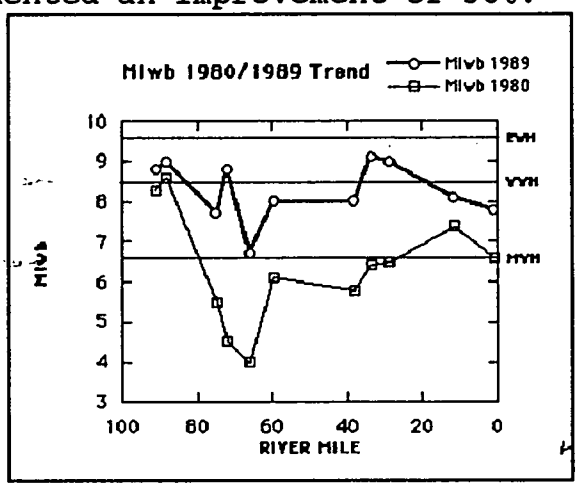

Fig 23

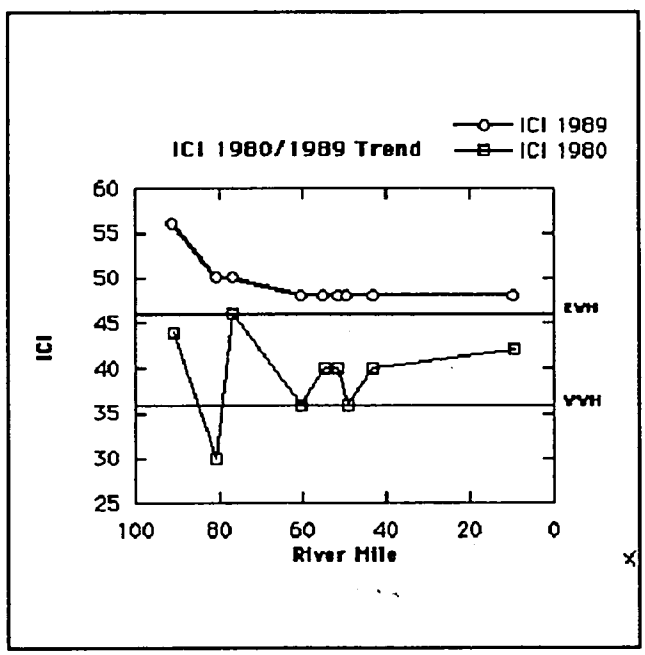

Fig 24

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As mentioned previously, the IBI is the last index to improve in streams recieving a large wastewater loading. Part of an explanation for the slow recovery of the IBI may also be due to two significant fishkills occurring over a three year period prior to the 1989 survey. All life stages of fish populations were effected because of these kills. Table 14 documents fishkills influencing the Great Miami River in the study area, investigated by ODNR, Division of Wildlife, during years 1985-1989 (ODNR, 1985; 1986; 1987; 1988; 1989). The two largest fishkills, occurring in July 1986 and June 1988 were located in same general area of the stream and effected the river for several miles. Compounded by the drought on 1988, the fish community had not recovered by the 1989 survey.

move after Table 13

Table 14. Fishkills in the Great Miami River basin from 1985 through 1989.

Mo/Yr	County	Stream	Number Killed	Pollutant	Operation
01/85	Butler	Dicks Ck	63	sulfuric acid	Metal Production
01/85	Butler	Dicks Ck	51	cyanide ammonia	Metal Production
07/85	Warren	Clear Ck	144	sewage	Public Sew. Sys.
08/85	Butler	Pleasant Run Ck	1087	sewage	Public Sew. Sys.
05/86	Preble	Four Mile Ck	27,198	manure	General Farming
07/86	**Mont.**	**Great Miami**	**75,565**	**phosph, lard**	**Railroad**
08/86	Preble	Four Mile Ck	65	unknown	unknown
03/87	Mont.	Bear Ck	1000	chemicals	-
06/87	Mont.	Bear Ck	50	sewage	Public Sew. Sys.
08/87	Mont.	Bear Ck	774	sewage	Public Sew. Sys.
09/87	Butler	Four Mile Ck	12,771	sewage	Public Sew. Sys.
11/87	Mont.	Clear Ck	1000	sewage	Public Sew. Sys.
11/87	Butler	Indian Ck	1943	sewage	Public Sew. Sys.
06/88	**Mont.**	**Great Miami**	**260800**	**thermal**	**Utilities**
09/89	Preble	Four Mile Ck	434	unknown	unknown

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Table 13. Aquatic life use attainment status in the Great Miami River based on data collected from similar sampling locations during July - October 1976 - 1989.

(Year) Fish/Inver River Mile	Ecoreg	IBI	Mod. Iwb	ICI	QHEI	Attainment Status[a]	Comments
1989							
91.1/91.0	ECBP	39^{ns}	8.8	56	70	Full	Dst. Little York Rd.
88.1/ -	ECBP	50	9.0	-	91	(Full)	Dst. Powell Rd.
87.0/ -	ECBP	38^{ns}	9.0	-	72	(Full)	Ust. MCD N. Reg. WWTP
82.0/ -	ECBP	39^{ns}	9.3	-	48	(Partial)	Dst. Steele Dam
80.4/80.6	ECBP	47	9.7	50	63	Full	Ust. Wolf Ck.
76.9/76.5	ECBP	35*	8.2	50	62	Partial	Ust. Dayton WWTP
74.8/ -	ECBP	28*	7.7*	-	55	**(NON)**	Ust. Holes Ck.
71.9/72.3	ECBP	32*	8.8	40	84	Partial	Dst. Appleton Paper
70.1/69.8	ECBP	29*	6.6*	50	68	Partial	Farmers.-W.Carrollt. Rd
- /67.1	ECBP	-	-	52	-	(Full)	Ust. Linden Ave.
65.9/ -	ECBP	19*	6.7*	-	54	**(NON)**	Ust. Mbg. WWTP, pooled
65.0/ -	ECBP	19*	6.1*	-	-	N/A	Mbg WWTP mixing zone
64.0/64.3	ECBP	27*	8.3	54	82	Partial	Dst. DP&L Hutchings dam
63.3/62.6	ECBP	33*	7.2*	50	76	Partial	Ust. Chautauqua dam
62.1/60.2	ECBP	28*	6.9*	48	66	Parital	Ust. Franklin WWTP
59.6/59.6	ECBP	27*	7.9*	44	-	N/A	Franklin WWTP mix zone
59.5/ -	ECBP	30*	8.0^{ns}	-	56	(Partial)	Rest of Zone
59.4/ -	ECBP	29*	8.2^{ns}	-	-	(Partial)	Dst. Franklin WWTP
58.4/ -	ECBP	29*	7.7*	-	59	**(NON)**	Dst. Clear Ck.
55.9/55.0	ECBP	35*	9.3	48	87	Partial	Dst. SR. 4
52.0/51.5	ECBP	26*	6.6*	48	-	Partial	Dst. Hyd. Canal Con.
51.2/50.9	ECBP	27*	7.8*	48	-	Partial	Dst. Armco Midtm, 001
50.0/ -	ECBP	31*	8.2^{ns}	-	61	(Partial)	Ust. Elk Ck.
49.1/49.3	ECBP	31*	8.5	48	63	Partial	Ust. Middletowm WWTP
47.5/47.4	ECBP	33*	7.9*	44	86	Partial	Dst. Dicks Ck.
42.3/43.0	ECBP	26*	5.6*	48	55	**NON**	Ust. Hamilton Hyd. Can.
38.5/38.7	ECBP	25*	8.2^{ns}	24*	66	N/A	Armco, New Miami, 001
38.4/ -	ECBP	28*	7.2*	-	-	**(NON)**	Rest of Zone
38.3/-	ECBP	25*	8.0^{ns}	-	-	**(NON)**	Dst. Armco, New Miami

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Table 13 (cont.). Aquatic life use attainment status in the Great Miami River based on data collected from similar sampling locations during July - October 1976 - 1989.

(Year) Fish/Inver River Mile	Ecoreg	IBI	Mod. Iwb	ICI	QHEI	Attainment Status[a]	Comments
1989							
33.7/ -	ECBP	26*	9.1		86	N/A	Hamilton WWTP mix zone
28.9/30.0	ECBP	28*	9.0	42	76	Partial	Adj. American Agg.
11.6/9.5	IP	25*	8.1*	48	60	NON	Ust. Chevron Refinery
0.9/ -	IP	34^{ns}	7.8*	-	-	(Partial)	Con. with Ohio River
1988							
- /67.1	ECBP	-	-	26*	-	(NON)	Ust. Linden Ave.
65.2/ -	ECBP	21*	5.7*	-	-	(NON)	Ust. Misbg. WWTP,pooled
64.0/64.3	ECBP	17*	3.1*	18*	-	NON	Dst. DP&L Hutchings dam
63.5/ -	ECBP	16*	1.9*	-	-	(NON)	Ust. Chautauqua Dam
62.5/ -	ECBP	17*	3.6*	-	-	(NON)	Ust. Chautauqua Dam
62.4/ -	ECBP	15*	3.0*	-	-	(NON)	Ust. Chautauqua Dam
60.5/ -	ECBP	19*	2.8*	-	-	(NON)	Ust. Franklin WWTP
59.5/ -	ECBP	22*	5.6*	-	-	N/A	Franklin WWTP mix zone
58.2/ -	ECBP	22*	3.7*	-	-	(NON)	Dst. Clear Creek
1987							
- /87.0	ECBP	-	-	30*	-	(NON)	Ust. MCD N. Reg. WWTP
82.3/ -	ECBP	32*	7.0*	-	-	(NON)	
69.8/ -	ECBP	32*	7.3*	-	-	(NON)	Farmers.-W. Carrol. Rd.
63.0/ -	ECBP	38^{ns}	8.2^{ns}	-	-	(FULL)	Ust. Chautauqua Dam
0.5/ -	ECBP	28*	9.0	-	-	(Partial)	Con. with Ohio River
1980							
91.0/91.1	ECBP	37*	8.3^{ns}	44	80	Partial	Dst. Little York Rd.
88.1/87.7	ECBP	33*	8.6	40	81	Partial	Dst. Powell.
- /82.0	ECBP	-	-	36	-	(Full)	Dst. St. Dam, ust. Mad
80.7/80.7	ECBP	36*	8.6	30*	56	Partial	Ust. Wolf Creek
- /76.5	ECBP	-	-	46	-	(Full)	Ust. Dayton WWTP
74.9/ -	ECBP	23*	5.5*	-	-	(NON)	Ust. Holes Creek
71.8/71.7	ECBP	25*	4.5*	20*	-	NON	Ust. Mont Co W. Reg.
65.9/-	ECBP	21*	4.0*	-	-	(NON)	Ust. Msbg. WWTP,pooled

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Table 12 (cont.). Aquatic life use attainment status in the Great Miami River based on data collected from similar sampling locations during July - October 1976 - 1989.

(Year) Fish/Inver River Mile	Ecoreg	IBI	Mod. Iwb	ICI	QHEI	Attainment Status[a]	Comments
1980							
- /64.3	ECBP	-	-	36	-	(Full)	Dst. DP&L Hutchings dam
- /60.2	ECBP	-	-	36	-	(Full)	Ust. Franklin WWTP
59.5/ -	ECBP	27*	6.1*	-	-	N/A	Franklin WWTP mix zone
58.2/ -	ECBP	25*	5.9*	-	-	(NON)	Dst. Clear Creek
- /55.0	ECBP	-	-	44	-	(Full)	Dst. SR. 4
- /51.5	ECBP	-	-	40	-	(Full)	Dst. Hyd. Canal Con.
51.0/50.7	ECBP	32*	6.9*	40	-	Partial	Dst. Armco Middletown
50.2/ -	ECBP	24*	5.7*	-	-	(NON)	Ust. Elk Creek
49.3/49.3	ECBP	19*	4.6*	36	-	NON	Ust. Middletown WWTP
- /43.2	ECBP	-	-	40	-	(Full)	Ust. Hamilton Hyd. Can.
38.2/ -	ECBP	29*	5.8*	-	-	(NON)	Dst. Armco New Miami
33.7/ -	ECBP	23*	6.4*	-	-	N/A	Hamilton WWTP mix zone
30.0/ -	ECBP	20*	5.0*	-	-	(NON)	Adj. American Agg.
28.9/ -	ECBP	20*	6.5*	-	-	(NON)	Adj. American Agg.
11.6/ 9.5	IP	23*	7.4*	42	-	NON	Ust. Chevron Refinery
1979							
- /87.0	ECBP	-	-	26*	-	(NON)	Ust. Wolf Creek
1978							
- /87.0	ECBP	-	-	28*	-	(NON)	Ust. Wolf Creek
1977							
- /87.0	ECBP	-	-	8*	-	(NON)	Ust. Wolf Creek
1976							
- /87.0	ECBP	-	-	30*	-	(NON)	Ust. Wolf Creek

a - Attainment status based on one organismic group is parenthetically expressed, sites used for mixing zone impact analyses are not used to determine use attainment status.

* - Significant departure from ecoregion biocriteria; poor and very poor results are underlined.

ns - Nonsignificant departure from biocriteria (4 IBI or ICI units; 0.5 Iwb units).

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California State Water Resources Control Board. April, 1971. Water Quality Criteria. Second Edition. McKee, J.E. and H.W. Wolf, editors. Publication 3-A. 548 p.

Fausch, D.O., J.R. Karr, and P.R. Yant. 1984. Regional application of an index of biotic integrity based on stream fish communities. Trans. Amer. Fish Soc. 113: 39-55.

Gammon, J.R. 1976. The fish populations of the middle 340 km of the Wabash River. Tech. report No. 86. Purdue University. Water Resources Research Center, West Lafayette, Indiana. 73 p.

Gammon, J.R., A. Spacie, J.L. Hamelink, and R.L. Kaesler. 1981. Role of electrofishing in assessing environmental quality of the Wabash River. pp. 307-324. In: Ecological assessments of effluent impacts on communities of indigenous aquatic organisms. ASTM STP 703, J.M. Bates and C.I. Weber (eds.). Philadelphia, PA.

Hughes, R.M., D.P. Larsen, and J.M. Omernik. 1986. Regional reference sites: a method for assessing stream pollution. Env. Mgmt. 10(5): 629-635.

Karr, J.R. 1981. Assessment of biotic integrity using fish communities. Fisheries 6(6): 21-27.

Karr, J.R. and D.R. Dudley. 1981. Ecological perspective on water quality goals. Env. Mgmt. 5(1): 55-68.

Kelly, M.H. and R.L. Hite. 1984. Evaluation of Illinois stream sediment data: 1974-1980. Illinois Environmental Protection Agency, Division of Water Pollution Control. Springfield, Illinois.

Ohio Department of Natural Resources. 1960. Gazetteer of Ohio streams. Ohio Water Plan Inventory. Division of Water. Report #12. 179 p.

Ohio Department of Natural Resources. 1985. Water Pollution, Fish Kill, & Stream Litter Investigations. Publication 7. Division of Wildlife.

Ohio Department of Natural Resources. 1986. Water Pollution, Fish Kill, & Stream Litter Investigations. Publication 7. Division of Wildlife.

Ohio Department of Natural Resources. 1987. Water Pollution, Fish Kill, & Stream Litter Investigations. Publication 7. Division of Wildlife.

Ohio Department of Natural Resources. 1988. Water Pollution, Fish Kill, & Stream Litter Investigations. Publication 7. Division of Wildlife.

Ohio Department of Natural Resources. 1989. Water Pollution, Fish Kill, & Stream Litter Investigations. Publication 7. Division of Wildlife.

Ohio Environmental Protection Agency. 1990 (May). State of Ohio Water Quality Standards. Chapter 3745-1 of the Administrative Code. Division of Water Quality Planning and Assessment, Columbus, Ohio.

Ohio Environmental Protection Agency. 1990b. Ohio water resource inventory - 1990, 305b report. Volume II. Edward T. Rankin, editor. Division of Water Quality Planning and Assessment, Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1989a. Ohio EPA manual of surveillance methods and quality assurance practices, updated edition. Division of Environmental Services,

Columbus, Ohio.

Ohio Environmental Protection Agency. 1989b. Addendum to: Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality, Planning and Assessment, Surface Water Section, Columbus Ohio.

Ohio Environmental Protection Agency. 1989c. Biological criteria for the protection of aquatic life: Vol. III. Standardize field and laboratory methods for assessing fish and macroinvertebrate communities. Division of Water Quality Planning and Assessment, Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1987. Biological criteria for the protection of aquatic life: Vol. II. Users manual for biological field assessment of Ohio surface waters. Division of Water Quality Monitoring and Assessment, Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1984 (revised September). Amendments to the Great Miami River Basin Water Quality Management Plan. Comprehensive Water Quality Report for the Lower Mainstem of the Great Miami River, Great Miami River, Dayton to the Ohio River, River Mile 92.0-0.9, Montgomery, Warren, Butler, and Hamilton Counties, Ohio. Division of Wastewater Pollution Control, Water Quality Management Section, Columbus, Ohio. 484 p.

Omernik, J.M. 1988. Ecoregions of the conterminous United States. Ann. Assoc. Amer. Geogr. 77(1): 118-125.

Rankin, E.T. 1989. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Ohio EPA, Division of Water Quality Planning and Assessment, Columbus, Ohio.

United States Department of the Interior - Geological Survey. 1970. Water Resoureces data for Ohio. Vol. 2. Water quality records. 1980, 1983, 1985, 1986, 1987, 1988, 1989, 1990.

United States Environmental Protection Agency. 1979. Water-related environmental fate of 129 priority pollutants. Vol. 1. EPA document 440/079-029a.

United States Geological Survey. 1980. Water Resources Data for Ohio. Volume 1. Ohio River Basin. Water-Data Report OH-80-1.

_____ **1983.** Water Resources Data for Ohio. Volume 1. Ohio River Basin. Water-Data Report OH-83-1.

_____ **1985.** Water Resources Data for Ohio. Volume 1. Ohio River Basin. Water-Data Report OH-85-1.

_____ **1986.** Water Resources Data for Ohio. Volume 1. Ohio River Basin. Water-Data Report OH-86-1.

_____ **1987.** Water Resources Data for Ohio. Volume 1. Ohio River Basin. Water-Data Report OH-87-1.

_____ **1988.** Water Resources Data for Ohio. Volume 1. Ohio River Basin Excluding Project Data. Water-Data Report OH-88-1.

_____ **1989.** Water Resources Data for Ohio. Volume 1. Ohio River Basin Excluding Project Data. Water-Data Report OH-89-1.

_____ **1990.** Water Resources Data for Ohio. Volume 1. Ohio River Basin Excluding Project Data. Water-Data Report OH-90-1.

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CRYSTAL TISSUE (1IA00000) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.1972	1.1712	.	.	80.734	61.581	.	.	.	.	.	.	.	.
1979	2.3072	1.0212	.	.	152.47	130.35	.	.	.	.	.	.	.	.
1984	2.4225	2.7145	.	.	173.44	199.32	.	.	.	.	.	.	.	.
1985	2.4848	9.1036	.	1.6137	157.36	224.81	.	.	.	.	.	.	.	.
1986	2.623	18.032	.	1.7694	187.19	241.27	.	.	.	.	.	.	.	.
1987	2.6024	14.037	.	2.9532	177.94	265.07	.	.	.	.	.	.	.	.
1988	2.635	7.0406	.	3.1425	198.32	282	.	.	.	.	.	.	.	.
1989	2.6361	1.5359	.	2.7321	179.2	212.57	.	.	.	.	.	.	.	.
1990	2.1112	2.4203	.	2.9985	143.68	191	.	.	.	.	.	.	.	.
1991	1.7955	1.5617	.	1.0815	214.56	159.36	.	.	.	.	.	.	.	.

SIMPSON PAPER HARDING (1IA00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.94962	1.0275	.	.	92.852	59.131	.	.	.	.	.	.	.	.
1979	1.0674	1.0981	.	.	88.241	67.995	.	.	.	.	.	.	.	.
1984	1.0898	.80726	.	1.1219	65.931	116.87	.	.	.	.	.	.	.	.
1985	.83973	2.3012	.	0.775	90.502	83.127	.	.	.	.	.	.	.	.
1986	.86467	.97522	.	.77938	53.048	67.293	.	.	.	.	.	.	.	.
1987	.94372	.31836	.	1.1752	112.4	89.807	.	.	.	.	.	.	.	.
1988	.77114	.26642	.	.67288	131.21	74.912	.	.	.	.	.	.	.	.
1989	.89003	.88493	.	.58341	70.521	131.62	.	.	.	.	.	.	.	.
1990	.94632	2.0823	.	0.5637	87.225	95.143	.	.	.	.	.	.	.	.

APPLETON PAPER (1IA00004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.5903	16.311	.	15.692	638.14	640.38	.	.	.	.	.	.	.	.
1979	3.923	14.192	.	15.748	1103.6	874.03	.	.	.	.	.	.	.	.
1984	4.3341	30.021	.	15.073	1115.3	1327	.	.	.	.	.	.	.	.
1985	6.3218	23.702	.	7.151	486.34	741.01	.	.	.	.	.	.	.	.
1986	5.95	29.119	.	4.669	383.73	562.81	.	.	.	.	.	.	.	.
1987	5.932	15.859	.	3.738	299.17	462.32	.	.	.	.	.	.	.	.
1988	5.5367	14.518	.	4.1726	276.09	315.08	.	.	.	.	.	.	.	.
1989	6.3634	8.589	.	4.7734	345.08	402.99	.	.	.	.	.	.	.	.
1990	5.7849	3.5897	.	4.753	310.72	400.29	.	.	.	.	.	.	.	.
1991	4.8101	9.4778	.	3.0801	185.88	405.84	.	.	.	.	.	.	.	.

MIAMI PAPER (1IA00007) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.3766	2.622	.	4.3669	227.87	337.52	.	.	.	.	.	.	.	.
1979	2.139	3.4637	.	4.3744	250	515.28	.	.	.	.	.	.	.	.
1984	2.7685	1.1596	.	3.7193	129.64	237.95	.	.	.	.	.	.	.	.
1985	2.7617	4.1268	.	4.5477	154.94	275.82	.	.	.	.	.	.	.	.
1986	2.9947	0.8504	.	3.3391	238.79	354.57	.	.	.	.	.	.	.	.
1987	3.1116	4.4979	.	7.8186	224.37	254.59	.	.	.	.	.	.	.	.
1988	3.1674	3.9573	.	6.9019	264.22	498.05	.	.	.	.	.	.	.	.
1989	3.513	1.7875	.	7.4612	153.37	380.9	.	.	.	.	.	.	.	.
1990	3.7508	8.5458	.	5.9948	176.85	295.52	.	.	.	.	.	.	.	.
1991	2.9017	1.3003	.	3.7268	184.63	232.36	.	.	.	.	.	.	.	.

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W CARROLLTON PARCHMNT (1IA00010) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.59265	.	.	.	.	22.76	.	.	.	.	.	.	.	.
1979	.60569	.	.	.	.	58.744	.	.	.	.	.	.	.	.
1984	.60229	.	.	.	.	471.67	.	.	.	.	.	.	.	.
1985	.68739	.	.	.	.	925.33	.	.	.	.	.	.	.	.
1986	.60086	.	.	.	.	595.43	.	.	.	.	.	.	.	.
1987	.66999	.	.	.	.	625.74	.	.	.	.	.	.	.	.
1988	.48275	.	.	.	.	560.3	.	.	.	.	.	.	.	.
1989	.60057	0	.	.	.	77.845	0.0052	0.0108	0.0226	0.46	.	.	20.631	.
1990	.69959	.72584	.	.	.	28.771	.01695	.00905	.03835	.09049	.	.	16.193	.
1991	.64924	2.6064	.	.	.	25.88	0	.04803	.04405	.04964	.	.	38.176	.

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DAYTON POWER HUTCHING (1IB00004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	169.2	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	195.58	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	49.553	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	38.53	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	62.075	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	128.38	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	108.88	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	47.23	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	63.825	.	.	.	.	.	.	.	.	.	.	.	.	.
1991	25.678	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.4427	.	.	.	.	3813.3	.	.	.26111	.	.	.	.	.
1979	1.8288	.	.	.	.	284.64	.	.	.69183	.	.	.	.	.
1984	2.4518	.	.	.	.	42.579	.	.	.63423	.	.	.	.	.
1985	1.8339	.	.	.	.	35.042	.	.	.26956	.	.	.	.	.
1986	1.8499	.	.	.	.	43.725	.	.	.	.	.	.	.	.
1987	2.2034	.	.	.	.	59.243	.	.	.	.	.	.	.	.
1988	2.3197	.	.	.	.	63.108	.	.	.	.	.	.	.	.
1989	1.6103	.	.	.	.	43.757	.	.	.	.	.	.	.	.
1990	1.8726	.	.	.	.	48.549	.05787	.57873	.	.	.	.	.	.
1991	1.5334	.	.	.	.	79.772	0	0	.	.	.	.	.	.

AERONCA INCORPORATED (1IC00003) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.65	.	.	.	.	26.615	.	.16562	.	.	.	.	.	.
1979	0.65	.	.	.	.	41.824	.	.22324	.	.	.	.	.	.
1984	0.65	.	.	.	.	8.4632	.	.19062	.	.	.	.	.	.
1985	1.1502	.	.	.	.	23.68	.	.32783	.	.	.	.	.	.
1986	0.65	.	.	.	.	38.236	.	.25392	.	.	.	.	.	.
1987	0.65	.	.	.	.	19.123	.	.42096	.	.	.	.	.	.
1988	0.65	.	.	.	.	17.573	.	.19036	.	.	.	.	.	.
1989	0.65	.	.	.	.	24.705	.	.16975	.	.	.	.	.	.
1990	.57295	.	.	.	.	18.745	.	.05038	.	.	.	.	.	.
1991	.55375	.	.	.	.	8.9182	.	.08303	.	.	.	.	.	.

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GM DELCO PLANT #2 (1IC00007) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	7.2056	.	.	42.5	.	193.83	.	.47151	.	.	1.2763	.	.	.
1979	4.9809	.	.	10.851	.	144.32	.	0.2734	.	.	.70829	.	.	.
1984	1.2699	.	.	.72641	.	34.574	.	0.0144	.	.	.02212	.	.	.
1985	1.4916	.	.	1.3426	.	25.91	.	.03342	.	.	.01652	.	.	.
1986	1.3189	.	.	.76835	.	22.589	.	0.0019	.	.	.00415	.	.	.
1987	1.0378	.	.	.	.	46.659	.	.	.	.	.	.	.	.
1988	1.0075	.	.	.	.	37.887	.	.	.	.	.	.	.	.
1989	.87488	.	.	.	.	30.802	.	.	.	.	.	.	.	.
1990	.80296	.	.	.	.	4.562	.	.	.	.	.	.	.	.
1991	.	.	.	.	.	0	.	.	.	.	.	.	.	.

GM DELCO PLANT #3 (1IC00008) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.0107	.	.	12.693	.	189.34	.	.45756	.	.	6.1115	5.6104	.	.
1979	1.4573	.	.	3.2077	.	98.851	.	.25081	.	.	1.3488	1.4755	.	.
1984	.38442	.	.	.23455	.	14.971	.	.00456	.	.	.00954	.02301	.	.
1985	.59405	.	.	.	.	19.584	.	.	.	.	.	.	.	.
1986	.47661	.	.	.	.	10.476	.	.	.	.	.	.	.	.
1987	0.3342	.	.	.	.	7.4235	.	.	.	.	.	.	.	.
1988	.45607	.	.	.	.	6.4579	.	.	.	.	.	.	.	.
1989	.44741	.	.	.	.	7.7916	.	.	.	.	.	.	.	.
1990	.	.	.	.	.	0	.	.	.	.	.	.	.	.
1991	.04485	.	.	.	.	.17714	.	.	.	.	.	.	.	.

GM DELCO PLANT #3 (1IC00008) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1991	1.0576	.	.	.	.	13.974	.	.	.	.	.	.	.	.

SQUARE D COMPANY (1IC00016) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.05981	.	.	.	.	2.1888	.	.04534	.04744	.	.	.06098	.	.
1979	.05934	.	.	.	.	2.7914	.	.04438	.06149	.	.	.05239	.	.
1984	.05729	.	.	.	.	4.48	.	.00997	.03106	.	.	.00739	.	.
1985	.05296	.	.	.	.	3.1713	.	.00713	.02728	.	.	0.0069	.	.
1986	.06531	.	.	.	.	1.6629	.	0.0096	.02338	.	.	.00611	.	.
1987	.06777	.	.	.	.	.87084	.	.01113	.02032	.	.	.00522	.	.
1988	.06839	.	.	.	.	1.4461	.	.00667	0.0316	.	.	.00763	.	.
1989	.06219	.	.	.	.	.55886	.	0.0048	.01984	.	.	.00614	.	.
1990	0.0544	.	.	.	.	.18302	.	256E-6	.00141	.	.	345E-6	.	.
1991	.08764	.	.	.	.	.28434	.	0	0	.	0	0	.	.

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ARMCO HAMILTON (1ID00002) OUTFALL #001
(NEW MIAMI)

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	7.12	.	.	.	.	.	.	.	.	.	.	3.4247	.	.
1979	7.12	.	.	.	.	.	.	.	.	.	.	.	.	.

ARMCO HAMILTON (1ID00002) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.4199	.05231	.	.	0	.61318	.	.	.	.	.	.	.	.
1979	.05463	.58952	.	.	1.1653	4.8086	.	.	.	.	.	.	.	.
1984	.03218	.40984	.	.	2.47	1.5111	.	.	.	.	.	.	.	.
1985	.01992	.23315	.	.	1.4446	0.9158	.	.	.	.	.	.	.	.
1986	.00237	.00137	.	.	.07357	.32407	.	.	.	.	.	.	.	.
1987	.00225	.	.	.	.03441	.11126	.	.	.	.	.	.	.	.
1988	.00297	.	.	.	.07386	.12071	.	.	.	.	.	.	.	.
1989	0.0072	.	.	.	.31584	.48638	.	.	.	.	.	.	.	.
1990	.03266	.	.	.	1.044	1.3001	.	.	.	.	.	.	.	.
1991	.01817	.	.	.	.45466	1.4818	.	.	.	.	.	.	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	17.758	154.44	.	.	294.41	6807.1	.	.	.	5.9717	.	51.006	.	.
1979	18	.	.	.	571.88	4001.1	.	.	.	3.0679	.	27.401	.	.
1987	2.5084	.	.	.	.	316.77	.	.	.	.51607	.	75.484	.	.
1988	2.3146	.	.	.	.	425.24	.	.	.	.23702	.	6.3089	.	.
1989	1.9989	.	.	.	.	274.2	.	.	.	.25537	.	14.086	.	.
1990	1.8025	.	.	.	.	356.36	.	.	.	1.0301	.	7.4723	.	.
1991	1.7594	.	.	.	.	276.32	.	.	.	.50205	.	8.1425	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.42568	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	1.8695	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	1.4027	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	.80023	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	.84783	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	.80123	25.241	.	.	.	.	.	.	.	.	.	.	.	.
1988	.68472	28.258	.	.	.	.	.	.	.	.	.	.	.	.
1989	.49096	19.478	.	.	.	.	.	.	.	.	.	.	.	.
1990	.32973	16.721	.	.	.	.	.	.	.	.	.	.	.	.
1991	.42167	23.49	.	.	.	.	.	.	.	.	.	.	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.8335	.	.	.	.	80.296	.	.	.	.53498	.	26.16	.	.
1979	0.86	.	.	.	.	86.506	.	.	.	.42573	.	47.454	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #005

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.62807	.	.	.	.	44.544	.	.	.	.	.	.23712	.	.
1979	.60812	.	.	.	.	36.627	.	.	.	.	.	.05537	.	.
1984	.61024	.	.	.	.	12.688	.	.	.	.	.	.07664	.	.
1985	.69376	.	.	.	.	32.332	.	.	.	.	.	.54884	.	.
1986	1.1496	.	.	.	.	32.846	.	.	.	.	.	.14364	.	.
1987	.91985	.	.	.	.	20.481	.	.	.	.00245	.	.11534	.	.
1988	0.5874	.	.	.	.	14.099	.	.	.	.00793	.	.29806	.	.
1989	.35441	.	.	.	.	19.146	.	.	.	.01225	.	.09942	.	.
1990	.98536	.	.	.	.	42.938	.	.	.	.03351	.	.29979	.	.
1991	1.0421	.	.	.	.	37.432	.	.	.	.02972	.	.30125	.	.

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ARMCO MIDDLETOWN (1ID00001) OUTFALL #611

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	.65357	.	.	.	3.6895	14.949	.	.	.	.17292	.	.10721	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #612

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	1.3006	.	.	.	59.008	30.185	.	.	.	.09179	.	0.715	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #613

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	1.3045	167.73	.	.	0	206.57	.	.	.	.	.	2.5979	.	.
1984	.65121	63.991	.	.	87.716	78.335	.	.	.	.	.	4.0518	.	.
1985	1.0282	84.313	.	.	74.74	75.5	.	.	.	.	.	5.8744	.	.
1986	1.3469	66.063	.	.	31.615	100.14	.	.	.	.	.	7.9963	.	.
1987	1.0729	113.59	.	.	20.28	201.71	.	.	.	0.2897	.	14.439	.	.
1988	1.2309	94.079	.	.	.	366.05	.	.	.	.14081	.	2.0843	.	.
1989	.90816	65.503	.	.	.	219.02	.	.	.	.13519	.	.64517	.	.
1990	.97506	75.674	.	.	.	277.79	.	.	.	.91065	.	4.0755	.	.
1991	1.046	86.274	.	.	.	198.01	.	.	.	.56106	.	3.9942	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #614

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	1.467	.	.	.	.	89.204	.	.21867	.	.02017	.	59.228	.	.
1988	1.1254	.	.	.	.	37.27	.	.03648	.	.01796	.	4.3296	.	.
1989	1.0924	.	.	.	.	43.531	.	.05689	.	.11314	.	13.07	.	.
1990	.82531	.	.	.	.	77.756	.	.04413	.	.09647	.	2.5892	.	.
1991	.80426	.	.	.	.	84.897	.	.09987	.	.09178	.	4.3786	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #624

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1991	.75465	.	.	.	.	55.984	.	.04881	.	.11082	.	2.4141	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #631

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	0.2388	.	.	.	.	8.1401	.	.	.	.10024	.	1.6729	.	.
1984	.10071	.	.	.	.	11.336	.	.	.	.03046	.	.48052	.	.
1985	.06265	.	.	.	.	32.107	.	.	.	.10936	.	.74556	.	.
1986	.02597	.	.	.	.	1.078	.	.	.	.00787	.	.05304	.	.
1987	.12085	.	.	.	.	390.67	.	.	.	.50817	.	4.1857	.	.
1988	.20008	.	.	.	.	34.69	.	.	.	.04285	.	.22467	.	.
1989	.05408	.	.	.	.	9.0093	.	.	.	.02667	.	.24906	.	.
1990	.13331	.	.	.	.	27.49								

ALBRIGHT & WILSON (1IE00001) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.02062	.	.	.	.	.90446	.	.	.	.	.	.	.	.
1979	0.0131	.	.	.	.	.42183	.	.	.	.	.	.	.	.
1984	.03666	.	.	.	.	1.8883	.	.	.	.	.	.	.	.
1985	.03541	.	.	.	.	0.6217	.	.	.	.	.	.	.	.
1986	.01718	.	.	.	.	.20433	.	.	.	.	.	.	.	.
1987	.05967	.	.	.	.	448.9	.	.	.	.	.	.	.	.
1988	.05754	.	.	.	.	166.86	.	.	.	.	.	.	.	.
1989	0.0858	.	.	.	.	164.19	.	.	.	.	.	.	.	.
1990	.05021	.	.	.	.	39.69	.	.	.	.	.	.	.	.
1991	.05195	.	.	58.327	.	75.021	.	.00507	0.2891	.01268	.	.07988	.	.

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CHEVRON USA, INC (1IG00000) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.4992	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	3.5403	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	3.2592	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	3.4112	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	2.3189	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	2.0042	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	1.5314	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	.74654	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	1.9912	.	.	.	.	.	.	.	.	.	.	.	.	.
1991	2.9905	.	.	.	.	.	.	.	.	.	.	.	.	.

CHEVRON USA, INC (1IG00000) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1989	0.026	.	.	.	.	0	.	.	.	.	.	.	.	.
1990	2.8545	.	.	.	.	203.06	.	.	.	.	.	.	.	.

CHEVRON USA, INC (1IG00000) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.3192	19.6	.	.	164.7	75.447	.	.04447	.	.	.	.	.	.
1979	0.8866	15.194	.	.	109.23	48.091	.	.00929	.	.	.	.	.	.
1984	.91093	25.917	.	.	91.692	64.586	.	.01767	.	.	.	.	.	.
1985	0.745	22.742	.	.	61.273	54.945	.	0.0246	.	.	.	.	.	.
1986	0.6379	12.393	.	.	54.952	50.198	.	.04502	.	.	.	.	.	.
1987	.93712	.26798	.	.	26.969	48.478	.	.08481	.	.	.	.	.	.
1988	1.3747	.12098	.	.	39.078	67.762	.	.06885	.	.	.	.	.	.
1989	.74654	3.9924	.	.	26.945	39.105	.	.06007	.	0.012	.	0.1765	.	.
1990	1.9912	.	.	.	25.013	50.035	.	.01237	.	.01836	.	.24678	.	.
1991	2.9889	.	.	.	57.757	198.71	.	.24172	.	.09972	.	.28954	.	.

PROCTOR & GAMBLE (1IN00010) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.13386	.	.	.	3.6907	5.3173	.	.	.	.	.	.	.	.
1979	.17323	.	.	.	4.5109	5.7027	.	.	.	.	.	.	.	.
1984	.14703	.	.	.	2.2851	6.5764	.	.	.	.	.	.	.	.
1985	.15102	.	.	.	2.155	8.7907	.	.	.	.	.	.	.	.
1986	.16267	.	.	.	3.264	8.4247	.	.	.	.	.	.	.	.
1987	.17374	.	.	.	3.0553	11.625	.	.	.	.	.	.	.	.
1988	.17827	.	.	.	2.8337	8.4457	.	.	.	.	.	.	.	.
1989	.20622	.	.	.	4.3033	16.5	.	.	.	.	.	.	.	.
1990	.20307	.	.	.	3.1716	11.593	.	.	.	.	.	.	.	.
1991	.21135	.	.	.	2.8245	10.222	.	.	.	.	.	.	.	.

DOE FMPC (1IO00004) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.11956	.	.	.	3.1676	1.9676	.	.	.	.	.	.	.	.
1985	.11361	.	.	.	4.5265	2.4298	.	.	.	.	.	.	.	.
1986	.11662	.	.	.	4.1045	3.4216	.	.	.	.	.	.	.	.
1987	.22791	.	.	.	29.078	31.579	.	.	.	.	.	.	.	.
1988	.24218	.	.	.	11.989	13.81	.	.	.	.	.	.	.	.
1989	.22932	.	.	.	2.6947	3.7638	.	.	.	.	.	.	.	.
1990	.12063	.14773	.	.	2.4458	1.1538	.	603E-6	.00243	.	678E-6	.	.	.
1991	.15444	.27066	.	.	2.8057	1.2859	.	0	0	.	431E-6	.	.	.

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DOE FMPC (11000004) OUTFALL #602

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.04693	.	.	.	.	.56003	.	.00204	.00319	.	.00367	.	.	.
1985	.03727	.	.	.	.	.73574	.	.00117	.00183	.	.00309	.	.	.
1986	.03948	.	.	.	.	.79484	.	279E-6	651E-6	.	977E-6	.	.	.
1987	0.055	.	.	.	.	2.3803	.	614E-6	.00136	.	932E-6	.	.	.
1988	.05161	.	.	.	.	1.3585	.	447E-6	.00108	.	895E-6	.	.	.
1989	.05528	.	.	.	.	.34993	.	0	586E-6	.	.00241	.	.	.
1990	.08089	.	.	.	.	.	.	719E-6	.00203	.	.00171	.	.	.
1991	0.0582	.	.	.	.	.	.	568E-7	454E-6	.	.00185	.	.	.

DOE FMPC (11000004) OUTFALL #603

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.13414	.	.	.	.	4.5094	.	.01571	.02163	.	.04499	.	.	.
1985	0.1617	.	.	.	.	8.1009	.	.00942	.01381	.	0.0245	.	.	.
1986	.07579	.	.	.	.	2.4687	.	.00345	.00568	.	.00692	.	.	.
1987	.03335	.	.	.	.	5.2446	.	.00362	.00487	.	0.0075	.	.	.
1988	.09547	.	.	.	.	8.874	.	0.002	0.0055	.	0.0065	.	.	.
1989	0.2025	.	.	.	.	17.316	.	0.0025	0.0095	.	0	.	.	.

DOE FMPC (11000004) OUTFALL #604

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0.2483	.	.	.	.	7.8848	.	.	.	.	.	.	.	.
1985	0.2452	.	.	.	.	5.1271	.	.	.	.	.	.	.	.
1986	.24593	.	.	.	.	4.4264	.	.	.	.	.	.	.	.
1987	.22849	.	.	.	.	6.4208	.	.	.	.	.	.	.	.
1988	.16306	.	.	.	.	17.046	.	.	.	.	.	.	.	.
1989	.25902	.	.	.	.	23.149	.	.	.	.	.	.	.	.
1990	.08954	.	.	.	.	2.0098	.	.	.	.	.	.	.	.
1991	.11988	.	.	.	.	.48211	.	.	.	.	.	.	.	.

DOE FMPC (11000004) OUTFALL #605

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1986	0.0313	0.1395	.	.	.	.	.	.	.	.	.	.	.	.
1987	.11244	.80307	.	.	.	.	.	.	.	.	.	.	.	.
1988	.11564	.80711	.	.	.	.	.	.	.	.	.	.	.	.
1989	.11839	.32933	.	.	.	.	.	.	.	.	.	.	.	.
1990	.10492	.12843	.	.	5.3505	5.9279	.	.00135	.00411	.	.00753	.	.	.
1991	.16165	.04133	.	.	7.8501	3.1567	.	.00398	0	.	.00954	.	.	.

DOE FMPC (11000004) OUTFALL #606

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1990	.48764	.	.	.	.	9.2441	.	.	.	.	.	.	.	.
1991	.60971	.	.	.	.	22.701	.	.	.	.	.	.	.	.

DOE MOUND FACILITY (11000005) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0.6838	.	.	.	.	72.888	.	.	.	.	.	.	.	.
1985	.47062	.	.	.	.	24.341	.	.	.	.	.	.	.	.
1986	0.5631	.	.	.	.	32.017	.	.	.	.	.	.	.	.
1987	.62604	.	.	.	.	30.358	.	.	.	.	.	.	.	.
1988	.61235	.	.	.	.	42.348	.	.	.	.	.	.	.	.
1989	.48868	.	.	.	.	19.481	.	.	.	.	.	.	.	.
1990	.60155	.	.	.	.	28.076	.	.	.	.	.	.	.	.
1991	.71458	.	.	.	.	22.269	.	.	.	.	.	.	.	.

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DOE MOUND FACILITY (1I000005) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CRITOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.09148	.	.	.	1.7824	3.8408	.	.	.	.	.	.	.	.
1985	.08922	.	.	.	2.9837	5.0993	.	.	.	.	.	.	.	.
1986	.10129	.	.	.	2.0862	2.8817	.	.	.	.	.	.	.	.
1987	.12608	.	.	.	2.5819	2.7452	.	.	.	.	.	.	.	.
1988	.10444	.	.	.	1.6697	1.6124	.	.	.	.	.	.	.	.
1989	.11501	.	.	.	2.1938	1.761	.	.	.	.	.	.	.	.
1990	.10219	.11839	.	.	2.6398	1.3088	.	.	.	.	.	.	0.356	.
1991	0.1675	.62514	.	.	.	1.0086	.	.	.	.	.	.	.63788	.

DOE MOUND FACILITY (1I000005) OUTFALL #602

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.08805	.	.	.	.	15.345	.	.	.	.	.	.	.	.
1985	.08897	.	.	.	.	3.5894	.	.	.	.	.	.	.	.
1986	.07362	.	.	.	.	4.6496	.	.	.	.	.	.	.	.
1987	.07293	.	.	.	.	5.7051	.	.	.	.	.	.	.	.
1988	.06692	.	.	.	.	4.7789	.	.	.	.	.	.	.	.
1989	.12612	.	.	.	.	4.012	.	.	.	.	.	.	.	.
1990	.13284	.	.	.	.	5.3849	.	.	.	.	.	.	.	.
1991	.11237	.	.	.	.	3.6572	.	.	.	.	.	.	.	.

DOE MOUND FACILITY (1I000005) OUTFALL #603

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1985	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1986	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1987	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1988	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1989	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1990	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1991	.	.	.	.	.	.	0	0	0	.	0	.	.	.

DOE MOUND FACILITY (1I000005) OUTFALL #604

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1986	.49484	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	.04839	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	0.0929	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	.09968	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON SOUTH WTP (1IW00060) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.13558	.	.	.	.	21984	.	.	.	.	.	.	.	.
1979	.07102	.	.	.	.	19943	.	.	.	.	.	.	.	.
1984	.06491	.	.	.	.	19934	.	.	.	.	.	.	.	.
1985	.18506	.	.	.	.	27313	.	.	.	.	.	.	.	.
1986	.21946	.	.	.	.	29584	.	.	.	.	.	.	.	.
1987	.18431	.	.	.	.	28690	.	.	.	.	.	.	.	.
1988	.15325	.	.	.	.	30850	.	.	.	.	.	.	.	.
1989	.15642	.	.	.	.	30328	.	.	.	.	.	.	.	.
1990	.20861	.	.	.	.	35306	.	.	.	.	.	.	.	.
1991	.17025	.	.	.	.	33508	.	.	.	.	.	.	.	.

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HARRISON WWTP (1PC00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.53278	17.383	.	.	39.102	62.863	.	.	.	.	.	.	.	.
1979	.52977	8.2267	.	21.127	70.993	87.126	.02469	.02251	.09945	.	.	.12062	.	.
1984	.65503	23.059	.	15.972	97.821	108.36	.03606	.34928	.17976	.	.	.35805	.	.
1985	.79649	13.061	.	25.188	86.772	95.59	.03442	.06817	.07025	.	.	0.245	.	.
1986	.82711	78.637	.	20.122	310.7	120.58	.03327	.06057	.14036	0.1525	.07817	.26209	49.021	.
1987	.73492	49.786	.	.	.	95.685	0.0035	.	.09892	.01525	.01292	0.11	57.947	.
1988	.75639	38.783	.	.	.	79.985	0	.	.08417	0.006	.00433	.37675	34.241	.
1989	.80771	34.445	.	.	.	62.771	0.002	.	.13925	.01492	.02033	.28367	29.379	.
1990	.89206	49.432	.	.	.	122.69	.00347	.	.11784	.01764	.01729	.16574	47.503	.
1991	1.0535	.82371	.	.	.	42.882	.00405	.	.12289	.02024	.05342	.30675	17.959	.

FAIRFIELD WWTP (1PD00003) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.6489	179.89	.	30.313	209.73	194.92	.42517	.17908	.60006	.57307	1.7043	.42747	.	.
1979	4.4624	193.69	.	11.577	213.48	222.07	.18153	.18853	.20278	.79192	0.3409	.91574	.	.
1984	4.8321	54.869	.	.	227.37	256.37	.10902	1.0157	.76733	2.701	1.2031	2.3237	.	.
1985	4.8824	72.746	.	.	234.39	226.06	.11875	.33858	1.3566	1.5313	1.0607	3.3316	116.16	.
1986	4.3822	140.01	.	.	218.62	193.59	.22427	.35422	.35664	1.4116	3.0968	1.3857	151.31	.
1987	4.1133	72.642	.	.	260.92	191.18	0.038	.	.13218	0.55	.18273	0.622	.	.
1988	4.6093	69.692	.	.	127.83	139.06	.03383	.	.15758	.54825	0.205	.54567	116.14	.
1989	5.3725	110.67	.	.	.	148.62	.05373	.	.37525	.73733	.30983	2.2321	119.54	.
1990	5.8566	48.43	.	.	.	114.54	0.0679	.	0.2515	.65233	.34619	2.1335	77.08	.
1991	6.9371	70.262	.	.	.	109.98	0.0751	.	1.8686	.47707	.29964	.99821	74.252	.

MCD FRANKLIN WWTP (1PD00004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.4974	107.07	.	28.494	726.71	1486.1	0.1073	.35778	.61386	1.0092	.77876	2.4697	.	.
1979	4.0183	105.85	.	36.572	776.46	2486.7	.09046	0.2176	.53432	.89418	.48795	1.6055	.	.
1984	2.505	101.08	.	20.396	945.95	1383.3	.05433	.17935	.75669	.46883	.23491	1.1797	.	.
1985	2.7596	93.29	.	.	709	3311	.04414	0.1461	.32514	0.2091	.16686	.80271	.	.
1986	3.0073	101.95	.	.	318.6	785.42	0.023	.14758	.30858	.05733	.17033	6.3891	.	.
1987	2.8114	101.01	.	.	748.41	2504.1	.01525	.09442	.50767	.09075	.07517	14.032	.	.
1988	2.695	36.095	.	.	340.8	711.53	.01325	0.0835	.30858	.29408	.07092	1.6247	.	.
1989	3.0704	52.193	.	.	1273.9	2297.1	.01783	.04883	.27142	.15667	.10633	.52817	.	.
1990	3.3784	9.3162	.	.	424.56	1177.8	0.0197	.08846	.37064	.13752	.10664	1.2152	43.956	.
1991	4.8462	29.059	.	.	.	1354.5	0	.01733	.24916	0.0585	.11383	.94174	136.27	.

WEST CARROLLTON WWTP (1PD00014) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.92465	62.525	.	.	107.22	100.47	.02271	.05481	0.169	.13399	.10552	.18233	.	.
1979	.99359	53.144	.	29.521	122.58	175.09	.02608	.08052	.28329	.17077	.09069	.23796	.	.
1984	1.0863	46.872	.	20.157	112.89	113.03	.01278	.02175	.53984	.13445	.08939	.15195	70.368	.
1985	1.0095	44.514	.	.	110.7	81.707	0.0075	.08433	1.4465	0.051	.09225	0.1665	46.86	.
1986	0.8331	34.703	.	.	75.94	69.589	0.003	.	.03633	.00733	.00733	.04067	52.188	.
1987	0.8029	33.944	.	.	85.987	76.273	.00275	.	.08275	.01425	.01875	.17025	57.147	.
1988	.93729	37.396	.	.	129.29	106.77	0.002	.	.24933	.03067	.04533	.35967	81.831	.
1989	1.7937	30.434	.	.	.	72.901	0	.07575	.19192	0.0214	.07833	.23553	50.29	.
1990	1.6293	30.783	.	.	.	81.392	0	.01674	.28503	.00871	.00952	.21979	58.003	.
1991	1.7258	42.404	.	.	.	129.77	0	0	.29478	0	.02114	.12663	86.73	.

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MIAMISBURG WWTP (1PD00017) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.9862	144.79	.	35.745	89.163	107.33	0.0057	.02341	0.0845	.02609	.07128	.28635	.	.
1979	2.1569	140.84	.	34.167	102.38	89.143	0	0.0643	.09697	.02462	.00402	.21471	.	.
1984	2.343	180.2	.	.	147.5	151.57	0	0	0	0	0	0	.	.
1985	2.3908	166.16	.	.	168.95	117.41	0	0	0	0	0	0	.	.
1986	2.5851	171.37	.	.	185.01	119.15	.00567	.01667	.06967	0.014	0.014	.06967	.	.
1987	1.9709	127.05	.	.	173.58	87.641	0	.	0	0	.01475	0.2815	37.449	.
1988	2.1323	70.654	.	.	.	63.519	5.4787	.	0	0.0195	0.0195	.11225	31.915	.
1989	2.7051	82.03	.	.	.	77.179	0	.	.41775	0	0.2365	.49575	50.079	.
1990	2.8637	71.272	.	.	.	79.876	0	.	0	0	0	.28141	58.718	.
1991	3.7015	70.999	.	.	.	135.83	0	.	0	0	0	0.2975	63.603	.

MCD NORTH REG. WWTP (1PD00020) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1985	5.99	58.777	.	.	217.49	203.12	0.041	0.228	0.488	0.1055	0.129	2.986	.	.
1986	6.7467	61.026	.	148.33	359.38	209.09	.05398	.42306	.69067	0.1365	.43392	2.0849	.	.
1987	5.6628	26.326	.	.	284.19	142.03	.04141	.22331	.60582	.23458	.15325	.83833	142.42	.
1988	6.0053	23.259	.	.	214.83	139.16	.02967	.	0.461	2.1688	.16867	2.2561	112.39	.
1989	7.1662	32.46	.	.	274.77	168.33	.01596	.05382	0.4212	.20672	.09864	.57144	158.84	.
1990	7.8872	33.019	.	.	.	170.88	.02794	.07488	.48838	.12241	0.1296	.54382	123.73	.
1991	9.1808	14.722	.	.	.	231.36	.01196	.06786	.51722	.03587	.16672	.66977	138.28	.

HAMILTON WWTP (1PE00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	11.19	112.46	.	156.25	897.02	1876	.18838	.83319	.93666	1.1963	4.4782	3.3133	.	.
1979	14.122	92.844	.	52.275	669.67	2220	.08708	.52107	.51203	.90472	1.2306	3.3241	.	.
1984	19.251	16.567	.	.	442.21	495.69	.25995	1.1149	0.9732	.97485	1.3843	4.5451	.	.
1985	17.595	38.742	.	62.569	449.23	427.63	.20477	1.1201	.83092	1.4537	1.5155	3.9932	276.86	.
1986	19.113	33.927	.	51.143	391	445.45	.37262	2.4695	3.4184	4.6499	2.5633	7.361	258.7	.
1987	17.43	33.873	.	52.783	286.58	425.44	.53033	.77083	2.7829	2.5115	1.3087	4.6877	168.95	.
1988	18.091	11.888	.	51.402	196.97	273.06	.35017	4.2652	.86875	2.1894	1.7173	9.7752	127.68	.
1989	20.63	9.8848	.	28.21	246.8	344.12	.98483	.15383	1.8209	3.5747	2.3494	4.2371	161.22	.
1990	21.843	44.028	.	17.043	296.38	625.68	.60722	1.3334	4.2399	3.6335	.99577	3.6654	213.42	.
1991	22.502	33.702	.	.	.	547.02	0.1185	.97866	0.4085	7.1594	3.0353	6.1958	244.35	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	15.966	102.43	.	.	298.93	1340.3	.51463	1.2986	2.0582	2.099	2.6068	19.122	.	.
1979	19.283	251.23	.	.	1060.1	723.51	.72011	1.2123	1.0612	2.1065	1.8906	10.785	.	.
1984	18.482	80.388	.	58.913	1286.9	1330.8	.09824	.65717	.94319	.72087	1.4752	4.8857	.	.
1985	20.422	40.999	.	47.171	1605.1	1228.4	.15618	.48167	0.618	.90936	2.0278	6.8729	.	.
1986	19.328	194	.	.	1976	2202.7	.10058	.	.61167	.76542	1.2217	3.8262	.	.
1987	17.342	17.332	.	.	1221.4	1700.1	0.0835	.	0.5365	0.13	1.4436	1.3306	.	.
1988	15.292	28.287	.	.	958.2	1393.2	.03758	.	.48258	.03908	1.824	1.1136	.	.
1989	17.571	171.55	.	.	1049.8	1507.6	.07025	.	0.6255	0.136	1.1097	1.272	.	.
1990	21.88	111.6	.	.	1231	1818.6	.02606	0	0.5838	.36636	.71375	1.5669	799.09	.
1991	26.629	33.699	.	.	.	1911.6	.08176	.43348	1.0068	.23951	.33365	3.135	1187	.

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DAYTON WWTP (1PF00000) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	60.358	2649.3	.	1396.4	11616	12955	2.8284	59.745	33.211	20.309	34.643	112.15	.	/
1979	59.615	14279	.	1348.9	9260.5	10926	2.0131	47.621	58.937	19.777	49.165	100.05	.	.
1984	55.801	5741.4	.	.	11898	9307.6	.88897	44.565	17.897	4.5257	43.07	70.652	.	.
1985	56.482	5996.7	.	.	11688	7763.4	.46413	30.8	12.851	.93376	43.209	44.305	.	.
1986	56.795	3871.4	.	.	9440.1	7468.3	1.5887	.	13.134	3.457	39.294	43.76	2114.2	.
1987	51.013	2691.2	.	.	.	3828.3	.08782	11.199	6.1856	1.6225	24.104	18.013	2405.2	.
1988	55.856	1400.2	.	.	.	3423.5	.15934	9.252	4.3208	1.7715	23.959	16.1	2547.6	.
1989	67.701	40.057	.	.	.	1428.9	.08206	3.4243	3.6005	.37403	19	19.478	596.01	.
1990	64.504	28.681	.	.	.	646.72	.08495	.76483	1.4901	.20582	8.5926	14.305	452.8	/
1991	74.123	20.946	.	.	.	217.93	.09765	0	.54852	.41121	6.1885	13.139	135.1	.

LESOURDSVILLE WWTP (1PK00011) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.0969	6.5397	.	46.867	28.275	22.898	.02058	.04203	.09077	.07187	.08506	.13957	.	.
1979	1.5853	14.986	.	8.2325	32.817	27.856	0.0332	.04832	.15736	.15887	.12551	.	.	.
1984	3.0394	105.09	.	80.216	77.492	111.38	.04774	.08672	.13928	.15903	.15402	.22064	42.461	.
1985	3.0901	19.033	.	66.796	61.987	109.56	0.1045	0.525	1.8252	1.0437	0.748	1.9902	37.598	.
1986	2.9507	21.262	.	47.798	55.265	74.146	0.1405	.15975	0.1655	0.62	1.161	0.479	32.428	.
1987	2.7565	28.306	.	44.098	41.499	27.785	0.0245	0	0.086	0.319	0.185	0.246	21.657	.
1988	2.7871	37.543	.	31.432	.	29.079	.02375	.	0.1055	.24175	.09325	0.1775	19.583	.
1989	3.9315	101.75	.	45.692	.	80.227	.02875	.	.08975	0.1695	0.1845	.24325	88.887	.
1990	4.4927	97.323	.	45.393	.	92.656	0	.	0	0	0	0	85.719	.
1991	6.0658	36.809	.	59.331	.	103.43	0	.	.24224	0	0	1.0416	74.859	.

MONT CO WEST REG WWTP (1PL00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	10.519	41.689	.	63.609	866.17	300.3	.36336	0.4542	3.7386	1.3872	.72293	5.4504	.	.
1984	12.505	40.101	.	.	182.83	73.162	0	0	.59388	0	0	1.434	.	.
1985	13.215	27.342	.	.	219.96	60.611	0	0	0.5604	.21448	.10723	1.9975	.	.
1986	12.983	36.24	.	.	261.29	105.5	.04337	.01263	.72978	.22473	.15794	1.9785	.	.
1987	12.453	89.082	.	.	219.03	114.2	.05724	.35264	.72955	.22198	1.1219	2.9088	179.78	.
1988	10.897	27.551	.	.	.	87.365	.09288	.13108	.64658	.07248	0.8222	2.8848	122.21	.
1989	13.863	33.864	.	.	.	306.16	.00106	.05309	.28986	.07823	.35446	3.0807	209.55	.
1990	14.612	29.013	.	.	.	260.23	.03192	.34371	.51891	.13032	.60299	4.1011	227.76	.
1991	16.561	73.111	.	.	.	274.48	0	.26364	.23007	0	.97296	8.1829	242.76	.

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THIRD QUARTER AVERAGE FLOW AND LOADINGS FOR GREAT MIAMI RIVER DISCHARGES - LOADS IN KG/DAY

CRYSTAL TISSUE (1IA00000) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.3284	.05657	.	.	10.7	.60614	.	.	.	.	.	.	.	.
1979	2.32	1.5158	.	.	104.01	117.03	.	.	.	.	.	.	.	.
1984	2.4763	1.2233	.	.	178.87	172.35	.	.	.	.	.	.	.	.
1985	2.4987	18.44	.	1.9167	161.42	209.73	.	.	.	.	.	.	.	.
1986	2.7135	10.998	.	1.941	186.56	242.67	.	.	.	.	.	.	.	.
1987	2.5831	26.208	.	2.1407	177.06	247.5	.	.	.	.	.	.	.	.
1988	2.6129	7.0141	.	3.376	205.43	282.82	.	.	.	.	.	.	.	.
1989	2.528	.97325	.	1.8037	106.33	170.69	.	.	.	.	.	.	.	.
1990	1.8225	3.2321	.	1.4702	75.844	178.95	.	.	.	.	.	.	.	.

SIMPSON PAPER HARDING (1IA00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.98987	1.3924	.	.	88.045	60.241	.	.	.	.	.	.	.	.
1979	1.1892	1.2976	.	.	61.73	79.031	.	.	.	.	.	.	.	.
1984	1.0787	.74913	.	0.9754	43.872	96.429	.	.	.	.	.	.	.	.
1985	.77424	2.9648	.	.85425	104.53	79.362	.	.	.	.	.	.	.	.
1986	0.8766	3.1195	.	.64373	67.686	65.58	.	.	.	.	.	.	.	.
1987	.90408	.31345	.	1.1817	105.3	139.36	.	.	.	.	.	.	.	.
1988	.78329	.29682	.	.44709	156.98	61.508	.	.	.	.	.	.	.	.
1989	.96571	.77464	.	.44064	43.702	115.64	.	.	.	.	.	.	.	.

APPLETON PAPER (1IA00004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.4662	26.431	.	17.996	156.54	500.35	.	.	.	.	.	.	.	.
1979	4.3999	13.636	.	15.246	560.68	1102.3	.	.	.	.	.	.	.	.
1984	4.1422	16.164	.	15.22	1242.4	1350.2	.	.	.	.	.	.	.	.
1985	7.3974	29.618	.	2.7336	135.51	166.63	.	.	.	.	.	.	.	.
1986	5.9732	43.279	.	6.1589	619.69	939.64	.	.	.	.	.	.	.	.
1987	6.2811	30.138	.	5.3895	414.61	688.52	.	.	.	.	.	.	.	.
1988	5.6498	19.931	.	5.4708	300.36	351.11	.	.	.	.	.	.	.	.
1989	6.7213	6.899	.	4.8615	361.69	443.27	.	.	.	.	.	.	.	.
1990	6.52	2.7746	.	7.3574	361.34	459.93	.	.	.	.	.	.	.	.

APPLETON PAPER (1IA00004) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1985	0.225	.	.	.	.	5.5356	.	.	.	.	.	.	.	.
1986	0.225	.	.	.	.	23.059	.	.	.	.	.	.	.	.
1987	0.225	.	.	.	.	20.936	.	.	.	.	.	.	.	.
1988	.20625	.	.	.	.	10.503	.	.	.	.	.	.	.	.
1989	0.225	.	.	.	.	13.036	.	.	.	.	.	.	.	.
1990	.43375	.	.	.	.	45.069	.	.	.	.	.	.	.	.

MIAMI PAPER (1IA00007) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.4845	1.7628	.	3.9056	218.98	246.71	.	.	.	.	.	.	.	.
1979	2.3797	4.2155	.	5.3602	273.7	522	.	.	.	.	.	.	.	.
1984	2.8082	1.9146	.	5.9306	150.59	229.78	.	.	.	.	.	.	.	.
1985	2.6516	13.317	.	4.5625	172.19	245.59	.	.	.	.	.	.	.	.
1986	3.013	.87407	.	4.2968	199.83	321.64	.	.	.	.	.	.	.	.
1987	3.208	6.8607	.	8.3144	254.7	231.47	.	.	.	.	.	.	.	.
1988	3.2996	.81237	.	3.9977	184.73	462.96	.	.	.	.	.	.	.	.
1989	3.4668	4.4924	.	4.4483	162.78	306.56	.	.	.	.	.	.	.	.
1990	3.7773	3.7999	.	4.8448	69.151	202.79	.	.	.	.	.	.	.	.

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MIAMI PAPER (1IA00007) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.0354	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0.033	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.

W CARROLLTON PARCHMNT (1IA00010) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.5855	.	.	.	.	21.968	.	.	.	.	.	.	.	.
1979	.60935	.	.	.	.	56.15	.	.	.	.	.	.	.	.
1984	.71404	.	.	.	.	555.4	.	.	.	.	.	.	.	.
1985	.69036	.	.	.	.	888.35	.	.	.	.	.	.	.	.
1986	0.5712	.	.	.	.	468.52	.	.	.	.	.	.	.	.
1987	.61956	.	.	.	.	656.03	.	.	.	.	.	.	.	.
1988	.47607	.	.	.	.	467.1	.	.	.	.	.	.	.	.
1989	.52556	0	.	.	.	26.339	0.0055	0.0065	0.0295	0.047	.	.	6.681	.
1990	.76863	0.8255	.	.	.	28.928	.01386	0.0203	.03055	.07259	.	.	7.3983	.

W CARROLLTON PARCHMNT (1IA00010) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1989	0	0	.	.	0	0	.	.	.	.	.	.	.	.
1990	0	0	.	.	0	0	.	.	.	.	.	.	.	.

W CARROLLTON PARCHMNT (1IA00010) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1989	0	0	.	.	0	0	.	.	.	.	.	.	.	.
1990	0	0	.	.	0	0	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	152.93	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	161.15	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	63.152	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	41.34	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	53.928	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	167.14	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	151.52	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	64.332	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	80.022	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.88424	.	.	.	.	249.03	.	.	.08403	.	.	.	.	.
1979	1.3881	.	.	.	.	524.96	.	.	.97853	.	.	.	.	.
1984	2.4153	.	.	.	.	19.343	.	.	.34263	.	.	.	.	.
1985	1.836	.	.	.	.	19.707	.	.	.18267	.	.	.	.	.
1986	1.5677	.	.	.	.	34.843	.	.	.	.	.	.	.	.
1987	2.4272	.	.	.	.	50.093	.	.	.	.	.	.	.	.
1988	2.3564	.	.	.	.	27.889	.	.	.	.	.	.	.	.
1989	1.4277	.	.	.	.	34.196	.	.	.	.	.	.	.	.
1990	1.7728	.	.	.	.	33.653	.	.	.	.	.	.	.	.

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DAYTON POWER HUTCHING (1IB00004) OUTFALL #004

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.01752	.	.	.	0.4214	1.0547	.	.	.	.	.	.	.	.
1979	.01574	.	.	.	.11229	1.0182	.	.	.	.	.	.	.	.
1984	.00297	.	.	.	.04794	.04163	.	.	.	.	.	.	.	.
1985	.00188	.	.	.	.02267	.04267	.	.	.	.	.	.	.	.
1986	.00408	.	.	.	.04933	.08833	.	.	.	.	.	.	.	.
1987	.00474	.	.	.	0.0516	.16039	.	.	.	.	.	.	.	.
1988	.00325	.	.	.	0.0835	0.108	.	.	.	.	.	.	.	.
1989	.02107	.	.	.	.07833	0.625	.	.	.	.	.	.	.	.
1990	.00312	.	.	.	.10598	.14243	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	326E-7	.	.	.	.	1.9026	.	.	.	.	.	.	.	.
1979	326E-7	.	.	.	.	6.5947	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #603

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.11292	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	.09756	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #605

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.9963	.	.	.	.	8.7434	.	.	.	.	.	.	.	.
1979	.60588	.	.	.	.	35.893	.	.	.	.	.	.	.	.

DAYTON POWER HUTCHING (1IB00004) OUTFALL #631

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.04354	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	.07247	.	.	.	.	.	.	.	.	.	.	.	.	.

AERONCA INCORPORATED (1IC00003) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.65	.	.	.	.	16.87	.	.13215	.	.	.	.	.	.
1979	0.65	.	.	.	.	61.506	.	.14351	.	.	.	.	.	.
1984	0.65	.	.	.	.	10.192	.	0.1448	.	.	.	.	.	.
1985	0.65	.	.	.	.	12.301	.	0.1975	.	.	.	.	.	.
1986	0.65	.	.	.	.	79.548	.	.18017	.	.	.	.	.	.
1987	0.65	.	.	.	.	13.531	.	0.299	.	.	.	.	.	.
1988	0.65	.	.	.	.	22.552	.	.19117	.	.	.	.	.	.
1989	0.65	.	.	.	.	27.883	.	.12417	.	.	.	.	.	.
1990	.58189	.	.	.	.	15.253	.	.02559	.	.	.	.	.	.

GM DELCO PLANT #2 (1IC00007) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	8.18	.	.	52.532	.	250.93	.	.39509	.	.	1.5268	.	.	.
1979	5.6925	.	.	7.2563	.	222.69	.	.80225	.	.	.44324	.	.	.
1984	1.3935	.	.	.40679	.	34.73	.	.01271	.	.	0.0205	.	.	.
1985	1.5162	.	.	.74892	.	11.834	.	.02246	.	.	.00838	.	.	.
1986	1.6227	.	.	.	.	27.712	.	.	.	.	.	.	.	.
1987	.98516	.	.	.	.	55.14	.	.	.	.	.	.	.	.
1988	.98791	.	.	.	.	24.51	.	.	.	.	.	.	.	.
1989	.76482	.	.	.	.	34.103	.	.	.	.	.	.	.	.
1990	.	.	.	.	.	0	.	.	.	.	.	.	.	.

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GM DELCO PLANT #3 (1IC00008) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.3756	.	.	15.039	.	226.22	.	.52192	.	.	5.1719	5.726	.	.
1979	1.0019	.	.	1.3967	.	65.561	.	.05168	.	.	.09496	.49923	.	.
1984	0.4496	.	.	.14813	.	12.998	.	818E-6	.	.	.00385	.00198	.	.
1985	.95225	.	.	.	.	6.104	.	.	.	.	.	.	.	.
1986	.67398	.	.	.	.	7.0857	.	.	.	.	.	.	.	.
1987	.48831	.	.	.	.	11.407	.	.	.	.	.	.	.	.
1988	.76536	.	.	.	.	19.233	.	.	.	.	.	.	.	.
1989	.78467	.	.	.	.	12.709	.	.	.	.	.	.	.	.
1990	.	.	.	.	.	0	.	.	.	.	.	.	.	.

SQUARE D COMPANY (1IC00016) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.06588	.	.	.	.	2.1808	.	.03434	.04427	.	.	0.0448	.	.
1979	.06375	.	.	.	.	3.3661	.	0.0386	.06057	.	.	.03361	.	.
1984	.05717	.	.	.	.	2.3909	.	.01135	.03415	.	.	.00675	.	.
1985	.05648	.	.	.	.	3.4167	.	.00915	.02815	.	.	.00654	.	.
1986	.06679	.	.	.	.	.93954	.	.00885	.02208	.	.	.00477	.	.
1987	.07884	.	.	.	.	.95317	.	.01258	.02458	.	.	.00675	.	.
1988	.06888	.	.	.	.	1.6585	.	0.006	.03785	.	.	.00746	.	.
1989	0.0545	.	.	.	.	.37408	.	.00454	.01746	.	.	.00585	.	.
1990	0.0557	.	.	.	.	.21511	.	0	0	.	.	0	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	18	138.2	.	.	356.37	6744.9	.	.	.	8.1704	.	50.772	.	.
1979	18	.	.	.	733.7	4501.8	.	.	.	1.9129	.	29.474	.	.
1987	2.2591	.	.	.	.	373.76	.	.	.	.31677	.	130.71	.	.
1988	2.6644	.	.	.	.	839.54	.	.	.	.44456	.	2.5977	.	.
1989	1.8812	.	.	.	.	321.63	.	.	.	.14531	.	2.9278	.	.
1990	1.6316	.	.	.	.	254.63	.	.	.	.98681	.	3.6447	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.15	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	1.4761	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	2.65	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	.81639	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	.82258	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	.75412	13.638	.	.	.	.	.	.	.	.	.	.	.	.
1988	.88197	45.099	.	.	.	.	.	.	.	.	.	.	.	.
1989	.79348	21.021	.	.	.	.	.	.	.	.	.	.	.	.
1990	.29674	13.112	.	.	.	.	.	.	.	.	.	.	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.86	.	.	.	.	74.618	.	.	.	.35631	.	10.423	.	.
1979	0.86	.	.	.	.	63.348	.	.	.	.24138	.	35.807	.	.

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ARMCO MIDDLETOWN (1ID00001) OUTFALL #005

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.57824	.	.	.	.	60.853	.	.	.	.	.	.21797	.	.
1979	0.58	.	.	.	.	34.467	.	.	.	.	.	.03283	.	.
1984	.51977	.	.	.	.	6.6757	.	.	.	.	.	.03174	.	.
1985	.67303	.	.	.	.	39.441	.	.	.	.	.	0.3802	.	.
1986	1.4957	.	.	.	.	30.383	.	.	.	.	.	0.049	.	.
1987	1.196	.	.	.	.	27.353	.	.	.	0	.	.13723	.	.
1988	0.5	.	.	.	.	15.35	.	.	.	.00544	.	0.4255	.	.
1989	.40742	.	.	.	.	18.866	.	.	.	.01969	.	.15892	.	.
1990	1.0983	.	.	.	.	49.134	.	.	.	.02756	.	.37246	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #612

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	1.3006	.	.	.	59.008	30.185	.	.	.	.09179	.	0.715	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #613

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	1.2476	176.98	.	.	.	170.8	.	.	.	.	.	.	.	.
1984	.19161	31.44	.	.	32.081	12.642	.	.	.	.	.	0.909	.	.
1985	1.0408	81.797	.	.	43.433	94.97	.	.	.	.	.	6.489	.	.
1986	1.4874	77.976	.	.	7.286	83.005	.	.	.	.	.	8.128	.	.
1987	.97302	130.44	.	.	.	307.42	.	.	.	0.244	.	16.393	.	.
1988	1.645	135.03	.	.	.	801.37	.	.	.	.21911	.	1.0501	.	.
1989	.87848	47.93	.	.	.	273.51	.	.	.	.10015	.	.57023	.	.
1990	.85932	90.329	.	.	.	228.84	.	.	.	.97263	.	1.5464	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #614

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	1.2904	.	.	.	.	78.623	.	0.188	.	.01631	.	114.91	.	.
1988	1.0855	.	.	.	.	38.568	.	.00956	.	.02844	.	1.7979	.	.
1989	0.997	.	.	.	.	20.36	.	.07514	.	.03475	.	2.3036	.	.
1990	.76952	.	.	.	.	30.531	.	.02162	.	.01185	.	1.8471	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #631

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0.1	.	.	.	.	6.2889	.	.	.	.02714	.	.19816	.	.
1985	.05941	.	.	.	.	2.0036	.	.	.	.01756	.	.13944	.	.
1986	.00794	.	.	.	.	.17225	.	.	.	0.0225	.	0.0435	.	.
1987	.09199	.	.	.	.	1386.6	.	.	.	1.8437	.	14.851	.	.
1988	.16959	.	.	.	.	56.998	.	.	.	.12133	.	.40444	.	.
1989	.06009	.	.	.	.	3.2441	.	.	.	.02523	.	.16077	.	.
1990	0.186	.	.	.	.	16.447	.	.	.	.06013	.	.79157	.	.

ARMCO MIDDLETOWN (1ID00001) OUTFALL #641

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.2558	.	.	.	.	158.43	.	.	.	.	.	1.2186	.	.
1979	1.8201	.	.	.	.	146.74	.	.	.	.	.	0.1126	.	.
1984	2.3558	.	.	.	.	39.591	.	.	.	.	.	.15611	.	.
1985	2.192	.	.	.	.	20.038	.	.	.	.	.	0.1618	.	.
1986	2.0045	.	.	.	.	2.3213	.	.	.	.	.	0	.	.
1987	1.797	.	.	.	.	30.431	.	.	.	0	.	0.061	.	.
1988	1.801	.	.	.	.	39.002	.	.	.	.04422	.	.55012	.	.
1989	1.4635	.	.	.	.	24.046	.	.	.	.02569	.	.34046	.	.
1990	1.8312	.	.	.	.	37.06	.	.	.	.01077	.	.01041	.	.

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ARMCO HAMILTON (1ID00002) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.014	.05231	.	.	0	.61318	.	.	.	.	.	.	.	.
1979	.03976	.69665	.	.	.12328	2.895	.	.	.	.	.	.	.	.
1984	.03862	.48891	.	.	2.2205	1.6073	.	.	.	.	.	.	.	.
1985	.02407	.18975	.	.	1.1052	1.392	.	.	.	.	.	.	.	.
1986	0	0	.	.	0	0	.	.	.	.	.	.	.	.
1987	0.0022	.	.	.	.03029	.08114	.	.	.	.	.	.	.	.
1988	.00333	.	.	.	.03675	0.068	.	.	.	.	.	.	.	.
1989	.00659	.	.	.	.27817	.48967	.	.	.	.	.	.	.	.
1990	.01687	.	.	.	.32614	.61002	.	.	.	.	.	.	.	.

ARMCO HAMILTON (1ID00002) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.3	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0.3	.	.	.	.	.	.	.	.	.	.	.	.	.

ARMCO HAMILTON (1ID00002) OUTFALL #004

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	4.5143	1779.6	.	.	497.41	1045.5	.	.	.	.	.	.	.	.
1979	6.7782	48.1	.	.	.	1516.5	.	.	.	.	.	.	.	.

ARMCO HAMILTON (1ID00002) OUTFALL #611

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.72	52.365	.	.	.	106.91	.	.	.	.	.	1.1021	.	.
1979	.49696	56.33	.	.	.	131.35	.	.	.	.	.	1.3283	.	.
1987	.01525	0.212	.	.	.	2.3071	.	.	.	750E-6	.	.01812	.	.

ARMCO HAMILTON (1ID00002) OUTFALL #621

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	6.4	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	6.3304	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	10.4	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	10.4	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	10.4	.	.	.	.	.	.	.	.	.	.	.	.	.

ALBRIGHT & WILSON (1IE00001) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.01453	.	.	.	.	.51854	.	.	.	.	.	.	.	.
1979	.01345	.	.	.	.	.36307	.	.	.	.	.	.	.	.
1984	.04515	.	.	.	.	5.0833	.	.	.	.	.	.	.	.
1985	.04405	.	.	.	.	0.7233	.	.	.	.	.	.	.	.
1986	.01341	.	.	.	.	.35008	.	.	.	.	.	.	.	.
1987	.06588	.	.	.	.	774.04	.	.	.	.	.	.	.	.
1988	.04595	.	.	.	.	48.783	.	.	.	.	.	.	.	.
1989	.06941	.	.	.	.	31.658	.	.	.	.	.	.	.	.
1990	.06012	.	.	.	.	15.098	.	.	.	.	.	.	.	.

CHEVRON USA, INC (1IG00000) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.5941	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	3.8789	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	3.2809	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	3.3093	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	1.5233	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	2.1171	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	1.6046	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	1.1623	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	1.8434	.	.	.	.	.	.	.	.	.	.	.	.	.

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CHEVRON USA, INC (1IG00000) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.2008	15.495	.	.	109.47	59.585	.	0	.	.	.	.	.	.
1979	.64637	10.62	.	.	80.705	37.544	.	0	.	.	.	.	.	.
1984	.91556	25.976	.	.	97.604	64.57	.	0	.	.	.	.	.	.
1985	0.5763	22.71	.	.	60.399	43.783	.	.01775	.	.	.	.	.	.
1986	.23795	.08608	.	.	25.659	21.228	.	.06331	.	.	.	.	.	.
1987	1.41	.07857	.	.	46.531	81.704	.	.11721	.	.	.	.	.	.
1988	1.6046	.02331	.	.	86.54	94.348	.	.06385	.	.	.	.	.	.
1989	1.1623	7.502	.	.	45.135	43.737	.	.08054	.	.	.	.	.	.
1990	1.8434	.	.	.	27.468	26.328	.	0	.	.02165	.	.36443	.	.

PROCTOR & GAMBLE (1IN00010) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.14148	.	.	.	5.3315	5.106	.	.	.	.	.	.	.	.
1979	.20613	.	.	.	5.3456	5.2172	.	.	.	.	.	.	.	.
1984	.15008	.	.	.	2.763	7.0232	.	.	.	.	.	.	.	.
1985	.17173	.	.	.	2.4012	11.699	.	.	.	.	.	.	.	.
1986	.15895	.	.	.	2.1516	8.0132	.	.	.	.	.	.	.	.
1987	.17836	.	.	.	2.769	12.023	.	.	.	.	.	.	.	.
1988	.17598	.	.	.	2.6638	7.0742	.	.	.	.	.	.	.	.
1989	.20965	.	.	.	6.2295	22.65	.	.	.	.	.	.	.	.
1990	.17456	.	.	.	3.4258	9.7324	.	.	.	.	.	.	.	.

PROCTOR & GAMBLE (1IN00010) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.545	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0.514	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0.686	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	0.723	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	.71333	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	1.2897	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	.99933	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	1.0153	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	1.5675	.	.	.	.	.	.	.	.	.	.	.	.	.

PROCTOR & GAMBLE (1IN00010) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.091	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	1.0287	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	1.372	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	1.4457	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	1.4267	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	1.791	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	1.999	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	2.0303	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	3.1355	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON WALTHER (1IN00037) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.59409	.	.	.	.	17.944	.	.	.	.	.	.	.	.
1979	4.1275	.	.	.	.	165.64	.	.	.	.	.	.	.	.
1987	.	.	.	.	.	0	.	.	.	.	.	.	.	.
1988	.17675	.	.	.	.	0.804	.	.	.	.	.	.	.	.
1989	.08171	.	.	.	.	63.177	.	.	.	.	.	.	.	.
1990	.	.	.	.	.	0	.	.	.	.	.	.	.	.

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DAYTON WALTHER (1IN00037) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.52958	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	.19295	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	.26358	.	.	.	.	.98408	.	.	.	.	.	.	.	.
1988	.26639	.	.	.	.	1.0555	.	.	.	.	.	.	.	.
1989	.26214	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON WALTHER (1IN00037) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.0432	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	.02796	.	.	.	.	.	.	.	.	.	.	.	.	.

DOE FMPC (1I000004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.56711	.78425	.	.	.	16.447	.	.	.	.	.	.	.	.
1985	.35574	0.5029	.	.	.	10.76	.	.	.	.	.	.	.	.
1986	.43176	1.1996	.	.	.	8.6174	.	.	.	.	.	.	.	.
1987	.63247	1.9721	.	.	.	54.256	.	.	.	.	.	.	.	.
1988	.50385	.09222	.	.	.	18.246	.	.	.	.	.	.	.	.
1990	.57859	.34747	.	.	.	8.469	.	.02346	.00434	.00831	.00532	.	5.0132	.

DOE FMPC (1I000004) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.21271	.	.	.	.	6.6402	.	.	.	.	.	.	.	.
1985	0.1002	.	.	.	.	0.7584	.	.	.	.	.	.	.	.
1986	.08287	.	.	.	.	3.6464	.	.	.	.	.	.	.	.
1987	.00245	.	.	.	.	14.383	.	.	.	.	.	.	.	.

DOE FMPC (1I000004) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.09496	.	.	.	2.308	1.2604	.	.	.	.	.	.	.	.
1985	.09839	.	.	.	3.7808	1.8724	.	.	.	.	.	.	.	.
1986	.12272	.	.	.	3.9495	4.6946	.	.	.	.	.	.	.	.
1987	.28241	.	.	.	48.467	62.184	.	.	.	.	.	.	.	.
1988	.25957	.	.	.	7.1036	10.187	.	.	.	.	.	.	.	.
1990	.10372	.12427	.	.	2.0564	.52973	.	382E-6	592E-6	.	0	.	.	.

DOE FMPC (1I000004) OUTFALL #602

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0.0427	.	.	.	.	.68653	.	.00163	.00377	.	.00465	.	.	.
1985	.02793	.	.	.	.	0.7655	.	.00125	.00162	.	.00262	.	.	.
1986	.03365	.	.	.	.	1.1095	.	0	571E-6	.	500E-6	.	.	.
1987	.03869	.	.	.	.	.65671	.	100E-5	.00221	.	286E-6	.	.	.
1988	.03982	.	.	.	.	.58111	.	556E-6	111E-6	.	111E-6	.	.	.
1990	.10858	.	.	.	.	.	.	0	.00228	.	.00102	.	.	.

DOE FMPC (1I000004) OUTFALL #603

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.12425	.	.	.	.	4.3502	.	.01299	.01591	.	.02992	.	.	.
1985	.12106	.	.	.	.	4.344	.	0.0078	0.0107	.	0.0216	.	.	.
1986	.05783	.	.	.	.	3.1216	.	.00136	.00345	.	.00382	.	.	.
1987	.01974	.	.	.	.	19.587	.	0.003	0.008	.	0.009	.	.	.

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DOE FMPC (11000004) OUTFALL #604

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.22908	.	.	.	.	7.3464	.	.	.	.	.	.	.	.
1985	.21746	.	.	.	.	3.339	.	.	.	.	.	.	.	.
1986	.21513	.	.	.	.	4.1679	.	.	.	.	.	.	.	.
1987	.19902	.	.	.	.	3.3438	.	.	.	.	.	.	.	.
1988	.13574	.	.	.	.	55.101	.	.	.	.	.	.	.	.
1990	.07759	.	.	.	.	.93616	.	.	.	.	.	.	.	.

DOE FMPC (11000004) OUTFALL #605

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1986	0.0313	0.1395	.	.	.	.	.	.	.	.	.	.	.	.
1987	.15393	0.7239	.	.	.	.	.	.	.	.	.	.	.	.
1988	.11905	.64844	.	.	.	.	.	.	.	.	.	.	.	.
1990	.07644	.56798	.	.	1.5518	3.7244	.	0	.00714	.	.00621	.	.	.

DOE FMPC (11000004) OUTFALL #606

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1990	.45491	.	.	.	.	11.714	.	.	.	.	.	.	.	.

DOE MOUND FACILITY (11000005) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.64217	.	.	.	.	106.1	.	.	.	.	.	.	.	.
1985	.37791	.	.	.	.	21.275	.	.	.	.	.	.	.	.
1986	.63978	.	.	.	.	36.974	.	.	.	.	.	.	.	.
1987	.58685	.	.	.	.	21.309	.	.	.	.	.	.	.	.
1988	.62533	.	.	.	.	53.715	.	.	.	.	.	.	.	.
1989	.40685	.	.	.	.	18.855	.	.	.	.	.	.	.	.
1990	.50278	.	.	.	.	18.532	.	.	.	.	.	.	.	.

DOE MOUND FACILITY (11000005) OUTFALL #601

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.09098	.	.	.	1.6712	4.1004	.	.	.	.	.	.	.	.
1985	.09462	.	.	.	2.8793	5.9872	.	.	.	.	.	.	.	.
1986	.10098	.	.	.	1.6945	1.1005	.	.	.	.	.	.	.	.
1987	.13478	.	.	.	1.5032	1.7924	.	.	.	.	.	.	.	.
1988	.11032	.	.	.	0.7393	.49453	.	.	.	.	.	.	.	.
1989	.12576	.	.	.	1.8428	1.7584	.	.	.	.	.	.	.	.
1990	.10187	.	.	.	1.2141	.67839	.	.	.	.	.	.	.	.

DOE MOUND FACILITY (11000005) OUTFALL #602

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.07432	.	.	.	.	29.316	.	.	.	.	.	.	.	.
1985	.09242	.	.	.	.	3.453	.	.	.	.	.	.	.	.
1986	0.0513	.	.	.	.	3.584	.	.	.	.	.	.	.	.
1987	0.0713	.	.	.	.	6.2804	.	.	.	.	.	.	.	.
1988	.04462	.	.	.	.	4.7603	.	.	.	.	.	.	.	.
1989	0.1231	.	.	.	.	3.878	.	.	.	.	.	.	.	.
1990	.12461	.	.	.	.	7.2381	.	.	.	.	.	.	.	.

DOE MOUND FACILITY (11000005) OUTFALL #603

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1985	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1986	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1987	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1988	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1989	.	.	.	.	.	.	0	0	0	.	0	.	.	.
1990	.	.	.	.	.	.	0	0	0	.	0	.	.	.

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DOE MOUND FACILITY (1I000005) OUTFALL #604

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1989	0.0929	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	.09968	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON SOUTH WTP (1IW00060) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.14155	.	.	.	.	24906	.	.	.	.	.	.	.	.
1979	.07569	.	.	.	.	22409	.	.	.	.	.	.	.	.
1984	.08615	.	.	.	.	23655	.	.	.	.	.	.	.	.
1985	.17933	.	.	.	.	26635	.	.	.	.	.	.	.	.
1986	.25532	.	.	.	.	36493	.	.	.	.	.	.	.	.
1987	.21245	.	.	.	.	33634	.	.	.	.	.	.	.	.
1988	.16357	.	.	.	.	32831	.	.	.	.	.	.	.	.
1989	.15143	.	.	.	.	29836	.	.	.	.	.	.	.	.
1990	.26271	.	.	.	.	40719	.	.	.	.	.	.	.	.

HAMILTON SOUTH WTP (1IW00060) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	.08435	.	.	.	.	404.63	.	.	.	.	.	.	.	.

HARRISON WWTP (1PC00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0.5644	3.0566	.	.	31.604	73.578	.	.	.	.	.	.	.	.
1979	.55596	7.5284	.	17.524	62.823	65.873	.01345	.03441	.09471	.	.	.08099	.	.
1984	.67188	28.259	.	16.749	66.049	50.802	.03568	.27751	.30249	.	.	0.5005	.	.
1985	.82605	4.7485	.	52.645	65.585	48.726	0.039	0.094	0.052	.	.	.16267	.	.
1986	.89464	49.043	.	.	.	69.641	0.0365	0.04	0.054	0.146	0.0405	0.4845	52.423	.
1987	.80066	35.324	.	.	.	30.767	0.003	.	0.137	.01567	.01567	.13633	13.35	.
1988	.81362	13.296	.	.	.	104.73	0	.	0.214	0.015	.01733	.52933	22.249	.
1989	.83865	38.659	.	.	.	38.407	0.003	.	.08167	0.016	0.048	0.221	20.251	.
1990	.93313	57.139	.	.	.	99.466	.00358	.	.10184	0.0179	0.0179	.11122	32.427	.

FAIRFIELD WWTP (1PD00003) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	2.9258	100.01	.	13.493	118.47	38.353	.04961	.18411	1.7655	.43143	.29776	.33858	.	.
1979	4.574	138.26	.	10.206	266.31	270.4	.22967	.19282	.13876	.49429	.14555	.23356	.	.
1984	3.8709	39.247	.	.	135.24	179.37	.08629	.14847	.23737	1.0294	.55959	.63117	.	.
1985	3.7597	66.057	.	.	81.783	88.879	0.036	.27867	0.25	.67233	.62667	0.424	55.814	.
1986	3.9858	55.349	.	.	85.643	86.385	.14233	.43367	0.295	1.1097	0.7	.89967	40.806	.
1987	4.0494	25.432	.	.	124.84	97.335	.03967	.	0.124	.44767	0.185	.51467	.	.
1988	4.0506	12.729	.	.	.	63.951	.03933	.	.15567	.55433	.27433	.65767	36.097	.
1989	4.706	29.773	.	.	.	92.624	.05167	.	0.175	.47767	.26433	2.739	109.23	.
1990	5.2822	19.856	.	.	.	69.109	.06289	.	.18701	0.4695	.35688	1.5519	36.243	.

MCD FRANKLIN WWTP (1PD00004) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	3.2882	212.92	.	17.999	439.13	637.85	.09158	.26081	.31721	.67284	.65322	0.8421	.	.
1979	3.8436	151.08	.	38.409	592.17	1404.4	.08027	.17967	.28939	.81125	.50611	1.0913	.	.
1984	2.1974	187.24	.	.	1578.1	1631.8	.04849	.13862	.43315	0.3911	.21935	.65432	.	.
1985	2.5243	97.903	.	.	146.66	196.16	0.019	.18733	.31667	0.187	0.055	.69367	.	.
1986	2.8285	109.33	.	.	146.8	210.89	0.021	.05233	.26033	.05233	.05233	.72667	.	.
1987	2.7466	137.63	.	.	633.33	2447.4	0.01	.06767	.29033	0.051	.05433	9.5217	.	.
1988	2.603	48.15	.	.	173.06	368.36	.01267	.08667	.33633	0.261	.09433	1.2477	.	.
1989	2.8426	49.053	.	.	389.26	348.11	0.015	0.041	0.374	.05967	.11567	.59967	.	.
1990	2.9057	6.2236	.	.	47.501	133.03	.01741	.06556	.21681	.12028	.06001	.75384	50.094	.

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WEST CARROLLTON WWTP (1PD00014) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.0504	70.058	.	.	121.01	142.38	.02615	.07618	.20303	.11572	.09003	0.2536	.	.
1979	1.089	26.301	.	29.719	163.29	230.59	.02879	.11196	.30557	.19682	.05294	.31458	.	.
1984	1.0923	40.855	.	.	61.032	61.249	0.0212	.02967	.11446	.12294	.13989	.27131	38.334	.
1985	1.0262	40.993	.	.	91.884	59.659	0.004	0.015	4.87	0.009	0.011	0.069	30.595	.
1986	.81946	59.232	.	.	80.635	90.771	0	.	0	0	0	0	69.765	.
1987	.79136	31.342	.	.	76.782	57.033	0.003	.	0.081	0.016	0.039	0.13	40.231	.
1988	.88286	44.068	.	.	133.82	136.08	0	.	0.409	0.033	0.072	0.298	96.094	.
1989	1.7583	17.589	.	.	.	38.272	0	.47567	0.217	.02433	.26767	0.189	29.111	.
1990	1.5307	19.335	.	.	.	63.341	0	0	.16128	0.0105	.03807	.23476	47.437	.

WEST CARROLLTON WWTP (1PD00014) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.

MIAMISBURG WWTP (1PD00017) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.651	142.52	.	32.191	61.033	53.221	.00714	0	0	.00253	.00714	.07852	.	.
1979	2.2085	142.34	.	33.824	101.96	70.691	0	0.011	0	.03073	0	.15404	.	.
1984	2.0604	205.95	.	.	141.28	125.91	0	0	0	0	0	0	.	.
1985	1.9829	157.24	.	.	138.76	60.395	0	0	0	0	0	0	.	.
1986	2.3624	177.6	.	.	169.38	86.298	0.017	0.05	0.209	0.042	0.042	0.209	.	.
1987	1.8623	85.403	.	.	.	38.148	0	.	0	0	0	0.227	23.107	.
1988	1.8399	47.697	.	.	.	31.783	0	.	0	0	0	0.151	11.513	.
1989	2.0219	47.779	.	.	.	41.565	0	.	0.423	0	0	0.519	30.582	.
1990	2.2019	70.872	.	.	.	61.857	0	.	0	0	0	.24869	58.343	.

MIAMISBURG WWTP (1PD00017) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	.00435	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	.10503	.	.	.	.	.	.	.	.	.	.	.	.	.

MIAMISBURG WWTP (1PD00017) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	0	.	.	.	.	.	.	.	.	.	.	.	.	.

MIAMISBURG WWTP (1PD00017) OUTFALL #004

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0	.	.	.	.	.	.	.	.	.	.	.	.	.

MIAMISBURG WWTP (1PD00017) OUTFALL #005

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	.02174	.	.	.	.	.	.	.	.	.	.	.	.	.

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MIAMISBURG WWTP (1PD00017) OUTFALL #006

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	870E-6	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	0	.	.	.	.	.	.	.	.	.	.	.	.	.

MCD NORTH REG. WWTP (1PD00020) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1986	5.8641	81.931	.	.	276.09	146.3	.04792	1.0553	.70015	.14067	.17667	3.5493	.	.
1987	5.2532	35.415	.	.	280.12	115.34	.02667	.	.55733	0.1	0.1	1.005	106.1	.
1988	5.3038	14.768	.	.	122.29	83.81	.02833	.	.30467	0.434	.12033	0.32	42.957	.
1989	5.8072	19.38	.	.	147.79	101.67	0	0.0255	0.4175	.02183	0.0745	0.3465	79.124	.
1990	6.8655	17.055	.	.	.	185.53	0.0222	.05865	.38002	.09723	.10401	.40513	91.284	.

HAMILTON WWTP (1PE00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	8.1019	33.13	.	183.19	228.35	306.35	.17586	1.753	1.0677	2.2924	3.5342	1.3774	.	.
1979	17.389	127.49	.	38.485	800.37	6711.9	0	1.756	1.0536	3.7929	2.5988	8.85	.	.
1984	17.986	16.453	.	.	325.12	546.16	.23143	.62487	1.5241	.46287	2.2575	5.0115	.	.
1985	15.631	20.614	.	69.084	295.82	368.48	0.1436	0.166	0.7268	1.0416	0.2634	3.6352	.	.
1986	18.221	25.717	.	65.184	359.55	435.77	0.438	1.9487	.77433	3.6093	1.6227	4.1803	258.62	.
1987	16.859	13.602	.	64.451	145.43	365.09	1.584	0.562	8.247	1.9763	.88867	2.2493	94.957	.
1988	16.814	0	.	54.259	119.64	184.5	.41233	1.123	.39933	2.5697	0.815	10.507	87.156	.
1989	19.529	.63752	.	22.727	159.69	288.44	1.3027	0	.87533	3.014	.79033	1.36	99.459	.
1990	21.105	25.849	.	23.137	298.77	638.01	.67398	1.4494	5.6257	1.7685	0	2.0949	229.73	.

HAMILTON WWTP (1PE00002) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #008

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #009

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #011

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #012

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #013

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.

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HAMILTON WWTP (1PE00002) OUTFALL #014

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #021

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #022

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1989	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #027

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #029

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #030

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1987	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #036

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

HAMILTON WWTP (1PE00002) OUTFALL #037

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1990	0	.	.	.	.	.	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	15.738	21.168	.	.	247.29	414.87	.41036	1.2836	1.2093	2.7278	1.8675	5.4709	.	.
1979	20.838	79.308	.	.	1697.1	524.69	1.6321	1.7862	1.7862	3.4698	2.4041	11.354	.	.
1984	17.592	144.03	.	91.876	1424.9	1785.3	.05792	.62427	.58647	.28958	1.565	6.6365	.	.
1985	18.551	24.404	.	23.747	1220.6	1198.9	.23133	0.421	0.588	1.5853	2.7543	5.17	.	.
1986	18.09	15.792	.	.	1392.8	1695.2	.14733	.	.78433	.58467	1.335	2.501	.	.
1987	19.514	23.167	.	.	1484	2519.5	.12767	.	.50367	0	1.3177	1.736	.	.
1988	13.822	15.13	.	.	665	636.27	0.032	.	.81533	0	1.644	.98667	.	.
1989	17.706	362.81	.	.	1420.8	1703.5	.07233	.	.51567	0.124	1.0683	1.4893	.	.
1990	20.666	25.675	.	.	676.83	1509.4	0	.	.94427	0.1349	.52168	1.882	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1988	1.8	.	.	.	872.06	654.05	.	.	.	.	.	.	.	.

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MIDDLETOWN WWTP (1PE00003) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.00417	.	.	.	35.579	314.91	.	.	.	.	.	.	.	.
1986	.34545	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	.35667	.	.	.	28.009	78.728	.	.	.	.	.	.	.	.
1989	0.2875	.	.	.	388.01	116.2	.	.	.	.	.	.	.	.
1990	.40273	.	.	.	79.769	97.084	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #004

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	.33333	.	.	.	173.35	152.91	.	.	.	.	.	.	.	.
1987	.35667	.	.	.	30.28	43.906	.	.	.	.	.	.	.	.
1989	0.175	.	.	.	139.29	48.448	.	.	.	.	.	.	.	.
1990	0.2495	.	.	.	118.82	75.382	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #005

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0.0218	.	.	.	213.43	458.66	.	.	.	.	.	.	.	.
1986	1.3883	.	.	.	30.999	2373.6	.	.	.	.	.	.	.	.
1987	.87111	.	.	.	183.61	1044.4	.	.	.	.	.	.	.	.
1989	0.875	.	.	.	862.98	416.35	.	.	.	.	.	.	.	.
1990	1.3817	.	.	.	89.025	144.13	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #007

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	.10246	.	.	.	1343.7	953.82	.	.	.	.	.	.	.	.
1986	3.8929	.	.	.	7562.4	87570	.	.	.	.	.	.	.	.
1987	3.2022	.	.	.	817.56	893.26	.	.	.	.	.	.	.	.
1990	4.9	.	.	.	1417.5	5246	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #008

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	0.61	.	.	.	23.845	508.7	.	.	.	.	.	.	.	.
1987	0.127	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	.74333	.	.	.	239.21	193.79	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #009

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	4.45	.	.	.	731.26	3412.6	.	.	.	.	.	.	.	.

MIDDLETOWN WWTP (1PE00003) OUTFALL #010

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	3.8	.	.	.	1147.5	2736.3	.	.	.	.	.	.	.	.
1987	2.286	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	4.45	.	.	.	1261.2	5722.9	.	.	.	.	.	.	.	.

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DAYTON WWTP (1PF00000) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	58.988	2715.8	.	1466.9	5601.9	12337	3.3173	71.965	43.378	22.673	41.325	118.36	.	.
1979	60.777	45113	.	1241.3	9383.4	9698.1	1.4066	53.061	94.492	9.4118	52.909	140.26	.	.
1984	48.655	5509.6	.	.	8663.8	6247.7	.81797	42.736	17.261	4.1017	43.991	75.53	.	.
1985	48.224	5644.7	.	.	9726	6170.2	.26533	29.196	14.155	.48644	43.55	25.544	.	.
1986	52.272	2172.4	.	.	6165	7352.3	4.624	.	12.659	2.8977	26.992	34.014	.	.
1987	51.157	1623.3	.	.	.	4737.1	.08865	7.7264	7.5083	.74427	19.341	17.504	1854.7	.
1988	53.485	127.12	.	.	.	1279	.02063	3.3055	2.8204	0	18.082	11.001	402.83	.
1989	64.67	21.383	.	.	.	1125.6	.10624	1.1617	3.3658	0.0181	17.622	15.185	437.72	.
1990	59.382	17.306	.	.	.	318.43	.06062	0	1.5575	.57191	5.4714	12.726	300.22	.

DAYTON WWTP (1PF00000) OUTFALL #002

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	1.6645	.	.	.	647.27	670.8	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	0.0139	.	.	.	.	.	.	.	.	.	.	.	.	.
1987	.01768	.	.	.	.	564.18	.	.	.	.	.	.	416.91	.
1990	.01637	.	.	.	.	431.3	.	.	.	.	.	.	103.05	.

DAYTON WWTP (1PF00000) OUTFALL #003

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1979	2.8205	.	.	.	1602.4	1896.1	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	.90484	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	.01067	.	.	.	.	.	.	.	.	.	.	.	.	.
1990	.09352	.	.	.	.	2787.1	.	.	.	.	.	.	1163.1	.

DAYTON WWTP (1PF00000) OUTFALL #004

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	4.1274	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON WWTP (1PF00000) OUTFALL #005

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON WWTP (1PF00000) OUTFALL #006

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON WWTP (1PF00000) OUTFALL #007

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	0.156	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	742E-6	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	935E-6	.	.	.	.	.	.	.	.	.	.	.	.	.
1988	290E-6	.	.	.	.	.	.	.	.	.	.	.	.	.

DAYTON WWTP (1PF00000) OUTFALL #008

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	0.164	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.
1985	.00332	.	.	.	.	.	.	.	.	.	.	.	.	.
1986	.00184	.	.	.	.	.	.	.	.	.	.	.	.	.

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DAYTON WWTP (1PF00000) OUTFALL #009

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1979	0.5728	.	.	.	.	.	.	.	.	.	.	.	.	.
1984	0	.	.	.	.	.	.	.	.	.	.	.	.	.

LESOURDSVILLE WWTP (1PK00011) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1978	1.0224	.	.	.	13.958	15.022	.01846	.04663	.06218	.06106	.04358	.09513	.	.
1979	1.5666	1.5555	.	3.2178	22.865	30.406	.04587	.09175	.22937	.25231	.14909	.	.	.
1984	2.3134	96.011	.	46.908	58.948	84.932	.02907	.13808	.09447	.11628	.13081	.19621	30.32	.
1985	2.4409	7.8562	.	61.358	41.329	70.51	0.048	0.097	0.174	0.483	0.396	0.232	27.53	.
1986	2.5511	11.651	.	48.821	44.085	47.022	0.194	0.225	0.184	0.511	1.758	0.337	30.52	.
1987	2.2757	25.579	.	45.489	.	20.239	0.017	.	0	0.338	0.135	0.228	12.481	.
1988	2.2297	39.774	.	26.131	.	25.109	0.015	.	0.061	0.378	0.151	0.204	6.1553	.
1989	3.5326	104.5	.	56.204	.	65.121	0.047	.	0.085	0.284	0.189	0.218	92.994	.
1990	4.1435	52.609	.	55.658	.	58.186	0	.	0	0	0	0	42.039	.

MONT CO WEST REG WWTP (1PL00002) OUTFALL #001

YEAR (JAN-DEC)	MGD	NH3-N	NO3-N	PHOS	BOD5	TSS	CD	CR TOT	CU	PB	NI	ZN	CBOD5	GPD
1984	11.362	17.736	.	.	159.02	65.852	0	0	.44543	0	0	1.1744	.	.
1985	13.129	19.766	.	.	260.15	63.966	0	0	.45475	0	0	1.8232	.	.
1986	11.47	28.502	.	.	166.96	75.032	0	0	.70733	0	0	1.4819	.	.
1987	12.121	18.762	.	.	169.11	116.75	.01731	.	.61692	0	.88477	2.9958	.	.
1988	11.465	20.534	.	.	.	118.68	.16498	0	.81883	0	.72892	2.6004	114.7	.
1989	12.264	7.6507	.	.	.	297.86	0	0.445	.31967	0.103	0.521	3.554	163.66	.
1990	12.595	20.098	.	.	.	107.76	.02463	.36522	.54624	.07387	0.3596	5.9617	217.1	.

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Table 3. QHEI Warmwater and modified warmwater characteristics for the Great Miami River mainstem, 1989.

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Key OHEI Components

River Mile	QHEI	Gradient (ft/mile)	WWH Attributes: No Channelization or Recovered	Boulder/Cobble/Gravel Subs trates	Silt Free Substrates	Good/Excellent Development	Mod/High Sinuosity	Extensive/Mod erate Cover	Fast Current/ Eddies	Low/Normal Em beddedness	Max Depth >40 cm	Low/No Riffle Embeddedness	Total WWH Attributes	MWH Attributes — High Influence: Channelized or No Recovery	Silt/Muck Sub strates	Low Sinuosity	Sparse/No Cov er	Max Depth < 4 0 cm (WD,HW)	Total (High Influence) MWH Attributes	MWH Attributes — Moderate Influence: Recovering Channel	Heavy/Mod. Si lt Cover	Sand Substrat es (BT)	Hardpan Origin	Fair/Poor Dev elopment	Low/No Sinuosity	Only 1-2 Cover Types	Intermittent & Poor Pools	No Fast Curre nt	High/Mod. Embeddedness	Ext./Mod. Rif fle Embeddedness	No Riffle	Total (Moderate Influence) MWH Attributes	MWH (High)/WWH Attributes	MWH (Mod.)/WWH Attributes
GREAT MIAMI RIVER																																		
Year: 89																																		
91.0	71.5	2.03	■		■	■	■	■		■	■	■	8						0	▲	▲		▲					▲				4	.11	.56
88.1	91.0	2.03	■	■		■	■	■		■	■	■	9						0													0	.10	.10
87.0	73.5	6.37	■	■		■	■	■		■	■	■	9						0	▲		▲						▲				3	.10	.40
86.5	69.0	6.37	■	■		■		■	■	■	■	■	8						0	▲		▲		▲	▲			▲				5	.11	.67
82.9	35.5	.10										■	1	●	●			●	3		▲			▲	▲			▲	▲		▲	6	2.00	5.00
82.0	49.0	.10	■						■				3	●				●	2		▲			▲	▲			▲	▲	▲		6	.75	2.25
80.4	65.0	3.00	■					■	■	■	■	■	6	●					1					▲	▲			▲				3	.29	.71
80.1	68.0	2.67	■		■			■	■	■	■	■	7	●					1					▲	▲							2	.25	.50
77.9	52.0	.10	■					■				■	3	●					1					▲	▲			▲	▲		▲	5	.50	1.75
76.9	61.5	2.67	■					■	■			■	4						0	▲	▲			▲	▲				▲		▲	6	.20	1.40
76.0	67.5	2.67	■					■	■			■	5						0	▲	▲			▲	▲				▲			5	.17	1.00
74.8	55.0	2.78	■						■			■	3	●				●	2		▲			▲	▲				▲		▲	5	.75	2.00
73.3	50.0	2.78	■									■	2	●				●	2		▲			▲	▲			▲	▲		▲	6	1.00	3.00
71.9	85.5	5.18	■	■	■	■	■	■	■	■	■	■	9						0	▲												1	.10	.20
71.1	69.5	5.18	■						■	■	■	■	5					●	1	▲				▲	▲							3	.33	.83
70.1	68.5	5.18	■	■			■	■	■			■	6					●	1		▲	▲		▲				▲	▲		▲	6	.29	1.14
68.6	92.0	1.77	■	■		■	■	■	■	■	■	■	9						0													0	.10	.10
65.9	53.5	1.77	■					■	■			■	4	●					1		▲	▲		▲	▲				▲	▲	▲	7	.40	1.80
64.9	34.0	.10										■	1	●	●			●	3		▲			▲	▲				▲	▲	▲	6	2.00	5.00
64.0	85.0	6.25	■	■	■	■	■	■	■	■	■	■	10						0													0	.09	.09
63.3	79.0	6.25	■	■		■	■	■	■	■	■	■	9					●	1					▲								1	.20	.30
62.1	67.5	6.25	■					■	■			■	5	●				●	2		▲			▲	▲				▲			4	.50	1.17
59.5	57.0	4.12	■					■					2	●				●	2					▲	▲			▲	▲	▲		5	1.00	2.67
58.4	59.5	4.12							■			■	2	●				●	2	▲	▲			▲	▲			▲	▲	▲		7	1.00	3.33
55.9	89.0	3.70	■	■	■	■	■	■	■	■	■	■	9						0	▲												1	.10	.20
51.3	57.0	2.90	■						■			■	3	●				●	2					▲	▲	▲			▲	▲		5	.75	2.00
50.0	61.0	2.41	■						■			■	3					●	1	▲	▲			▲	▲			▲	▲		▲	7	.50	2.25
49.1	63.5	2.41	■					■	■			■	4	●					1	▲	▲			▲	▲				▲		▲	6	.40	1.60
48.0	83.5	2.41	■	■		■	■	■	■	■	■	■	9						0													0	.10	.10
47.5	86.5	2.41	■	■		■	■	■	■	■	■	■	9						0													0	.10	.10
45.5	86.5	2.78	■	■	■	■	■	■	■	■	■	■	10						0													0	.09	.09
42.3	55.5	2.78	■									■	2					●	1	▲	▲	▲		▲	▲			▲	▲		▲	8	.67	3.33
40.9	93.0	11.80	■	■	■	■	■	■	■	■	■	■	10						0													0	.09	.09
38.5	65.5	3.85	■	■			■	■	■		■	■	7						0					▲	▲						▲	3	.13	.50
37.0	40.5	4.65	■						■				2	●				●	3		▲			▲	▲				▲	▲		5	[illegible]	[illegible]

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Table 2. QHEI Warmwater and modified warmwater characteristics for the Great Miami River mainstem, 1989.

Key QHEI Components

			WWH Attributes											MWH Attributes														
														High Influence					*Moderate Influence*									
River Mile	QHEI	Gradient (ft/mile)	No Channelization or Recovered	Boulder/Cobble/Gravel Subs trates	Silt Free Substrates	Good/Excellent Development	Mod/High Sinuosity	Extensive/Mod erate Cover	Fast Current/ Eddies	Low/Normal Em beddedness	Max Depth >40 cm	Low/No Riffle Embeddedness	Total WWH Att ributes	Channelized or No Recovery	Silt/Muck Sub strates	Low Sinuosity	Sparse/No Cov er	Max Depth < 4 0 cm (WD,HW)	Total (High Influence) MWH Attributes	Recovering Channel	Heavy/Mod. Si lt Cover	Sand Substrat es (BT)	Hardpan Origin	Fair/Poor Dev elopment	Low/No Sinuosity	Only 1-2 Cover Types	Intermittent & Poor Pools	No Fast Curre nt	High/Mod. Embeddedness	Ext./Mod. Rif fle Embeddedness	No Riffle	Total (Moderate Influence) MWH Attributes	MWH (High)/WWH Attributes	MWH (Mod.)/WWH Attributes
33.9	48.5	2.45	■						■				2	●			●	●	3				▲	▲	▲			▲	▲		5	1.33	3.00
33.7	86.0	2.45	■	■	■	■	■	■	■	■	■	■	10						0												0	.09	.09
32.0	74.5	2.45	■		■	■	■	■	■	■	■	■	9						0			▲		▲							2	.10	.30
28.7	75.5	3.57	■	■	■	■	■	■	■		■	■	9						0										▲		1	.10	.20
25.8	60.0	3.75							■		■		2	●			●		2		▲	▲		▲	▲			▲	▲		6	1.00	3.00
23.4	76.5	4.65	■	■		■	■	■	■		■	■	8				●		1		▲	▲						▲			3	.22	.56
20.1	51.0	3.01		■					■		■		3	●			●		2		▲	▲		▲	▲			▲	▲	▲	7	.75	2.50
15.6	76.0	2.53	■	■		■	■	■	■		■	■	8						0		▲			▲					▲		3	.11	.44
14.8	77.5	2.53	■			■	■	■	■	■	■	■	8						0		▲	▲									2	.11	.33
11.6	60.0	2.84	■	■				■	■		■		5				●		1		▲	▲		▲	▲			▲	▲	▲	7	.33	1.50
8.2	76.5	3.50	■	■		■	■		■	■	■	■	8				●		1		▲										1	.22	.33

Parameter data from DWQPA-Modeling Section GMR survey, 1990. Sampling dates; 8/1&2/90 & 9/17&18/90 at five select river miles (average values of ~~4~~ four-day sampling event).

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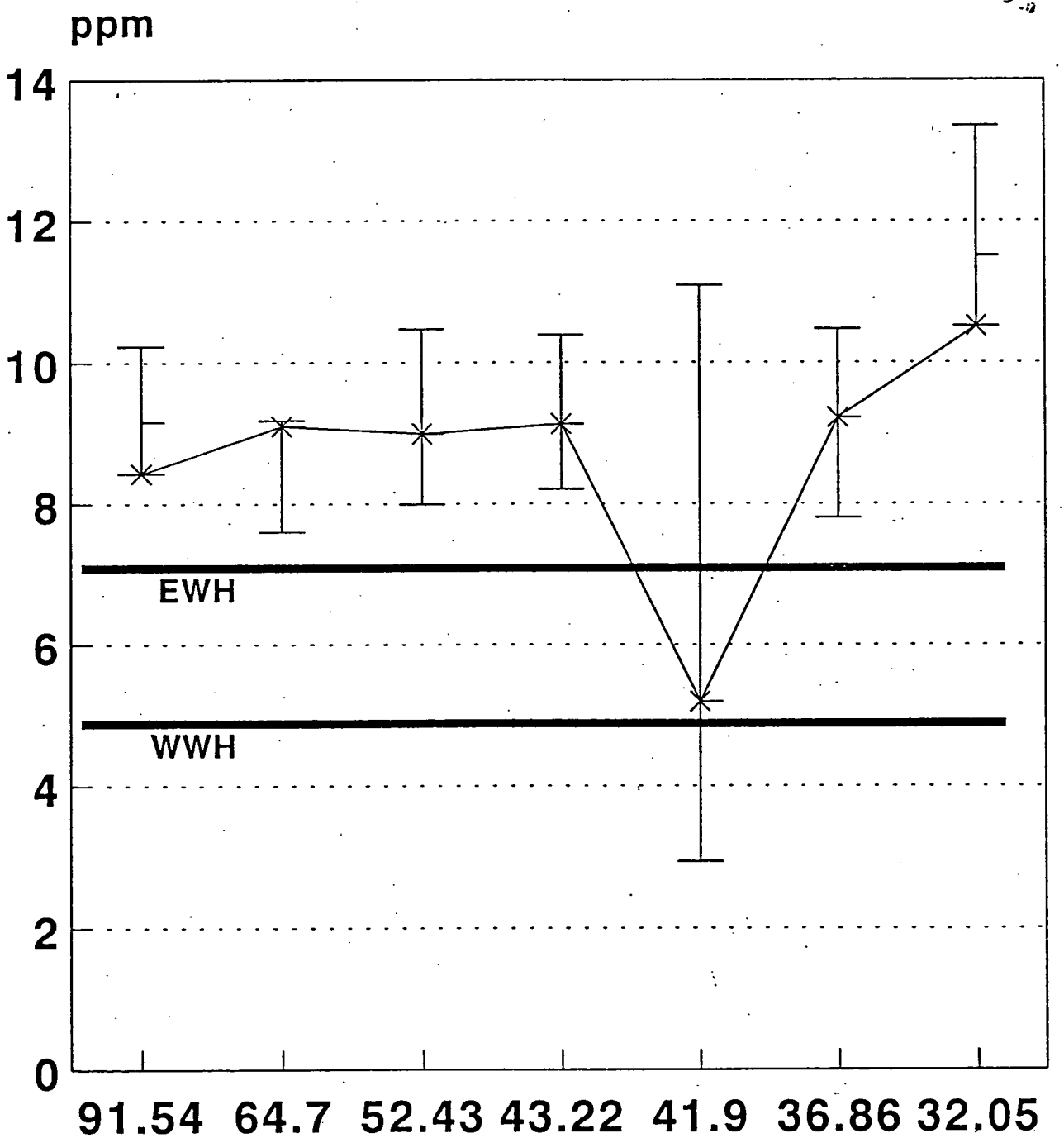
River Mile		43.2	48.1	51.45	82.51	91.14
CBOD	(mg/l)	3.12	46.30	2.9	1.7	2.3
NO2+N03	"	3.30	0.10	2.2	3.3	2.5
Nitrite	"	0.03	0.02	1.0	0.03	0.02
NH3-Ammonia	"	0.12	0.11	3.6	0.1	0.1
TKN	"	0.71	3.02	3.8	0.5	0.6
COD	"	20.0	115.50	20.0	20.0	20.0
Chloride	"	52.0	0.17	222.5	23.6	29.0
Phosphorus	"	0.30	0.17	0.12	0.20	0.20
TSS-Filt.	"	511.0	774.5	-	413.3	440.5
TSS-N.Filt.	"	20.25	14.0	21.75	34.0	13.75
Hardness	"	338.7	436.5	603.2	288.0	323.7
Magnesium	"	32.2	37.5	35.5	30.5	30.5
Cadmium	(ug/l)	<0.20	<0.20	183.0	<0.20	<0.20
Chromium	"	<30.0	<30.0	<30.0	<30.0	<30.0
Copper	"	<10.0	11.25	11.25	<10.0	<10.0
Lead	"	<2.0	2.25	41.5	<2.0	<2.0
Nickel	"	<40.0	40.0	40.0	<40.0	<40.0
Zinc	"	16.2	10.0	296.2	<10.0	<10.0

Fig. D-1

Dissolved Oxygen
1990 Datasonde Data

DRAFT



I High I Low * Average

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3-day sampling event 9-17-19-90