

ATMOSPHERIC DEPOSITION OF TOXIC SUBSTANCES TO THE GREAT LAKES: IADN RESULTS THROUGH 2000



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ATMOSPHERIC DEPOSITION OF TOXIC SUBSTANCES TO THE GREAT LAKES: IADN RESULTS THROUGH 2000

Executive Summary

The Integrated Atmospheric Deposition Network was initiated in 1990 to measure atmospheric concentrations of persistent toxic pollutants in the Great Lakes basin. These measurements have been conducted at 5 master stations, one on each of the Great Lakes, as well as 10 satellite stations. The measured concentrations combined with physical parameters have formed the basis of loadings estimates produced by IADN every two years. This report presents the results of the loadings estimates for the years 1999-2000.

In the IADN calculations, processes of wet deposition via precipitation, dry deposition of particles and gas absorption at the water interface are taken into account. Volatilization from the Lakes is also important, and this is estimated using water concentrations from other monitoring or research projects for some compounds. The calculations in this report build on previous reports although several modifications have been made. The estimates are now calculated monthly instead of seasonally. The rates of precipitation and wind speeds, involved in the calculations, are lakewide values instead of "at station" measurements. Several Henry's law constants have been updated. Given these upgrades, loading estimates from previous years were re-calculated using the new model. The use of lakewide precipitation rates and wind speeds has changed the magnitude of the loading estimates on an annual basis by 25% for wet deposition and by a factor of two or less for gas absorption.

For all Lakes, loading estimates of banned organochlorine (OC) pesticides, such as α -HCH, continue to decline. For several OC pesticides, including chlordanes and p,p'-DDT, loading estimates are relatively small, with fluxes often less than 2 ng/m²/day. Dieldrin is volatilizing out of the Lakes, while HCB is depositing in Lake Superior but volatilizing out of Lakes Michigan and Erie. Current-use pesticides such as γ -HCH and α -endosulfan are still depositing to the Lakes from the atmosphere and as expected show no trend. The monthly calculations revealed seasonality for several OC pesticides. α -HCH loading estimates have a strong seasonality with maxima in summer for both absorption and volatilization. These maxima are likely due to an increase in atmospheric concentration of α -HCH in the summertime combined with a favorable temperature-dependent Henry's law constant. γ -HCH (lindane) fluxes also presented a strong seasonal behaviour of the absorption process with maxima in spring. These correspond to planting of canola seeds in the Canadian prairies and subsequent transport of lindane to the Great Lakes as demonstrated by other researchers.

The PCBs considered in this report (18, 44, 52, 101 and suite PCB) all continue their trends of volatilizing out of the lakes, however tending towards equilibrium. Given that the water concentrations used in this report are similar to the ones in the 97-98 report, it is not surprising that the magnitude of the volatilization has remained the same in recent years with fluxes for suite PCB less than 50 ng/m²/day. PCB loading estimates also show some seasonality.

Loadings of PAHs have remained constant over time, which is consistent with the combustion sources of these chemicals. The semi-volatile character of PAHs results in heavier PAHs entering the Lakes through dry and wet deposition while for lighter PAHs, absorption is most prominent. Most PAHs total loading estimates are similar for all lakes with

Lake Erie being slightly larger. One exception is phenanthrene for Lake Erie where total fluxes are 2 to 4 times larger than the other Lakes. Seasonal patterns of dry deposition reflect the seasonality of sources and the temperature dependent partitioning of PAHs with larger estimates in winter when particulate concentrations are expected to be larger.

Metals total loading estimates are of similar magnitudes for both Lake Ontario and Huron (the only Lakes for which metals data are available). Wet deposition is always more important than dry deposition and there is a lack of trend over time. This is consistent with Canadian emission sources that have remained constant over the last few years. Slight increases in loading estimates are observed in the winter months.

The influence of urban areas on the lakewide loading estimates was evaluated using the satellite site of Chicago, the only urban site in operation in 99-00. Total downward fluxes were compared between the Master station at Sleeping Bear Dunes and Chicago. For pesticides, similar fluxes were seen while PCBs and PAHs fluxes were much larger in Chicago. The urban effect of Chicago was investigated and as in previous IADN reports, it was found that there is a substantial effect for PCBs and PAHs. This points to the critical importance of including urban data in the loading estimates.

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1. Introduction

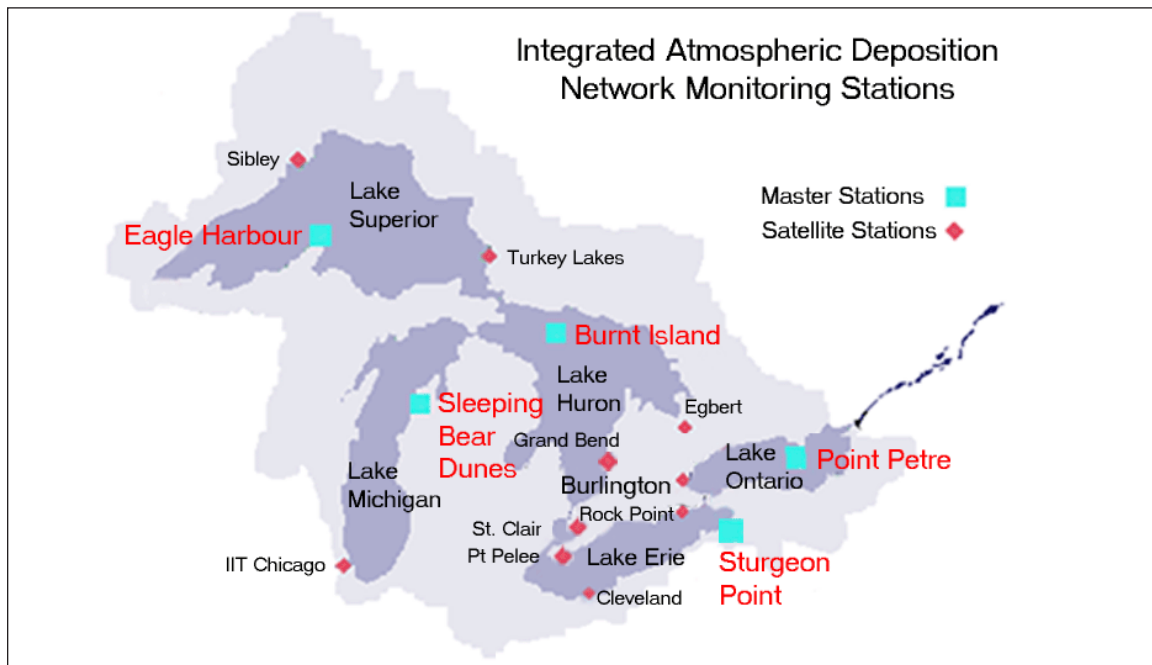
In 1987, a revision of the Great Lakes Water Quality Agreement of 1978 included a separate Annex (Annex 15) which called for the creation of the Integrated Atmospheric Deposition Network (IADN) to carry out surveillance and monitoring of the toxic contaminants. In accordance with Annex 15, IADN has produced biennial loading estimates on data from 1992 through 1998 (Hoff, 1996; Hillery et al., 1998; Galarneau et al., 2000; Buehler et al., 2001). This report details the 1999 and 2000 atmospheric loadings to the Great Lakes. It also defines a new reporting format for the IADN loading estimates. This new format consists of a standard “front end” that includes the sampling and analytical status of IADN and a section detailing recent improvements to the loadings calculations. A short summary of results is presented followed by tables and figures of loading estimates.

2. Status of IADN

2.1. Sampling Sites

IADN collects gas, particle, and precipitation phase samples at each of its master stations, one on each of the Great Lakes (see Figure 1). Sampling details can be found elsewhere (Environment Canada, 1994; Basu, 1996). Master stations on Lakes Erie (Sturgeon Point, STP), Michigan (Sleeping Bear Dunes, SBD) and Superior (Eagle Harbour, EGH) are operated by the United States (Indiana University, IU, via a cooperative agreement with US EPA) while Canada (Meteorological Service of Canada, MSC) operates the Master stations on Lakes Huron (Burnt Island, BNT) and Ontario (Point Petre, PPT). On the US side, two satellite urban stations are in operation in Chicago and Cleveland. Both air and precipitation samples are collected at these sites. On the Canadian side, air samples are collected at MSC’s satellite site of Egbert while only precipitation samples are collected at the other six satellite stations. The Ecosystem Health Division (EHD) of Environment Canada-Ontario Region is responsible for these precipitation satellite stations.

Figure 1. IADN master and satellite sampling stations



2.2. Measured Substances

IADN has been measuring several chemicals as well as meteorological parameters at all Master stations (Table 1). IADN has determined loading estimates for 26 of these (bold in Table), for which necessary supplementary information (such as Henry's Law constants and open lake water concentration data) was available.

Table 1. IADN Chemical List, Revised June 2004

Chemicals measured at Master and satellite stations in air and precipitation
Bold: Chemicals for which loading estimates are available

IADN-suite PCBs (see Table 2)

Organochlorine pesticides:

Aldrin

Trans-Chlordane (γ)

Cis-Chlordane (α)

p,p'-DDT

p,p'-DDD

p,p'-DDE

o,p'-DDT

Dieldrin

α -Endosulfan

β -Endosulfan

Endrin

Heptachlor epoxide

Hexachlorobenzene (HCB)

α -HCH

β -HCH

γ -HCH (lindane)

Methoxychlor

Trans-Nonachlor

PCB congeners 18, 44, 52, 101

Polycyclic aromatic compounds:

Anthracene

Benz[a]anthracene

Benzo[b]fluoranthene+

Benzo[k]fluoranthene

Benzo[ghi]perylene

Benzo[a]pyrene

Benzo[e]pyrene

Chrysene + Triphenylene

Dibenz[a,h]anthracene

Fluoranthene

Fluorene

Indeno[1,2,3,cd]pyrene

Phenanthrene

Pyrene

Trace Metals (Canada):

Arsenic

Cadmium

Lead

Selenium

A standardized suite of PCB congeners that make up the majority of PCB mass in air, the IADN PCB Suite, has been developed for the purpose of estimating total PCBs in air and precipitation.

Table 2. IADN PCB Suite congeners.

4+10	28	70+76	100	156+171+202
5+8	31	74	101	169
6	33+53	77+110	105+132+153	170+190
7+9	37+42	83	114+131	172
12+13	41+64+71	85	118	174
15+17	44	87+81	119	180
16+32	45	89	123+149	194+205
18	47+48	91	126	199
19	49	95+66	128+167	201
22	52	97	137+144	206
26	56+60+84+92	99	138+163	207

2.3. Sampling Protocols

2.3.1. Precipitation

The details of all sampling protocols are given in the Sampling Procedures Manuals for each agency. These details will be reviewed briefly here. All stations (including all Satellite facilities except Egbert) have samplers to measure wet deposition of gaseous organics. The precipitation sampler used for the organics measurements is uniform across the network, a MIC-B collector with a stainless steel funnel.

Indiana University uses XAD-2 resin column cartridges for accumulating the organics. EHD uses a dichloromethane solvent extraction system in which the rainwater is stabilized with 250 mL of dichloromethane then liquid/liquid extracted using fresh dichloromethane. Indiana University samples precipitation on a 28-day cumulative basis. EHD takes 14-day cumulative samples; however, as of 2000, the 14-day samples are composited to 28-day samples prior to analysis. The start and finish dates for the 28-day period are aligned between the two agencies. For trace metals, EHD uses a MIC-B precipitation sampler. The precipitation samples are collected in pre-cleaned polyethylene buckets. Indiana University does not measure trace metals.

2.3.2. Air

Organics air sampling uses modified high volume samplers with filter and absorbent combinations. Indiana University uses a HiVol of identical design, which has an XAD absorbent cartridge. This allows for a >800 m³ sample volume. MSC uses polyurethane foam as the absorbent for organics. In this case, sample volumes are kept below 400 m³ to avoid breakthrough of lighter organics during warm summer months. The metals are collected on a glass fiber filter at the sites of Point Petre and Burnt Island using a dedicated hi-vol sampler for a total air volume of 1625m³. All agencies have now adopted a sampling frequency of a 24-hour sample every 12 days. Early results showed that little organochlorine mass was found on the filter. For example, at the Point Petre station in 1992, the particulate/gaseous mass ratio was 2.3% for total PCBs and < 1% for the HCHs, *p,p'*-DDE,

and HCB. Due to the low analyte masses on the filters, agency protocols have changed over the course of IADN. The general absence of most organochlorine pesticides and PCBs on the filters led Environment Canada to terminate the measurements of these compounds on filters in 1993. Indiana University stopped PCB analysis on filters in 1996; however, IU continues to analyze the pesticides on the filters because of their higher concentrations in the urban samples.

2.4. Chemical Analyses

Laboratory analysis protocols generally call for solvent extraction of the organic sampling media with addition of surrogate recovery standards. Extracts are then concentrated followed by column chromatographic cleanup, fractionation, nitrogen blow-down to small volume and injection into GC-ECD, HPLC or GC-MS instruments (Figure 2, 3, 4). Details of these analyses can be found in the agency project plans (e.g. Basu and Hillery, 1995). Metals analyses for Canadian samples are conducted using inductively coupled plasma emission for particulate and precipitation samples.

Figure 2. Schematic of Analyses for Canadian Precipitation Samples.

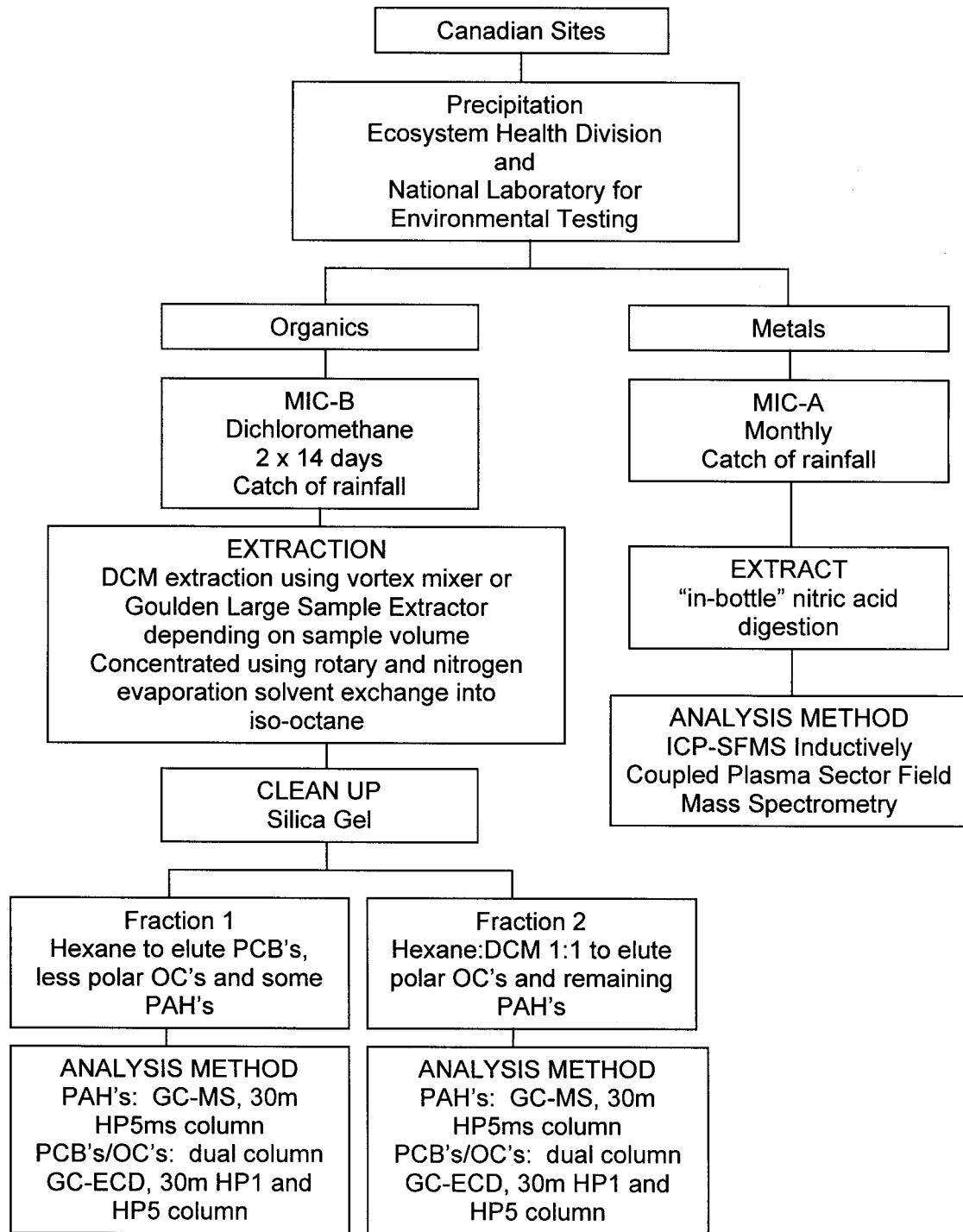


Figure 3. Schematic of Analyses for Canadian Air Samples.

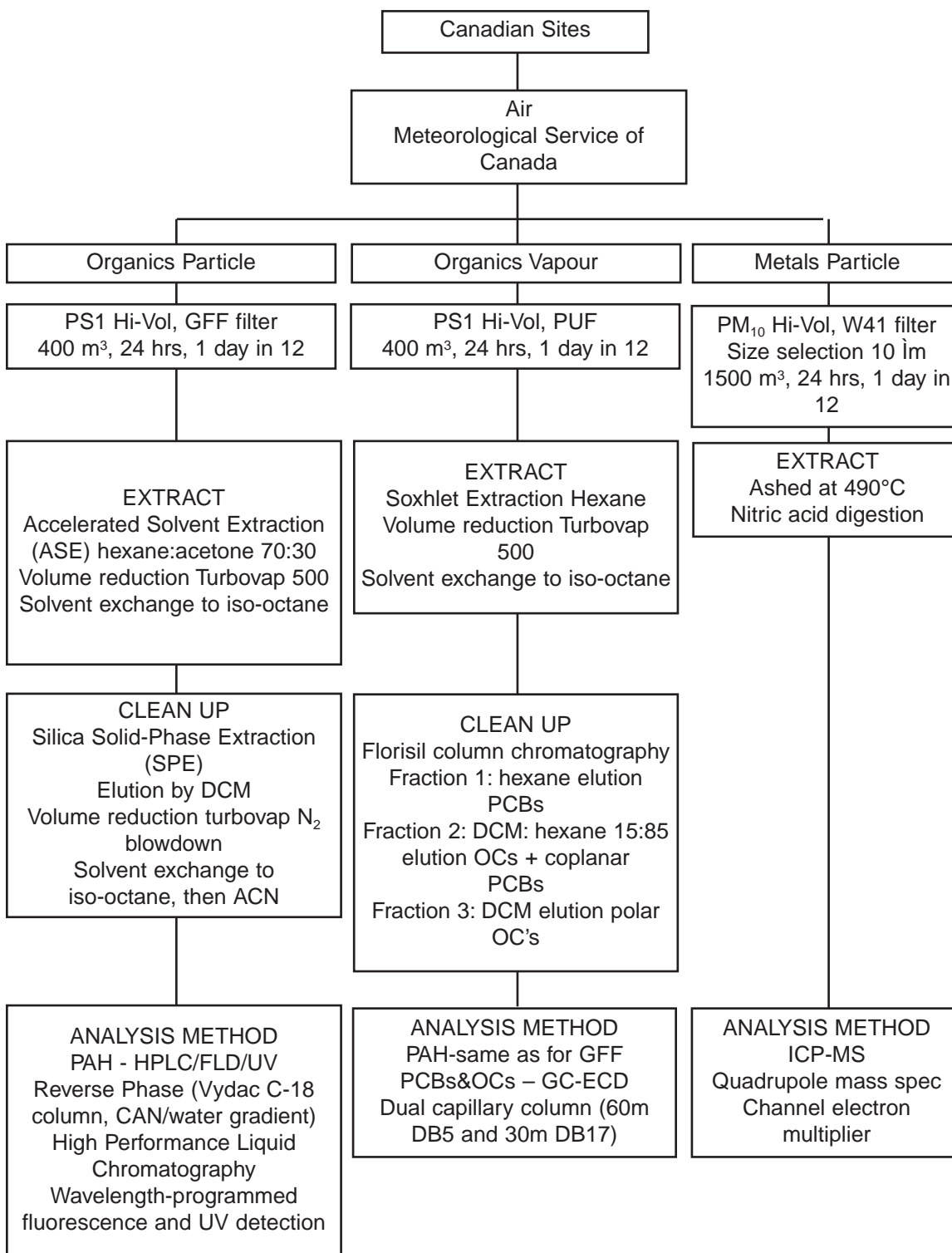
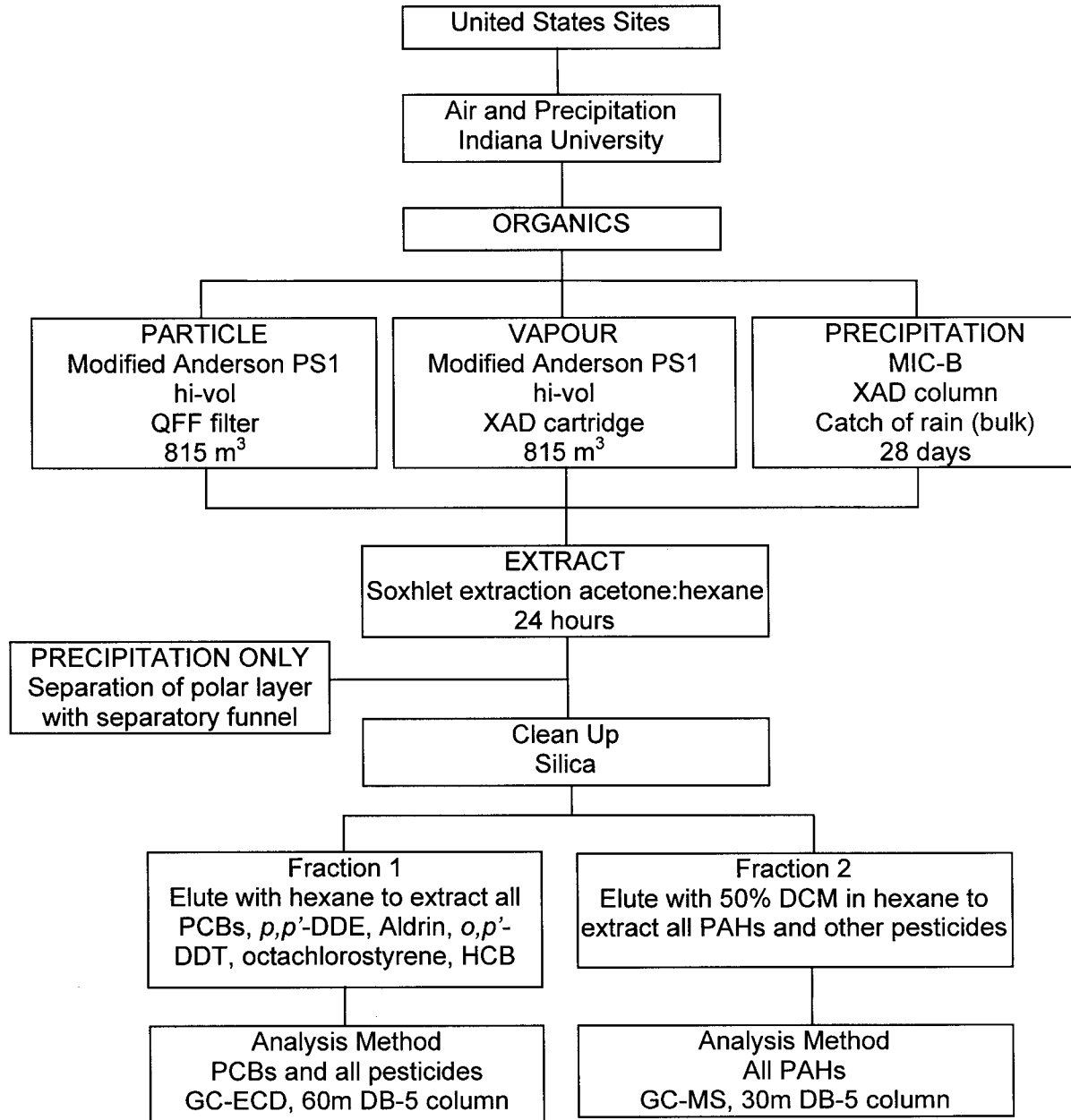


Figure 4. Schematic of Analyses for US Air and Precipitations Samples.



IADN follows a strong quality assurance program. The Quality Assurance Program Plan (QAPP) was documented jointly by Environment Canada, the United States Environmental Protection Agency, and the Ontario Ministry of the Environment and Energy (February 1994). All air and precipitation chemical data and all meteorological data measured by IADN go through a quality control process via the Research Data Management and Quality Control System™ (Sukloff et al., 1995).

Based on the results of our quality assurance studies to date, differences in loading estimates among sites/lakes should be viewed in consideration of the identified measurement differences among agencies involved in IADN. Some of these differences include (Fowlie, 2001): for PAHs, IU [Indiana University] reports data about 30% higher than MSC [Meteorological Services of Canada] for gas-phase samples but there was no such bias for particles or precipitation. For PCBs in the gas phase, IU reported data about 30% higher than MSC. For pesticides, IU reports data about 30% higher than MSC in the gas phase but comparable to NLET for precipitation. It is important to note that these results can only be applied to one point in time early in 2001 and should not be applied without caution to the 10 years of the IADN program. These issues continue to be addressed to ensure that data are compatible.

3. Loadings Calculations

3.1. Loadings Equation

Detailed descriptions of the loadings calculations can be found elsewhere (Hoff, 1994; Hoff et al., 1996; Hillery et al., 1998). A brief summary will be presented here. Net atmospheric flows (L , in kg/yr) are based on three processes: wet deposition, dry deposition, and net gas exchange. They are represented by the equation:

$$L = C_p R_p A + C_a \phi_a v_d A + [k_{ol}(1 - \phi_a) C_a (RT/H) A - k_{ow}(1 - \phi_w) C_w A] \quad (1)$$

Wet deposition is the product of the volume-weighted mean precipitation concentration, C_p (kg/m³), the rate of precipitation, R_p (m/yr), and the area of the lake, A (m²). Dry deposition is the product of the total atmospheric concentration of the pollutant, C_a (kg/m³), the fraction of the compound in the particle phase, ϕ_a , the deposition velocity of the particles, v_d (m/yr), which is taken as 0.2 cm/s for all chemicals, and the area of the lake, A (m²). The product of C_a and ϕ_a is operationally defined as the concentration obtained on the filter samples. Atmospheric concentrations are obtained from the measurements at master stations. It should be noted that the use of 0.2 cm/s does not accurately reflect the deposition velocity of all particles and most likely results in an underestimation of dry deposition.

Net gas exchange is divided into two components: absorption and volatilization. The variable, k_{ol} (m/yr), is the overall air-water mass transfer coefficient, R (atm m³ K⁻¹ mol⁻¹) is the ideal gas constant, T (K) is the temperature at the air-water interface, H (mol atm⁻¹ m⁻³) is the Henry's Law constant, and C_w (kg/m³) is the concentration of the compound in water. For absorption, $(1 - \phi_a)C_a$ is the air concentration of the compound in the gas phase as obtained operationally on the PUF or XAD media. Absorption is the transfer of the compound in the gas phase from air to water. In the volatilization term, ϕ_w is the fraction of the compound on the particle phase in the water, thus making $(1 - \phi_w)C_w$ the dissolved phase concentration of the compound of interest. Volatilization is then the transfer of the compound from water to air. Net gas exchange is the sum of the absorption and volatilization estimates. The convention in this report is that positive net gas exchange indicates absorption, while negative net gas exchange indicates volatilization.

The loadings estimates are presented in this report as both flows and fluxes. Fluxes (ng/m²/day) are simply the flows (kg/month) converted to ng/day and divided by the appropriate lake area. These areas are 82,100 km² for Lake Superior, 57,800 km² for Lake Michigan, 59,600 km² for Lake Huron, 25,700 km² for Lake Erie, and 18,960 km² for Lake Ontario. Fluxes allow for comparisons between the lakes by removing the variation due to differing lake areas. In past IADN reports, flows and fluxes were calculated seasonally and then summed to give annual loads and averaged to give annual fluxes. In this report, loadings estimates of dry and wet deposition and absorption are calculated monthly. Volatilization estimates are calculated annually and presented in a separate section since IADN does not measure water concentrations and must rely on other researchers' measurements.

In this report, errors are presented for each term as a coefficient of variation (COV). These COVs were calculated in accordance with the error propagation analysis by Hoff (1994). However, because monthly loadings estimates are now calculated, the standard deviation over mean as a measure of uncertainties for ambient air concentrations was not used because only 2-3 values were available. Instead, limit of detection over mean was adopted. This has resulted in slightly smaller overall COVs since temporal variability was one of the major source of error in previous reports.

3.2. 1999-2000 Model Improvements

The 1999-2000 Report includes several improvements to the calculation of the modeled estimates. The first significant improvement is the conversion to the Statistical Analysis System (SAS) format from an Excel-based program. The use of SAS allows direct transfer of the IADN data from the quality control process via the Research Data Management and Quality Control System™ (Sukloff et al., 1995). Further calculations will now be automated and thus results will be available shortly after data delivery. For the purpose of calculations, non-detect data values were set to zero. Other improvements have been done to various parameters in the model. These improvements affect the wet deposition and gas exchange terms of equation 1 and are discussed below. Considering the many changes to the calculations, flows and fluxes for all years were recalculated using the new information.

3.2.1 Rate of Precipitation, R_p

In past reports, the rate of precipitation R_p (m/yr) has been derived from data collected at each Master Station. This was then applied to the rest of the Lake although it had been recognized that this might not properly represent the rate of precipitation over the entire Lake. In this report, rates of precipitation have been obtained from the Great Lakes Environmental Research Laboratory (<http://www.glerl.noaa.gov/>) and averaged monthly. The NOAA estimates use multiple land-based measurements to interpolate area-weighted overlake precipitation amounts using the Thiessen method (Huggins, 1996). The ratios of lakewide precipitation estimates versus the precipitation rate at station are presented in Figure 5 for all Lakes for all years. For all Lakes, averages of these ratios are close to unity with RSD of the order of 40 to 70% due to monthly variability. Therefore although for the entire period, the updated precipitation rates may not drastically impact the wet deposition estimates, they will be affected for certain months/Lakes.

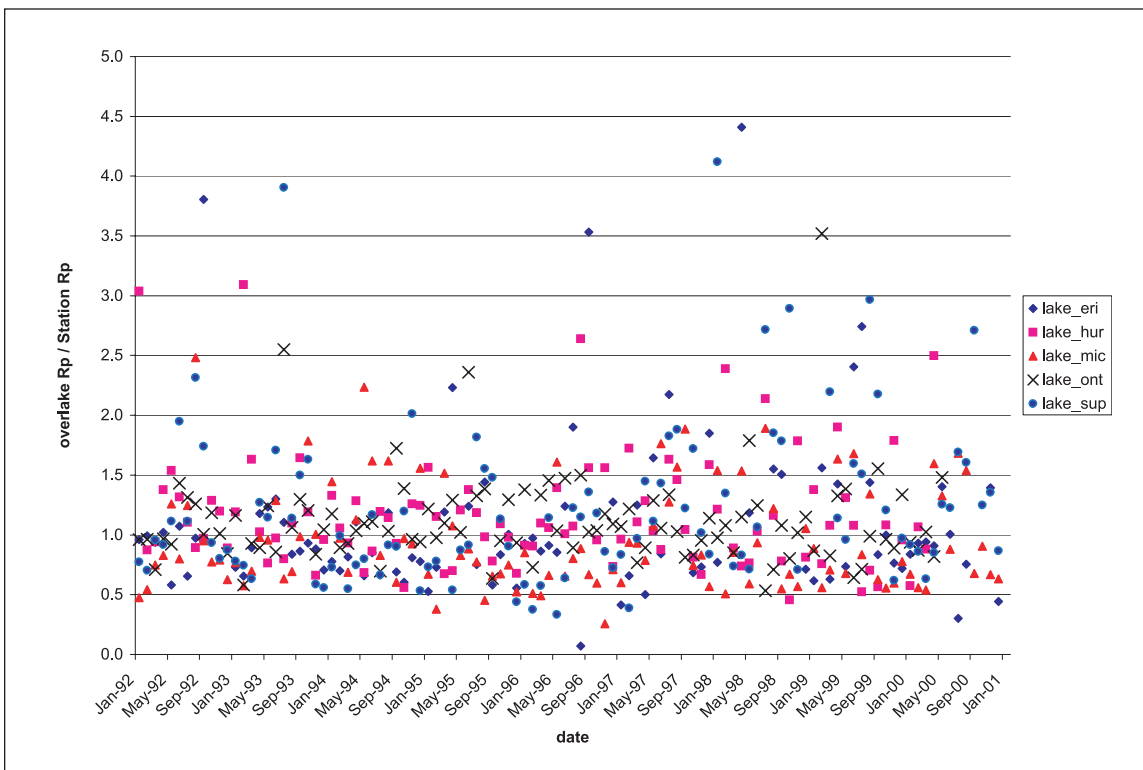


Figure 5. Ratio of lakewide R_p and station R_p for all years of measurements.

3.2.2 Henry's Law Constant, H

Modification of the Henry's law constants (H) strongly affects mass transfer coefficients and absorption (Equation 1). For this report updated Hs were adopted for PCBs based on the work of Li et al (2003). A list of all the Hs used is given in Table 3. Li et al. do not report temperature-dependent Hs for congeners 18 and 44. Congener 28 and 52 were used as surrogates of tri and tetra chlorinated PCB, respectively. Thus their temperature-dependent Hs were applied to PCB18 and PCB44. For the suite PCB, each homologue group was weighted according to its occurrence in ambient air samples (Neilson, 2000) and the same weight was used to obtain a "suite" H. The suite H equation is similar to the tetra homologue group that is the most prominent group in the atmosphere around the Great Lakes. It is important to note that the choice of Henry's law constants is critical to the resulting loadings estimates. Therefore further work will be ongoing to assess the effects of other researchers published H values on loadings calculations.

Table 3. Henry's Law Constants used in IADN calculations of gas exchange.

Substance	Parameters <i>m</i> and <i>b</i> for Henry's Law Constant, H (Pa•m ³ /mol), $\log_{10}H = m/T+b$		Source
	<i>m</i>	<i>b</i>	
α-HCH	-3054	10.1	Cotham and Bidleman (1991); Jantunen and Bidleman (2000)
Dieldrin	-3416	12.2	Cotham and Bidleman (1991)
Cis-chlordane	-1994	8.11	Jantunen et al. (2004)
Trans-chlordane	-1760	7.36	Jantunen et al. (2004)
Trans-nonachlor	-2317	9.28	Jantunen et al. (2004)
p,p'-DDD	-3416	11.3	Suntio et al. (1987); Tateya et al. (1988); as per Hoff et al. (1996)
p,p'-DDE	-2590	10.13	Jantunen et al. (2004)
p,p'-DDT	-3416	11.7	Cotham and Bidleman (1991)
γ-HCH	-2694	8.54	Cotham and Bidleman (1991); Jantunen and Bidleman (2000)
α-endosulfan	-1001	4.26	Rice et al. (1997)
HCB	-2559	10.4	Ten Hulscher et al. (1992)
PCB 18 (tri)	-2860	11.1	Li et al. (2003)
PCB 44 (tetra)	-2956	11.3	Li et al. (2003)
PCB 52 (tetra)	-2956	11.3	Li et al. (2003)
PCB 101 (penta)	-3233	12.2	Li et al. (2003)
IADN suite PCB	-2954	11.3	Weighted Calculation
Phenanthrene	-2469	8.89	Bamford et al. (1999)
Pyrene	-2239	7.59	Bamford et al. (1999)
Benzo[b]fluoranthene	-3416	10.4	Ten Hulscher et al. (1992)
Benzo[k]fluoranthene	-3416	10.7	Ten Hulscher et al. (1992)
Benzo[a]pyrene	-3416	10.8	Ten Hulscher et al. (1992)
Indeno[1,2,3-cd]pyrene	-3416	6.95	Ten Hulscher et al. (1992)

3.2.3 Wind Speed, U_{10}

In previous reports, the wind speed at 10 meters (U_{10}) has been obtained from measurements at station and then applied to the entire lake area. A better representation of lakewide wind speeds has now been obtained and incorporated into the model. Monthly wind speed values derived by NOAA (NOAA, 2000) from over-water buoy data were used. The impact of these updated wind speeds is quite significant because it affects the air-water mass transfer coefficient. K_{ol} is calculated from the water-side and air-side mass transfer coefficients following

$$\frac{1}{k_{ol}} = \frac{1}{k_w} + \frac{RT}{Hk_a} \quad (2)$$

The equation for the water-side mass transfer coefficient is (Galarneau et al, 2000):

$$k_{w,x} = 0.45u_{10}^{1.64} \left[\left(\frac{V_{m,x}}{29.6} \right)^{0.6} \right]^{(-0.5or-0.66)} \quad (3)$$

The exponent will change depending on wind speed: if $U_{10} < 3.6$ then -0.66 is used for the exponent and if $U_{10} \geq 3.6$ then -0.5.

While the air-side mass transfer coefficient is:

$$k_{a,x} = 15(0.2u_{10} + 0.3) \left[\frac{(1/M_x + 1/29)^{0.5}}{((\Sigma V_d)_x^{1/3} + 19.7^{1/3})^2} \right]^{0.61} \quad (4)$$

Where $V_{m,x}$ is the molar volume, M_x is the molecular weight, ΣV_d is the atomic diffusion volume, all three quantities are specific to each chemical of interest. Therefore it is readily seen that a modification of the wind speed results in a substantial change of k_w , k_a and thus k_{ol} .

The ratios of lakewide wind speed estimates versus wind speeds measured at station are plotted in Figure 6 for all Lakes for all years. As can be observed there are substantial differences in wind speeds measured at the stations versus integrated overlake values mostly resulting in larger wind speeds. This will in turn impact the mass transfer coefficients where a doubling of wind speed will result in an increase of k_{ol} by a factor of 2 to 4. Undoubtedly this will affect the gas exchange term of equation 1.

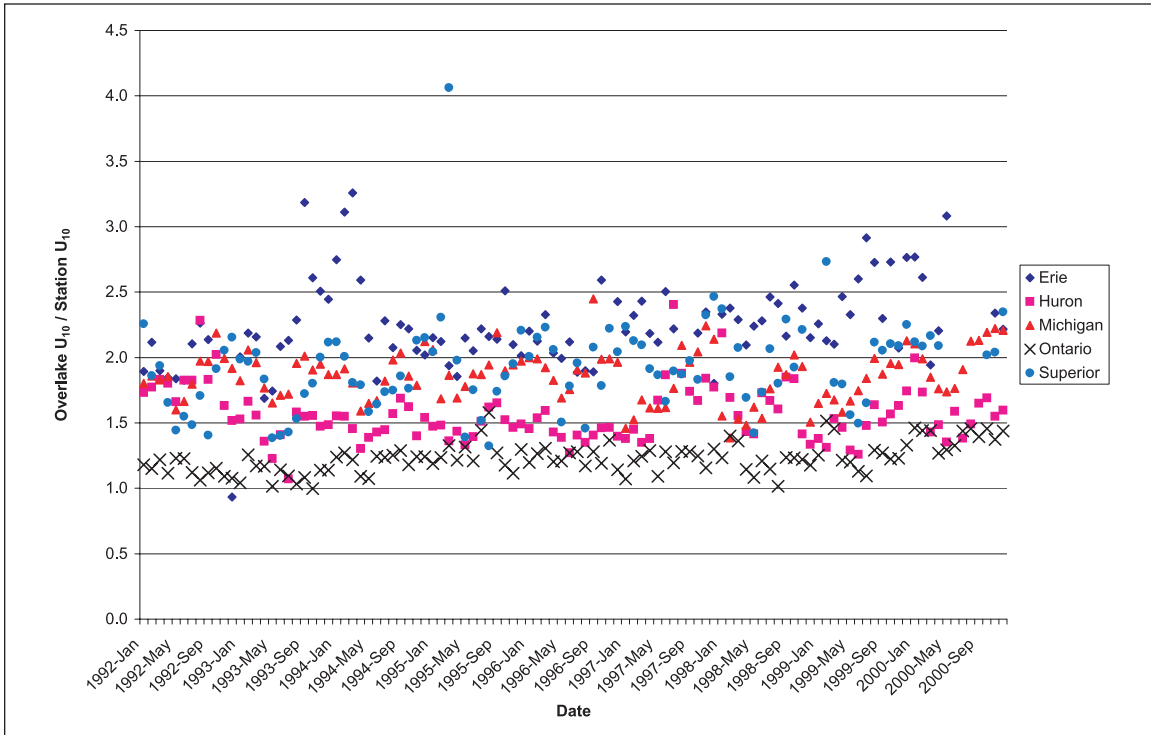


Figure 6. Ratios of lakewide and at station wind speeds for all measurements.

It is important to note that this effect is not as significant for Lake Ontario where the ratio of new to old wind speed is lowest. This is likely due to the fact that the IADN site on that lake is located on a peninsula extending into the lake and thus the meteorological measurements at station reflect open lake conditions.

As discussed in section 3.1, lake water concentrations, although crucial to the loadings calculations, are not measured on a routine basis as part of IADN. No new data were available for 1999-2000, therefore water concentration data for 1997 and 1998 from available sources were used (Buehler et al., 2001). If more than one source was available for a given lake for one year, the water concentration data were pooled by the method of weighting by inverse variance (Taylor, 1990).

4. Results

A comparison of annual wet deposition flows (kg/yr) between results contained in this report and results for 1997-98 calculated using the old method (Buehler et al., Appendix D) indicates a difference of 25% or less. This difference can be explained by the adoption of overlake precipitation for the calculations herein. The introduction of overlake wind speeds has also increased the absolute magnitudes of absorption and volatilization by one and a half to two times. Furthermore, the water-side mass transfer coefficient is also dependent on wind speed (the exponent term, Equation 3) as the wind speed goes from less than 3.6 m/s at station to more than 3.6 m/s overlake. The water concentrations were obtained as annual averages. Earlier in IADN's operation, particulate concentrations were found to be insignificant for pesticides and PCBs, so dry deposition is not determined for those chemicals.

4.1 Organochlorine pesticides:

4.1.1 α -HCH

Wet deposition fluxes of α -HCH appear to be decreasing particularly for Ontario and Huron. For all lakes, the amount of precipitation has not significantly varied since 1992 therefore the decreasing trend is due to a decline of α -HCH in precipitation. This has been shown before (Chan et al. 2003) and attributed to international changes in usage patterns. Lakes Huron and Ontario have larger wet deposition fluxes than the other Lakes.

The magnitude of both absorption and volatilization has decreased over time, and air-water exchange for α -HCH is approaching equilibrium whereby absorption from the atmosphere equals volatilization from the Lake. The volatilization trends for Lake Michigan and Huron are driven by the difference in water concentration data pre- and post-1994.

A strong seasonality is observed for both absorption and volatilization of α -HCH with maxima in the summer months (Figure 7). The strong seasonality observed is likely a result of the temperature dependence of source strengths of banned OC pesticides i.e. increased summertime volatilization from soils where they were historically applied.

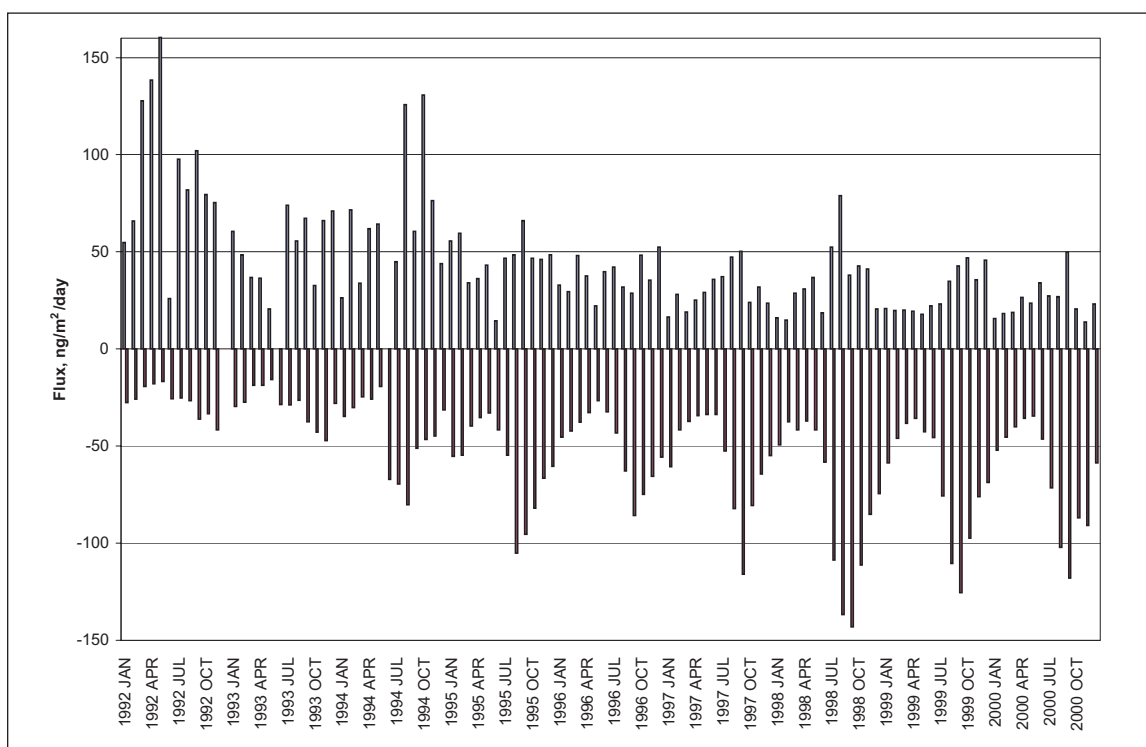


Figure 7. α -HCH monthly absorption and volatilization fluxes for Lake Superior.

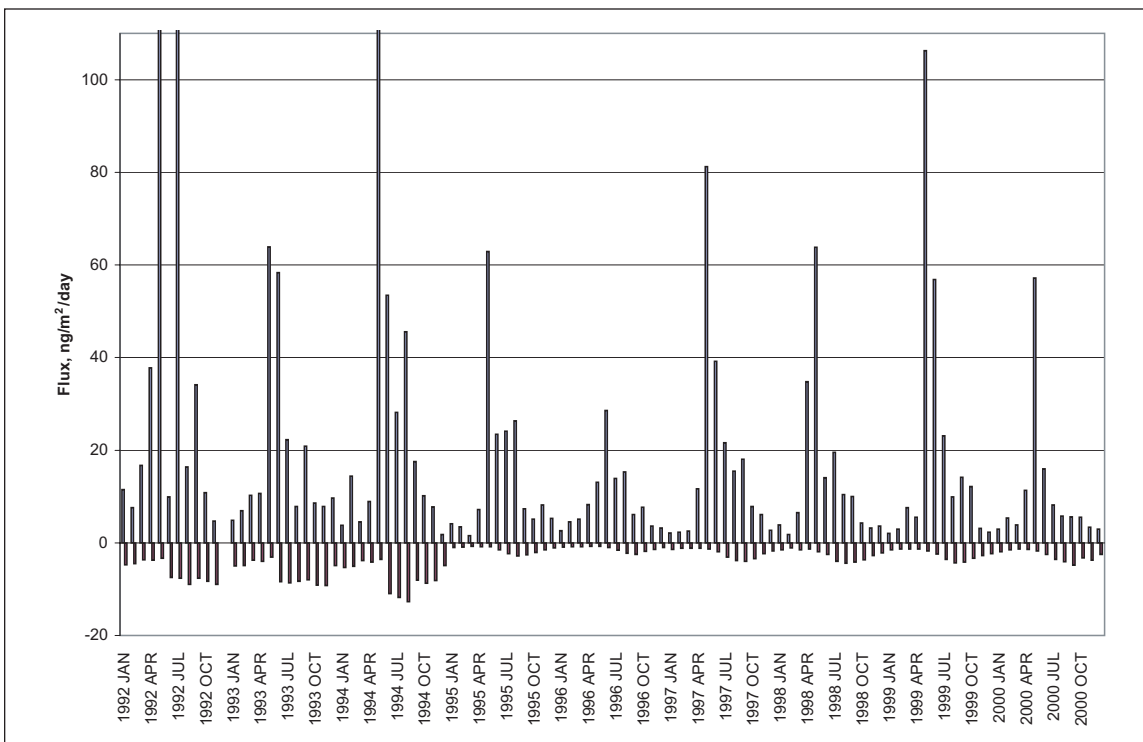


Figure 8. γ -HCH monthly absorption and volatilization fluxes for Lake Michigan.

4.1.2 γ -HCH (Lindane)

Wet deposition fluxes of γ -HCH have remained similar throughout the nineties. This is not surprising because lindane is a current-use pesticide in Canada that has been shown to impact the Great Lakes region (Ma et al. 2003). For all Lakes, lindane is still showing net deposition through absorption from the atmosphere. All Lakes present a strong seasonality (Figure 8) with maxima in absorption fluxes in April-May-June. Lindane has been used extensively in the Canadian prairies as a seed treatment for canola and re-emission from soil usually occurs in April-May (Waite et al. 2001). This re-emission from the Canadian prairies can then be transported to the Great Lakes basin. This is clearly seen from the temporal variation of the absorption results. Some volatilization of lindane from the Lakes occurs in summer but this is usually relatively small compared to the spring atmospheric deposition.

For α -HCH, the use of overlake wind speeds has had the result of increasing both absorption and volatilization significantly compared to Buehler et al. This is partly due to the fact that the atmospheric concentration maxima are in summer when the wind speed differences are more pronounced. However, in the case of lindane, the absorption component will not be as influenced since lindane has a springtime maxima when wind speeds at station and overlake are relatively comparable. Thus the magnitude of lindane absorption fluxes to the Lakes is comparable to results obtained by Buehler et al. However the volatilization term will be affected since most lindane volatilization occurs in summer.

4.1.3 Dieldrin

Dieldrin has been used directly as a pesticide on crops but is also a degradation product of aldrin; both were deregistered in 1987. This banned pesticide has been volatilizing from the lakes since 1992. As with other compounds, the inclusion of the overlake wind speed had a doubling effect on the volatilization and also results in a seasonal pattern with larger volatilization in summer (when wind speeds are largest).

4.1.4 HCB

HCB absorption data are only reported for Lake Superior, Michigan and Erie due to breakthrough during air sampling at the Canadian sites. At all sites HCB is tending towards equilibrium with absorption and volatilization having similar magnitudes. Fluxes are between 15 and -15 ng/m²/day for all three lakes indicating the ubiquity of HCB. There is a strong seasonality of both absorption and volatilization fluxes for all Lakes with maxima in winter. While most OC pesticides usually peak in summer, HCB has a relatively large Henry's law constant (H) yielding mass transfer coefficients with winter maxima.

4.1.5 Chlordanes

Cis-chlordane, trans-chlordane, trans-nonachlor

Technical chlordane was used extensively for termite control and phased out in the US in 1988. Volatilization from soils is the predominant source of chlordanes to the Great Lakes (Hafner and Hites, 2003). In this loadings report, only wet deposition and absorption fluxes are included. The fluxes of chlordanes are small, often less than 1-2 ng/m²/day. Lake Erie has the largest absorption fluxes for all three compounds.

4.1.6 DDT and Metabolites

p,p'-DDT; p,p'-DDD; p,p'-DDE

DDT has been banned in Canada and the United States since the early 1970s, while Mexico banned its use in 2000. For these compounds, absorption fluxes dominate and are larger for Lake Erie. Fluctuations throughout the nineties are observed; for example, p,p'-DDT showed a slight increase in absorption during the summers of 1999 for Lake Michigan. The increase seen in wet deposition for Lake Huron and Ontario in 1997 is due to a single monthly sample of large concentration.

4.1.7 α -endosulfan

α -Endosulfan is a current-use pesticide employed on fruit and vegetable crops with heavy uses in New York, Michigan and some use in Ontario. Absorption fluxes dominate deposition to the Lakes with larger fluxes for Lakes Michigan, Erie and Ontario. Wet deposition is also relatively significant for Lake Ontario. Similar to lindane, the other current-use pesticide measured by IADN, α -endosulfan deposition presents a strong seasonal pattern with maxima in summer consistent with application patterns.

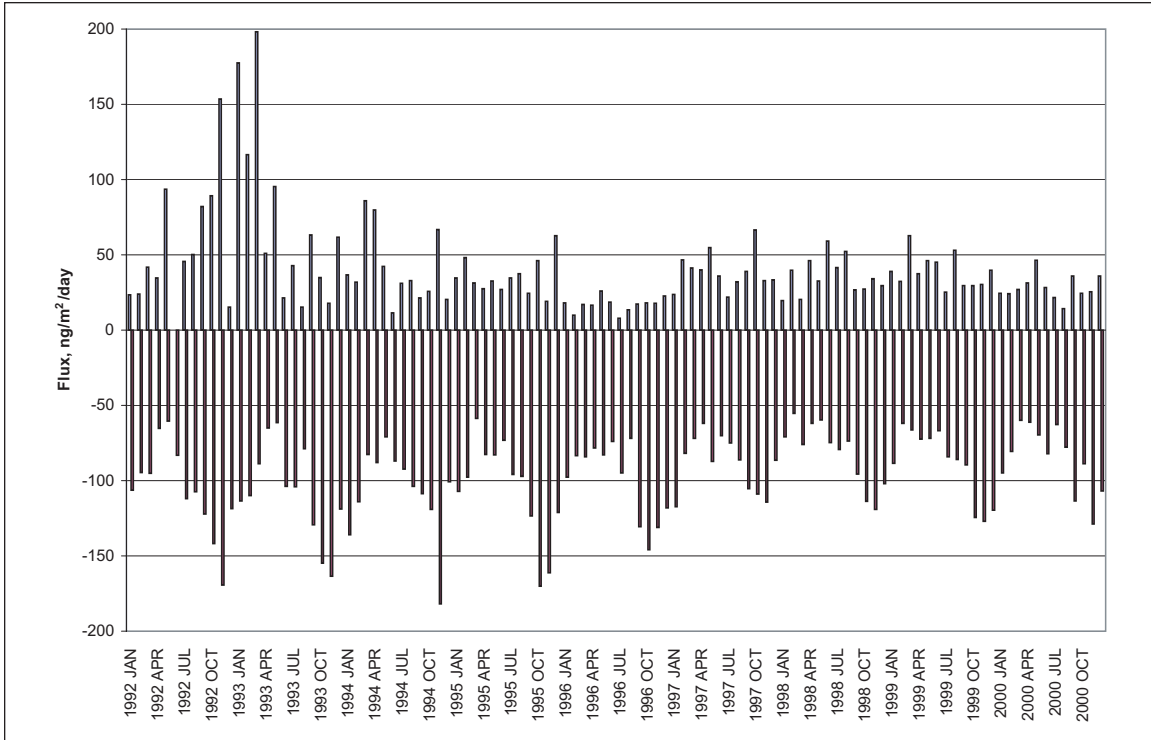


Figure 9. Suite PCBs absorption and volatilization for Lake Erie.

4.2 Polychlorinated Biphenyls, PCBs

Fluxes for the individual PCB congeners (18, 44, 52, and 101) generally reflect patterns of the suite. Wet deposition constitutes 7-15% of downward deposition on average (note that wet deposition fluxes are multiplied by 10 in Figure C16). There is no discernable trend over time for wet deposition and fluxes are similar among lakes for which recent data are available (Superior, Michigan, and Erie). It is also noteworthy to mention that the PCB concentrations in precipitation are getting very small relative to blank concentrations, particularly at the sites of Eagle Harbour and Sleeping Bear Dunes. Gas exchange is the dominant process for PCBs. Overall deposition of PCBs continues to decrease, with air-water exchange dominated by volatilization out of the Lakes, but tending towards equilibrium, particularly for Superior and Michigan. Some increases in absorption are seen in the late 1990s for Lakes Superior, Michigan, and Erie. Absorption decreases again by 2000. Monthly absorption and volatilization fluxes are plotted for Lake Erie. PCB fluxes tend to be largest for Lake Erie. The Lake Erie master station, Sturgeon Point, may be influenced by source areas of PCBs in New York State and in the highly populated areas on the eastern seaboard of the U.S. (Hafner and Hites, 2003).

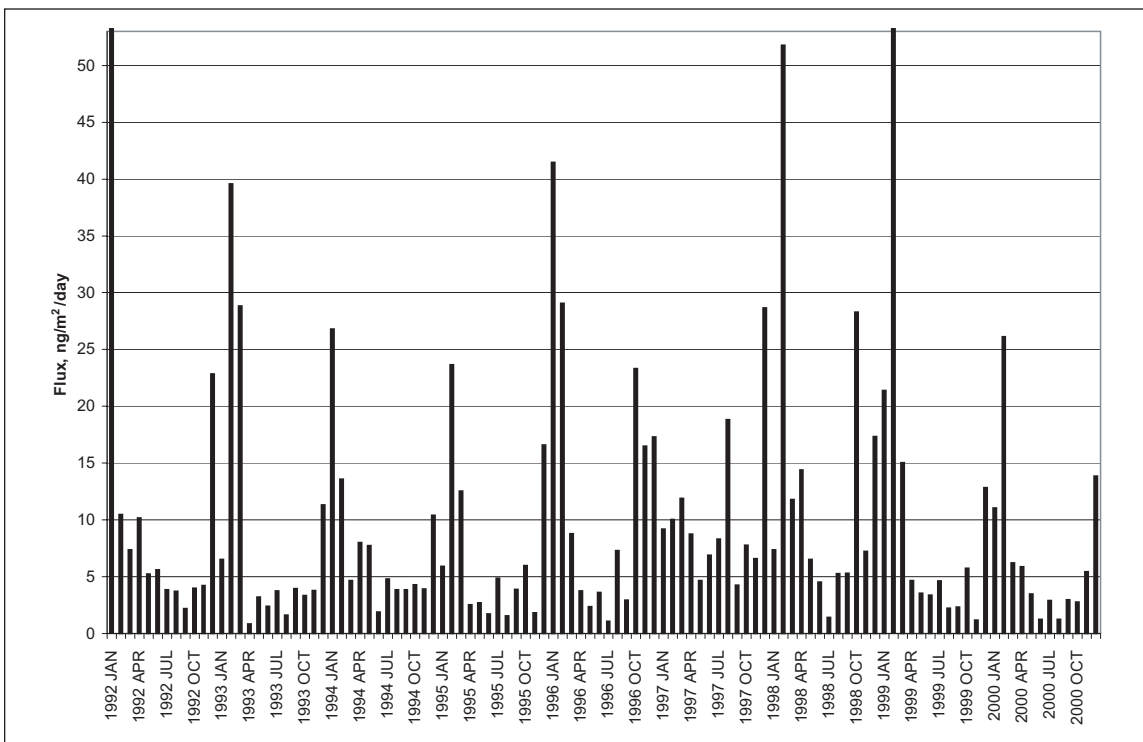


Figure 10. Pyrene Monthly Dry Deposition for Lake Ontario.

4.3 Polycyclic Aromatic Hydrocarbons, PAHs

Phenanthrene, Pyrene, B(a)P, Indeno, B(b+k)F

For the lighter PAHs (e.g. phenanthrene), absorption fluxes dominate deposition to the Lakes whereas for the heavier PAHs (e.g. B(a)P), wet and dry deposition are the main pathways of entry into the lakes. Fluxes are largest for Lake Erie, particularly absorption, again emphasizing the impact of urban emissions on the Sturgeon Point site.

For all lakes no particular temporal trend is observed consistent with current emissions of these combustion by-products. Across the basin, dry deposition of PAHs is larger in winter (Jan.-Apr.) reflecting the tendency of these semi-volatile compounds to partition to aerosols in colder temperatures (Figure 10). Furthermore, domestic heating is expected to contribute to winter PAHs maxima. For phenanthrene and pyrene, absorption fluxes might be expected to be larger in summer when temperatures are warmer and the more volatile PAH will partition to the vapour phase. This is only observed for Lake Superior. For the other lakes, the increase in domestic heating sources in winter seems to obscure this pattern and thus seasonality is not as marked.

4.4 Trace Metals

Lead, Cadmium, Arsenic, Selenium

For all metals, wet deposition fluxes are larger than dry deposition. For the present calculations, the deposition velocity was 0.2 cm/s for all organochlorines, PAHs and metals. More information is needed to accurately describe the dry deposition process, in particular the use of a single value deposition velocity. For trace metals, it is possible that dry deposition fluxes are underestimated. No trends in dry or wet deposition were observed for both Lakes. This is not surprising since Canadian atmospheric emissions have not significantly declined since 1992.

4.5 Urban Influence

Many air monitoring studies in urban areas have shown higher levels of toxic pollutants than exist at more rural sites (Simcik et al., 1997; Miller et al., 2001; Harner et al., 2004). Lakes Michigan, Erie, and Ontario are likely significantly affected by deposition from urban areas such as Chicago/Milwaukee, Cleveland, and Toronto/Hamilton. Therefore, loadings calculated using only master station data most likely underestimate deposition to the Great Lakes. In the past, the only urban IADN station was located on the Illinois Institute of Technology campus in Chicago. In late December of 2002, a new monitoring site was established in Cleveland, Ohio. Data from this site will assist IADN in estimating urban inputs to Lake Erie. The previous two IADN loadings reports (for data from 1995-96 and 1997-98) calculated fluxes and loadings using Chicago data to estimate the influence of that urban area on atmospheric deposition to Lake Michigan. This exercise has been repeated for this report.

Fluxes calculated using Sleeping Bear Dunes data and Chicago data are compared. Chicago data are then applied to an area of the lake representing the “urban plume” to examine the increase in loadings to the Lake. Flux and loadings estimates were made on an annual basis, and average lakewide surface water temperature and precipitation rates, as well as overwater wind speeds, were used. As for loadings results for Sleeping Bear Dunes, the water data used were unpublished EPA data from 1997 (the most recent available). Volatilization estimates are not available for many chemicals due to the lack of available data. In addition, dry deposition estimates could not be made for some compounds due to lack of particulate concentration measurements (most notably for PCBs).

Table 4 shows a comparison of fluxes occurring at Sleeping Bear Dunes (the background site) and Chicago. Examination of total net inputs (not including volatilization) indicates that total downward fluxes in 1999 were greater at Chicago for all chemicals except α -HCH and α -endosulfan. Fluxes were generally higher in Chicago but of the same magnitude for the DDTs and HCB, while the chlordane components were about ten times higher at Chicago. Actually, downward fluxes of the HCHs, α -endosulfan, and HCB are very similar between the two sites. The comparability of the pesticide fluxes between the two sites may be due to the fact that many of the IADN pesticides were used in agriculture in more rural areas, like those near Sleeping Bear Dunes. Chlordane was used for termite control, explaining the greater presence in the urban area. The comparability of HCB fluxes may simply reflect the ubiquity of HCB as a pollutant, in part due to its ability to be transported easily over long distances from sources to more remote areas.

The situation is different for PCBs and PAHs. Total downward fluxes of PCBs were about ten times higher in Chicago. Downward fluxes of PAHs were generally about 20-75 times higher at the urban site. Examination of volatilization was limited due to the availability of water data, but for PCBs (with the exception of PCB 52), addition of Chicago data usually resulted in a switch in direction for gas exchange from net volatilization (but generally near equilibrium) at Sleeping Bear Dunes to net deposition at Chicago. Net gas exchange of PCB 52 was positive at both SBD and Chicago. Chicago fluxes in all deposition categories tended to decrease from 1999 to 2000 reflecting patterns at the master stations.

Elevated PCB fluxes at Chicago may be due to continued inputs of PCBs from landfills, sewage sludge drying beds, and historically contaminated sites in the area (Hsu et al. 2003). High PAH fluxes are most likely due to a high concentration of industry in the Chicago-Gary, IN area as well as contributions from motor vehicles.

Patterns in dominant deposition processes reflect those at the master stations: the pesticides, PCBs, and lighter PAHs (phenanthrene and pyrene) have highest fluxes for absorption, whereas the heavier PAHs have higher fluxes for wet and dry deposition than for absorption. Wet deposition fluxes were lowest for pesticides and HCB and higher for PCBs and PAHs at Sleeping Bear Dunes, and the same is the case at Chicago. Wet deposition fluxes are higher in the city, particularly for PAHs. When compared to past fluxes (1996-1998), newly calculated Chicago wet deposition fluxes were either comparable or lower. For dry deposition, pesticide fluxes are much lower than PAH fluxes at both SBD and Chicago. Similar to wet deposition, dry deposition fluxes of PAHs are much higher at the Chicago site, in the hundreds of ng/m²/d compared to fluxes in the single digits at SBD. Dry deposition fluxes at Chicago have been for the most part consistent over time. Absorption fluxes for dieldrin, chlordane component compounds, and DDT and its degradation products were quite a bit higher (about five to ten times) at Chicago versus SBD. The urban effect on absorption fluxes was even higher for PCBs (8-22X) and the lighter PAHs (40-100X).

Reflecting a pattern found at the master stations, the magnitude of the absorption and volatilization fluxes has increased by about two for many compounds (versus the results for 1996-98, which used old methods of calculation). This is most likely due to a method change, namely the use of overlake wind speeds, which are greater than at-station wind speeds, rather than a change in the state of the environment. The method change also results in higher net loads (wet + dry + absorption + volatilization), which can be calculated for substances with available water data.

Loadings (in kilograms per year) to Lake Michigan as a whole were also calculated taking Chicago's influence into account. As in the past, the "urban plume" surface area where Chicago data was applied was 100 km of shoreline and 10 km offshore for wet and dry deposition (1,000 km², or 1.7% of the total lake area) and 100 km by 20 km offshore for gas exchange (2,000 km², or 3.5% of the total lake area) (See Galarneau et al. 2000). It is assumed that Chicago-originated pollutants in the vapor phase have a more extensive spatial influence out over the lake, since particles and affected precipitation deposit closer to the city. In addition, the percentages of the time that winds were blowing from Chicago out onto the Lake (winds from entire southwest quadrant) were calculated using 1999 and 2000 station-specific hourly meteorological data from IIT. This was used to determine the fraction of the time that the Chicago concentrations/fluxes should be applied to the affected area of the lake. These percentages were 32.8% and 35.2% for 1999 and 2000, respec-

Table 4. Mass Fluxes (ng/m²/day) of atmospheric deposition at Sleeping Bear Dunes (SBD), the master station, and Chicago in 1999 and 2000.

	Wet Deposition		Dry Deposition		Absorption		Volatilization		Net Gas Exchange		Total (w/dry deposition)		Net Input (downward flux)	
	SBD	Chicago	SBD	Chicago	SBD	Chicago	SBD	Chicago	SBD	Chicago	SBD	Chicago	SBD	Chicago
α-HCH	1999	0.68	1.3	0.16	0.081	16	-16	4	1	49	21	17		
	2000	1.7	1.2	0.15	0.034	24	-17	5	8	6.9	24	25		
γ-HCH	1999	0.79	5.4	0.1	0.2	18	-2	19	16	20	22	24		
	2000	2.3	2.4	0.04	0.1	14	-2.7	8.3	11.4	11	13	17		
Dieldrin	1999	0.94	5	0.91	4.2	59					12	68		
	2000	0.9	2.3	0.57	3.4	22					6.3	28		
Cis-chlordane	1999	0.31	1.3	0.1	0.73	8.3	-4		4.3		1.3	10		
	2000	0.34	1.5	0.08	0.6	4.1	-4.6		-0.5		1.1	6.2		
Trans-chlordane	1999	0.04	0.32	0.09	0.62	0.7	-2.8		2.7		0.83	6.4		
	2000	0.04	0.23	0.05	0.48	0.39	-3.1		-0.2		0.48	3.6		
Trans-nonachlor	1999	0.05	0.27	0.07	0.26	0.78	-3.2		0.5		0.9	4.2		
	2000	0.04	0.13	0.02	0.23	0.53	-3.6		-1.5		0.58	2.5		
α-endosulfan	1999	0.75	2.4	1.04	1.1	14					18	18		
	2000	1.2	1.6	0.68	0.9	9.4					9.5	12		
p,p'-DDE	1999	0.25	0.59			0.94	-5.6		0		1.2	6.2		
	2000	0.06	0.18			0.65	-6.3		-3		0.71	3.5		
p,p'-DDT	1999	0.2	1.6	0.06	1.6	2.3	-0.25		13		2.6	16		
	2000	0.21	0.51	0.05	0.78	0.78	-0.26		6.4		1.2	8		
p,p'-DDD	1999	0.04	0.43	0.07	0.42	1.2	-0.01		1.4		1.3	2.3		
	2000	0.03	0.12	0.02	0.22	0.35	-0.011		0.48		0.4	0.83		
HCB	1999	0.04	0.12			5.9	-7.2		0.5		6	8		
	2000	0.045			6.8	8.1	-8.5		-1.6		8.1			
PCB 18	1999	0.09	0.54			1.3	-1.7		-0.4		1.4	11		
	2000	0.09	0.25			0.8	-1.9		-1.1		0.94	5.6		
PCB 44	1999	0.16	1.5			1	-2		-1		1.2	13		
	2000	0.08	0.6			0.82	-2.3		-1.5		0.9	6.7		
PCB 52	1999	0.15	0.66			1.2	-0.49		0.71		1.4	17		
	2000	0.17	0.57			0.9	-0.57		0.33		1.1	11		
PCB 101	1999	0.11	0.58			0.65	-1.3		-0.65		0.76	14		
	2000	0.13	0.53			0.5	-1.5		-1		0.63	7.6		
Suite PCBs	1999	2.8	16			21	-23		240		24	280		
	2000	2.3	8.6			15	-27		110		17	150		
Phenanthrene	1999	11	760	6.4	210	290					310	17000		
	2000	13	210	8.9	150	330					350	11000		
Pyrene	1999	9	550	6.9	290	21					37	2700		
	2000	8.8	160	8.1	240	25					42	1800		
B(b+k)F	1999	14	580	11	390	100					25	1100		
	2000	14	210	16	300	61					30	570		
B(a)P	1999	5	320	2.6	140	0					7.5	470		
	2000	4.1	85	3.5	110	0					7.6	210		
Indeno(1,2,3-cd)P	1999	8	290	4.5	200	0					12	510		
	2000	6	81	6.4	150	0					12	240		

tively, and are similar to such percentages from past calculations showing that contaminated urban air blows out onto the lake roughly a third of the time.

Table 5 shows loadings for Sleeping Bear Dunes and Chicago, as well as a percentage urban effect (the ratio of the extra loading provided by Chicago to the lakewide loading calculated using only Sleeping Bear Dunes data). Since loadings are simply fluxes applied to the Lake as a whole, general patterns for loadings reflect those found in the fluxes. Total downward loadings ("net input" which do not include the effects of volatilization) show that Chicago has a minimal effect for the HCHs, α -endosulfan, p,p'-DDD, and HCB. Urban effects of about 5-10% are found for dieldrin, the chlordane components, and p,p'-DDT and its degradation product p,p'-DDE. Since gas exchange is the dominant deposition process for the pesticides and HCB, increases in absorption drive urban effects, and wet deposition and dry deposition generally have a lower urban effect than for gas absorption for these substances.

Urban effects for total downward loads for PCB congeners range from 7% to 20%, with about a 10-13% added effect for Suite PCBs. When volatilization is included, in most cases there is a negative urban effect, indicating a switch from net volatilization at the rural site to net deposition at Chicago. The exception is PCB 52, which has positive net deposition at both sites, and Suite PCB in 1999, which for the first time since early in the IADN program shows total deposition (including all pathways) to be positive at Sleeping Bear Dunes, though the Suite PCB contribution from Chicago for that year is still three times higher than the lakewide loading calculated using data from SBD. However, Suite PCB total deposition for SBD becomes negative again in 2000.

Urban effects for PAH loadings are sizable in all deposition categories. Since wet and dry deposition are more significant for the heavier PAHs than for PCBs and the pesticides, urban effects for these processes are higher than was the case for pesticides and PCBs, usually between 10-40%. Urban effects for absorption are high, increasing deposition particularly for phenanthrene and pyrene, the lighter PAHs. Total downward loadings are increased by 12 to 72% for PAHs.

Fluxes and loadings for Chicago for 1999 and 2000 reiterate the conclusion from past IADN loadings reports that cities can have a significant effect on atmospheric deposition to the Lakes, particularly for PCBs and PAHs. The effect of urban pollution on deposition to Lake Michigan is likely greater than that described here for Chicago, since cities like Milwaukee and Green Bay are not included. Data from the new Cleveland station will shed further light on urban effects on the Great Lakes.

Table 5. Atmospheric Loadings (kg/yr) using data from Sleeping Bear Dunes (SBD), a remote master station, and Chicago for 1999 and 2000.

	Wet Deposition						Dry Deposition						Absorption						Volatilization						Net Gas Exchange						Total						Net input	
	SBD		Chicago		Urban Effect		SBD		Chicago		Urban Effect		SBD		Chicago		Urban Effect		SBD		Chicago		Urban Effect		SBD		Chicago		Urban Effect		SBD		Chicago		Urban Effect			
	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000		
α-HCH	14	0.16	1.1%	3.4	0.0097	0.3%	420	3.8	0.9%	-340	-3.6	1.1%	80	0.2	97	0.37	440	4	1.0%	36	0.15	0.4%	3.2	0.0044	0.1%	460	6.2	1.4%	-360	-4.1	1.1%	100	2.1	140	2.3	500	6.4	1.3%
	17	0.65	3.8%	2.1	0.024	1.1%	440	4.3	1.0%	-42	-0.58	1.4%	400	3.7	420	4.4	460	5	1.1%	49	0.31	0.6%	0.84	0.013	1.5%	230	3.6	1.6%	-57	-0.67	1.2%	170	2.9	220	3.3	280	3.9	1.4%
Dieldrin	20	0.6	3.0%	19	0.5	2.6%	200	14	7.0%						240	15	240	15	6.3%	19	0.3	1.6%	12	0.44	3.7%	100	5.7	5.7%				130	6.4	130	6.4	130	6.4	4.9%
	6.5	0.16	2.5%	2.1	0.087	4.1%	18	2	11%						27	1.3	27	2.2	8.2%	7.2	0.19	2.6%	1.7	0.077	4.5%	14	1.1	7.9%	-0.96	-1.2	6.1%	23	2.3	23	2.2	23	2.2	6.1%
Cis-chlordane	0.84	0.038	4.5%	1.9	0.074	3.9%	15	1.3	8.7%						18	0.74	18	1.4	7.8%	0.84	0.03	3.6%	1.1	0.062	5.6%	8.2	0.74	9.0%	-0.67	-0.8	8.3%	10	0.032	10	0.83	10	0.83	7.8%
	0.95	0.032	3.4%	1.5	0.031	2.1%	17	0.89	5.2%						20	0.18	20	0.95	4.8%	0.72	0.017	2.4%	0.42	0.03	7.1%	11	0.54	4.9%	-0.77	-0.92	4.9%	12	-0.33	12	0.59	12	0.59	4.9%
α-endosulfan	16	0.29	1.8%	22	0.13	0.6%	340	3.4	1.0%						380	3.8	380	3.8	1.0%	25	0.21	0.8%	14	0.12	0.9%	160	2.4	1.5%				200	2.7	200	2.7	200	2.7	1.4%
	5.3	0.071	1.3%	1.4	0.023	1.8%	20	1.3	6.5%						25	0.07	25	1.4	5.6%	1.3	0.023	1.8%	1.4	0.028	6.7%	14	0.85	6.1%	-1.3	-1.6	5.8%	15	-0.73	15	0.87	15	0.87	5.8%
p,p'-DDE	4.2	0.19	4.5%	1.3	0.19	15%	49	3.1	6.3%						49	3.1	49	3.1	6.3%	4.4	0.065	1.5%	1.1	0.1	9.1%	20	1.7	8.5%	-0.06	-0.067	7.3%	26	1.8	26	1.9	26	1.9	7.3%
	0.84	0.051	6.1%	1.5	0.05	3.3%	25	0.34	1.4%						25	0.34	25	0.44	1.6%	0.63	0.015	2.4%	0.42	0.028	6.7%	7.4	0.13	1.8%	-0.002	-0.003	2.0%	8.5	0.17	8.5	0.17	8.5	0.17	2.0%
HCB	0.84	0.014	1.7%	1.4	0.058	0.7%	120	1.9	1.6%						120	1.9	120	1.9	1.6%	0.84	0.058	0.7%	1.4	0.058	0.7%	140	2.1	1.5%	-1.8	-2.2	1.2%	-30	0.1	-29	0.11	120	1.9	1.6%
	1.9	0.065	3.4%	1.7	0.032	1.7%	27	2.4	8.9%						27	2.4	27	2.4	8.9%	1.9	0.032	1.7%	1.7	0.032	1.7%	18	1.4	7.8%	-36	-0.43	1.2%	-9	2	-7.1	2	29	2.5	8.6%
PCB 18	3.4	0.18	5.3%	1.1	0.1	9.1%	21	2.6	12%						21	2.6	21	2.6	12%	3.4	0.18	5.3%	1.1	0.1	9.1%	20	1.6	9.4%	-42	-0.53	1.3%	-21	2	-18	2.3	24	2.8	12%
	1.7	0.077	4.5%	1.5	0.051	3.3%	17	1.6	9.4%						17	1.6	17	1.6	9.4%	1.7	0.077	4.5%	1.5	0.051	3.3%	11	1.8	16%	-49	-0.64	1.3%	-32	0.96	-30	1	19	1.7	9.0%
PCB 52	3.2	0.079	2.5%	1.4	0.028	6.7%	25	3.8	15%						25	3.8	25	3.8	15%	3.2	0.079	2.5%	1.4	0.028	6.7%	19	2.6	14%	-10	-0.022	0.22%	15	3.8	18	3.9	28	3.9	14%
	3.6	0.073	2.0%	1.9	0.051	3.3%	19	2.6	14%						19	2.6	19	2.6	14%	3.6	0.073	2.0%	1.9	0.051	3.3%	14	3.1	22%	-12	-0.026	0.22%	7	2.5	11	2.6	23	2.7	12%
PCB 101	2.3	0.07	3.0%	1.4	0.051	3.3%	14	3.1	22%						14	3.1	14	3.1	22%	2.3	0.07	3.0%	1.4	0.051	3.3%	11	1.8	16%	-27	-0.29	1.3%	-13	2.8	-11	2.9	16	3.2	20%
	2.7	0.068	2.5%	1.9	0.051	3.3%	11	1.8	16%						11	1.8	11	1.8	16%	2.7	0.068	2.5%	1.9	0.051	3.3%	440	62	14%	-32	-0.36	1.4%	-21	1.4	-18	1.5	14	1.9	14%
Suite PCBs	59	1.9	3.2%	140	25	18%	320	36	11%						320	36	320	36	11%	59	1.9	3.2%	140	25	18%	320	36	11%	-490	-5.8	1.2%	-250	56	9	58	64	13%	
	49	1.1	2.2%	190	19	10%	190	19	10%						190	19	190	19	10%	49	1.1	2.2%	190	19	10%	6100	3800	62%	-570	-6.9	1.2%	-250	29	-140	30	370	37	10%
Phenanthrene	270	27	10%	150	35	23%	6100	3800	62%						6100	3800	6100	3800	62%	270	27	10%	150	35	23%	6100	3800	62%						6500	3900	6500	3900	60%
	190	66	35%	170	31	18%	440	460	105%						440	460	440	460	105%	190	66	35%	170	31	18%	440	460	105%						740	560	740	560	72%
B(b+h)F	300	70	23%	240	47	20%	4.6	25	540%						4.6	25	4.6	25	540%	300	70	23%	240	47	20%	0	16						570	140	570	140	26%	
	300	28	9.3%	330	39	12%	0	0							0	0	0	0		300	28	9.3%	330	39	12%	0	0						630	82	630	82	13%	
B(a)P	100	38	38%	55	17	31%	0	3.4							0	3.4	0	3.4		100	38	38%	55	17	31%	0	2.8						170	58	170	58	36%	
	87	11	13%	74	14	19%	0	0							0	0	0	0		87	11	13%	74	14	19%	0	2.8						160	28	160	28	18%	
Indeno	160	35	22%	95	24	25%	0	4.1							0	4.1	0	4.1		160	35	22%	95	24	25%	0	4.1						270	63	270	63	23%	
	130	10	7.7%	140	19	14%	0	0							0	0	0	0		130	10	7.7%	140	19	14%	0	3.1						270	32	270	32	12%	

4.6 Blank Loadings

The IADN data are not blank corrected. Therefore it is important to present loadings estimates obtained from blank values to understand the proportion of calculated deposition due to blanks. For IADN, MSC air field blanks are obtained by sending a sampling medium to the field and retrieving it with only a short period of exposure to ambient air (without pumping air through). IU blank cartridges are installed in the sampler, kept there for one week, and then returned to the laboratory. The results are representative of analytical blanks and potential interferences from the sampling media. Precipitation blanks for the US samples are XAD cartridges sent out to the field, installed in the sampler, kept there for 28 days, and then shipped back to the laboratory for extraction. Water concentration blanks are prepared by placing a clean filter in the sampling device, wetting with organic free water then shipping for chemical analysis.

Results are presented in Table 6 for Lake Superior and Ontario to represent the different laboratories involved in the program. For pesticides such as HCHs, the blank loadings are small compared to the sample values from less than 1% to about 5%. Dieldrin blanks are a little more prominent with the blank loadings representing 5-10%, 3% and 8% of the wet deposition, absorption and volatilization respectively. HCB blank loadings are larger particularly for wet deposition (13-17%) and volatilization (26%). Cis- and trans-chlordane have blank loadings of the order of 10-30% for wet deposition with smaller blank loadings for absorption. DDT and metabolites can have large blank loadings, particularly for wet deposition, due to the small concentrations now measured for these species. PCBs blanks contribute between 10 and 35% of loadings for all terms. For the heavier PAHs mostly found on particles, blank loadings for absorption are very large compared to what is found in air while lighter PAHs mostly found in the gas phase have large dry deposition blanks relative to dry loadings.

Table 6. Annual blank loadings calculated for Lakes Superior and Ontario compared to annual loadings.

	SUPERIOR (kg/Year)						SUPERIOR BLANK LOADING (kg/Year)						ONTARIO (kg/Year)						ONTARIO BLANK LOADING (kg/Year)						
	DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		
α HCH	1999 2000	45 42	870 750	-2000 -1900	-1200 -1200			0.091 0.070	2.2 1.9	0 0	2.2 1.9			11 11	54 47	-140 -140	-83 -110				0.48 0.25	0 0	0.48 0.25		
γ HCH	1999 2000	63 42	330 250	-240 -220	81 30			0.21 0.092	1.1 0.94	-5.7 -5.4	-4.6 -4.5			24 24	41 45	-37 -37	4.1 3.7				0.37 1.4	-1.7 -1.7	-1.3 -0.26		
Dieldrin	1999 2000	22 9.3	90 54	-690 -660	-600 -600			2.4 0.38	2.2 1.4	-53 -50	-51 -49			6 6.8	28 17	-190 -190	-160 -200				0.43 0.18	-15 -15	-14 -15		
HCB	1999 2000	1.3 0.99	260 220	-230 -210	33 8.7			0.17 0.17	0.86 0.93	-59 -54	-58 -53			0.9 1.5		-69 -76							-13 -14		
cis_chlor	1999 2000	5.4 3.6	14 13					0.58 1.1	2.6 1.7					0.42 5.4	3.7 2.3						0.033 0.031				
trans_chlor	1999 2000	0.87 0.87	8.4 5.7					0.17 0.25	0.36 0.78					0.11 2.8	2.8 1.6						0.029 0.028				
p,p'-DDD	1999 2000	0.15 0	16 7.5					0.42 0.37	3.0 2.1					0.35 0.9	0.9 0.76						0.15 0.19				
p,p'-DDE	1999 2000	2.9 0.57	8.4 4.5					0.16 0.077	0.27 0.20					1.7 3.9	7.6 5.7						0.046 0.050				
p,p'-DDT	1999 2000	1.6 2.0	30 17					1.8 1.0	7.9 9.4					1.0 7.6	6.2 3.8						0.35 0.25				
PCB 018	1999 2000	3.9 2.8	36 36	-36 -36	-1.3 0.87			0.61 0.54	1.6 1.5	-13 -12	-11 -11				12 8.3	-21 -23	-9.0 -15				2.2 1.6	-4.6 -4.9	-2.4 -3.3		
PCB 044	1999 2000	3.6 2.8	23 33	-33 -30	-8.4 3.9			2.1 1.3	4.3 5.3	-11 -11	-6.9 -5.2			4.0 3.1	4.0 -20	-19 -20	-15 -17				0.26 0.18	-4.2 -4.4	-3.9 -4.3		
PCB 052	1999 2000	3.9 4.5	33 33	-16 -15	17 17			1.9 2.3	5.8 4.0	-5.6 -5.3	0.18 -1.2			6.6 4.5	6.6 -11	-11 -12	-4.8 -7.6				0.48 0.33	-2.5 -2.7	-2.0 -2.3		
PCB 101	1999 2000	5.1 3.9	17 15	-3.6 -3.3	14 11			1.4 1.8	3.8 4.1	-1.3 -1.2	2.5 2.9			2.6 1.7	2.6 -6.7	-6.7 -6.9	-4.1 -5.5				0.23 0.085	-1.5 -1.6	-1.3 -1.5		
SUITE PCB	1999 2000	100 69	480 570	-750 -720	-260 -150			25 20	57 53	-270 -250	-210 -200			57 45	57 45	-300 -320	-240 -270				9.4 8.3	-66 -70	-57 -62		
B[a]pyrene	1999 2000	36 20	57 48	0 0				9.1 3.3	3.6 9.7	11 1.1			56 33	19 43	0 0						3.8 3.8				
B[b]fluor	1999 2000	160 100	17 0					35 9.1	10 9.8	26 2.8			180 100	52 170	0.53 12						6.8 5.7				
B[k]fluor.	1999 2000	45 25	69 30	6.3 0				12 3.3	14 11				53 28	31 100	0.37 1.7						4.2 3.2				
Phenanth.	1999 2000	110 90	260 280	7800 5700				57 11	28 7.8	230 50			45 27	260 560	1500 1500						49 53				
Pyrene	1999 2000	99 54	170 150	870 360				49 4.3	31 8.7	39 3.7			97 48	150 280	310 280						12 11				
Lead	1999 2000							5900 3700	22000 17000				130 92												

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Appendix A.

Annual atmospheric fluxes (ng/m²/day) for 1992-2000

Table A. Annual Atmospheric Fluxes (ng/m²/day) for 1992-2000.

	SUPERIOR (ng/m ² /day)				MICHIGAN (ng/m ² /day)				HURON (ng/m ² /day)				ERIE (ng/m ² /day)				ONTARIO (ng/m ² /day)										
	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG		
α₁HCH																											
1992		2.5	92	-27	65		3.5	85	-56	29							4.7	92	-52	40			5.6	21	-29	-8	
1993		1.4	52	-29	23		1.5	61	-57	4							2.7	82	-53	29			5.0	21	-30	-9	
1994		1.5	67	-44	23		3.6	59	-66	-7							2.8	82	-52	30			4.3	23	-30	-7	
1995		1.4	46	-60	-14		2.5	39	-10	29							2.0	50	-29	21			8.1	18	-21	-3	
1996		1.8	37	-50	-13		0.38	31	-8.5	23							1.7	35	-26	9			7.9	15	-18	-3	
1997		1.3	31	-58	-27		1.5	33	-14	19							3.2	12	-17	-4			4.7	12	-18	-6	
1998		0.29	35	-77	-42		0.69	31	-17	14							1.8	10	-19	-9			4.7	9.2	-19	-9.8	
1999		1.5	29	-68	-39		0.68	20	-16	4							1.3	7.2	-19	-12			1.6	7.8	-20	-12	
2000		1.4	25	-65	-40		1.7	22	-17	5							2.2	20	-17	3			1.6	6.8	-20	-13	
γ₁HCH																											
1992		1.5	14	-5.4	8.6		4.2	65	-6.3	59							4.1	24	-9.3	15			4.5	6.1	-6.2	-0.1	
1993		0.53	6.9	-5.8	1.1		4.5	19	-6.4	13							2.0	21	-9.5	12			3.3	6.4	-6.0	0.4	
1994		0.90	9.7	-8.4	1.3		1.9	35	-7.3	28							2.2	22	-11	11			5.2	7.8	-4.7	3.1	
1995		0.77	6.6	-5.6	1.0		1.1	15	-1.5	14							1.5	12	-4.8	7.2			3.3	5.4	-3.9	1.5	
1996		0.94	6.8	-4.8	2.0		0.18	9.3	-2.3	8.0							4.7	3.6	-2.0	1.6			3.7	5.5	-3.4	2.1	
1997		1.2	8.6	-6.7	1.9		1.7	18	-2.2	16							0.71	14	-6.7	7.3			8.3	5.1	-4.8	0.3	
1998		0.37	6.6	-8.7	-2.1		0.58	15	-2.6	12							0.13	13	-7.0	6			8.6	5.5	-5.2	0.3	
1999		2.1	11	-7.9	3.1		0.79	21	-2.5	19							1.0	13	-7.1	5.9			3.5	5.9	-5.3	0.6	
2000		1.4	8.5	-7.5	1.0		2.3	11	-2.7	8.0							2.7	14	-6.8	7.2			3.5	6.5	-5.3	1.2	
Dieldrin																											
1992		1.6	4.9	-31	-26		2.7	8.9	0	8.9							0.94						1.3	4.0	-55	-51	
1993		1.2	3.5	-34	-30		2.2	9.1	0	9.1							0.98	4.0	-57	-53			0.92	6.3	-30	-24	
1994		0.57	4.0	-46	-42		2.1	9.2	0	9.2							0.75	3.5	-56	-53			0.57	6.2	-38	-32	
1995		1.2	2.7	-18	-15		2.1	7.1	-29	-22							0.85	2.0	0	2.0			1.6	7.0	-37	-45	
1996		0.69	2.8	-15	-12		1.2	4.2	-25	-21							2.1	2.1	0	2.1			2.0	4.9	-33	-40	
1997		0.57	2.6	-20	-17		1.0	5.9	0	5.9							1.3	2.9	0	2.9			1.0	8.1	-34	-26	
1998		0.51	1.9	-25	-23		1.3	3.7	0	3.7							0.75	2.2	0	2.2			0.62	7.5	-34	-22	
1999		0.73	3.0	-23	-20		0.94	9.7	0	9.7							0.54	3.4	0	3.4			0.59	5.2	-35	-23	
2000		0.31	1.8	-22	-20		0.9	4.8	0	4.8							0.72	3.0	0	3.0			0.96	5.8	-34	-26	
hexachlorobenzene																											
1992		0.21	12				0.097	10									0						0				
1993		0.15	8.9	-7.6	1.3		0.12	9.2	-11	-1.8							0.21		-5.2				0.089	11	-13	-2.6	
1994		0.054	7.4	-8.1	-0.7		0.049	6.5	-11	-4.5							0.046		-5.1				0.035	8.9	-13	-4.1	
1995		0.052	7.6	-5.9	1.7		0.054	7.0	-5.8	1.2							0.17		-8.3				0.078	8.6	-10	-1.9	
1996		0.045	7.1	-5.3	1.8		0.034	6.1	-5.5	0.6							0.035		-6.6				0.064	6.6	-10	-3.4	
1997		0.034	6.8	-6.8	0		0.030	6.3	-6.8	-0.5							0.21		-6.0				0.034	8.5	-12	-3.5	
1998		0.030	7.9	-7.3	0.6		0.033	7.3	-6.7	0.6							0.052		-5.9				0.060	7.7	-11	-3.3	
1999		0.045	8.8	-7.7	1.1		0.038	5.9	-7.2	-1.3							0.20		-6.3				0.044	8.1	-12	-3.9	
2000		0.033	7.3	-7.1	0.2		0.042	6.8	-8.4	-1.6							0.10		-6.3				0.058	7.8	-11	-3.2	
cis_chlordane																											
1992		0.16					0.054										0.016						0.039				
1993		0.22					0.13										0.0060	0.36					0.20				
1994		0.12	0.78				0.82	1.1									0	0.31					0.39	1.9			
1995		0.16	0.56				0.38	0.78									0.071	0.20					1.0	1.6			
1996		0.10	0.43				0.10	0.57									0.041	0.22					0.33	0.84			
1997		0.16	0.43				0.38	0.71									0.087	0.23					1.4	1.4			
1998		0.13	0.32				0.51	0.49									0.019	0.21					0.67	1.2			
1999		0.18	0.48				0.31	0.84									0.020	0.32					0.97	1.2			
2000		0.12	0.42				0.34	0.68									0.025	0.24					1.9	1.2			

	SUPERIOR (ng/m ³ /day)				MICHIGAN (ng/m ³ /day)				HURON (ng/m ³ /day)				ERIE (ng/m ³ /day)				ONTARIO (ng/m ³ /day)									
	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	
trans_chlordane																										
1992		0.050					0.14					0.071						0.035					0.072	0.41		
1993		2.0					2.4					0	0.30					7.4					0.036	0.51		
1994		0.70	0.43				2.5	1.0				0.092	0.26					2.7	1.7				0.070	0.50		
1995		0.23	0.75				0.15	0.57				0.0070	0.15					1.9	1.3				0	0.47		
1996		0.34	0.34				0.30	0.48				0.083	0.18					3.3	0.62				0.037	0.30		
1997		0.02	0.46				0.045	0.56				0.18	0.18					0.074	1.2				0.14	0.35		
1998		0.034	0.22				0.046	0.33				0.092	0.15					0.037	1.1				0.042	0.22		
1999		0.029	0.28				0.042	0.70				0.037	0.22					0.075	0.97				0.016	0.40		
2000		0.029	0.19				0.041	0.39				0.70	0.20					0.076	0.77				0.41	0.23		
p'p'-DDD																										
1992		0.029	0.42				0.11	1.1				0.12						0.26	2.9				0.049	0.17		
1993		0.21	0.11				0.049	0.85				0.030	0.068					0.036	1.7				0.093	0.20		
1994		0.42	0.34				0.69	0.38				0	0.099					0.12	0.65				0	0.24		
1995		0.076	0.23				0.050	0.14				0.0030	0.043					0.19	2.0				0.053	0.12		
1996		0.017	0.38				0.052	0.57				0.12	0.051					1.0	0.86				0.026	0.12		
1997		0.0010	0.31				0.0070	0.33				1.0	0.068					0.082	0.66				0.19	0.13		
1998		0.028	0.27				0.088	0.43				0.040	0.057					0.22	0.93				0.090	0.10		
1999		0.0050	0.53				0.037	1.2				0.018	0.042					0	3.0				0.050	0.13		
2000		0	0.25				0.026	0.35				0.021	0.046					0.012	0.34				0.13	0.11		
p'p'-DDE																										
1992		0.15	0.37				0.20	1.1				0.37						0.51	2.1				0.83	1.3		
1993		0.16	0.41				0.35	1.7				0.28	0.40					0.35	3.0				0.93	1.5		
1994		0.14	0.26				0.20	0.68				0.067	0.34					0.33	1.8				0.45	2.1		
1995		0.13	0.24				0.30	0.79				0.42	0.29					0.86	2.0				1.1	1.3		
1996		0.057	0.21				0.13	0.65				0.25	0.24					0.37	1.5				1.3	0.96		
1997		0.062	0.38				0.12	0.83				0.92	0.18					0.22	1.9				2.3	1.0		
1998		0.088	0.18				0.10	0.55				0.19	0.19					0.13	1.4				0.81	0.76		
1999		0.096	0.28				0.25	0.94				0.14	0.24					0.25	1.7				0.25	1.1		
2000		0.019	0.15				0.063	0.65				0.17	0.22					0.16	1.8				0.56	0.82		
p'p'-DDT																										
1992		1.1	1.1				1.5	2.8				1.5						3.7	4.2				0.74	1.1		
1993		11	0.67				2.3	3.2				0	0.37					6.7	5.4				0.28	1.2		
1994		1.8	0.15				2.4	0.52				0	0.35					1.3	2.3				0.19	1.8		
1995		0.18	0.79				0.32	0.86				0.22	0.26					2.6	3.4				0.76	1.1		
1996		0.063	0.80				0.25	1.1				0.68	0.21					0.67	4.3				0.50	1.4		
1997		0.073	0.45				0.25	1.1				1.7	0.22					0.29	2.7				2.5	0.84		
1998		0.12	0.52				0.13	1.4				0.0020	0.12					0.13	2.6				0.17	0.62		
1999		0.054	1.0				0.20	2.3				0.059	0.29					0.25	3.3				0.15	0.90		
2000		0.066	0.57				0.21	0.95				0.22	0.19					0.38	2.5				1.1	0.55		
trans_nonachlor																										
1992		0.058	0.29				0.028	0.50				0						0.018	1.2				0	0.48		
1993		0.084	0.26				0.26	0.71				0	0.38					0.032	1.4				0	0.60		
1994		0.11	0.33				0.029	0.61				0	0.36					0.14	1.1				0	0.69		
1995		0.30	0.26				0.037	0.42				0	0.20					0.063	0.83				0	0.50		
1996		0.072	0.27				0.025	0.33				0	0.20					0.038	0.52				0	0.31		
1997		0.028	0.24				0.027	0.43				0	0.23					0.046	0.80				0	0.35		
1998		0.026	0.29				0.036	0.39				0.014	0.19					0.032	0.69				0.039	0.24		
1999		0.026	0.42				0.045	0.78				0.035	0.27					0.024	0.84				0.13	0.45		
2000		0.013	0.20				0.034	0.53				0.036	0.22					0.065	0.78				0.044	0.22		

	SUPERIOR (ng/m ³ /day)				MICHIGAN (ng/m ³ /day)				HURON (ng/m ³ /day)				ERIE (ng/m ³ /day)				ONTARIO (ng/m ³ /day)										
	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG		
α_endosulfan	1992		0																								
	1993		0																								
	1994		0.20																								
	1995		2.3	4.2				0.55	15																		
	1996		0.91	4.0				0.34	10																		
	1997		0.66	4.4				0.73	21																		
	1998		0.26	4.0				0.43	22																		
	1999		0.84	6.6				0.75	16																		
	2000		0.52	1.8				1.2	7.6																		
	PCB 018	1992		0.089	0.86	-5.7	-4.8		0.049	1.7	-9.7	-8.0															
1993			0.059	1.4	-6.0	-4.6		0.034	1.7	-10	-8.3																
1994			0.063	0.79	-6.7	-5.9		0.073	1.2	-9.9	-8.7																
1995			0.099	0.59	-1.8	-1.2		0.096	0.81	-3.8	-2.9																
1996			0.15	0.59	-1.6	-1.0		0.069	0.67	-3.5	-2.8																
1997			0.090	0.49	-1.1	-0.61		0.044	0.78	-1.6	-0.80																
1998			0.056	0.46	-1.2	-0.74		0.056	1.1	-1.6	-0.5																
1999			0.13	1.2	-1.2	0		0.093	1.3	-1.7	-0.4																
2000			0.093	1.2	-1.2	0		0.086	0.85	-1.9	-1.1																
PCB 044		1992		0.030	0.69	-1.8	-1.1		0.038	2.9	-7.0	-4.1															
	1993		0.012	2.3	-1.9	0.4		0.028	3.0	-7.2	-4.2																
	1994		0.062	2.3	-2.1	0.2		0.22	0.90	-7.1	-6.2																
	1995		0.11	1.3	-2.1	-0.8		0.068	1.1	-3.3	-2.2																
	1996		0.094	0.43	-1.8	-1.4		0.041	0.62	-3.0	-2.4																
	1997		0.076	0.68	-0.93	-0.25		0.059	0.53	-1.8	-1.3																
	1998		0.28	0.51	-1.1	-0.59		0.10	0.70	-1.9	-1.2																
	1999		0.12	0.76	-1.1	-0.34		0.16	1.0	-2.0	-1.0																
	2000		0.093	1.1	-1.0	0.1		0.080	0.82	-2.3	-1.5																
	PCB 052	1992		0.028	0.85	-1.8	-0.95		0.046	2.2	-9.0	-6.8															
1993			0.010	2.2	-1.9	0.3		0.035	2.0	-9.2	-7.2																
1994			0.095	2.4	-2.1	0.3		0.11	1.1	-9.2	-8.1																
1995			0.16	1.3	-2.6	-1.3		0.11	0.95	-0.55	0.40																
1996			0.14	0.69	-2.3	-1.6		0.091	0.72	-0.50	0.22																
1997			0.057	0.59	-0.47	0.12		0.076	0.76	-0.46	0.30																
1998			0.069	0.55	-0.53	0.02		0.082	0.97	-0.47	0.50																
1999			0.13	1.1	-0.53	0.57		0.15	1.2	-0.49	0.71																
2000			0.15	1.1	-0.50	0.6		0.17	0.90	-0.57	0.33																
PCB 101		1992		0.064	0.54	-3.4	-2.9		0.042	1.6	-4.0	-2.4															
	1993		0.031	1.2	-3.6	-2.4		0.022	1.6	-4.1	-2.5																
	1994		0.066	2.4	-4.2	-1.8		0.069	0.66	-4.1	-3.4																
	1995		0.15	1.1	-1.3	-0.2		0.077	0.53	-1.5	-0.97																
	1996		0.11	0.54	-1.2	-0.66		0.052	0.43	-1.3	-0.87																
	1997		0.096	0.40	-0.10	0.3		0.054	0.36	-1.2	-0.84																
	1998		0.18	0.36	-0.12	0.24		0.070	0.49	-1.3	-0.81																
	1999		0.17	0.58	-0.12	0.46		0.11	0.65	-1.3	-0.65																
	2000		0.13	0.49	-0.11	0.38		0.13	0.50	-1.5	-1.0																

	SUPERIOR (ng/m ² /day)				MICHIGAN (ng/m ² /day)				HURON (ng/m ² /day)				ERIE (ng/m ² /day)				ONTARIO (ng/m ² /day)							
	DRY	WET	ABS	NETG	DRY	WET	ABS	NETG	DRY	WET	ABS	NETG	DRY	WET	ABS	NETG	DRY	WET	ABS	NETG	DRY	WET	ABS	NETG
SUITE PCB																								
1992	. . .	3.7	14	-81	. . .	1.6	39	-180	. . .	. . .	. . .	. . .	. . .	. . .	2.1	59	-110	. . .	. . .	. . .	. . .	. . .	20	-93
1993	. . .	2.8	36	-85	. . .	2.1	39	-190	. . .	5.9	12	-44	. . .	1.4	75	-110	. . .	5.4	21	-95	. . .	5.4	21	-95
1994	. . .	1.5	34	-96	. . .	3.9	19	-180	. . .	9.0	13	-44	. . .	3.8	41	-110	. . .	5.1	29	-98	. . .	5.1	29	-98
1995	. . .	3.2	18	-37	. . .	2.1	14	-54	. . .	0	11	-27	. . .	3.8	35	-110	. . .	3.6	15	-57	. . .	3.6	15	-57
1996	. . .	3.1	11	-33	. . .	1.5	11	-49	. . .	7.6	22	-14	. . .	3.1	17	-99	. . .	3.5	13	-52	. . .	3.5	13	-52
1997	. . .	2.6	9.6	-22	. . .	1.1	13	-22	. . .	6.3	26	-20	. . .	1.7	39	-89	. . .	1.7	39	-89	. . .	1.7	39	-89
1998	. . .	3.6	8.1	-25	. . .	1.6	18	-22	. . .	4.3	27	-23	. . .	1.5	36	-82	. . .	6.7	40	-31	. . .	6.7	40	-31
1999	. . .	3.5	16	-25	. . .	2.8	21	-23	. . .	8.1	28	-20	. . .	1.7	39	-88	. . .	8.3	43	-35	. . .	8.3	43	-35
2000	. . .	2.3	19	-24	. . .	2.3	15	-27	. . .	6.3	28	-22	. . .	2.2	28	-86	. . .	6.5	46	-40	. . .	6.5	46	-40
benzo[a]pyrene																								
1992	1.2	8.5	0	. . .	. . .	4.6	9.1	1.6	. . .	4.4	0	. . .	. . .	7.4	21	. . .	11	0	. . .	. . .	. . .	. . .	. . .
1993	0	2.6	0	. . .	. . .	1.5	5.3	0	. . .	4.9	4.6	. . .	. . .	5.8	10	0.24	. . .	12	2.1	. . .	. . .	. . .	. . .
1994	1.2	1.1	0	. . .	. . .	2.7	3.0	0	. . .	2.6	0	. . .	. . .	10	8.2	0	. . .	6.9	0.26	. . .	. . .	. . .	. . .
1995	0.42	2.6	1.6	. . .	. . .	1.9	5.5	0.036	. . .	2.1	1.4	. . .	. . .	12	17	2.7	. . .	5.9	1.6	. . .	. . .	. . .	. . .
1996	1.2	1.3	0.021	. . .	. . .	1.9	3.5	0.83	. . .	4.5	1.6	. . .	. . .	13	8.3	0.083	. . .	9.4	7.1	. . .	. . .	. . .	. . .
1997	1.2	2.4	0.053	. . .	. . .	2.3	5.6	0.71	. . .	3.9	6.8	0	. . .	11	13	0.27	. . .	8.6	7.2	0	. . .	8.6	7.2	0
1998	0.94	2.6	0.021	. . .	. . .	2.6	3.9	0.38	. . .	2.8	1.6	0	. . .	11	7.8	0.17	. . .	9.0	19	0.20	. . .	9.0	19	0.20
1999	1.2	1.9	0	. . .	. . .	2.6	4.9	0	. . .	2.5	2.0	0	. . .	12	8.3	3.4	. . .	8.1	2.7	0	. . .	8.1	2.7	0
2000	0.66	1.6	0	. . .	. . .	3.5	4.1	0.012	. . .	3.1	4.1	0	. . .	6.9	10	1.4	. . .	4.8	6.2	0	. . .	4.8	6.2	0
benzo[b]fluoranthene																								
1992	5.2	15	2.2	. . .	. . .	14	16	3.4	. . .	7.9	0	. . .	. . .	43	41	8.6	. . .	37	1.0	. . .	. . .	. . .	. . .
1993	1.1	3.8	0	. . .	. . .	5.8	9.5	0	. . .	8.8	6.7	. . .	. . .	28	20	3.0	. . .	46	28	. . .	. . .	. . .	. . .
1994	4.3	2.7	0	. . .	. . .	8.3	7.6	0.40	. . .	5.6	1.6	. . .	. . .	36	17	2.5	. . .	18	4.0	. . .	. . .	. . .	. . .
1995	4.0	8.2	3.2	. . .	. . .	7.3	13	0.29	. . .	4.0	1.1	. . .	. . .	48	39	10	. . .	16	6.6	. . .	. . .	. . .	. . .
1996	3.3	4.8	0.12	. . .	. . .	6.9	7.6	1.8	. . .	7.9	11	. . .	. . .	33	20	0.30	. . .	29	16	. . .	. . .	. . .	. . .
1997	4.3	5.4	0.18	. . .	. . .	6.8	11	2.1	. . .	6.8	13	0.32	. . .	32	26	1.2	. . .	24	16	0	. . .	24	16	0
1998	3.8	6.3	0.17	. . .	. . .	8.6	9.7	2.8	. . .	6.0	6.0	0.15	. . .	39	20	3.3	. . .	31	93	5.3	. . .	31	93	5.3
1999	5.2	6.1	0.57	. . .	. . .	8.4	10	0.22	. . .	4.0	7.7	0.040	. . .	42	18	13	. . .	26	7.5	0.077	. . .	26	7.5	0.077
2000	3.5	5.2	0	. . .	. . .	12	11	0.0050	. . .	5.2	11	0	. . .	25	23	5.9	. . .	15	25	1.8	. . .	15	25	1.8
benzo[k]fluoranthene																								
1992	0.60	7.4	0.42	. . .	. . .	14	6.5	2.0	. . .	3.4	0	. . .	. . .	6.1	16	3.3	. . .	10	0	0	. . .	10	0	0
1993	0.44	1.8	0	. . .	. . .	5.8	3.3	0	. . .	3.9	2.0	. . .	. . .	8.6	7.4	0.43	. . .	12	0	. . .	. . .	12	0	. . .
1994	1.7	1.2	0	. . .	. . .	8.3	2.7	0	. . .	2.2	1.1	. . .	. . .	11	6.8	0.71	. . .	4.8	0	. . .	. . .	4.8	0	. . .
1995	1.2	1.7	0.94	. . .	. . .	2.3	4.5	0.047	. . .	1.8	1.1	. . .	. . .	14	10	2.7	. . .	5.6	5.2	. . .	. . .	5.6	5.2	. . .
1996	1.4	1.6	0.044	. . .	. . .	2.2	2.4	0.44	. . .	3.3	8.1	. . .	. . .	13	6.6	0.086	. . .	9.4	11	. . .	. . .	9.4	11	. . .
1997	1.3	1.9	0.043	. . .	. . .	2.0	4.3	0.60	. . .	3.0	9.4	0	. . .	9.4	9.4	0.28	. . .	7.9	8.9	0	. . .	7.9	8.9	0
1998	0.83	2.1	0.014	. . .	. . .	2.0	2.9	0.38	. . .	2.5	3.7	0	. . .	8.8	5.7	0.075	. . .	9.8	43	1.2	. . .	9.8	43	1.2
1999	1.5	2.3	0.21	. . .	. . .	2.7	4.2	0	. . .	2.0	4.0	0	. . .	14	7.5	4.1	. . .	7.6	4.5	0.053	. . .	7.6	4.5	0.053
2000	0.85	1.0	0	. . .	. . .	3.8	3.1	0.0030	. . .	2.2	8.1	0	. . .	8.1	7.5	1.5	. . .	4.1	15	0.25	. . .	4.1	15	0.25
benzo[k]fluoranthene + benzo[b]fluoranthene																								
1992	5.8	23	2.6	. . .	. . .	29	22	5.4	. . .	11	0	. . .	. . .	49	57	12	. . .	47	1.0	. . .	. . .	47	1.0	. . .
1993	1.5	5.6	0	. . .	. . .	12	13	0	. . .	13	8.6	. . .	. . .	36	28	3.4	. . .	58	28	. . .	. . .	58	28	. . .
1994	6.0	3.9	0	. . .	. . .	17	10	0.40	. . .	7.9	2.7	. . .	. . .	46	24	3.2	. . .	22	4.0	. . .	. . .	22	4.0	. . .
1995	5.3	10	4.1	. . .	. . .	9.6	17	0.34	. . .	5.8	2.2	. . .	. . .	63	49	13	. . .	22	12	. . .	. . .	22	12	. . .
1996	4.7	6.4	0.16	. . .	. . .	9.1	9.9	2.2	. . .	11	19	. . .	. . .	46	26	0.38	. . .	39	27	. . .	. . .	39	27	. . .
1997	5.6	7.3	0.22	. . .	. . .	8.9	16	2.7	. . .	9.8	22	0.32	. . .	42	35	1.5	. . .	32	25	0	. . .	32	25	0
1998	4.6	8.3	0.18	. . .	. . .	11	13	3.2	. . .	8.6	9.7	0.15	. . .	48	26	3.4	. . .	41	140	6.5	. . .	41	140	6.5
1999	6.6	8.5	0.78	. . .	. . .	11	14	0.22	. . .	6.0	12.0	0.04	. . .	56	26	17	. . .	34	12	0.13	. . .	34	12	0.13
2000	4.3	6.3	0	. . .	. . .	16	14	0.0070	. . .	7.4	19	0	. . .	33	31	7.3	. . .	19	40	. . .	. . .	19	40	. . .

	SUPERIOR (ng/m ² /day)						MICHIGAN (ng/m ² /day)						HURON (ng/m ² /day)						ERIE (ng/m ² /day)						ONTARIO (ng/m ² /day)					
	DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG	
Indeno[1,2,3-cd]Pyrene	1992	2.5	7.4	0			8.5	11	0.56				8.5	0				18	25	1.9				16	0					
	1993	0	2.0	0			3.3	5.9	0				8.2	6.2				14	12	0.28				24	17					
	1994	2.3	1.0	0			5.3	4.2	0				5.9	0				20	7.7	0				17	0.45					
	1995	1.1	4.3	0			3.7	8.4	0.035				3.8	3.2				24	25	2.2				13	1.9					
	1996	2.5	3.4	0.0020			4.7	4.8	0.32				8.6	7.2				26	14	0.040				21	7.8					
	1997	2.5	4.2	0.075			4.1	8.5	0.73				6.5	10				19	17	0.19				17	9.0					
	1998	2.0	3.9	0.022			5.9	5.9	1.0				5.1	5.9				22	11	0.094				20	32					
	1999	2.6	4.0	0			4.5	7.7	0				3.4	6.3				22	13	2.6				14	8.1					
	2000	1.7	3.0	0			6.4	6.0	0.0060				4.1	6.4				13	13	1.5				12	12					
	Phenanthrene	1992	2.1	9.7	300			5.9	17	380				4.6	23				11	40	1600				6.1	54				
1993		0.30	3.6	260			3.4	6.1	520				4.6	32				10	25	2100				6.1	97					
1994		8.9	6.1	190			6.7	7.6	400				3.7	27				20	19	1600				8.2	54					
1995		1.9	8.6	400			4.0	14	310				2.7	17				17	39	2000				4.1	40					
1996		3.1	8.7	250			4.9	9.0	290				4.8	20				21	12	990				10	28					
1997		3.1	8.0	200			4.6	12	320				6.7	34				17	31	1200				7.4	70					
1998		2.5	6.1	170			4.5	7.7	230				3.0	29				15	18	1200				7.1	140					
1999		3.7	8.6	260			6.4	11	290				1.5	29				20	25	1200				6.5	37					
2000		3.0	9.4	190			8.8	13	330				2.5	34				12	38	1300				3.9	81					
Pyrene		1992	4.5	7.6	68			7.5	13	45				5.7	0				13	32	260				11	0				
	1993	0.59	2.7	24			4.2	6.7	62				6.2	0				14	21	260				9.1	2.1					
	1994	6.7	4.6	16			7.2	5.4	35				3.5	3.0				25	14	140				7.8	0.88					
	1995	1.8	6.7	120			4.6	12	21				2.8	17				23	31	220				7.0	22					
	1996	2.9	4.7	22			5.1	6.0	21				5.8	18				28	8.2	110				13	27					
	1997	2.6	5.3	14			4.7	9.1	27				7.2	27				20	23	110				10	60					
	1998	2.5	4.5	16			5.4	5.9	27				4.8	16				19	12	110				13	75					
	1999	3.3	5.7	29			6.9	8.8	21				2.7	14				28	18	97				14	22					
	2000	1.8	5.1	12			8.1	8.8	25				3.8	17				14	23	120				6.9	41					

	SUPERIOR (ng/m ³ /day)						MICHIGAN (ng/m ³ /day)						HURON (ng/m ³ /day)						ERIE (ng/m ³ /day)						ONTARIO (ng/m ³ /day)					
	DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG		DRY	WET	ABS	VOL	NETG	
Arsenic																														
1992																														
1993														250												240				
1994														130												210				
1995														49	150											220				
1996														170	170											100	200			
1997														79												160				
1998														59												110				
1999														73												120				
2000														92												110				
Cadmium																														
1992														31												24				
1993														23	170											22	150			
1994														30	110											36	150			
1995														12	75											10	130			
1996														22	290											23	110			
1997														25	180											28	210			
1998														14	260											23	180			
1999														17	68											29	130			
2000														23	140											26	78			
Lead																														
1992														560												780				
1993														550	1900											860	1900			
1994														950	870											1100	1900			
1995														460	860											570	1900			
1996														760	2300											850	2800			
1997														600	3500											890	3300			
1998														330	1300											670	4000			
1999														450	1300											850	3200			
2000														320	1100											540	2500			
Selenium																														
1992																														
1993																														
1994																														
1995																														
1996																														
1997																														
1998																														
1999																														
2000																														

Appendix B.

Annual atmospheric flows (kg/yr) for 1992-2000

Table B. Annual Atmospheric Flows (kg/yr) for 1992-2000.

	SUPERIOR (kg/year)				MICHIGAN (kg/year)				HURON (kg/year)				ERIE (kg/year)				ONTARIO (kg/year)							
	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG	DRY	WET	ABS	VOL	NETG				
α _HCH																								
1992		75	2800	-810	2000		74	1800	-1200	600		130												
1993		42	1600	-870	730		32	1300	-1200	100		85	410	-1100	-690		44	860	-490	370		39	150	-200
1994		45	2000	-1300	700		76	1200	-1400	-200		91	410	-1100	-690		25	770	-500	270		35	150	-210
1995		42	1400	-1800	-400		53	820	-210	610		240	350	-480	-130		19	470	-270	200		56	120	-150
1996		54	1100	-1500	-400		80	650	-180	470		170	280	-370	-90		16	330	-240	90		55	100	-120
1997		39	930	-1700	-770		32	700	-300	400		70	260	-370	-110		63	290	-160	130		30	83	-120
1998		87	1000	-2300	-1300		15	650	-360	290		39	220	-410	-190		34	320	-170	150		33	64	-130
1999		45	870	-2000	-1100		14	420	-340	80		28	160	-410	-250		70	220	-170	50		11	54	-140
2000		42	750	-1900	-1200		36	460	-360	100		26	140	-390	-250		21	190	-160	30		11	47	-140
γ _HCH										0														
1992		45	420	-160	260		89	1400	-130	1300		100												
1993		16	210	-170	40		95	400	-140	260		91	98	-150	-52		19	200	-89	110		23	44	-42
1994		27	290	-250	40		40	740	-150	590		91	130	-150	-20		21	210	-100	110		36	54	-33
1995		23	200	-170	30		23	320	-32	290		120	87	-52	35		14	110	-45	65		23	37	-27
1996		28	200	-140	60		38	200	-27	170		100	78	-44	34		34	120	-41	79		26	38	-24
1997		36	260	-200	60		36	380	-46	330		120	100	-37	63		67	130	-63	67		57	35	-33
1998		11	200	-260	-60		12	320	-55	270		140	83	-41	42		12	120	-66	54		60	38	-36
1999		63	330	-240	90		17	440	-53	390		52	110	-41	69		94	120	-67	53		24	41	-37
2000		42	250	-220	30		49	230	-57	170		59	74	-41	33		25	130	-64	66		24	45	-37
Dieldrin																								
1992		48	150	-930	-780		57	190	0	190		20												
1993		36	100	-1000	-900		46	190	0	190		21	87	-1200	-1100		27	83	-780	-700		90	28	-380
1994		17	120	-1400	-1300		44	190	0	190		16	76	-1200	-1100		23	110	-790	-680		64	44	-210
1995		36	81	-540	-460		44	150	-610	-460		18	44	0	44		73	100	-770	-670		39	43	-260
1996		21	84	-450	-370		25	89	-530	-440		46	46	0	46		15	66	-340	-270		49	26	-340
1997		17	78	-600	-520		21	120	0	120		28	63	0	46		19	46	-310	-260		11	19	-300
1998		15	57	-750	-690		27	78	0	78		16	48	0	48		94	76	-320	-240		67	24	-170
1999		22	90	-690	-600		20	200	0	200		12	74	0	74		58	70	-320	-250		76	19	-180
2000		9.3	54	-660	-610		19	100	0	100		16	65	0	65		55	49	-330	-280		60	28	-190
hexachlorobenze																								
1992		6.3	360				2.0	210				0												
1993		4.5	270	-230	40		2.5	190	-230	-40		4.6		-110										
1994		1.6	220	-240	-20		1.0	140	-230	-90		1.0		-110										
1995		1.6	230	-180	50		1.1	150	-120	30		3.7		-180										
1996		1.3	210	-160	50		0.72	130	-120	10		0.76		-140										
1997		1.0	200	-200	0		0.63	130	-140	-10		4.6		-130										
1998		0.90	240	-220	20		0.70	150	-140	10		1.1		-130										
1999		1.3	260	-230	30		0.80	120	-150	-30		4.4		-140										
2000		0.99	220	-210	10		0.89	140	-180	-40		2.2		-140										
cis_chlordane																								
1992		4.8					1.1					0.35												
1993		6.6					2.7					0.13	7.8											
1994		3.6	23				17	23				0	6.7											
1995		4.8	17				8.0	16				1.5	4.4											
1996		3.0	13				2.1	12				0.89	4.8											
1997		4.8	13				8.0	15				1.9	5.0											
1998		3.9	9.6				11	10				0.41	4.6											
1999		5.4	14				6.5	18				0.44	7.0											
2000		3.6	13				7.2	14				0.54	5.2											

	SUPERIOR (kg/year)						MICHIGAN (kg/year)						HURON (kg/year)						ONTARIO (kg/year)											
	WET		ABS		VOL		NETG		DRY		WET		ABS		VOL		NETG		DRY		WET		ABS		VOL		NETG			
	DRY																													
trans_chlordane	1992																													
	1993		1.5								3.0												0.33							
	1994		60								51												69							
	1995		21	13							53	21											25	16						
	1996		6.9	22							3.2	12											18	12						
	1997		10	10							6.3	10											31	5.8						
	1998		0.60	14							0.95	12											0.69	11						
	1999		1.0	6.6							0.97	7.0											0.35	10						
	2000		0.87	8.4							0.89	15											0.70	9.1						
	2000		0.87	5.7							0.86	8.2											0.71	7.2						
p'p'-DDD	1992																													
	1993		0.87	13							2.3	23											2.4	27						
	1994		6.3	3.3							1.0	18											0.34	16						
	1995		13	10							15	8.0											1.1	6.1						
	1996		2.3	6.9							1.1	3.0											0.065	0.94						
	1997		0.51	11							1.1	12											9.4	8.1						
	1998		0.030	9.3							0.15	7.0											0.77	6.2						
	1999		0.84	8.1							1.9	9.1											2.1	8.7						
	2000		0.15	16							0.78	25											0	28						
	2000		0	7.5							0.55	7.4											0.11	3.2						
p'p'-DDE	1992																													
	1993		4.5	11							4.2	23											4.8	20						
	1994		4.8	12							7.4	36											3.3	28						
	1995		4.2	7.8							4.2	14											3.1	17						
	1996		3.9	7.2							6.3	17											9.1	19						
	1997		1.7	6.3							2.7	14											5.4	5.2						
	1998		1.9	11							2.5	18											2.1	18						
	1999		2.6	5.4							2.1	12											4.1	4.1						
	2000		2.9	8.4							5.3	20											2.3	16						
	2000		0.57	4.5							1.3	14											3.7	4.8						
p'p'-DDT	1992																													
	1993		33	33							32	59											35	39						
	1994		330	20							49	68											63	51						
	1995		54	4.5							51	11											12	22						
	1996		5.4	24							6.8	18											24	32						
	1997		1.9	24							5.3	23											6.3	40						
	1998		2.2	13							5.3	23											2.7	25						
	1999		3.6	16							2.7	30											0.044	2.6						
	2000		1.6	30							4.2	49											1.3	6.3						
	2000		2.0	17							4.4	20											4.8	4.1						
trans_nonachlor	1992																													
	1993		1.7	8.7							0.59	11											0.17	11						
	1994		2.5	7.8							5.5	15											0.30	13						
	1995		3.3	9.9							0.61	13											1.3	10						
	1996		9.0	7.8							0.78	8.9											0.59	7.8						
	1997		2.2	8.1							0.53	7.0											0.36	4.9						
	1998		0.84	7.2							0.57	9.1											0.43	7.5						
	1999		0.78	8.7							0.76	8.2											0.30	4.1						
	2000		0.78	13							0.95	16											0.23	7.9						
	2000		0.39	6.0							0.72	11											0.61	7.3						

	SUPERIOR (kg/year)						MICHIGAN (kg/year)						HURON (kg/year)						ERIE (kg/year)						ONTARIO (kg/year)														
	WET		ABS		VOL		NETG		DRY		WET		ABS		VOL		NETG		DRY		WET		ABS		VOL		NETG		DRY		WET		ABS		VOL		NETG		
	DRY	WET	ABS	WET	ABS	VOL	NETG	DRY	WET	ABS	WET	ABS	VOL	NETG	DRY	WET	ABS	WET	ABS	VOL	NETG	DRY	WET	ABS	WET	ABS	VOL	NETG	DRY	WET	ABS	WET	ABS	VOL	NETG				
α_endosulfan	1992		0								0																												
	1993		0								0																												
	1994		6								57																												
	1995		69	130							12	320																											
	1996		27	120							7.2	210																											
	1997		20	130							15	440																											
	1998		7.8	120							9.1	460																											
	1999		25	200							16	340																											
	2000		16	54							25	160																											
	PCB 018	1992		2.7	26	-170	-140				1.0	36	-200	-170																									
		1993		1.8	42	-180	-140				0.72	36	-210	-170																									
1994			1.9	24	-200	-180				1.5	25	-210	-190																										
1995			3.0	18	-54	-36				2.0	17	-80	-63																										
1996			4.5	18	-48	-30				1.5	14	-74	-60																										
1997			2.7	15	-33	-18				0.93	16	-34	-18																										
1998			1.7	14	-36	-22				1.2	23	-34	-11																										
1999			3.9	36	-36	0				2.0	27	-36	-9																										
2000			2.8	36	-36	0				1.8	18	-40	-22																										
PCB 044		1992		0.9	21	-54	-33				0.80	61	-150	-89																									
		1993		0.36	69	-57	12				0.59	63	-150	-87																									
	1994		1.9	69	-63	6				4.6	19	-150	-130																										
	1995		3.3	39	-63	-24				1.4	23	-70	-47																										
	1996		2.8	13	-54	-41				0.86	13	-63	-50																										
	1997		2.3	20	-28	-8				1.2	11	-38	-27																										
	1998		8.4	15	-33	-18				2.1	15	-40	-25																										
	1999		3.6	23	-33	-10				3.4	21	-42	-21																										
	2000		2.8	33	-30	3				1.7	17	-49	-32																										
	PCB 052	1992		0.84	25	-54	-29				0.97	46	-190	-140																									
		1993		0.30	66	-57	9				0.74	42	-190	-150																									
1994			2.8	72	-63	9				2.3	23	-190	-170																										
1995			4.8	39	-78	-39				2.3	20	-12	8																										
1996			4.2	21	-69	-48				1.9	15	-11	4																										
1997			1.7	18	-14	4				1.6	16	-9.7	6.3																										
1998			2.1	16	-16	0				1.7	20	-9.9	10																										
1999			3.9	33	-16	17				3.2	25	-10	15																										
2000			4.5	33	-15	18				3.6	19	-12	7																										
PCB 101		1992		1.9	16	-100	-84				0.89	34	-84	-50																									
		1993		0.93	36	-110	-74				0.46	34	-86	-52																									
	1994		2.0	72	-130	-58				1.5	14	-86	-72																										
	1995		4.5	33	-39	-6				1.6	11	-32	-21																										
	1996		3.3	16	-36	-20				1.1	9.1	-27	-18																										
	1997		2.9	12	-30	9				1.1	7.6	-25	-17																										
	1998		5.4	11	-3.6	7.4				1.5	10	-27	-17																										
	1999		5.1	17	-3.6	13				2.3	14	-27	-13																										
	2000		3.9	15	-3.3	12				2.7	11	-32	-21																										

SUIITE PCB	SUPERIOR (kg/year)						MICHIGAN (kg/year)						HURON (kg/year)						ERIE (kg/year)						ONTARIO (kg/year)							
	DRY		WET		VOL		NETG		DRY		WET		VOL		NETG		DRY		WET		VOL		NETG		DRY		WET		VOL		NETG	
1992		110	420	-2400	-2000			34	820	-3800	-3000																					
1993		84	1100	-2500	-1400			44	820	-4000	-3200			130	260	-960	-700			13	700	-1000	-300			37	150	-660	-510			
1994		45	1000	-2900	-1900			82	400	-3800	-3400			200	280	-960	-680			36	380	-1000	-620			35	200	-680	-480			
1995		96	540	-1100	-560			44	300	-1100	-800			0	240	-590	-350			36	330	-1000	-670			25	100	-390	-290			
1996		93	330	-990	-660			32	230	-1000	-770			170	-480	-310				29	160	-930	-770			24	90	-360	-270			
1997		78	290	-660	-370			23	270	-460	-190									16	370	-830	-460				68	-280	-210			
1998		110	240	-750	-510			34	380	-460	-80			94	-590	-500			14	340	-770	-430				46	-280	-230				
1999		100	480	-750	-270			59	440	-490	-50			180	-610	-430			16	370	-830	-460				57	-300	-240				
2000		69	570	-720	-150			49	320	-570	-250			140	-610	-470			21	260	-810	-550				45	-320	-280				
benzo[a]pyrene																																
1992		36	250	0				97	190	34				96	0																	
1993		0	78	0				32	110	0				110	100																	
1994		36	33	0				57	63	0				57	0																	
1995		13	78	48				40	120	0.76				46	30																	
1996		36	39	0.63				40	74	18				98	35																	
1997		36	72	1.6				49	120	15				85	150	0																
1998		28	78	0.63				55	82	8.0				61	35	0																
1999		36	57	0				55	100	0				54	44	0																
2000		20	48	0				74	86	0.25				67	89	0																
benzo[k]fluoranthene																																
1992		160	450	66				300	340	72				170	0																	
1993		33	110	0				120	200	0				190	150																	
1994		130	81	0				180	160	8.4				120	35																	
1995		120	250	96				150	270	6.1				87	24																	
1996		99	140	3.6				150	160	38				170	240																	
1997		130	160	5.4				150	230	44				150	280	7.0																
1998		110	190	5.1				180	200	59				130	130	3.3																
1999		180	180	17				180	210	4.6				87	170	0.87																
2000		100	160	0				250	230	0.11				110	240	0																
benzo[k]fluoranthene																																
1992		18	220	13				300	140	42				74	0																	
1993		13	54	0				120	70	0				85	44																	
1994		51	36	0				180	57	0				48	24																	
1995		36	51	28				49	95	0.99				39	24																	
1996		42	48	1.3				46	51	9.3				72	180																	
1997		39	57	1.3				42	91	13				65	200	0																
1998		25	63	0.42				42	61	8.0				54	80	0																
1999		45	69	6.3				57	89	0				44	87	0																
2000		25	30	0				80	65	0.063				48	180	0																
benzo[k]fluoranthene + benzo[b]fluoranthene																																
1992		170	690	78				610	460	110				240	0																	
1993		45	170	0				250	270	0				280	190																	
1994		180	120	0				360	210	8.4				170	59																	
1995		160	300	120				200	360	7.2				130	48																	
1996		140	190	4.8				190	210	46				240	410																	
1997		170	220	6.6				190	340	57				210	480	7.0																
1998		140	250	5.4				230	270	68				190	210	3.3																
1999		200	250	23				230	300	4.6				130	260	0.87																
2000		130	190	0				340	300	0.15				160	410	0																

	SUPERIOR (kg/year)						MICHIGAN (kg/year)						HURON (kg/year)						ERIE (kg/year)						ONTARIO (kg/year)														
	DRY			WET			NETG			VOL			ABS			WET			NETG			VOL			ABS			WET			NETG			VOL					
	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS	DRY	WET	ABS									
Indeno[1,2,3-cd]Pyrene	1992	75	220	0			180	230	12			180	0			170	230	18																					
	1993	0	60	0			70	120	0			130	130			130	110	2.6							170	120													
	1994	69	30	0			110	89	0			130	0			190	72	0							120	3.1													
	1995	33	130	0			78	180	0.74			83	70			230	230	21							90	13													
	1996	75	100	0.060			99	100	6.8			190	160			240	130	0.38							150	54													
	1997	75	130	2.2			86	180	15			140	220	0		180	160	1.8							120	62	0												
	1998	60	120	0.66			120	120	21			110	130	0		210	100	0.88							140	220	0												
	1999	78	120	0			95	160	0			74	140	0		210	120	24							97	56	0												
	2000	51	90	0			140	130	0.13			89	140	0		120	120	14							83	83	0												
	Phenanthrene																																						
	1992	63	290	9000			120	360	8000			100	500			100	380	15000							42	370	1300												
	1993	9.0	110	7800			72	130	11000			100	700			94	230	20000							42	670													
	1994	270	180	5700			140	160	8400			80	590			190	180	15000							57	370													
	1995	57	260	12000			84	300	6500			59	370			160	370	19000							28	280													
	1996	93	260	7500			100	190	6100			100	440			200	110	9300							69	190													
	1997	93	240	6000			97	250	6800			150	740	2200		160	290	11000							51	480	1100												
	1998	75	180	5100			95	160	4900			65	630	1700		140	170	11000							49	970	1700												
	1999	110	260	7800			140	230	6100			33	630	1800		190	230	11000							45	260	1500												
	2000	90	280	5700			190	270	7000			54	740	2100		110	360	12000							27	560	1500												
Pyrene																																							
	1992	130	230	2000			160	270	950			120	0			120	300	2400							76	0	230												
	1993	18	81	720			89	140	1300			130	0			130	200	2400							63	15													
	1994	200	140	480			150	110	740			76	65			230	130	1300							54	6.1													
	1995	54	200	3600			97	250	440			61	370			220	290	2100							48	150													
	1996	87	140	660			110	130	440			130	390			260	77	1000							90	190													
	1997	78	160	420			99	190	570			160	590	350		190	220	1000							69	420	170												
	1998	75	130	480			110	120	570			100	350	350		180	110	1000							90	520	330												
	1999	99	170	870			150	190	440			59	300	350		260	170	910							97	150	310												
	2000	54	150	360			170	190	530			83	370	370		130	220	1100							48	280	280												

Appendix C.

Graphs of annual fluxes for 1992-2000

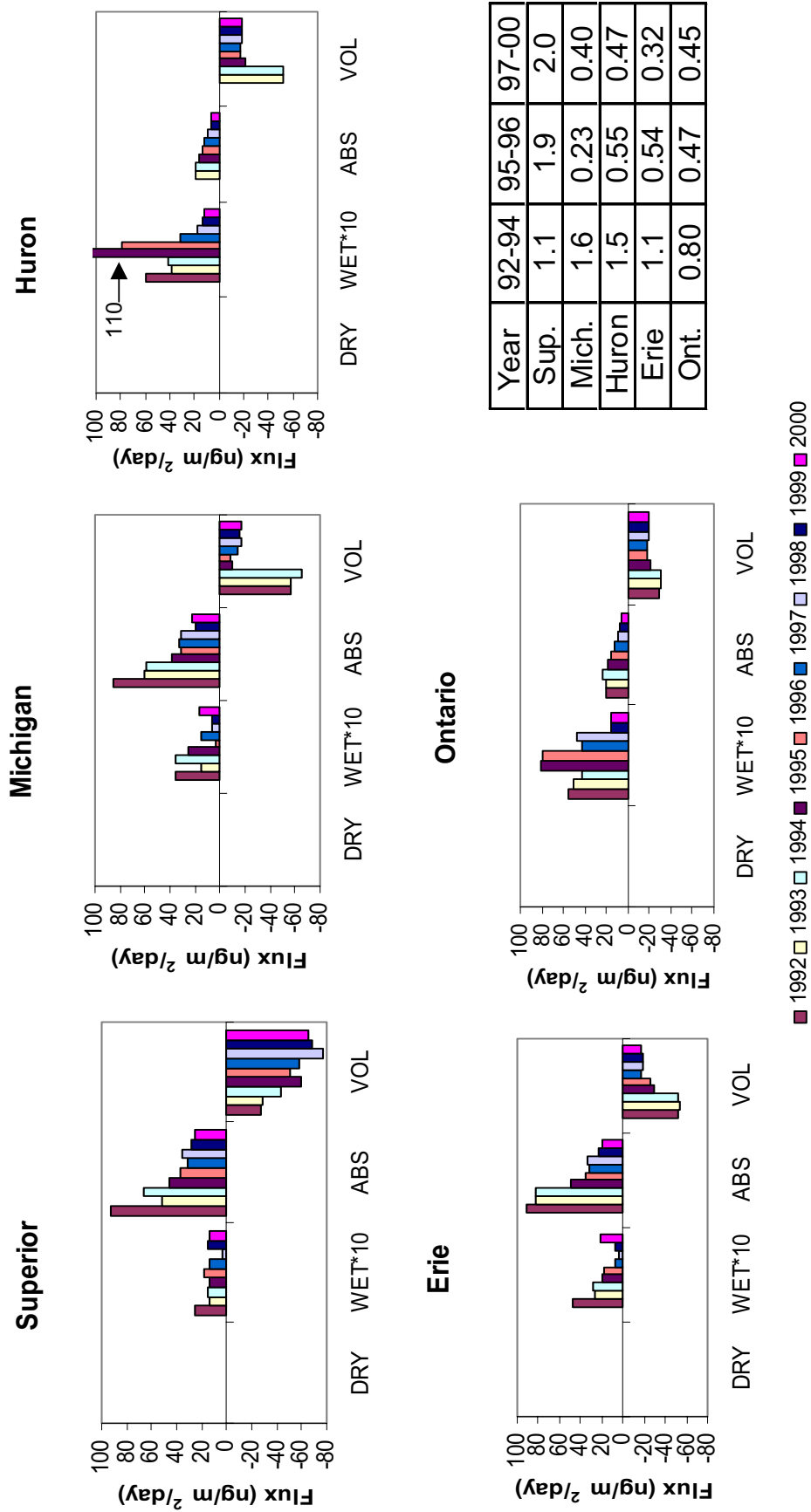


Figure C1. Annual Average Flux (ng/m²/day) and Lake Water Concentration (ng/L) of α -Hexachlorocyclohexane

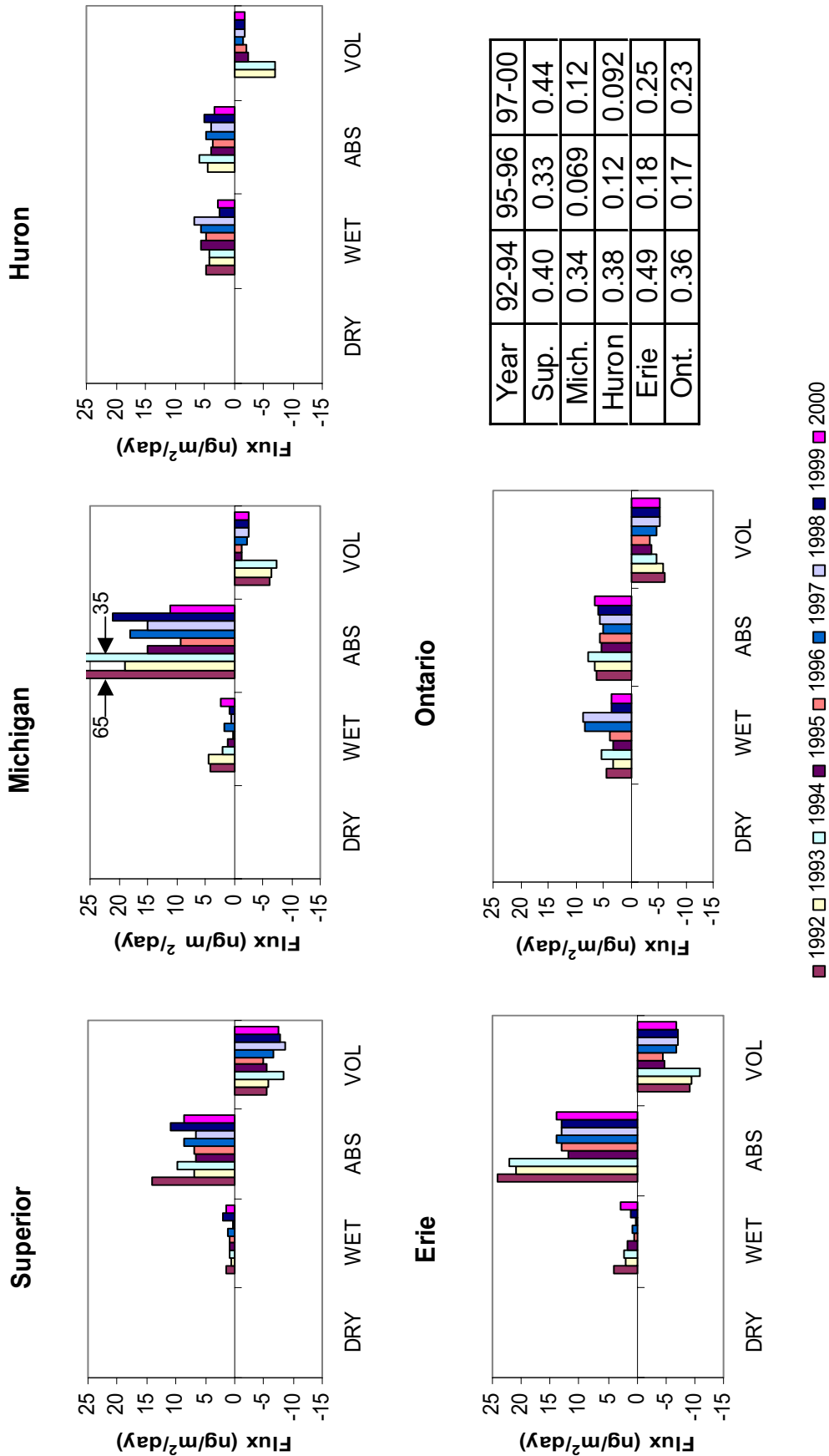


Figure C2. Annual Average Flux (ng/m²/day) and Lake Water Concentration (ng/L) of γ -Hexachlorocyclohexane

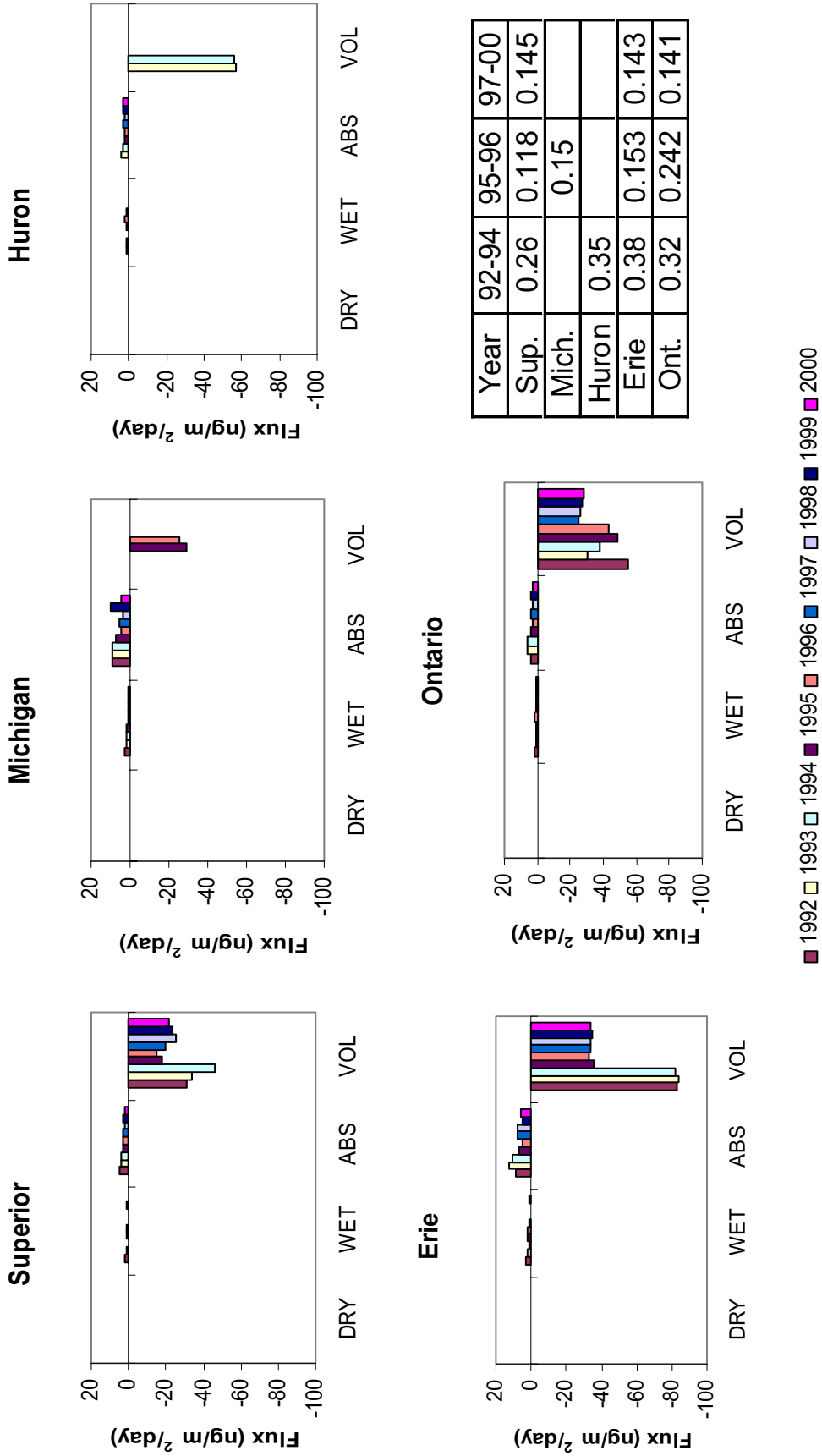


Figure C3. Annual Average Flux (ng/m²/day) and Lake Water (ng/L) Concentration of Dieldrin

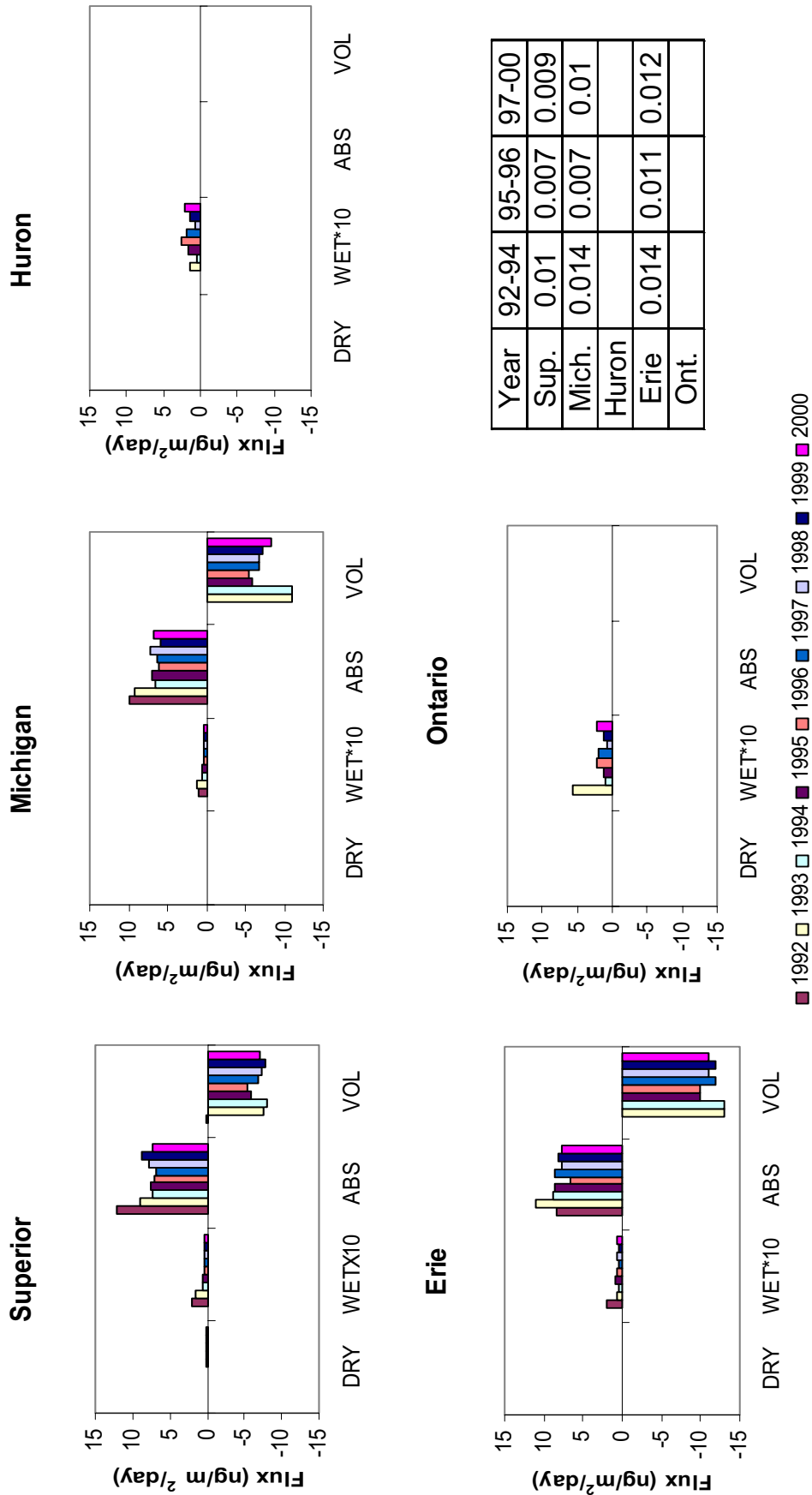


Figure C4. Annual Average Flux (ng/m²/day) and Lake Water Concentration (ng/L) of Hexachlorobenzene

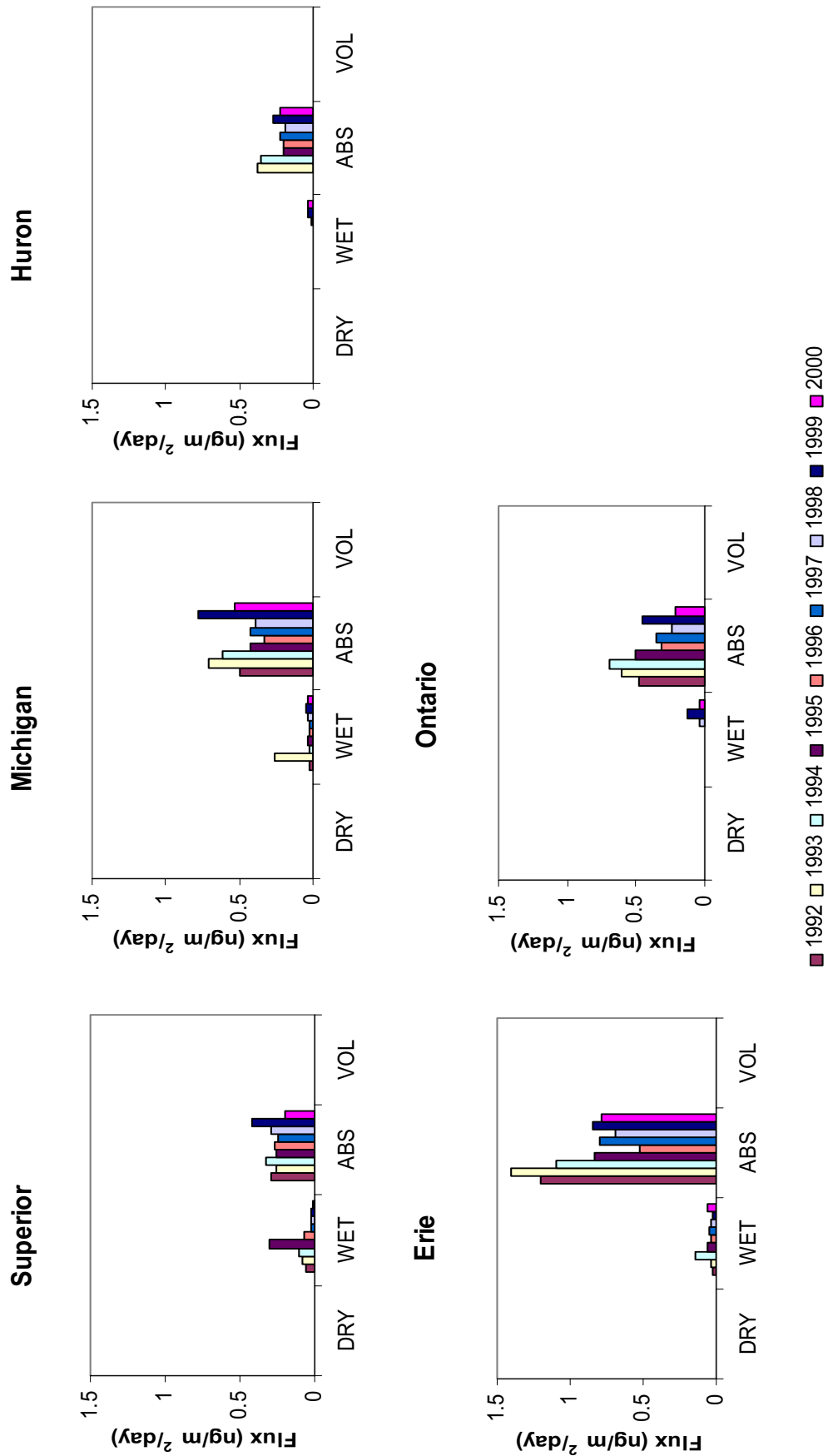


Figure C5. Annual Average Flux (ng/m²/day) of Trans-nonachlor

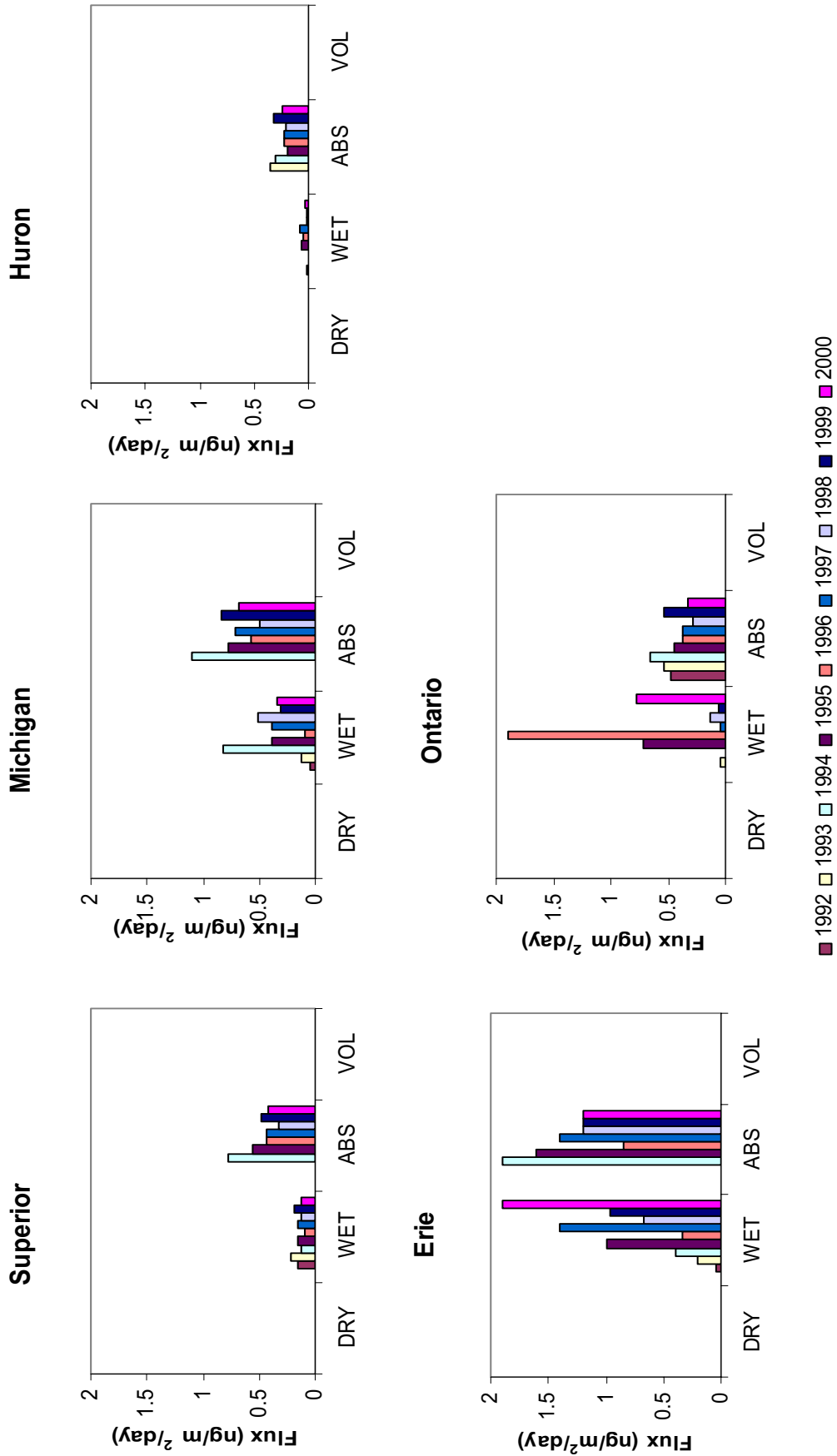


Figure C6. Annual Average Flux (ng/m²/day) of Cis-chlordane

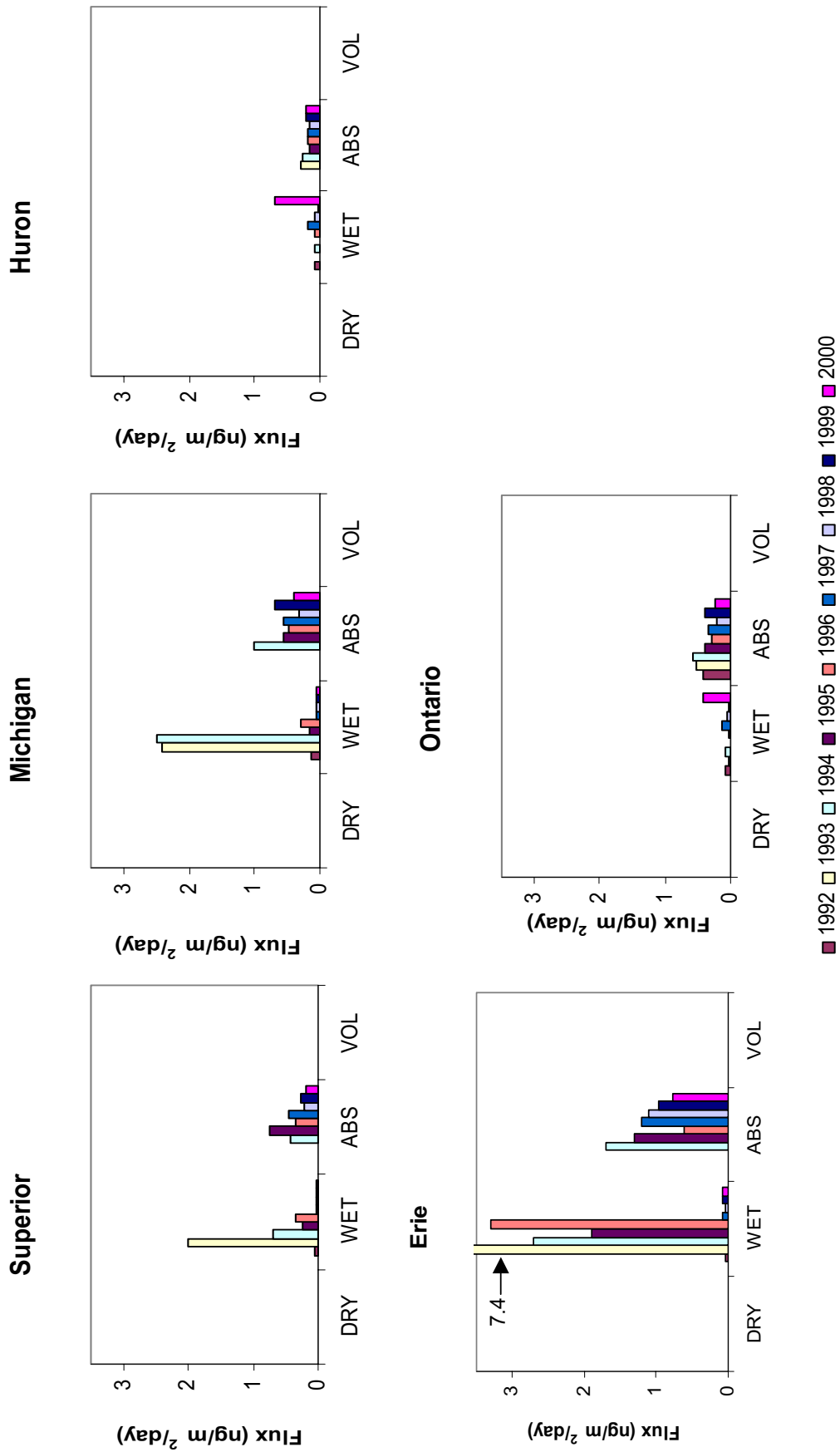


Figure C7. Annual Average Flux (ng/m²/day) of Trans-chlordane

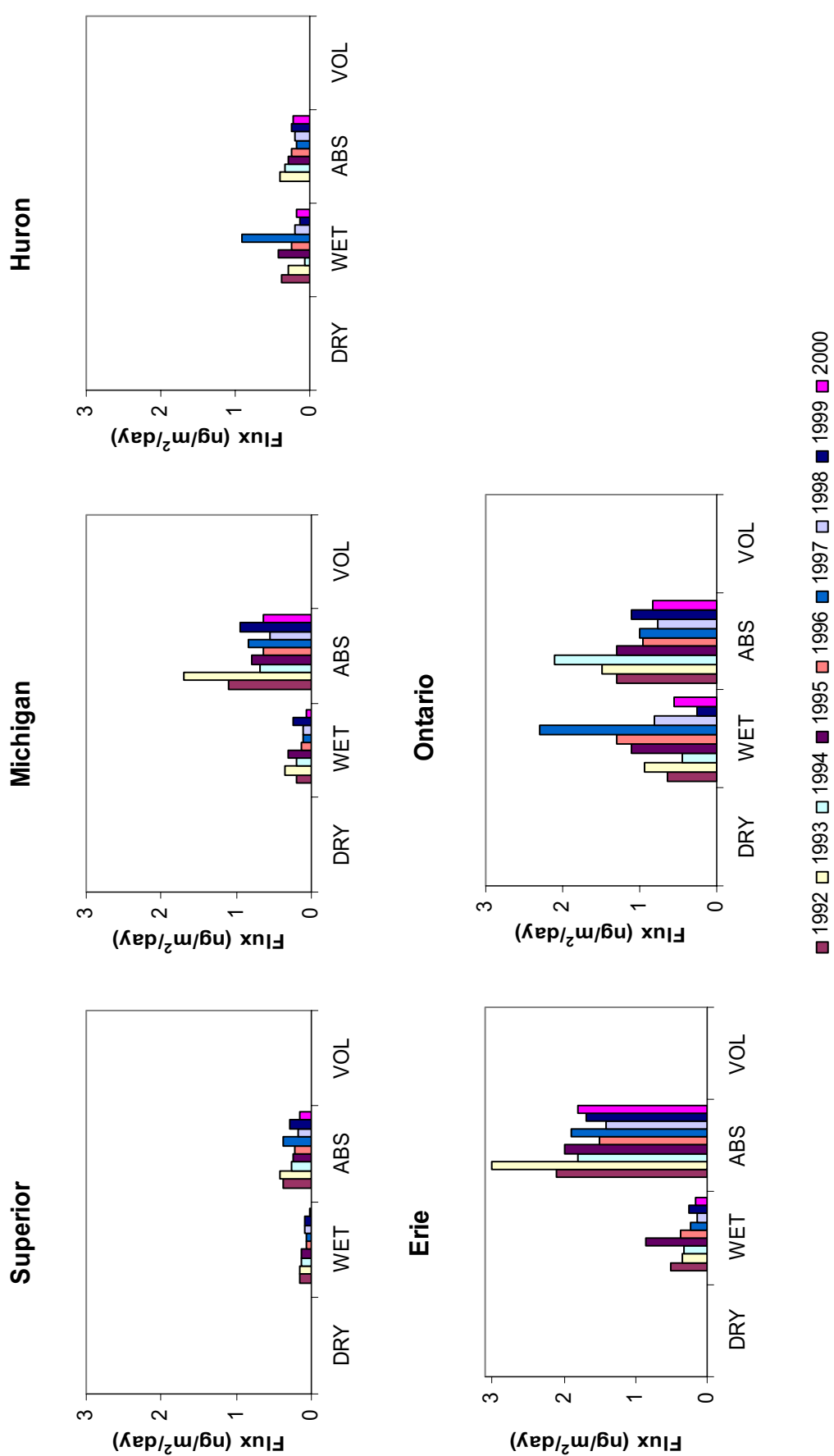


Figure C8. Annual Average Flux (ng/m²/day) of p,p'-DDE

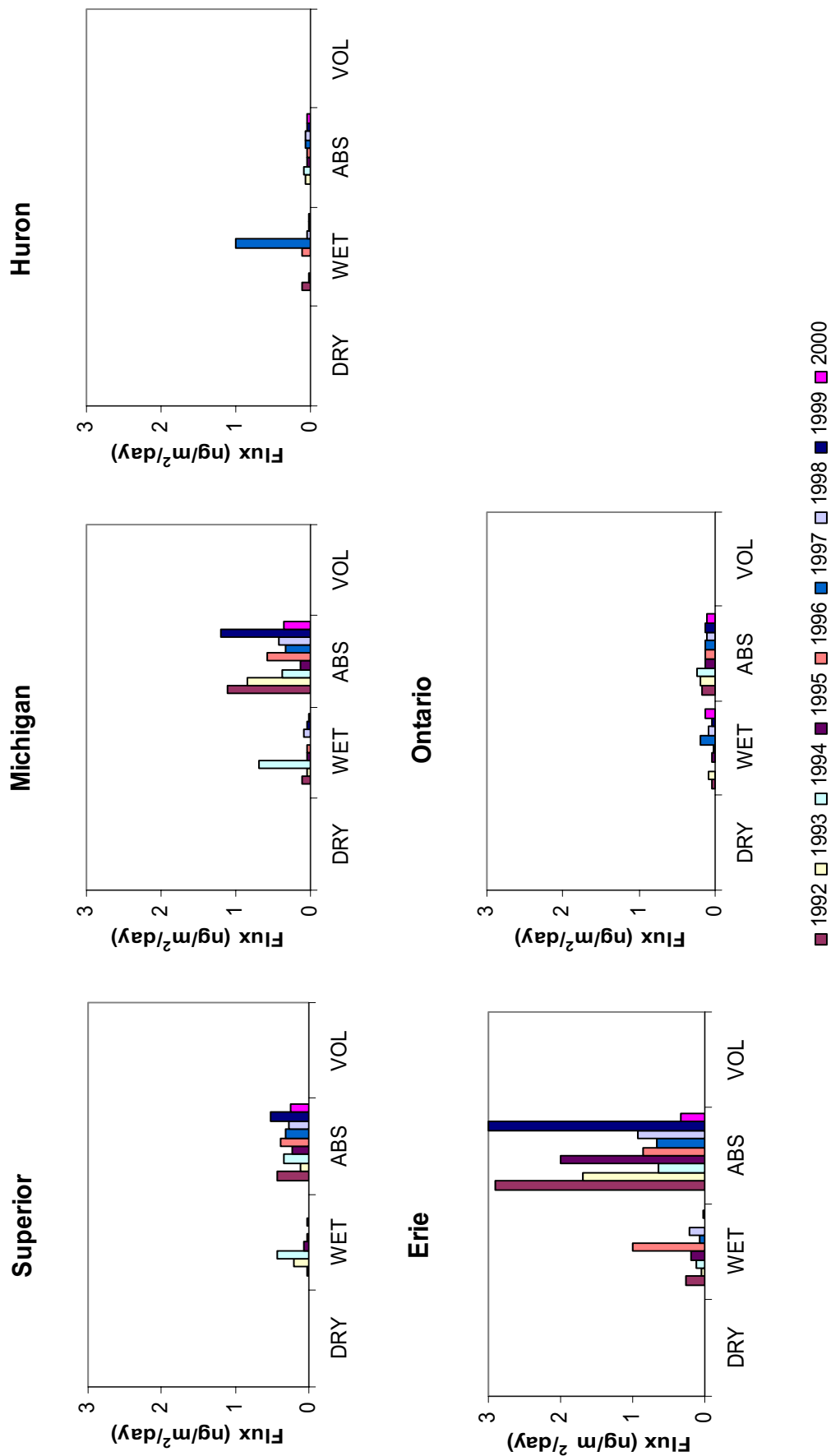


Figure C9. Annual Average Flux (ng/m²/day) of p,p'-DDD

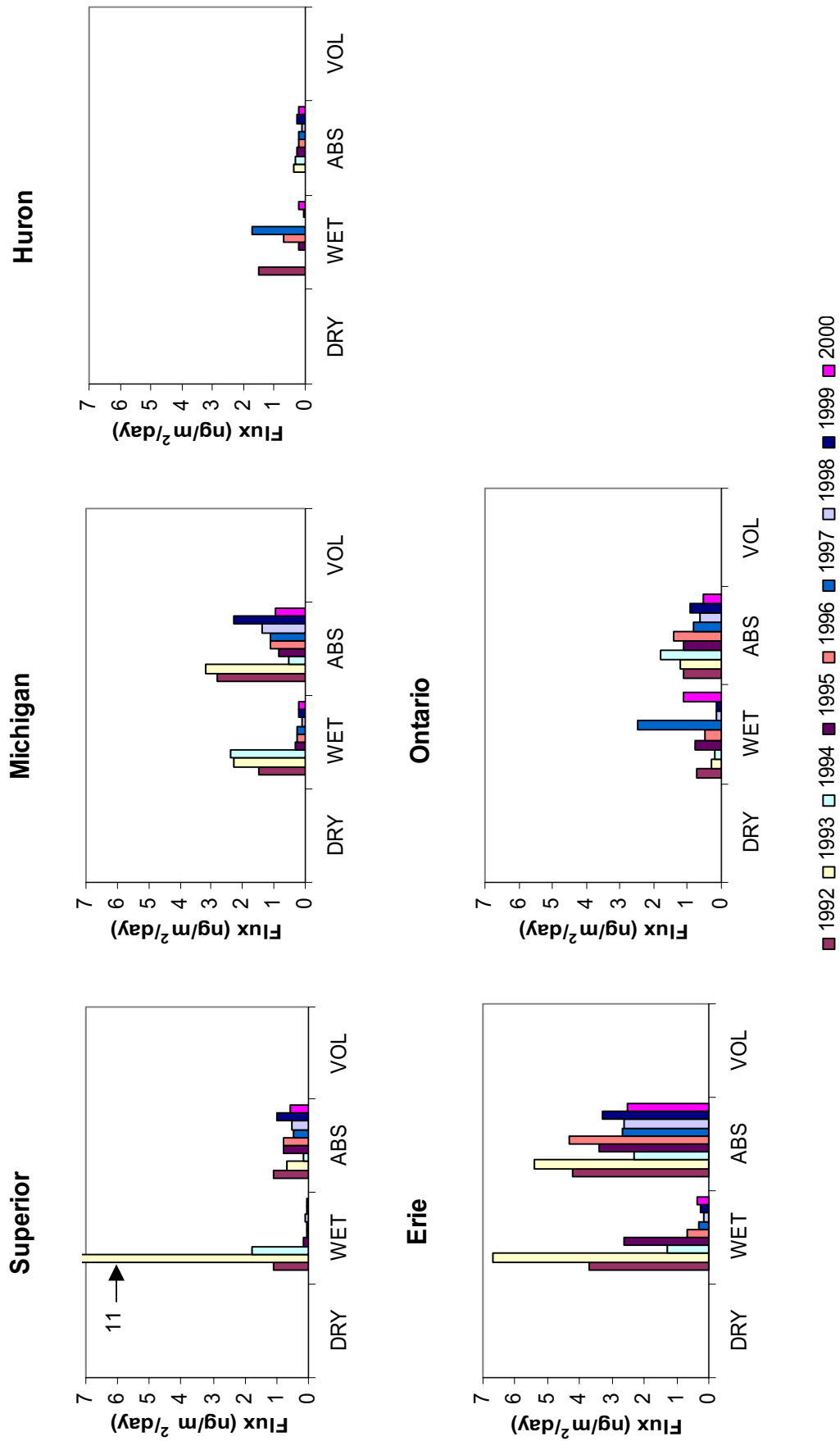


Figure C10. Annual Average Flux (ng/m²/day) of p,p'-DDT

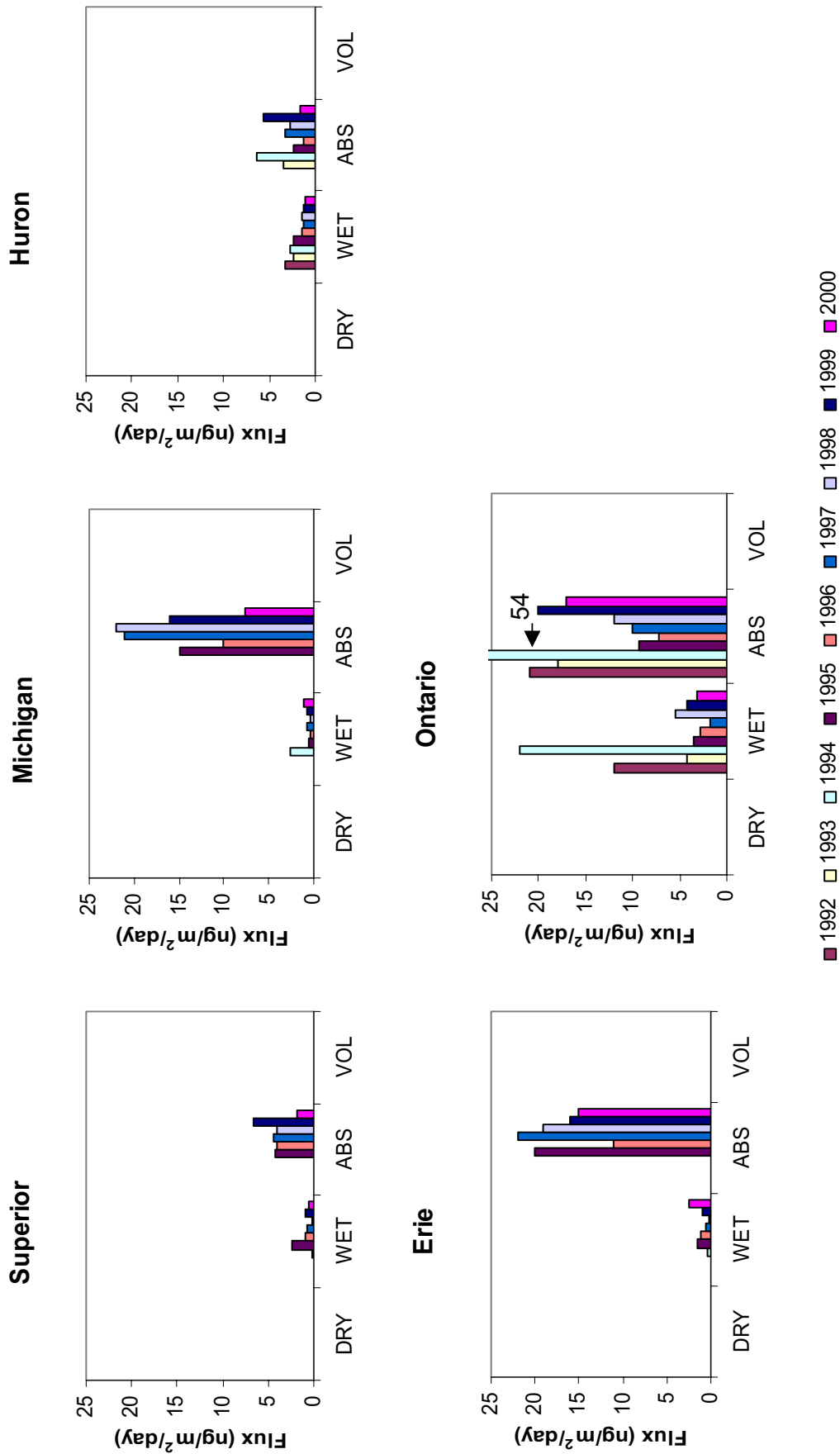
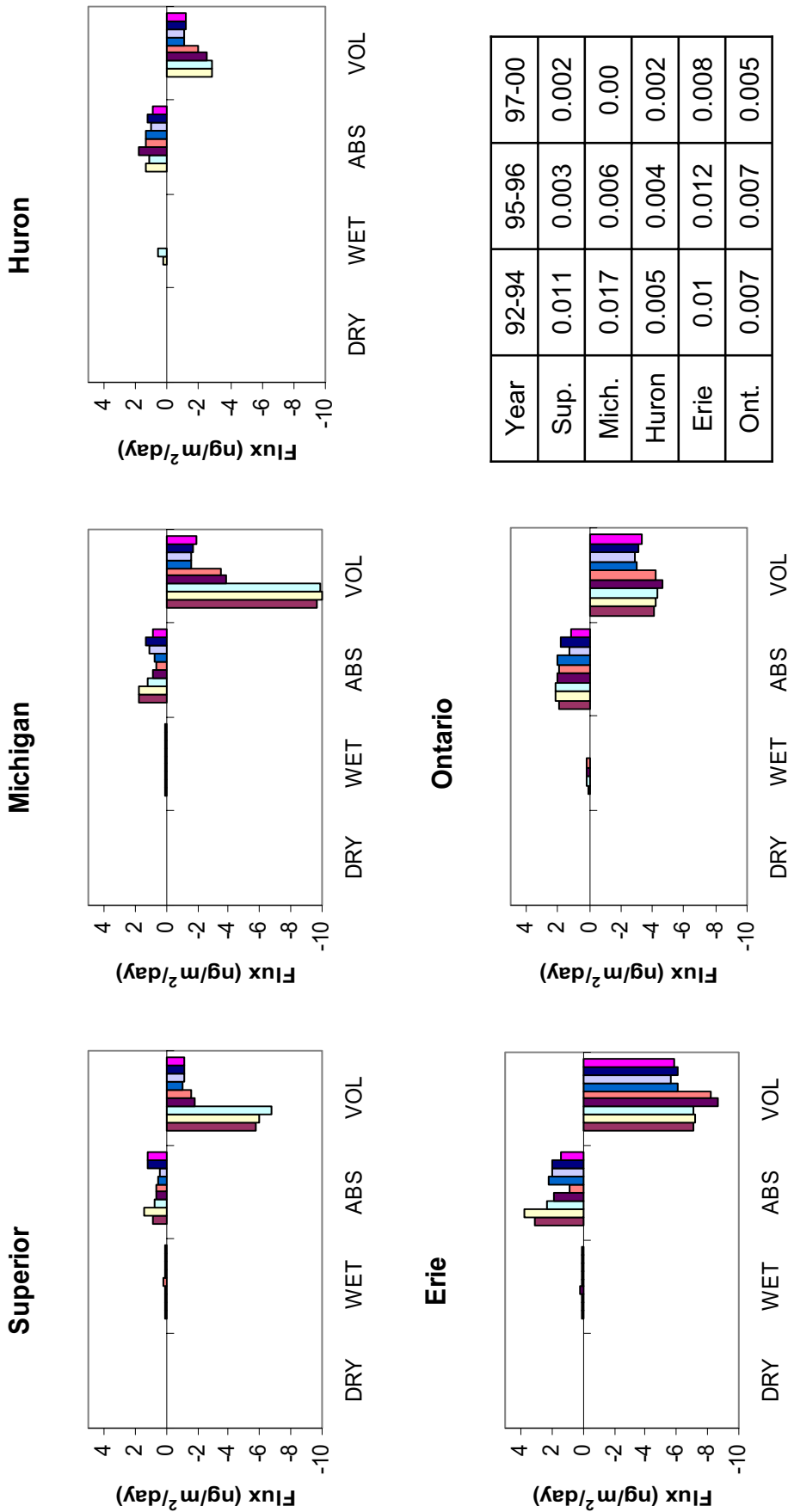


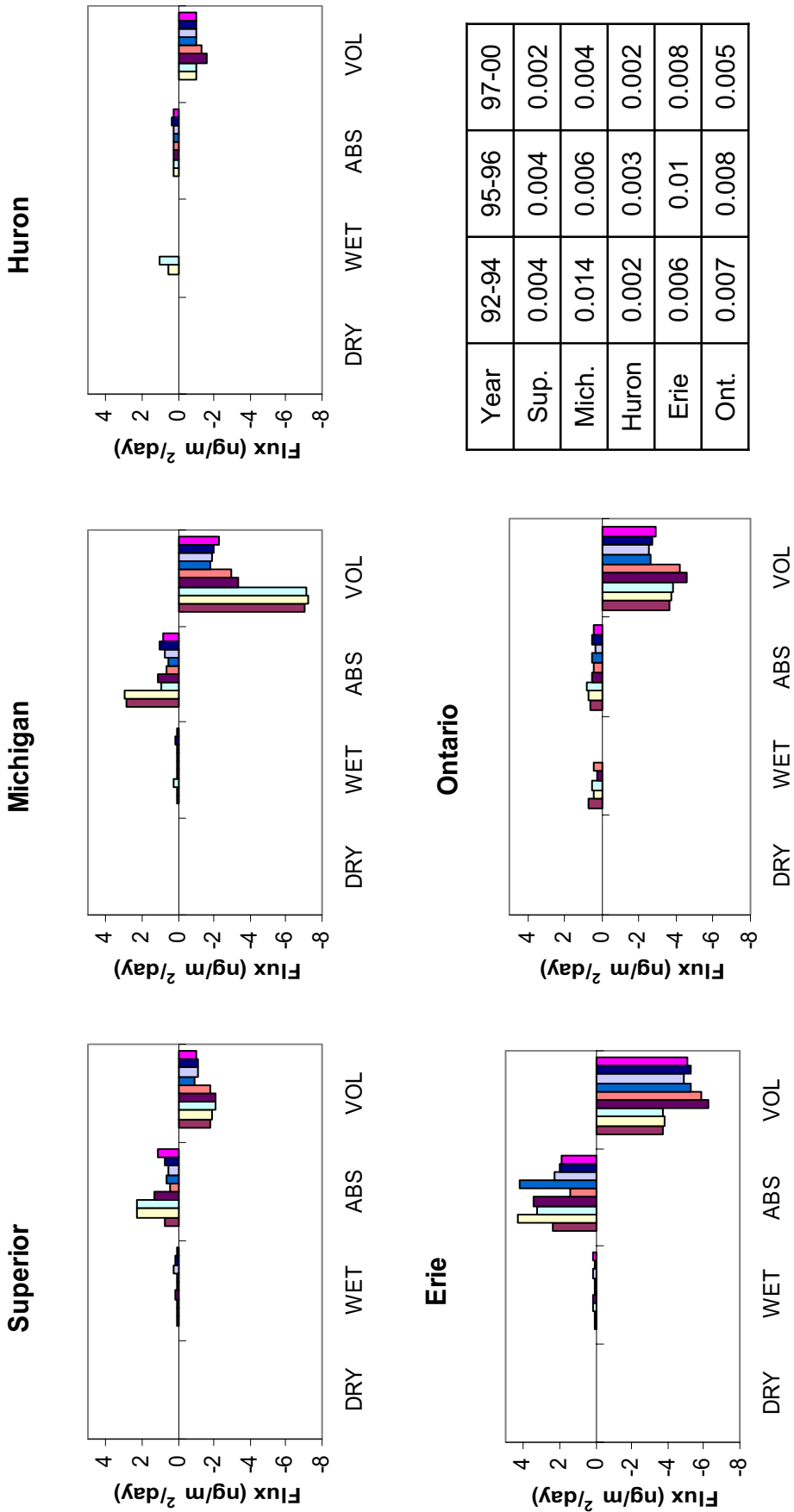
Figure C11. Annual Average Flux (ng/m²/day) of α -endosulphan



■ 1992 □ 1993 □ 1994 ■ 1995 ■ 1996 ■ 1997 □ 1998 ■ 1999 ■ 2000

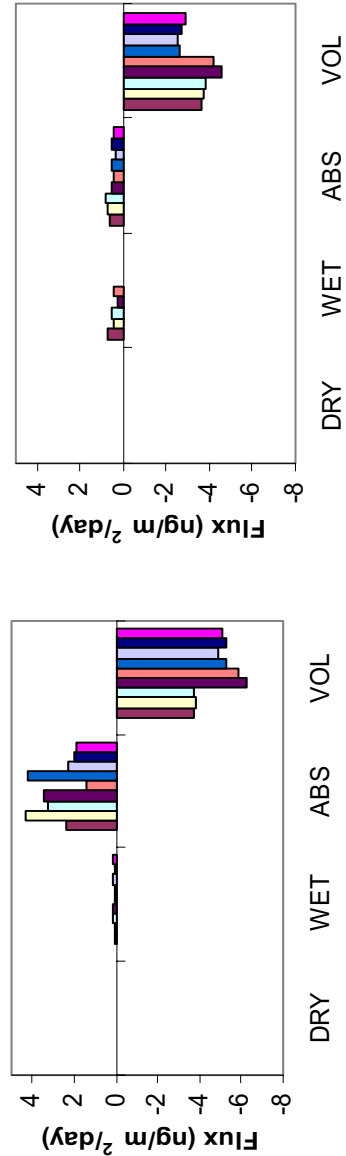
Year	92-94	95-96	97-00
Sup.	0.011	0.003	0.002
Mich.	0.017	0.006	0.00
Huron	0.005	0.004	0.002
Erie	0.01	0.012	0.008
Ont.	0.007	0.007	0.005

Figure C12. Annual Average Flux (ng/m²/day) and Lake Water concentration (ng/L) of PCB 018



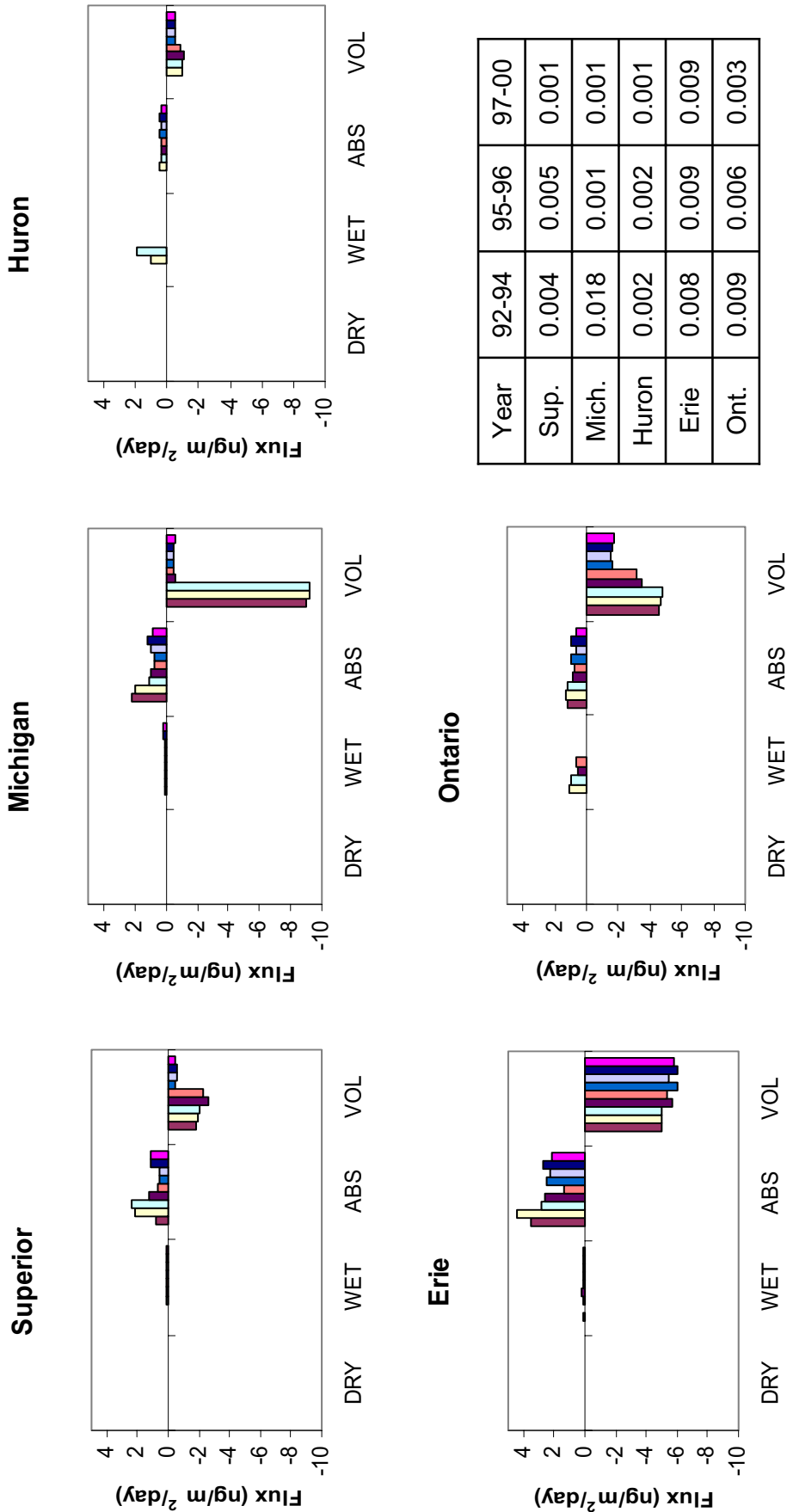
Ontario

Year	92-94	95-96	97-00
Sup.	0.004	0.004	0.002
Mich.	0.014	0.006	0.004
Huron	0.002	0.003	0.002
Erie	0.006	0.01	0.008
Ont.	0.007	0.008	0.005



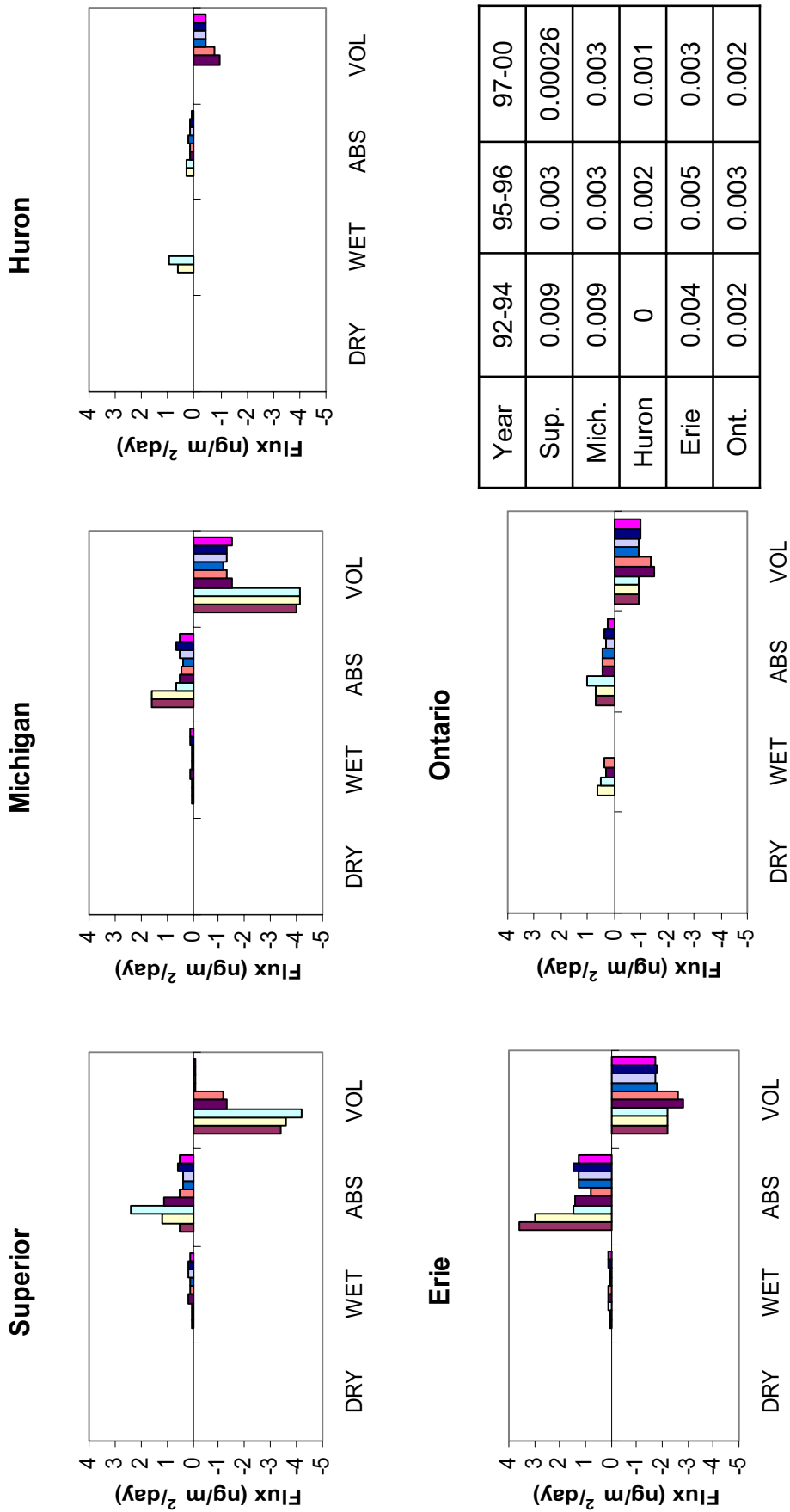
■ 1992 □ 1993 □ 1994 ■ 1995 ■ 1996 ■ 1997 □ 1998 ■ 1999 ■ 2000

Figure C13. Annual Average Flux (ng/m²/day) and Lake Water concentration (ng/L) of PCB 044



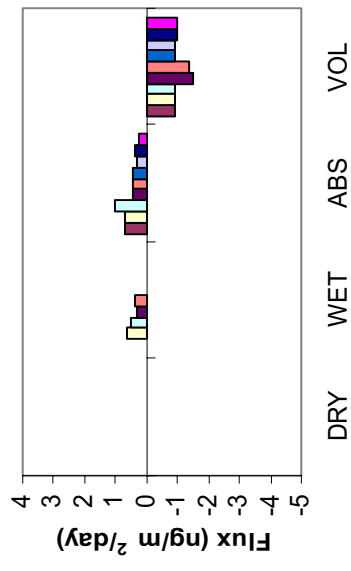
■ 1992 □ 1993 □ 1994 ■ 1995 □ 1996 ■ 1997 □ 1998 □ 1999 ■ 2000

Figure C14. Annual Average Flux (ng/m²/day) and Lake Water concentration (ng/L) of PCB 052



Ontario

Year	92-94	95-96	97-00
Sup.	0.009	0.003	0.00026
Mich.	0.009	0.003	0.003
Huron	0	0.002	0.001
Erie	0.004	0.005	0.003
Ont.	0.002	0.003	0.002



Erie

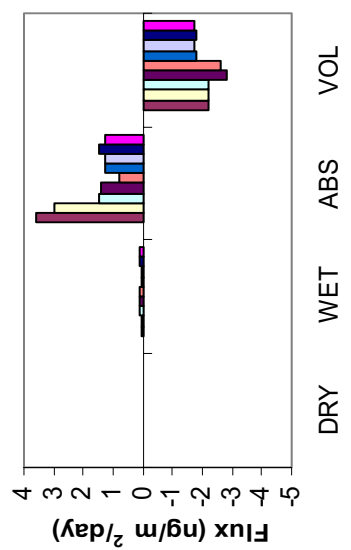
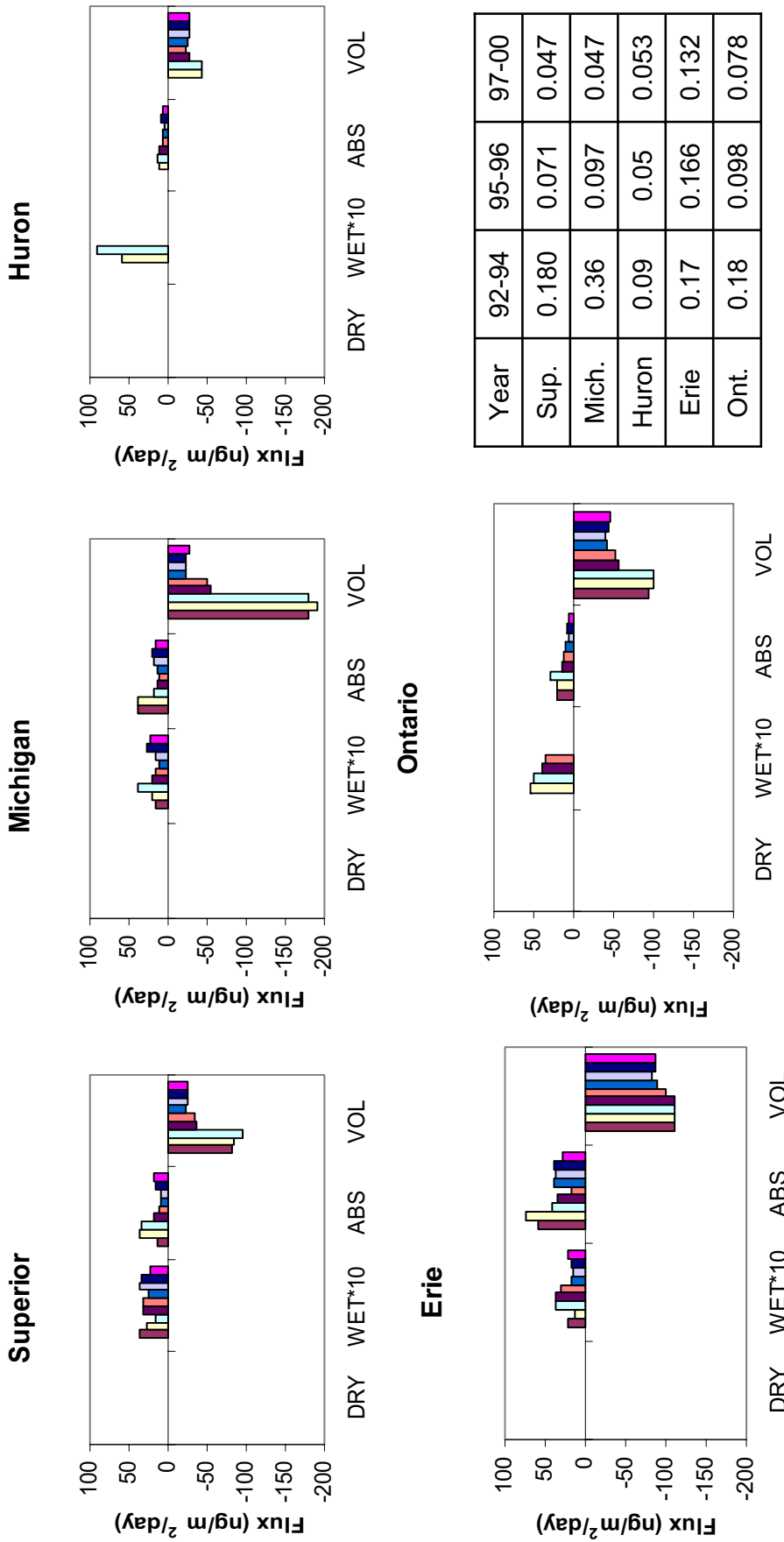


Figure C15. Annual Average Flux (ng/m²/day) and Lake Water concentration (ng/L) of PCB 101



■ 1992 □ 1993 □ 1994 ■ 1995 □ 1996 ■ 1997 □ 1998 ■ 1999 □ 2000

Figure C16. Annual Average Flux (ng/m²/day) and Lake Water concentration (ng/L) of Suite PCB

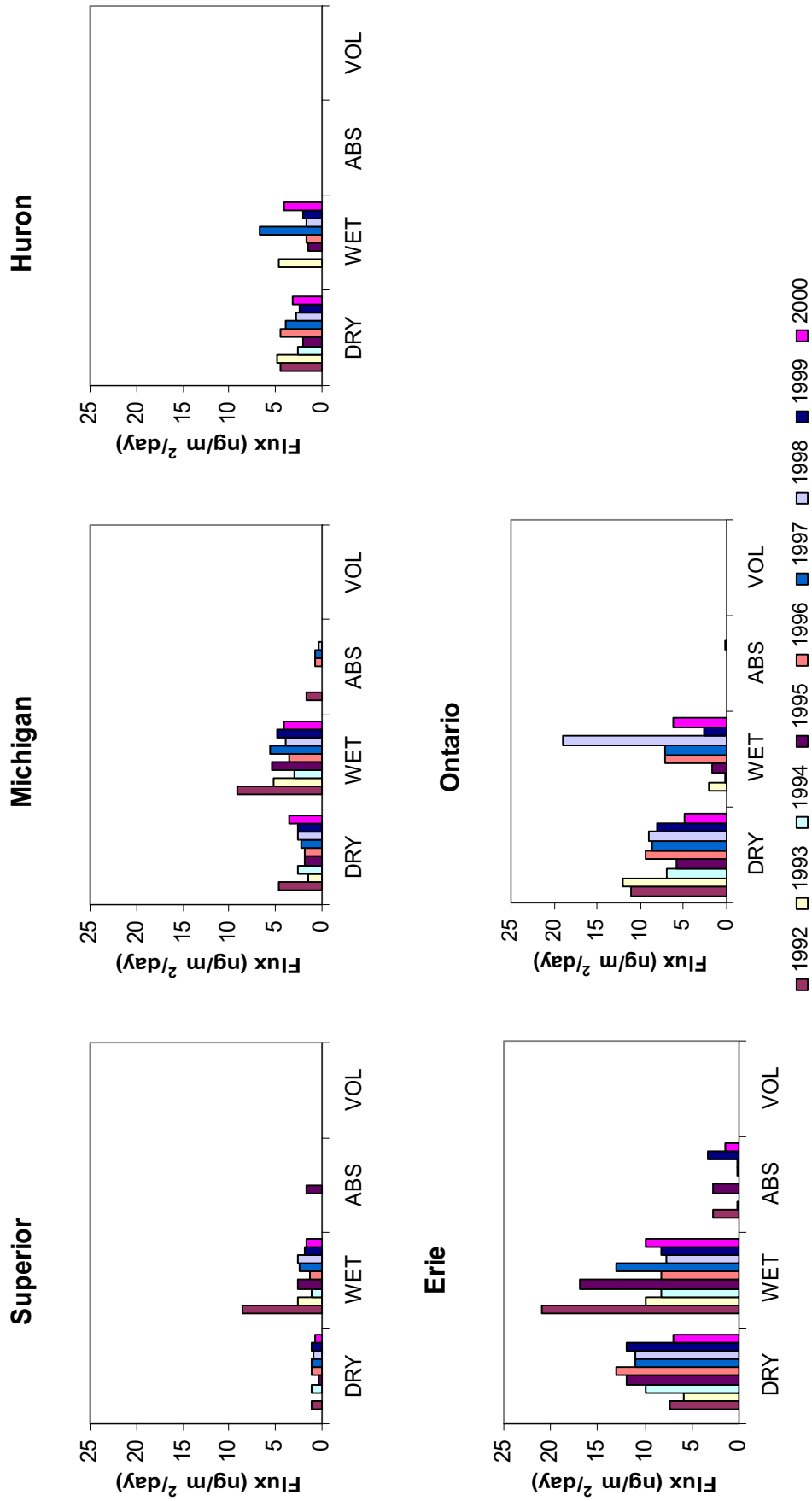


Figure C17. Annual Average Flux ($\text{ng/m}^2/\text{day}$) of Benzo (a) Pyrene

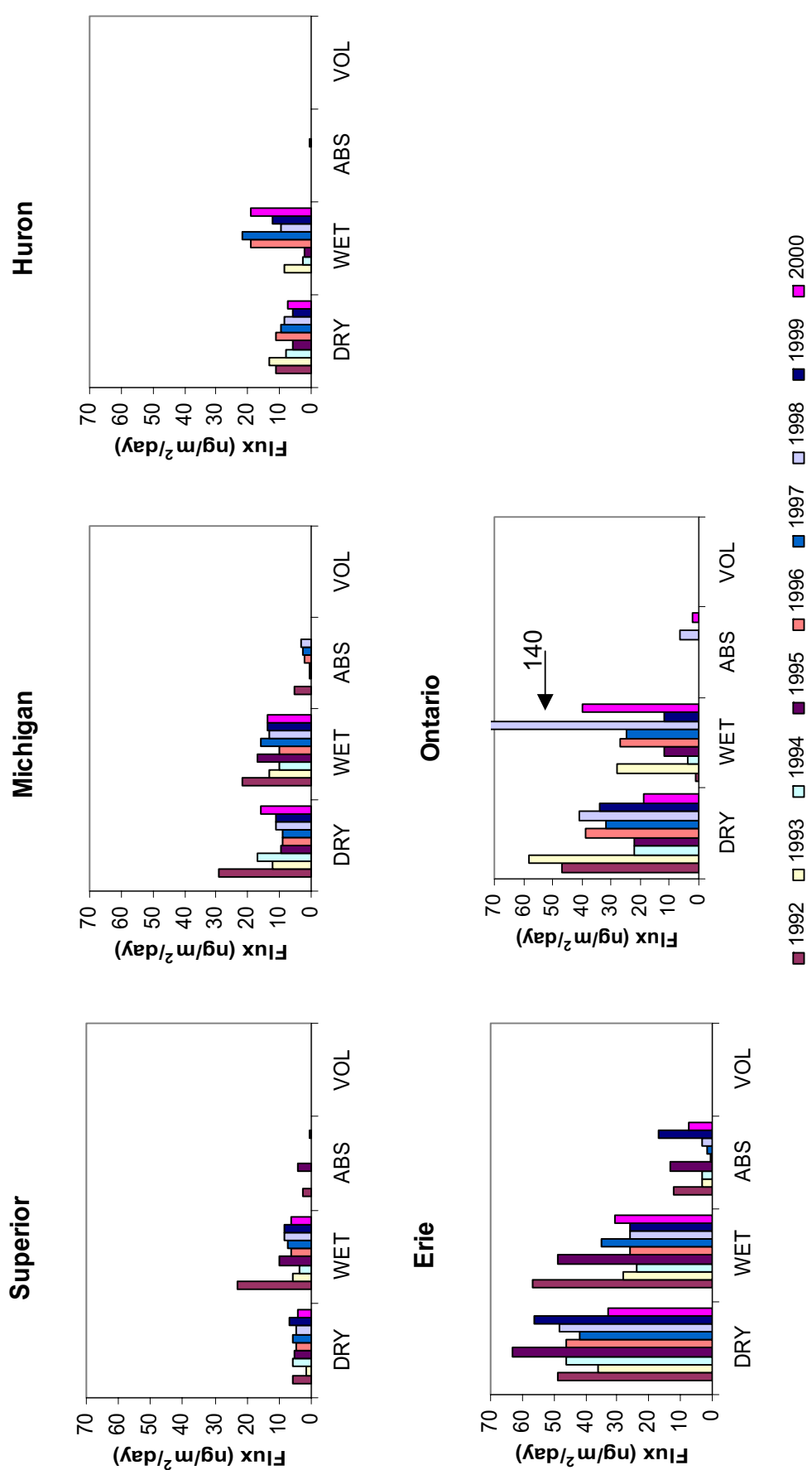


Figure C18. Annual Average Flux (ng/m²/day) of Benzo (k) Fluoranthene + Benzo (b) Fluoranthene

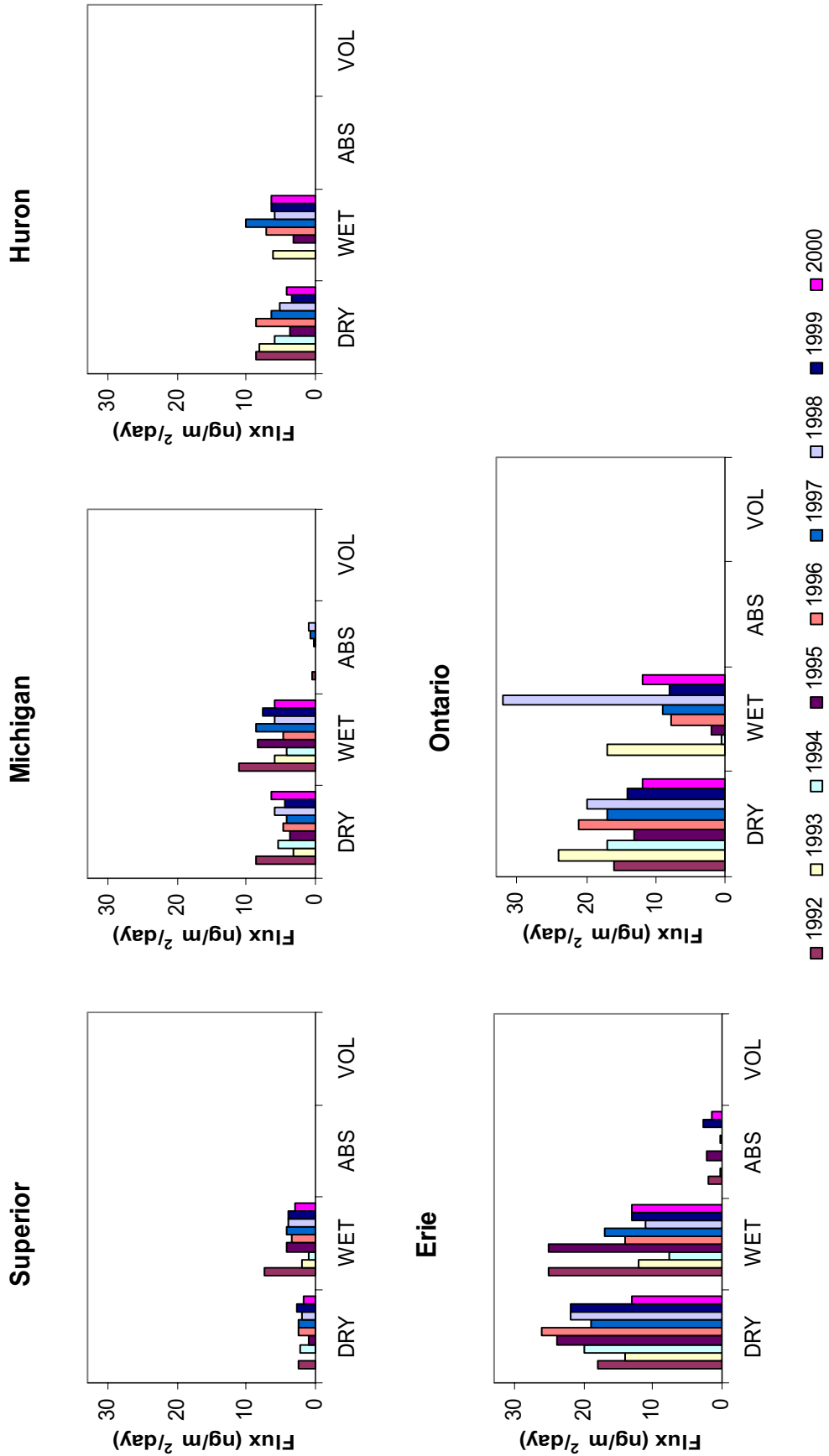


Figure C19. Annual Average Flux ($\text{ng/m}^2/\text{day}$) of Indeno (1,2,3) Pyrene

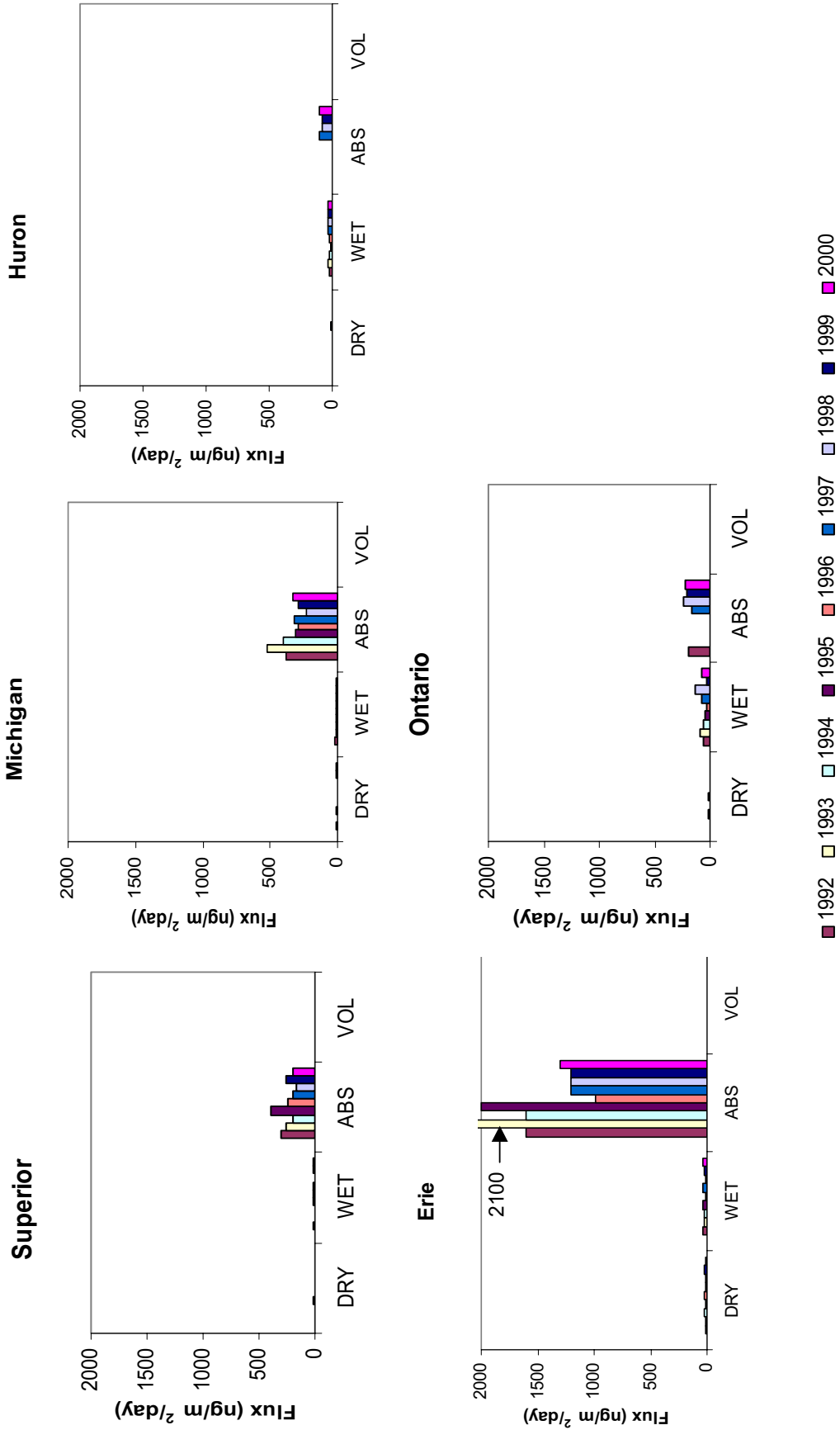


Figure C20. Annual Average Flux (ng/m²/day) of Phenanthrene

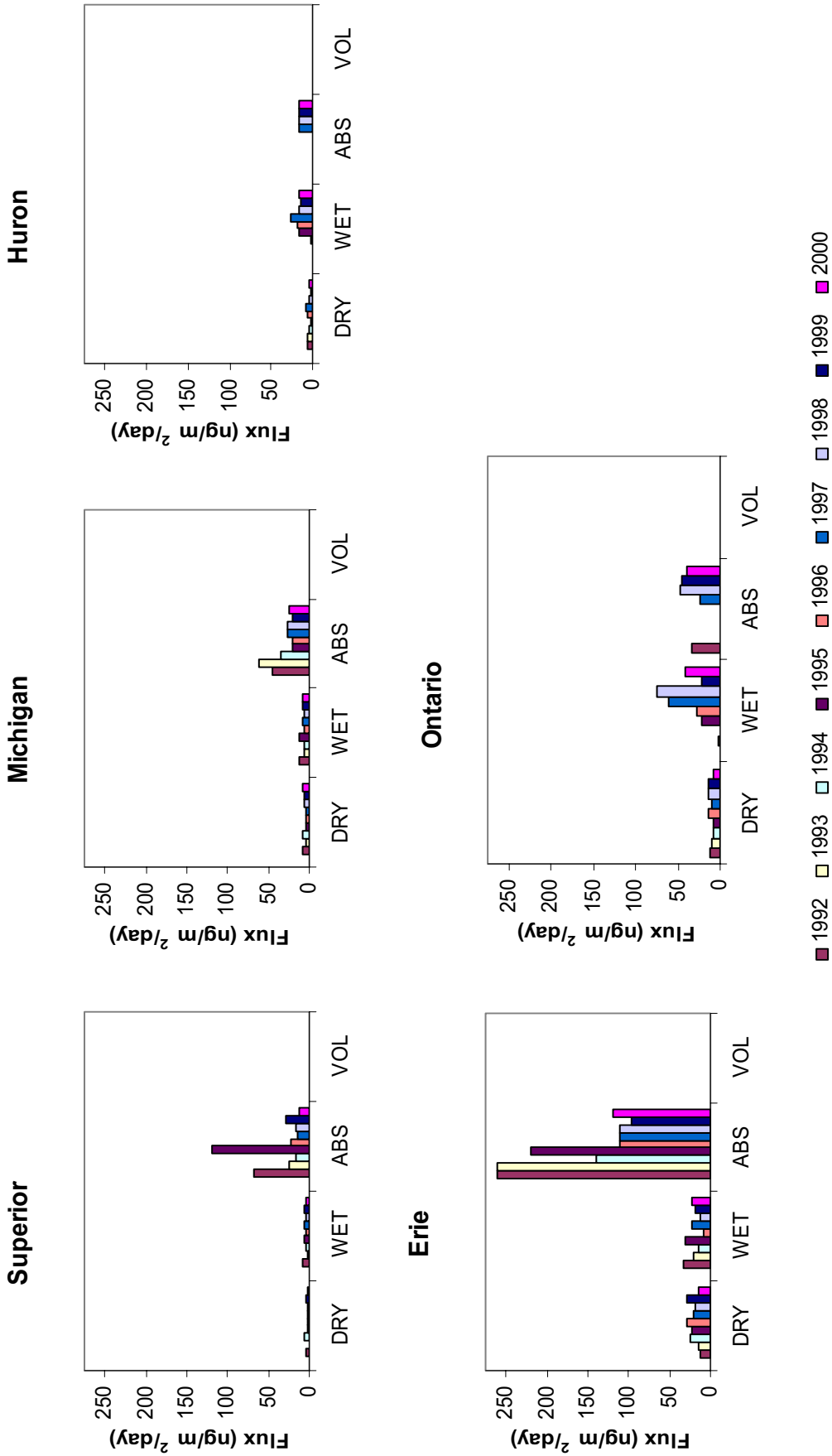


Figure C21. Annual Average Flux ($\text{ng/m}^2/\text{day}$) of Pyrene

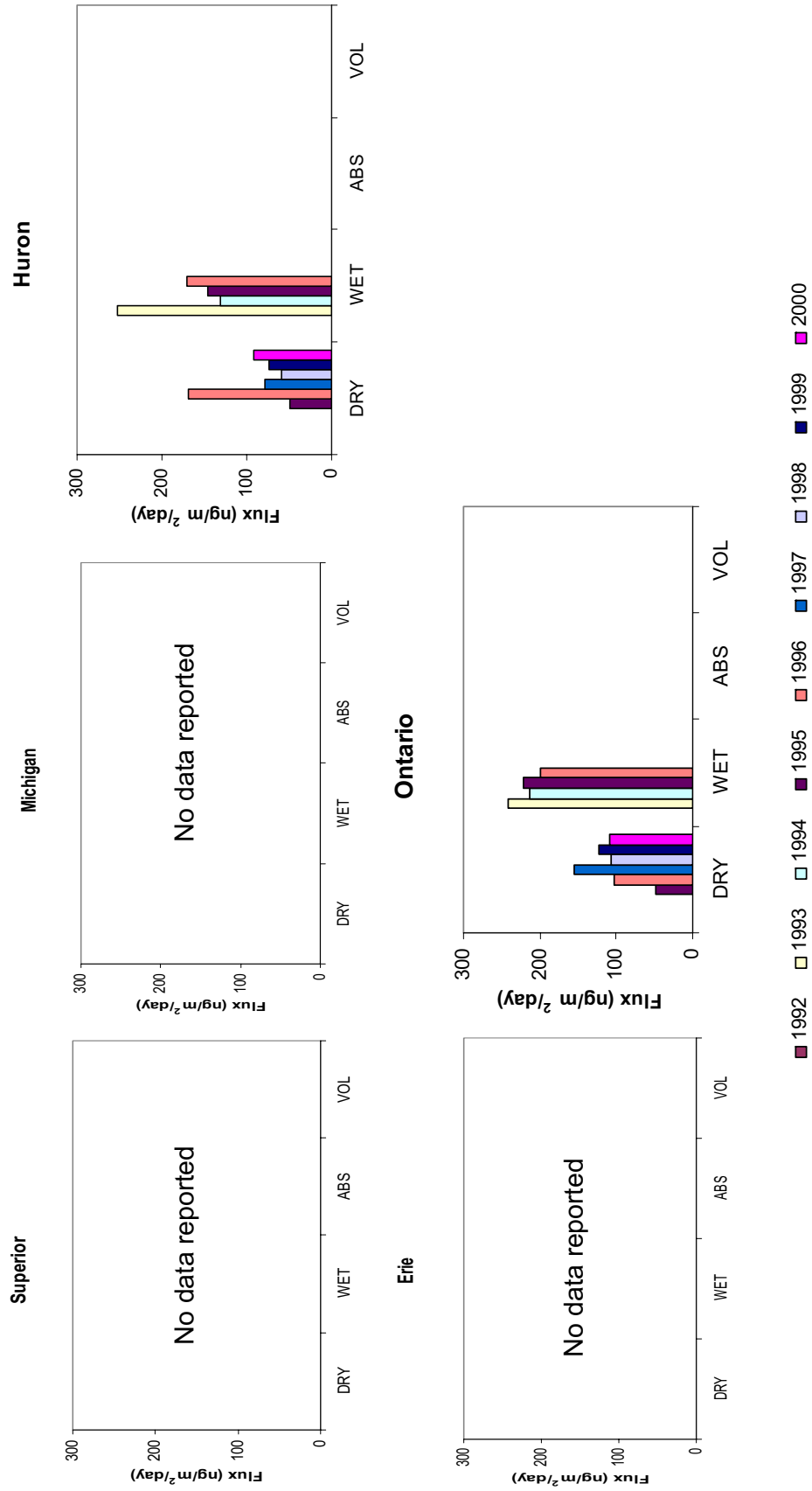


Figure C22. Annual Average Flux (ng/m²/day) of Arsenic

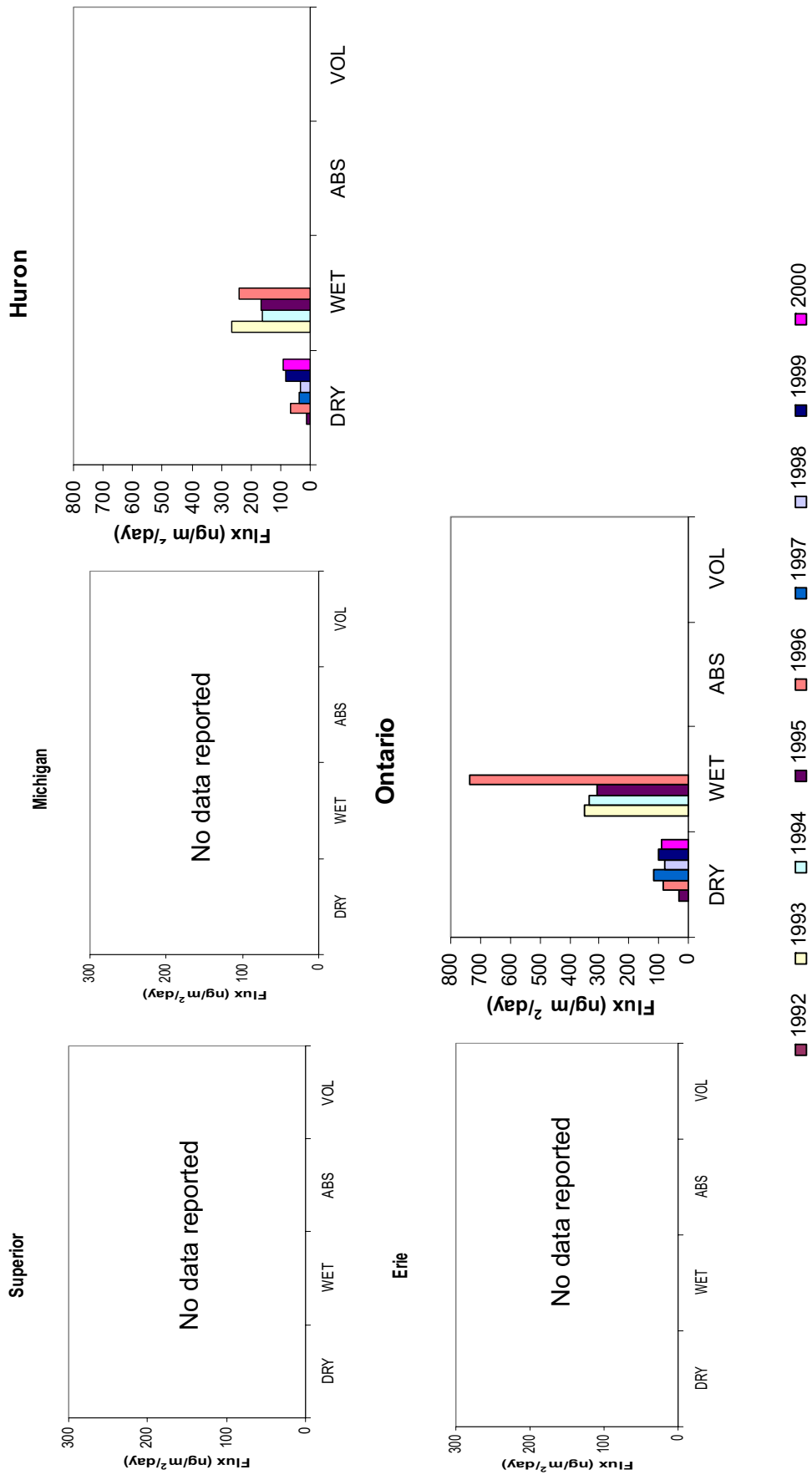


Figure C23. Annual Average Flux (ng/m²/day) of Cadmium

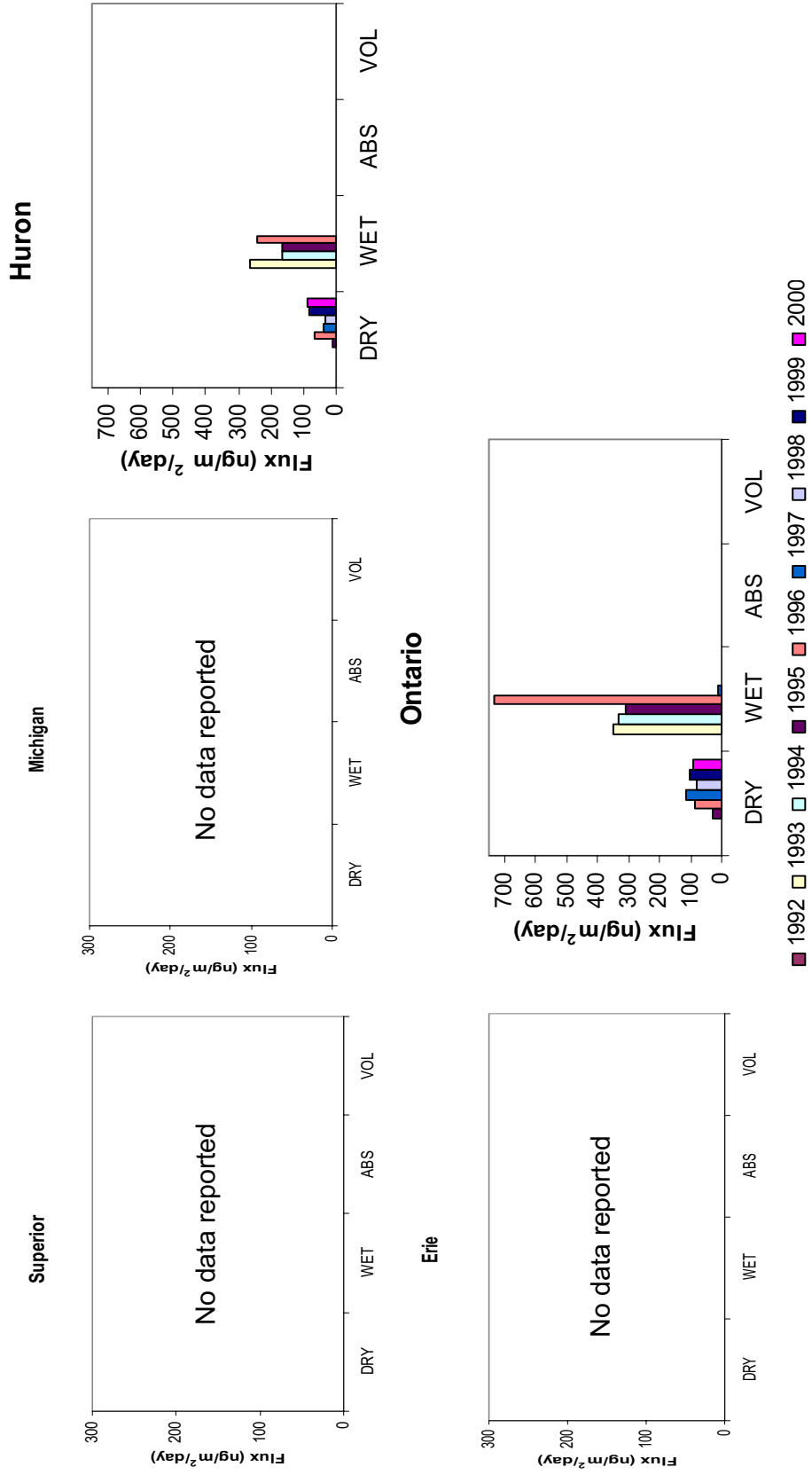


Figure C24. Annual Average Flux (ng/m²/day) of Selenium

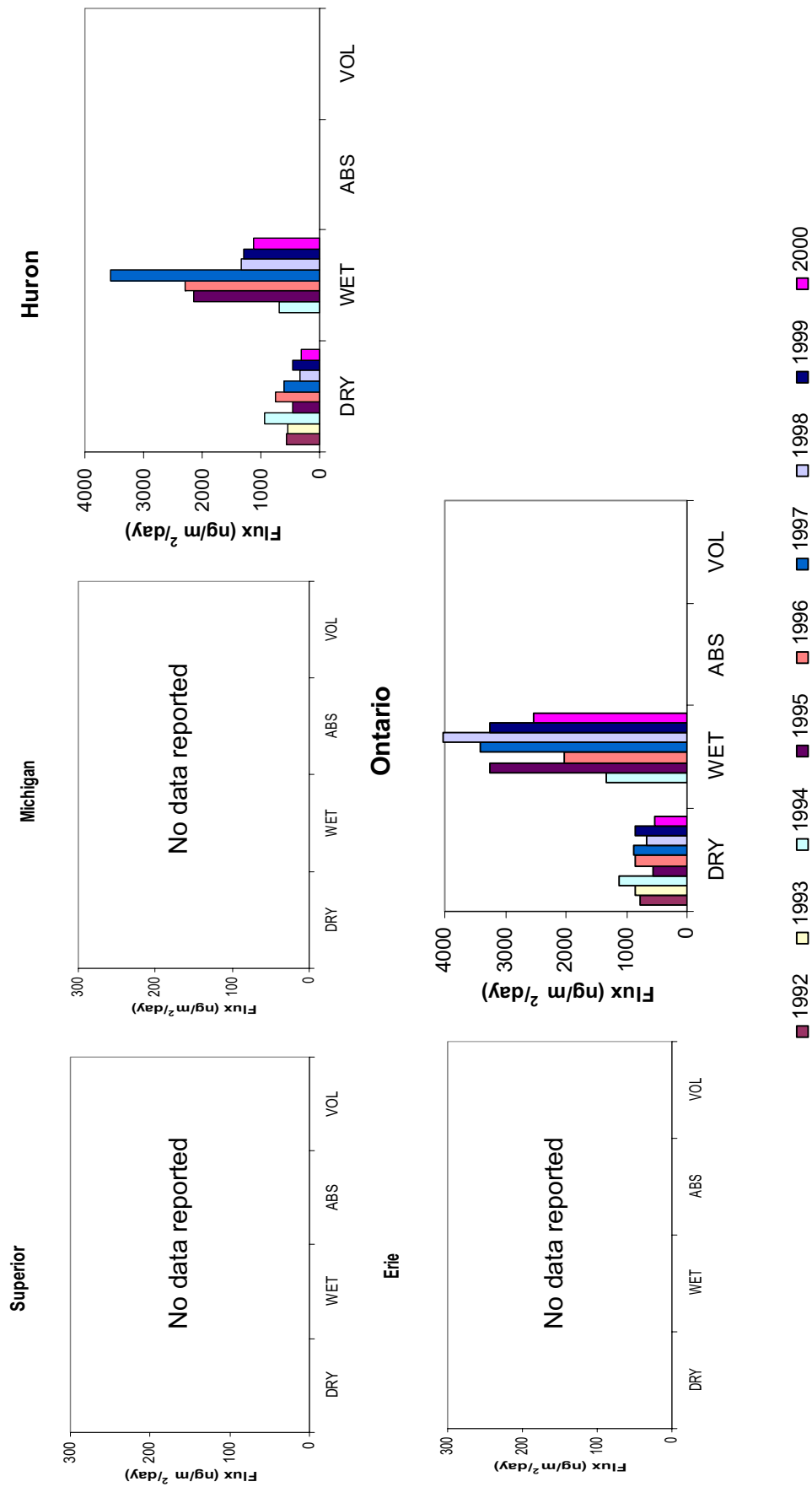


Figure C25. Annual Average Flux (ng/m²/day) of Lead

Appendix D.

Monthly atmospheric fluxes (ng/m²/day) for 1992-2000

α-HEXACHLOROCYCLOHEXANE (ng/m³/day)

Table with columns for Year, Month, and Region (SUPERIOR, MICHIGAN, HURON, ERIE, ONTARIO). Each region has sub-columns for DRY, WET, ABS, and WET_e. The data is organized by month from January to December for each year from 1997 to 2000.

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	
1992	JAN		0.60	27	3.1	65	12	27	1.2	27	1.2	27	1.2	27	3.3	27	9.0	59	1.8	27	3.2	60
1992	FEB				5.8	60	7.6	59									11	59	0.87	27	2.2	62
1992	MAR		0.028	27	1.5	59	1.9	27	1.9	27	1.9	27	1.9	27	2.8	27	12	59	3.2	27	4.4	59
1992	APR		1.2	27	16	58	38	58	13	27	38	58	13	27	14	27	45	58	13	27	6.0	59
1992	MAY		0	27	65	58	320	58	7.3	27	320	58	7.3	27	0.45	27	94	58	9.8	27	13	58
1992	JUN		9.2	27	3.6	60	8.2	27	8.2	27	10	58	6.2	27	2	27	16	58	3.1	27	10	58
1992	JUL		0	27	14	58	5.4	27	5.4	27	250	58	6.5	27	14	27	38	58	6.9	27	8.9	58
1992	AUG		0	27	8.6	59	27	16	58	2.7	16	58	4.6	27	2.4	27	9.9	59	1.9	27	4.7	59
1992	SEP		0.52	27	9.9	59	34	58	1.6	27	34	58	4.0	27	1.4	27	10	59	3.9	27	5.9	59
1992	OCT				27	6.2	59		0.71	27	11	59	2.5	27				58	1.5	27	3.9	59
1992	NOV		0	27	5.9	60	2.7	27	2.7	27	4.7	60	5.2	27	0	27	6.5	59	3.7	27	4.1	60
1992	DEC		2.1	27	4.6	62			0.89	27					1.1	27			3.6	27		
1993	JAN		0	27	3.7	64	6.9	60	0.57	27	4.8	61	0.58	27	0	27	8.2	60	0	27	2.1	59
1993	FEB		0	27	4.9	60	2.7	60	0	27	6.9	60	2.4	27	0	27	19	59	1.3	27	2.0	59
1993	MAR		0.33	27	7.4	59	11	59	1.7	27	11	59	9.9	27	0	27	7.5	60	2.1	27	3.6	58
1993	APR		0	27	7.3	59	36	27	36	27	64	58	18	27	0	27	9.0	59	6.9	27	3.9	58
1993	MAY		2.7	27	15	58	9.8	27	9.8	27	58	58	9.4	27	12	27	45	58	7.8	27	15	58
1993	JUN		0	27	15	58	22	58	0	27	22	58	2.5	27	0.86	27	33	58	0.92	27	18	58
1993	JUL		0.14	27	6.9	59	7.9	59	0	27	7.9	59	2.0	27	2.2	27	12	59	1.1	27	5.3	58
1993	AUG		2.2	27	8.6	59	21	58	1.5	27	21	58	2.2	27	3.1	27	33	58	2.2	27	6.7	58
1993	SEP				27	6.6	60		0	27	8.6	59	1.8	27	1.1	27	18	59	3.1	27	3.3	58
1993	OCT		0	27	5.1	61	7.9	60	0	27	7.9	60	0.78	27	0	27	7.4	60	1.2	27	4.1	58
1993	NOV				5.6	60			0	27	9.7	59	0.82	27	0.72	27	9.2	59	0.83	27	3.2	58
1993	DEC		0	27	2.4	90	3.8	70			3.8	70	0.88	27	0	27	18	59	2.6	27	4.2	59
1994	JAN		0	27	7.0	62	1.6	27	2.6	27	14	59	1.5	27	0	27	13	60	0.89	27	2.9	59
1994	FEB		1.4	27	3.7	68	4.5	64	3.6	27	10	60	1.7	27	0.67	27	9.7	60	2.4	27	3.3	59
1994	MAR		2.9	27	7.6	61	8.9	60	10	27	8.9	60	3.5	27	19	27	43	58	13	27	10	58
1994	APR		1.4	27	20	59	220	58	2.6	27	220	58	13	27	0	27	52	58	25	27	13	58
1994	MAY		1.7	27					1.0	27	53	58	16	27	0	27	45	58	5.0	27	18	58
1994	JUN		0.24	27	13	59	28	58	0	27	28	58	3.3	27	0	27	29	58	1.5	27	14	58
1994	JUL		0.89	27	27	58	27	46	1.3	27	46	58	4.3	27	2.2	27	24	58	2.5	27	7.3	58
1994	AUG		1.8	27	9.8	59			0	27	18	59	2.2	27	2.3	27	8.5	60	3.7	27	6.4	58
1994	SEP		0.61	27	8.6	61	8.6	60	3.6	27	10	60	1.7	27	0	27	8.6	60	0.91	27	5.5	58
1994	OCT		0	27	4.3	71	7.8	62	0	27	7.8	62	2.8	27	0	27	8.6	62	4.0	27	6.7	59
1994	NOV		0	27	3.5	64	1.8	73	0.11	27	1.8	73	0	27	0	27	5.6	60	0	27	2.0	59
1994	DEC		0.42	27	4.2	60	4.1	59			4.1	59	3.5	27	0.29	27	6.6	59	1.9	27	3.6	61
1995	JAN		0	27	4.3	60					3.4	60	0	27	2.1	27	4.9	59	0.43	27	3.0	63
1995	FEB		0	27	1.9	63	1.6	63	2.0	27	1.6	63	1.9	27	0.051	27	1.2	65	0	27	1.6	66
1995	MAR		0	27	5.2	59	7.2	59	0	27	7.2	59	7.8	27	0.062	27	10	58	5.3	27	4.1	60
1995	APR		0.073	27	13	58	1.6	27	1.6	27	63	58	1.5	27	0.16	27	37	58	8.9	27	11	58
1995	MAY		0.041	27	3.6	59	4.9	27	4.9	27	4.9	60	4.9	27	0.16	27	12	58	0.23	27	9.3	58
1995	JUN		4.5	27	13	58	0.066	27	0.066	27	24	58	3.9	27	0.57	27	22	58	9.5	27	8.9	59
1995	JUL		0.35	27	11	58			0.12	27	26	58	2.7	27	0.37	27	15	58	1.1	27	5.5	59
1995	AUG				8.2	58	1.1	27	1.1	27	7.3	59	0.91	27	0.048	27	11	58	6.2	27	4.9	59
1995	SEP				6.1	59	2.2	27	2.2	27	5.1	59	2.3	27	0.23	27	14	58	1.0	27	5.8	59
1995	OCT		0.25	27	5.0	59			2.1	27	8.2	59	2.3	27	1.6	110	9.3	59	5.3	27	4.5	60
1995	NOV		0.22	27	3.7	73	5.3	65	0.76	27	5.3	65	0	27	0	27	3.3	79	0.37	27	3.5	59
1995	DEC		0.22	27	3.0	58	2.7	58	0.87	27	2.7	58	1.4	27	0.41	27	6.1	58	4.5	27	2.5	61
1996	JAN		0.38	27	1.5	59			0.22	27	4.5	58	2.1	27	0	27	3.0	58	0	27	1.9	62
1996	FEB		0.089	27	6.0	58	0.040	27	0.040	27	5.1	58	1.2	27	0	27	4.5	58	0.063	27	2.7	60
1996	MAR		0	27	5.3	58			0	27	8.3	58	1.6	27	0.49	27	11	58	7.2	27	3.9	59
1996	APR		3.8	27	6.0	58			0	27	13	58	1.3	27	0.18	27	21	58	5.9	27	9.8	58
1996	MAY		3.1	27	21	58			0.53	27	29	58	3.6	27	0.11	27	53	58	8.2	27	21	58
1996	JUN		1.8	27	10	58			0.51	27	14	58	7.2	27	0	27	21	58	2.9	27	5.4	59
1996	JUL		0.021	27	6.4	58			0	27	15	58	1.5	27	0	27	9.6	58	0.83	27	6.3	58
1996	AUG		0	27	5.2	58			0	27	6.1	58	4.3	27	0	27	6.2	58	2.4	27	3.3	59
1996	SEP		0.31	27	7.0	58			0.021	27	7.7	58	3.8	27	0	27	7.6	58	4.8	27	3.1	60
1996	OCT		0.71	27	5.4	58			0.032	27	3.6	58	1.8	27	0.19	27	3.7	58	5.6	27	3.1	60
1996	NOV		0.85	27	5.0	59			0	27	3.2	59	1.2	27	3.0	27	3.5	60	1.3	27	3.1	62
1996	DEC																					

α-HEXACHLOROCYCLOHEXANE (ng/m³/day)

YEAR	MONTH	SUPERIOR				MICHIGAN				HUIRON				ERIE				ONTARIO			
		DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e
1997	JAN			1.3	27	1.1	59	2.2	58	1.1	27	0.93	78	0.22	27	2.1	59	3.9	27	1.8	59
1997	FEB			0.017	27	3.2	58	1.8	27	1.7	64	0.17	27	8.8	58	3.9	27	2.7	27	2.7	58
1997	MAR			2.0	27	2.3	58	1.3	27	2.5	58	1.7	27	2.3	27	5.0	58	1.2	27	3.0	58
1997	APR			0.31	27	6.6	58	0.26	27	12	58	5.6	27	0.55	27	9.5	58	7.5	27	3.3	58
1997	MAY			5.0	27	19	58	1.0	27	81	58	2.0	27	9.2	58	42	58	19	27	7.3	58
1997	JUN			3.2	27	18	58	2.7	27	39	58	4.1	27	11	58	40	58	11	27	15	58
1997	JUL			1.0	27	21	58	0.14	27	22	58	3.4	27	6.9	59	21	58	0.68	27	11	58
1997	AUG			0.12	27	7.2	58	0.25	27	15	58	3.3	27	6.1	59	11	58	3.7	27	4.4	58
1997	SEP			0.31	27	9.1	58	0.48	27	18	58	5.9	27	4.0	59	14	58	3.4	27	5.2	58
1997	OCT			0.39	27	7.0	58	0.29	27	7.8	58	2.4	27	3.8	60	9.1	58	1.6	27	3.7	58
1997	NOV			0.65	27	5.3	58	0.46	27	6.1	58	0.86	27	2.7	61	6.7	58	5.5	27	2.2	58
1997	DEC			0.082	27	3.0	58	0.85	27	2.8	58	1.4	27	1.3	68	3.5	58	2.5	27	2.1	62
1998	JAN			0.32	27	2.9	59	0.42	27	1.9	58	4.8	27	1.7	64	1.9	59	5.5	27	1.6	59
1998	FEB			0	27	2.3	59	0.39	27	1.8	59	3.3	27	1.7	62	2.6	59	2.8	27	1.3	59
1998	MAR			0.011	27	4.5	58	0.74	27	6.5	58	4.3	27	2.9	60	5.6	58	3.6	27	2.6	59
1998	APR			0.025	27	7.3	58	3.0	27	35	58	4.2	27	6.5	59	15	58	8.0	27	5.9	58
1998	MAY			2.5	27	11	58	0.25	27	64	58	18	27	8.2	58	39	58	3.5	27	22	58
1998	JUN			0.38	27	12	58	0.80	27	14	58	3.7	27	7.2	58	22	58	11	27	9.6	58
1998	JUL			0.024	27	9.1	58	0.943	27	20	58	1.9	27	4.5	59	23	58	5.1	27	6.4	58
1998	AUG			0.041	27	11	58	0.099	27	10	58	2.0	27	3.7	59	17	58	4.6	27	4.1	58
1998	SEP			0.58	27	6.3	58	0.21	27	10	58	1.2	27	3.3	59	14	58	2.7	27	4.6	58
1998	OCT			0.11	27	5.4	58	0.27	27	4.3	58	1.1	27	2.2	62	7.0	58	2.2	27	2.8	59
1998	NOV			0.18	27	3.9	59	0.28	27	3.2	59	1.4	27	2.2	62	7.9	58	2.3	27	3.0	59
1998	DEC			0.24	27	3.9	58	0.45	27	3.6	58	3.0	27	1.8	65	4.1	58	2.1	27	1.9	59
1999	JAN			0.21	27	2.3	59	0.099	27	2.0	59	0.93	27	1.4	61	4.8	58	9.7	27	2.3	59
1999	FEB			0	27	3.6	58	0.11	27	2.9	58	1.0	27	1.4	60	4.6	58	1.1	27	2.0	59
1999	MAR			0.005	27	2.9	58	0.022	27	7.6	58	1.8	27	1.1	62	3.6	58	5.1	27	1.6	59
1999	APR			0	27	3.6	58	0.021	27	5.5	58	3.3	27	2.0	59	5.4	58	3.3	27	4.0	58
1999	MAY			1.3	27	3.3	58	0.21	27	110	58	7.1	27	19	58	55	58	5.3	27	22	58
1999	JUN			2.8	27	28	58	3.4	27	57	58	3.2	27	12	58	23	58	3.3	27	13	58
1999	JUL			2.4	27	21	58	2.3	27	23	58	3.8	27	7.0	58	14	58	3.4	27	8.2	58
1999	AUG			1.1	27	7.5	58	0.83	27	9.9	58	1.8	27	3.5	58	8.6	58	1.9	27	3.2	58
1999	SEP			1.5	27	6.3	58	1.1	27	14	58	1.8	27	3.5	59	14	58	2.7	27	4.4	58
1999	OCT			2.8	27	8.0	58	0.54	27	12	58	1.9	27	4.3	59	9.8	58	1.7	27	5.1	58
1999	NOV			0.46	27	6.0	58	0.42	27	3.1	58	1.3	27	2.2	60	5.1	58	3.3	27	3.4	59
1999	DEC			0.19	27	4.8	58	0.38	27	2.3	63	1.5	27	2.3	63	5.3	58	1.5	27	2.4	59
2000	JAN			0	27	2.1	60	0	27	3.0	59	0.68	27	1.8	65	3.6	59	3.9	27	2.4	59
2000	FEB			0.17	27	3.1	59	0.65	27	5.3	59	0.78	27	1.5	66	2.9	59	2.6	27	2.4	59
2000	MAR			0.75	27	3.3	59	0.67	27	3.9	59	0.55	27	2.0	61	5.3	58	1.5	27	2.4	59
2000	APR			1.9	27	26	58	6.9	27	11	58	8.0	27	2.4	60	7.0	58	3.3	27	2.5	63
2000	MAY			6.2	27	22	58	11	27	57	58	8.6	27	11	58	63	58	11	27	22	58
2000	JUN			4.0	27	21	58	2.3	27	16	58	5.5	27	4.7	59	43	58	5.9	27	12	58
2000	JUL			0	27	6.5	58	0.62	27	8.1	58	1.9	27	2.5	59	7.6	58	2.0	27	5.7	59
2000	AUG			0.28	27	3.5	59	1.1	27	5.8	58	1.8	27	3.3	59	6.2	58	4.7	27	4.9	59
2000	SEP			1.1	27	4.9	59	2.3	27	5.6	58	2.5	27	4.4	59	9.0	58	1.7	27	4.6	59
2000	OCT			0.45	27	3.8	59	0.59	27	5.6	58	0.54	27	2.1	61	5.3	58	0	27	2.3	63
2000	NOV			1.0	27	2.8	59	0.74	27	3.3	59	0.87	27	3.4	59	6.4	58	2.3	27	3.0	62
2000	DEC			0.55	27	3.4	58	0.30	27	3.0	58	1.3	27	1.5	61	2.6	59	2.4	27	1.7	59

CIS-CHLORDANE (ng/m³day)

YEAR	MONTH	SUPERIOR			MICHIGAN			HURON			ERIE			ONTARIO			
		DRY_e	WET_e	ABS_e	DRY_e	WET_e	ABS_e	DRY_e	WET_e	ABS_e	DRY_e	WET_e	ABS_e	DRY_e	WET_e	ABS_e	
1992	JAN		0.044	27		0	27										
1992	FEB																
1992	MAR		0	27		0	27							0.084	27	0.50	
1992	APR		0	27		0	27							0	27	0.46	
1992	MAY		0	27		0	27							0	27	0.50	
1992	JUN		0.042	27		0.067	27		0.11	27		0.055	27		0	27	0.38
1992	JUL		0.53	27		0.086	27		0	27		0.093	27		0.16	27	0.69
1992	AUG								0	27		0.093	27		0	27	0.69
1992	SEP		0.042	27		0.21	27		0	27		0.080	27		0	27	0.87
1992	OCT					0.014	27		0	27					0	27	0.26
1992	NOV		0.61	27		0.16	27		0	27		0	27		0	27	0.46
1992	DEC		0.15	27		0	27					0	27		0	27	
1993	JAN		0.54	27		0.38	27		0	27		0.40	58		0	27	0.57
1993	FEB		0.064	27		0.21	27		0	27		0.18	59		0.23	27	0.20
1993	MAR		0.40	27		0.38	27		0	27		0.15	59		0	27	0.30
1993	APR		0	27		0	27		0	27		0.17	59		0	27	0.35
1993	MAY		0.16	27		0.045	27		0	27		0.43	58		0.099	27	0.70
1993	JUN		0.94	27		0.064	27		0	27		0.32	58		1.8	27	1.1
1993	JUL		0	27		0	27		0	27		0.32	58		0	27	0.72
1993	AUG		0	27		0.23	27		0	27		0.18	58		0	27	0.40
1993	SEP		0.041	27		0	27		0	27		0.89	58		0	27	0.77
1993	OCT					0	27		0	27		0.59	58		0.051	27	0.22
1993	NOV		0.014	27		0.090	27		0.067	27		0.31	58		0	27	0.63
1993	DEC								0	27		0.074	61		0.050	27	0.54
1994	JAN		0	27					0	27		0.27	59		0.16	27	0.28
1994	FEB		0	27		0	27		0	27		0.27	59		0	27	0.17
1994	MAR		0	27		0	27		0	27		0.15	59		0	27	0.34
1994	APR		0	27		0.24	330		0	27		0.82	58		0.35	27	3.0
1994	MAY		0.025	27		0.35	150		0	27		0.21	58		0	27	1.3
1994	JUN		0	27					0	27		0.16	58		0	27	0.78
1994	JUL		0.25	27		0.36	82		0.49	27		0.46	75		0	27	0.96
1994	AUG		0.50	27		0.94	65		0.51	27		0.56	58		0.28	27	2.2
1994	SEP		0.36	27		0.68	79		1.9	27		0.45	98		1.8	27	1.0
1994	OCT		0.30	27		1.1	72		2.8	27		1.1	76		0.32	27	1.5
1994	NOV		0	27		1.1	110		3.2	27		2.0	71		1.8	27	3.2
1994	DEC								0	27		0.24	58		0	27	0.54
1995	JAN		0	27		1.3	64			0		0.67	71		2.5	27	2.3
1995	FEB		0.49	27		0.46	99			0		0.28	59		0.73	27	2.5
1995	MAR		0.021	27		0.32	100		1.5	27		0.55	71		1.6	27	0.93
1995	APR		0	27		0.33	91			0		0.44	80		2.0	27	1.7
1995	MAY		0.012	27		0.55	65		0.075	27		0.13	59		0.17	27	1.5
1995	JUN		0	27		0.21	80			0		0.10	59		0.12	27	0.59
1995	JUL		0.10	27		0.57	61		0.18	27		0.35	58		0.97	27	1.9
1995	AUG		0.053	27		1.1	59		0.070	27		0.30	58		0.25	27	1.5
1995	SEP					0.40	67		0.24	27		0.74	60		0.22	27	1.5
1995	OCT					0.51	73		0.61	27		0.56	68		2.1	27	2.5
1995	NOV		0	27		0.19	160		0.25	27		0.47	82		0	27	0.79
1995	DEC		0.91	27		0.73	150		0.84	27		1.4	90		1.8	27	1.3
1996	JAN		0.23	27		0.30	83		0.47	27		0.28	83		0.52	27	1.2
1996	FEB		0.004	27		0.067	260		0	27		0.26	87		0.10	27	0.28
1996	MAR		0	27		0.37	72		0.013	27		0.52	87		0.009	27	0.48
1996	APR		0.002	27		0.20	88		0	27		0.14	62		0.31	27	0.73
1996	MAY		0.012	27		0.21	70		0	27		0.24	59		0.11	27	1.6
1996	JUN		0	27		0.69	59		0.11	27		0.50	60		0	27	0.98
1996	JUL		0.11	27		0.53	60		0.055	27		0.78	59		0	27	0.65
1996	AUG		0	27		0.35	60		0.038	27		0.76	59		0.015	27	0.88
1996	SEP		0.44	27		0.58	59		0.30	27		0.57	59		0.22	27	1.2
1996	OCT		0.13	27		0.78	61		0.018	27		1.1	59		0.43	27	0.81
1996	NOV		0.080	27		0.68	63		0.26	27		0.74	61		0.43	27	0.63
1996	DEC		0.27	27		0.46	80		0	27		0.69	62		1.8	27	0.81

YEAR	MONTH	TRANS-CHLORDANE (ng/m ³ /day)										ERIE										ONTARIO										
		SUPERIOR					MICHIGAN					HURON					ERIE					ONTARIO										
		DRY	DRY_e	WET	WET_e	ABS.	ABS_e	DRY	DRY_e	WET	WET_e	ABS.	ABS_e	DRY	DRY_e	WET	WET_e	ABS.	ABS_e	DRY	DRY_e	WET	WET_e	ABS.	ABS_e	DRY	DRY_e	WET	WET_e	ABS.	ABS_e	
1997	JAN				0.049	27	0.062	190			0	27	0.39	61			0	27	0.059	82			0.056	27	0.71	61			0	27	0.44	58
1997	FEB				0.023	27	0.052	170			0	27	0.087	90			0	27	0.12	63			0.11	27	1.5	59			1.4	27	0.47	58
1997	MAR				0	27	0.042	180			0	27	0.15	72			0	27	0.12	62			0.15	27	1.5	59			0	27	0.62	58
1997	APR				0	27	0.12	80			0	27	0.25	63			0	27	0.12	62			0.12	27	0.65	59			0	27	0.14	59
1997	MAY				0	27	1.5	58			0.088	27	0.36	60			0	27	0.13	61			0.15	27	1.1	59			0	27	0.22	58
1997	JUN				0	27	0.29	59			0.048	27	0.80	58			0	27	0.42	58			0	27	1.3	58			0	27	0.33	58
1997	JUL				0.026	27	0.33	59			0.037	27	0.69	58			1.1	27	0.14	59			0.057	27	1.0	58			0	27	0.51	58
1997	AUG				0	27	0.42	59			0.090	27	0.73	58			0.73	27	0.13	59			0.047	27	1.6	58			0.067	27	0.24	58
1997	SEP				0.086	27	0.51	59			0.086	27	0.92	58			0.29	27	0.21	59			0.087	27	1.2	58			0	27	0.31	58
1997	OCT				0	27	1.8	58			0.031	27	1.7	58			0.015	27	0.40	59			0.048	27	1.9	58			0	27	0.31	58
1997	NOV				0.012	27	0.15	74			0	27	0.31	61			0	27	0.076	70			0.053	27	0.89	59			0.087	27	0.074	60
1997	DEC				0.047	27	0.20	59			0.034	27	0.35	59			0	27	0.18	60			0.014	27	1.0	58			0.13	27	0.49	59
1998	JAN				0.051	27	0.042	220			0	27	0.21	67			0	28	0.12	61			0.030	27	0.66	60			0	27	0.25	58
1998	FEB				0	27	0.58	60			0	27	0.47	59			0.61	27	0.17	59			0	27	0.89	59			0.26	27	0.16	58
1998	MAR				0.032	27	0.15	81			0.078	27	0.15	82			0.045	27	0.14	60			0	27	0.27	71			0.10	27	0.099	59
1998	APR				0.003	27	0.11	80			0.050	27	0.36	60			0	27	0.13	59			0.14	27	0.82	59			0	27	0.21	58
1998	MAY				0.021	27	0.15	67			0.039	27	0.49	59			0	27	0.14	59			0.036	27	0.52	59			0.087	27	0.11	58
1998	JUN				0.067	27	0.19	62			0.093	27	0.55	59			0.095	27	0.18	58			0.047	27	1.3	58			0.063	27	0.30	58
1998	JUL				0.024	27	0.074	71			0.014	27	0.28	59			0.031	27	0.73	59			0.044	27	1.2	58			0	27	0.16	58
1998	AUG				0	27	0.38	59			0.025	27	0.39	59			0	27	0.094	59			0.033	27	1.0	58			0	27	0.11	58
1998	SEP				0.051	27	0.15	65			0.041	27	0.13	62			0	27	0.19	58			0.010	27	1.0	58			0	27	0.36	58
1998	OCT				0.072	27	0.34	63			0.050	27	0.17	66			0.006	27	0.14	59			0.083	27	1.3	58			0	27	0.18	58
1998	NOV				0.033	27	0.18	74			0.13	27	0.13	80			0.027	27	0.23	59			0	27	1.8	58			0	27	0.47	58
1998	DEC				0.053	27	0.24	71			0.027	27	0.68	59			0	27	0.22	60			0.024	27	2.3	58			0	27	0.27	59
1999	JAN				0.046	27	0.13	67			0.069	27	0.18	61			0	27	0.17	59			0	27	0.56	59			0	27	0.49	58
1999	FEB				0.041	27	0.44	59			0.025	27	1.0	58			0.020	27	0.40	58			0.032	27	0.93	58			0	27	0.34	58
1999	MAR				0.031	27	0.14	63			0.026	27	0.70	58			0.082	27	0.063	60			0.065	27	0.87	59			0.13	27	0.25	59
1999	APR				0	27	0.10	64			0.11	27	0.16	60			0.11	27	0.088	59			0.15	27	0.40	59			0.033	27	0.15	59
1999	MAY				0.037	27	0.62	59			0.10	27	1.2	58			0.036	27	0.31	58			0	27	1.2	58			0	27	0.57	58
1999	JUN				0.006	27	0.39	58			0	27	1.3	58			0	27	0.23	56			0.033	27	0.98	58			0.033	27	0.37	58
1999	JUL				0.012	27	0.20	59			0.026	27	0.76	58			0.087	27	0.28	58			0.043	27	1.2	58			0	27	0.47	58
1999	AUG				0.022	27	0.18	59			0.026	27	0.45	58			0.041	27	0.16	58			0.027	27	0.87	58			0	27	0.12	58
1999	SEP				0.045	27	0.12	61			0.031	27	0.53	58			0.024	27	0.16	58			0.027	27	1.1	58			0	27	0.37	58
1999	OCT				0.066	27	0.43	59			0.044	27	1.5	58			0	27	0.30	56			0.037	27	1.2	58			0	27	0.46	58
1999	NOV				0.015	27	0.26	61			0.012	27	0.23	60			0	27	0.13	59			0.058	27	0.99	58			0	27	0.75	58
1999	DEC				0.025	27	0.36	65			0.035	27	0.47	61			0.037	27	0.33	59			0.29	27	1.4	59			0	27	0.45	58
2000	JAN				0	27	0.027	1100			0	27	0.25	130			0.36	27	0.12	62			0.059	27	0.42	110			3.5	27		
2000	FEB				0	27	0.21	160			0.030	27	0.14	200			0.12	27	0.12	63			0	27	0.43	100			0	27		
2000	MAR				0	27	0.16	160			0.054	27	0.31	88			0	27	0.20	59			0.098	27	1.1	63			0.12	27		
2000	APR				0	27	0.31	85			0	27	0.31	89			0.098	27	0.12	60			0.22	27	0.56	67			0.34	27	0.21	58
2000	MAY				0.029	27	0.34	73			0.074	27	0.83	61			0	27	0.24	58			0.11	27	1.9	59			0.21	27	0.33	58
2000	JUN				0	27	0.11	140			0	27	0.17	91			0	27	0.066	60			0.073	27	0.89	60			0.14	27	0.19	58
2000	JUL				0	27	0.15	87			0	27	0.20	73			0.10	27	0.058	59			0	27	0.39	61			0	27	0.10	58
2000	AUG				0.023	27	0.098	100			0.024	27	0.24	67			0.11	27	0.10	59			0.10	27	0.43	61			0	27	0.20	58
2000	SEP				0.036	27	0.24	90			0.11	27	0.87	61			0.076	27	1.1	60			0.076	27	1.1	60			0	27	0.21	58
2000	OCT				0	27	0.073	250			0.062	27	0.29	79			0.008	27	0.12	59			0	27	0.63	62			0	27	0.10	58
2000	NOV				0.21	27	0.063	280			0.10	27	0.44	77			7.5	27	0.56	58			0.16	27	0.88	64			0.14	27	0.25	58
2000	DEC				0.053	27	0.41	59			0.038	27	0.65	59			0.24	27	0.40	58			0.014	27	0.59	59			0.37	27	0.44	58

TRANS-NONACHLOR (ng/m²/day)

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	
1992	JAN		0.056	27																		
1992	FEB																					
1992	MAR		0	27																		
1992	APR		0	27																		
1992	MAY		0	27																		
1992	JUN		0.020	27																		
1992	JUL		0	27																		
1992	AUG				0.33	59																
1992	SEP		0.010	27																		
1992	OCT				0.28	60																
1992	NOV		0.37	27																		
1992	DEC		0.067	27																		
1993	JAN		0.35	27																		
1993	FEB		0.030	27																		
1993	MAR		0.081	27																		
1993	APR		0	27																		
1993	MAY		0.27	27																		
1993	JUN		0	27																		
1993	JUL		0	27																		
1993	AUG		0.052	27																		
1993	SEP		0.064	27																		
1993	OCT				0.19	84																
1993	NOV		0	27																		
1993	DEC				0.28	62																
1994	JAN		0	27																		
1994	FEB		0	27																		
1994	MAR		0	27																		
1994	APR		0.032	27																		
1994	MAY		0	27																		
1994	JUN		0	27																		
1994	JUL		0.076	27																		
1994	AUG		0	27																		
1994	SEP		0.46	27																		
1994	OCT		0	27																		
1994	NOV		0	27																		
1994	DEC		0.79	27																		
1995	JAN		0	27																		
1995	FEB		0	27																		
1995	MAR		0.047	27																		
1995	APR		0	27																		
1995	MAY		0.006	27																		
1995	JUN		0	27																		
1995	JUL		0.037	27																		
1995	AUG		0.018	27																		
1995	SEP				0.12	62																
1995	OCT				0.26	60																
1995	NOV		0.073	27																		
1995	DEC		2.8	27																		
1996	JAN		0.22	27																		
1996	FEB		0.002	27																		
1996	MAR		0.01	27																		
1996	APR		0.035	27																		
1996	MAY		0.011	27																		
1996	JUN		0.065	27																		
1996	JUL		0.011	27																		
1996	AUG		0.031	27																		
1996	SEP		0.045	27																		
1996	OCT				0.055	27																
1996	NOV		0.37	27																		
1996	DEC				0.27	61																

TRANS-NONACHLOR (ng/m³-day)

YEAR	MONTH	SUPERIOR			MICHIGAN			HURON			ERIE			ONTARIO								
		DRY	WET	ABS_e	DRY	WET	ABS_e	DRY	WET	ABS_e	DRY	WET	ABS_e	DRY	WET	ABS_e						
1997	JAN		0.089	27	0.097	190		0.0650	27	0.31	68		0.025	27	0.45	72		0	27	0.35	58	
1997	FEB		0.018	27	0.050	260		0.054	27	0.056	180		0.15	27	1.0	60		0	27	0.42	58	
1997	MAR		0.032	27	0.023	500		0.039	27	0.24	72		0.073	27	1.3	59		0	27	0.49	58	
1997	APR		0.006	27	0.16	88		0.022	27	0.29	66		0.040	27	0.79	60		0	27	0.21	58	
1997	MAY		0.025	27	0.25	67		0.038	27	0.33	63		0.080	27	0.66	61		0	27	0.29	58	
1997	JUN		0.012	27	0.21	62		0.051	27	0.44	59		0.047	27	1.1	58		0	27	0.44	58	
1997	JUL		0	27	0.29	60		0.006	27	0.64	58		0.026	27	0.84	58		0	27	0.69	58	
1997	AUG		0	27	0.30	60		0	27	0.41	59		0	27	0.63	59		0	27	0.23	58	
1997	SEP		0.014	27	0.49	60		0.027	27	0.69	59		0.039	27	0.78	59		0	27	0.36	58	
1997	OCT		0.047	27	0.68	60		0.026	27	1.3	59		0.020	27	0.85	59		0	27	0.33	58	
1997	NOV		0.031	27	0.068	160		0.018	27	0.17	77		0.044	27	0.52	63		0	27	0.13	59	
1997	DEC		0.036	27	0.26	61		0.036	27	0.32	59		0.012	27	0.57	59		0	27	0.32	58	
1998	JAN		0.036	27	0.19	83		0.029	27	0.36	62		0.049	27	0.60	62		0	27	0.25	59	
1998	FEB		0	27	0.46	61		0.007	27	0.47	60		0.013	27	0.55	61		0	27	0.16	59	
1998	MAR		0.016	27	0.27	70		0.034	27	0.30	67		0.009	27	0.49	64		0	27	0.13	60	
1998	APR		0.017	27	0.24	66		0.033	27	0.53	60		0.071	27	0.58	60		0	27	0.13	60	
1998	MAY		0.026	27	0.49	60		0.059	27	0.55	59		0.043	27	0.41	59		0	27	0.12	58	
1998	JUN		0.039	27	0.31	60		0.051	27	0.62	58		0.028	27	1.0	58		0	27	0.38	58	
1998	JUL		0.020	27	0.12	64		0.014	27	0.35	59		0.056	27	1.0	58		0.028	27	0.19	58	
1998	AUG		0.002	27	0.36	59		0.014	27	0.36	59		0.028	27	0.58	58		0.064	27	0.13	58	
1998	SEP		0.036	27	0.16	65		0.028	27	0.14	61		0.044	27	0.88	58		0.12	27	0.38	58	
1998	OCT		0.024	27	0.37	63		0	27	0.19	65		0.013	27	0.27	58		0.028	27	0.21	58	
1998	NOV		0.030	27	0.28	68		0.15	27	0.32	64		0.030	27	0.27	58		0	27	0.35	58	
1998	DEC		0.067	27	0.27	80		0.014	27	0.45	62		0.011	27	0.52	63		0	27	0.30	58	
1999	JAN		0.057	27	0.46	65		0.058	27	0.27	67		0.13	27	0.16	59		0	27	0.38	58	
1999	FEB		0	27	0.54	63		0.046	27	1.3	59		0.032	27	0.46	58		0.036	27	0.33	58	
1999	MAR		0.011	27	0.25	72		0.014	27	0.71	60		0.009	27	1.2	59		0.049	27	0.40	58	
1999	APR		0	27	0.19	74		0.11	27	0.42	61		0.041	27	0.14	59		0.032	27	0.17	59	
1999	MAY		0.022	27	1.1	59		0.035	27	1.5	58		0.049	27	0.36	58		0.037	27	0.71	58	
1999	JUN		0.018	27	0.33	59		0.019	27	0.90	58		0	27	0.40	58		0.026	27	0.47	58	
1999	JUL		0.021	27	0.27	60		0.01	27	0.41	59		0	27	0.39	58		0.016	27	0.64	58	
1999	AUG		0.025	27	0.18	66		0.021	27	0.67	59		0.007	27	0.85	58		0.11	27	0.19	58	
1999	SEP		0.094	27	0.40	63		0.028	27	1.1	59		0.012	27	0.88	59		0.007	27	0.40	58	
1999	OCT		0.017	27	0.37	67		0.031	27	0.38	63		0.067	27	0.14	59		0.056	27	0.49	58	
1999	NOV		0.030	27	0.40	66		0.16	27	0.33	65		0.082	27	0.46	58		0.068	27	0.66	58	
1999	DEC		0	27	0.065	150		0	27	0.16	79		0.12	27	0.90	60		0.11	27	0.53	58	
2000	JAN		0.011	27	0.17	79		0.025	27	0.20	71		0	27	0.14	60		0.061	27	0.28	70	
2000	FEB		0.011	27	0.19	69		0.035	27	0.49	60		0	27	0.21	59		0.068	27	1.2	59	
2000	MAR		0.017	27	0.31	61		0.045	27	0.55	59		0.049	27	0.17	59		0.17	27	0.82	59	
2000	APR		0.030	27	0.47	59		0.050	27	1.1	58		0	27	0.33	58		0.073	27	2.4	58	
2000	MAY		0	27	0.19	63		0	27	0.28	59		0	27	0.11	59		0.073	27	0.84	58	
2000	JUN		0	27	0.19	60		0	27	0.26	59		0	27	0.80	58		0.028	27	0.29	58	
2000	JUL		0	27	0.13	61		0.014	27	0.31	59		0.041	27	0.13	58		0.054	27	0.46	58	
2000	AUG		0.014	27	0.35	60		0.048	27	0.86	58		0	27	0.43	58		0.033	27	1.0	58	
2000	SEP		0.015	27	0.11	74		0.017	27	0.37	59		0.014	27	0.15	58		0.072	27	0.60	59	
2000	OCT		0.025	27	0.14	74		0.096	27	0.40	60		0.024	27	0.27	58		0.075	27	0.66	59	
2000	NOV		0.031	27	0.062	200		0.072	27	1.4	59		0.22	27	0.43	58		0.018	27	0.82	62	
2000	DEC																					

PP_DDE (ng/m³/day)

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO					
		DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e		
1992	JAN			0.10	27	0.11	240	0.030	27	1.2	61									0.30	27	0.83	93
1992	FEB			0.13	27	0.55	130	0.11	27	0.88	66									0	27	0.54	110
1992	MAR			0	27	0.50	70	0.16	27	1.3	60									0.084	27	0.86	87
1992	APR			0.061	27	0.62	59	0.30	27	1.3	58									0.40	27	1.7	62
1992	MAY			0.092	27	0.15	76	0.50	27	0.42	60									3.3	27	1.5	62
1992	JUN			0	27	0.21	67	0.16	27	1.4	58									0.56	27	1.1	60
1992	JUL			0.23	27	0.68	59	0.19	27	1.1	59									0.41	27	4.1	59
1992	AUG			0.54	27	0.18	88	0.064	27	1.2	59									0.14	27	1.2	59
1992	SEP			0.18	27	0.21	98	0.26	27	1.1	60									0.43	27	1.5	59
1992	OCT			0.049	27	0.52	260	0.18	27	1.2	110									0	27	0.88	71
1992	NOV			0	27	0.38	320	0	27	1.4	93									0.81	27	1.4	59
1992	DEC			1.1	27	0.23	450	0.067	27	0.84	140									0.25	27	4.2	66
1993	JAN			0	27	0.16	99	0	27	1.0	97									0.13	27	2.1	84
1993	FEB			0.082	27	0.24	75	0.20	27	0.20	75									0.23	27	2.6	72
1993	MAR			0	27	0.53	180	2.4	27	1.3	94									0.72	27	2.1	69
1993	APR			0.13	27	0.51	140	0.18	27	2.0	67									0.24	27	5.4	60
1993	MAY			0.18	27	0.39	140	0.70	27	1.4	63									0.99	27	4.2	59
1993	JUN			0	27	0.23	450	0.28	27	1.6	62									0.21	27	3.1	59
1993	JUL			0.058	27	0.50	71	0	27	1.7	59									0.10	27	1.8	60
1993	AUG			0.15	27	0.28	60	0.20	27	2.3	65									0.42	27	5.1	60
1993	SEP			0.62	27	0.26	62	0.43	27	0.89	59									0.40	27	2.8	65
1993	OCT			0.21	27	0.39	70	0.87	27	1.4	59									0.40	27	2.8	65
1993	NOV			0.042	27	0.18	580	0.023	27	0.53	160									0.24	27	1.1	94
1993	DEC			0.42	27	0.19	93	0.42	27	0.19	93									0.11	27	2.0	59
1994	JAN			0.038	27	0.23	80	0.55	27	0.55	60									0.32	27	1.7	59
1994	FEB			0.064	27	0.24	75	0.20	27	0.20	75									0	27	0.64	64
1994	MAR			0.082	27	0.45	27	0.092	27	0.32	61									0.39	27	1.6	59
1994	APR			0.43	27	0.23	450	0.39	27	0.32	61									0.61	27	1.6	59
1994	MAY			0.012	27	0.28	60	0.15	27	1.2	58									0.55	27	2.5	58
1994	JUN			0.13	27	0.28	60	0.15	27	1.2	58									0.23	27	2.8	58
1994	JUL			0.62	27	0.26	62	0.14	27	0.27	61									0.60	27	3.2	58
1994	AUG			0.21	27	0.39	70	0.87	27	1.4	59									0.23	27	1.5	58
1994	SEP			0.042	27	0.18	580	0.023	27	0.53	160									0.10	27	1.1	59
1994	OCT			0.42	27	0.19	93	0.42	27	0.19	93									0.19	27	2.8	59
1994	NOV			0.038	27	0.23	80	0.55	27	0.55	60									0.27	27	1.7	59
1994	DEC			0.059	27	0.11	110	0.60	27	1.1	60									0.27	27	1.9	60
1995	JAN			0.050	27	0.29	62	0.14	27	1.8	58									0.54	27	1.8	59
1995	FEB			0.026	27	0.18	63	0.058	27	0.85	58									0.18	27	1.7	59
1995	MAR			0.17	27	0.20	61	0.095	27	1.2	58									0.29	27	2.6	58
1995	APR			0.046	27	0.39	59	0.063	27	0.49	58									0.44	27	1.4	58
1995	MAY			0.35	60	0.42	61	0.20	27	0.79	59									0.14	27	2.3	58
1995	JUN			0.23	27	0.12	110	0.16	27	0.80	61									0.48	27	3.5	58
1995	JUL			0.17	27	0.27	82	0.081	27	1.1	60									1.6	27	1.6	59
1995	AUG			0.044	27	0.19	180	0.074	27	0.13	63									0.12	27	2.3	59
1995	SEP			0.005	27	0.11	64	0.18	27	0.31	59									0.26	27	1.3	58
1995	OCT			0.037	27	0.096	64	0	27	1.1	58									0	27	0.23	60
1995	NOV			0.054	27	0.20	59	0	27	1.1	58									1.2	27	1.9	58
1995	DEC			0.035	27	0.20	59	0.032	27	0.18	59									0.32	27	4.6	58
1996	JAN			0.044	27	0.30	58	0.10	27	0.69	58									0.20	27	2.1	58
1996	FEB			0.024	27	0.20	58	0.045	27	0.82	58									0.11	27	1.5	58
1996	MAR			0.071	27	0.10	59	0.28	27	1.5	58									0.066	27	0.81	58
1996	APR			0.054	27	0.43	59	0.17	27	0.81	58									0.14	27	1.4	58
1996	MAY			0.063	27	0.50	59	0.11	27	0.85	58									0.18	27	1.2	58
1996	JUN			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60
1996	JUL			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60
1996	AUG			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60
1996	SEP			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60
1996	OCT			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60
1996	NOV			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60
1996	DEC			0.10	27	0.23	71	0.31	27	0.16	79									0	27	0.73	60

YEAR	MONTH	SUPERIOR						MICHIGAN						HURON						ERIE						ONTARIO					
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e
1997	JAN			0.079	27	0.12	79			0.070	27	0.34	59			0	27	0.063	78			0.040	27	0.83	59			3.4	27	0.61	59
1997	FEB			0.084	27	0.054	110			0.20	27	0.14	64			0.79	27	0.12	63			0.14	27	2.9	58			21	27	1.3	58
1997	MAR			0.15	27	0.030	150			0.13	27	0.22	61			0.25	27	0.12	63			0.48	27	2.3	58			0.070	27	1.5	58
1997	APR			0.023	27	2.5	58			0.074	27	0.76	58			0	27	0.096	63			0.29	27	1.8	58			0.30	27	0.43	59
1997	MAY			0.066	27	0.16	61			0.21	27	0.58	59			0	27	0.15	61			0.50	27	2.8	58			0.28	27	0.74	58
1997	JUN			0.059	27	0.24	59			0.31	27	1.7	58			0.079	27	0.38	58			0.26	27	2.6	58			0.62	27	1.4	58
1997	JUL			0.053	27	0.27	59			0.067	27	1.0	58			3.6	27	0.15	59			0.085	27	2.2	58			0.37	27	2.6	58
1997	AUG			0	27	0.20	59			0.13	27	0.80	58			1.4	27	0.14	59			0.14	27	1.5	58			0.39	27	0.64	58
1997	SEP			0.066	27	0.17	60			0.10	27	1.9	58			4.7	27	0.12	60			0.49	27	2.7	58			0.68	27	1.1	58
1997	OCT			0.084	27	0.54	59			0.032	27	1.6	58			0.16	27	0.52	58			0.11	27	1.6	58			0.048	27	0.73	58
1997	NOV			0.044	27	0.079	77			0.033	27	0.24	60			0	27	0.097	65			0.078	27	0.79	59			0.29	27	0.24	60
1997	DEC			0.033	27	0.20	60			0.067	27	0.48	58			0	27	0.14	62			0.041	27	1.1	58			0.30	27	0.76	59
1998	JAN			0.070	27	0.079	69			0.043	27	0.27	59			0	27	0.14	62			0.12	27	0.57	59			3.3	27	0.49	59
1998	FEB			0	27	0.29	59			0.024	27	0.53	58			0	27	0.20	60			0.052	27	1.8	58			0.16	27	0.38	60
1998	MAR			0.16	27	0.12	62			0.29	27	0.40	59			0.63	27	0.23	60			0.22	27	0.32	59			0.22	27	0.25	62
1998	APR			0.017	27	0.14	60			0.12	27	0.80	58			0.24	27	0.19	59			0.22	27	1.5	58			0.33	27	0.97	58
1998	MAY			0.39	27	0.38	58			0.23	27	0.92	58			0.28	27	0.19	59			0.043	27	1.3	58			0.26	27	0.43	58
1998	JUN			0.070	27	0.16	59			0.11	27	0.95	58			0.30	27	0.23	58			0.16	27	1.7	58			2.1	27	1.3	58
1998	JUL			0.013	27	0.10	59			0.053	27	0.72	58			0.24	27	0.084	59			0.20	27	2.8	58			0.78	27	0.74	58
1998	AUG			0.038	27	0.18	59			0.057	27	0.57	58			0.041	27	0.11	59			0.33	27	1.1	58			0.69	27	0.46	58
1998	SEP			0.054	27	0.17	59			0.085	27	0.43	58			0.078	27	0.28	58			0.048	27	3.0	58			0.83	27	1.5	58
1998	OCT			0.032	27	0.28	59			0.099	27	0.27	59			0.095	27	0.19	59			0.088	27	0.90	58			0.37	27	0.58	59
1998	NOV			0.043	27	0.12	62			0.099	27	0.36	59			0.13	27	0.27	59			0	27	1.3	58			0.33	27	1.4	58
1998	DEC			0.16	27	0.16	68			0.022	27	0.40	59			0.29	27	0.18	61			0.049	27	0.81	59			0.12	27	0.63	59
1999	JAN			0.062	27	0.23	61			0.14	27	0.26	59			0.36	27	0.18	59			0	27	0.84	59			0	27	0.49	59
1999	FEB			0.12	27	0.39	59			0.067	27	1.5	58			0.029	27	0.54	58			0.052	27	1.3	58			0.022	27	0.82	58
1999	MAR			0.13	27	0.14	63			0.047	27	0.79	58			0	27	0.065	61			0.23	27	2.0	58			0	27	0.84	58
1999	APR			0	27	0.10	64			1.8	27	0.62	58			0.14	27	0.15	59			0.71	27	1.3	58			0.44	27	0.49	59
1999	MAY			0.23	27	0.58	59			0.41	27	1.4	58			0.44	27	0.25	58			0.27	27	2.3	58			0.46	27	1.9	58
1999	JUN			0.051	27	0.40	58			0.061	27	1.8	58			0	27	0.25	58			0.15	27	1.4	58			0.17	27	1.1	58
1999	JUL			0.026	27	0.28	58			0.14	27	1.3	58			0	27	0.24	58			1.3	27	1.7	58			0.64	27	2.1	58
1999	AUG			0.015	27	0.22	59			0.091	27	0.71	58			0.052	27	0.11	58			0.045	27	1.7	58			0.24	27	0.30	58
1999	SEP			0.13	27	0.15	59			0.065	27	0.78	58			0.090	27	0.13	58			0.081	27	1.7	58			0.22	27	0.75	58
1999	OCT			0.36	27	0.33	59			0.059	27	1.4	58			0.099	27	0.28	58			0.089	27	2.1	58			0.20	27	1.3	58
1999	NOV			0.017	27	0.22	61			0.038	27	0.42	59			0.21	27	0.17	59			0.052	27	1.9	58			0.31	27	1.5	58
1999	DEC			0.022	27	0.33	59			0.053	27	0.25	59			0.21	27	0.53	59			0.099	27	2.0	58			0.26	27	1.6	58
2000	JAN			0	27	0.11	71			0	27	0.31	60			0.074	27	0.14	88			0.16	27	0.69	59			1.7	27		
2000	FEB			0.034	27	0.16	64			0.15	27	0.32	59			0.14	27	0.15	87			0.095	27	0.36	60			0.24	27		
2000	MAR			0.052	27	0.18	61			0.18	27	0.53	59			0.13	27	0.25	64			0.49	27	1.1	58			0.43	27		
2000	APR			0.029	27	0.25	59			0.10	27	1.4	58			0.24	27	0.15	69			0.16	27	2.2	58			0.50	27	0.84	58
2000	MAY			0	27	0.20	59			0	27	0.67	58			0.33	27	0.38	59			0.41	27	6.0	58			0.74	27	1.9	58
2000	JUN			0	27	0.20	59			0	27	0.52	58			0.15	27	0.066	66			0.075	27	2.4	58			0.77	27	0.79	58
2000	JUL			0.009	27	0.077	60			0	27	0.53	58			0.038	27	0.061	65			0.037	27	0.86	58			0.46	27	0.49	58
2000	AUG			0.009	27	0.077	60			0.028	27	0.29	58			0.19	27	0.19	59			0.073	27	1.2	58			0.40	27	0.59	58
2000	SEP			0.015	27	0.19	59			0.11	27	1.4	58			0.10	27	0.32	59			0.11	27	2.3	58			0.11	27	0.62	58
2000	OCT			0	27	0.040	82			0.028	27	0.32	59			0.036	27	0.12	64			0.11	27	1.7	58			0.24	27	0.39	58
2000	NOV			0	27	0.11	65			0.034	27	0.33	59			0.093	27	0.48	59			0.14	27	1.2	58			0.39	27	0.51	58
2000	DEC			0.044	27	0.25	60			0.072	27	1.2	58			0.53	27	0.33	58			0.065	27	1.0	58			0.78	27	1.3	58

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	WET	WET_e	ABS	DRY	WET	WET_e	ABS	DRY	WET	WET_e	ABS	DRY	WET	WET_e	ABS	DRY	WET	WET_e	ABS	
1992	JAN		0	27	0	0.82	59															
1992	FEB				0.23	65																
1992	MAR		0	27	0.33	61																
1992	APR		0	27	0.31	59																
1992	MAY		0	27	0.24	85																
1992	JUN		0	27	0	0.050	27	0.20	160													
1992	JUL		0.26	27	0.47	86																
1992	AUG				0.72	73																
1992	SEP		0	27	1.3	61																
1992	OCT				0.05	27	2.4	61														
1992	NOV		0	27	0.19	260																
1992	DEC		0	27																		
1993	JAN		0	27	0.13	720																
1993	FEB		0	27	0.072	1200																
1993	MAR		0	27	0																	
1993	APR		0.036	27	0																	
1993	MAY		0.50	27	0.043	1300																
1993	JUN		1.6	27																		
1993	JUL		0	27	0.14	400																
1993	AUG				0.13	390																
1993	SEP		0	27	0.20	350																
1993	OCT				0.40	210																
1993	NOV		0	27	0.082	1100																
1993	DEC																					
1994	JAN		0	27	0.068	740																
1994	FEB		1.4	27	0																	
1994	MAR																					
1994	APR		0	27																		
1994	MAY		0	27																		
1994	JUN		0	27																		
1994	JUL																					
1994	AUG		2.7	1.5	61																	
1994	SEP		0.71	27	0.53	84																
1994	OCT		0.20	27	0																	
1994	NOV		0	27	0.61	100																
1994	DEC		0	27	0																	
1995	JAN		0	27	0.083	330																
1995	FEB		0.11	27	0																	
1995	MAR		0.029	27	0.14	170																
1995	APR		0.049	27	0.19	120																
1995	MAY		0	27	0.20	100																
1995	JUN		0.028	27	0.24	86																
1995	JUL		0.015	27	0.11	140																
1995	AUG		0	27	0.69	63																
1995	SEP				0.051	380																
1995	OCT				0.076	320																
1995	NOV		0	27	0.64	71																
1995	DEC		0.53	27	0.38	140																
1996	JAN		0	27	0.59	530																
1996	FEB		0	27	0																	
1996	MAR																					
1996	APR		0	27	0																	
1996	MAY		0	27	0																	
1996	JUN																					
1996	JUL		0.010	27	0.43	470																
1996	AUG		0	27	0.69	270																
1996	SEP		0	27	1.7	140																
1996	OCT		0.19	27	0.48	600																
1996	NOV		0	27	0																	
1996	DEC		0	27	0.64	69																

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YEAR	MONTH	SUPERIOR						MICHIGAN						HURON						ERIE						ONTARIO					
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e
1997	JAN			0	27	0	180			0	27	0.23	180			0	27	0.015	450			0.013	27	0.41	160			1.4	27	0.065	120
1997	FEB			0	27	0.082	530			0.077	27	0.54	88			0	27	0.066	110			0.055	27	1.0	75			0.93	27	0.11	78
1997	MAR			0	27	0.10	400			0	27	0				0	27	0.085	590			0.17	27	0.085	590			0	27	0.13	75
1997	APR			0	27	0.23	170			0	27	0				0	27	0.046	130			0.095	27	0.080	520			0	27	0.083	83
1997	MAY			0	27	0.32	120			0	27	0				0	27	0.13	73			0.046	27	0				0	27	0.11	73
1997	JUN			0	27	0.71	70			0	27	0				0	27	0.11	69			0	27	0				0	27	0.23	60
1997	JUL			0.017	27	0.37	97			0	27	0.11	250			4.2	27	0.077	82			0.046	27	0.21	160			0	27	0.34	59
1997	AUG			0	27	0.72	71			0	27	0.70	73			2.1	27	0.077	86			0	27	1.4	63			0	27	0.21	61
1997	SEP			0	27	0.086	480			0	27	0.12	300			6.0	27	0.067	100			0.25	27	0.17	240			0	27	0.15	67
1997	OCT			0	27	0.48	110			0	27	1.0	72			0	27	0.098	88			0.15	27	1.8	63			0	27	0.12	72
1997	NOV			0	27	0.59	93			0	27	1.2	67			0	27	0.037	200			0.17	27	1.0	77			0	27	0.10	77
1997	DEC			0	27	0.058	4900			0.011	27	0				0	27	0.028	300			0	27	1.7	190			0	27	0.048	210
1998	JAN			0	27	0.15	420			0	27	0.13	400			0	27	0				1.5	27	0.51	140			0	27	0.045	160
1998	FEB			0	27	0.15	340			0	27	0.25	180			0	27	0.027	240			0.089	27	0.68	100			0	27	0.039	150
1998	MAR			0.016	27	0.78	93			0.12	27	1.4	71			0	27	0.048	160			0.091	27	3.3	62			0	27	0.088	93
1998	APR			0.010	27	0.51	110			0.17	27	0.42	120			0	27	0.047	140			0.26	27	1.2	72			0	27	0.068	93
1998	MAY			0	27	0				0.078	27	0.79	79			0.28	27	0.089	83			0.049	27	0.22	200			0.12	27	0.049	100
1998	JUN			0.057	27	0	2500			0.054	27	0				0.20	27	0.10	76			0.063	27	0.48	110			0.45	27	0.16	64
1998	JUL			0.017	27	0.016	2500			0.009	27	0				0	27	0.027	200			0	27	0.059	710			0.10	27	0.068	82
1998	AUG			0	27	0				0.025	27	0.17	220			0	27	0.12	72			0.10	27	0.59	89			0.33	27	0.19	61
1998	SEP			0	27	0				0.016	27	0				0	27	0.059	110			0.030	27	0.040	1200			0	27	0.23	62
1998	OCT			0.21	27	0.37	180			0.086	27	0.18	310			0	27	0.10	92			0.25	27	0.21	290			0	27	0.080	93
1998	NOV			0.027	27	0.64	120			0	27	0.63	110			0	27	0.046	180			0	27	2.6	63			0.082	27	0.12	81
1998	DEC			0	27	0.66	98			0.49	27	1.2	69			0	27	0.024	300			0.12	27	1.2	73			0	27	0.047	150
1999	JAN			0	27	1.2	70			0.10	27	0.65	79			0	27	0.009	540			0	27	7.8	59			0	27	0.041	160
1999	FEB			0.054	27	0.49	110			0.015	27	0.84	71			0	27	0				0	27	9.0	58			0	27	0	
1999	MAR			0	27	1.3	65			0	27	1.7	62			0	27	0				0	27	6.9	59			0	27	0	
1999	APR			0	27	0.39	100			0.24	27	0.35	110			0	27	0.024	170			0	27	0.76	78			0	27	0.019	240
1999	MAY			0	27	0.58	83			0.0090	27	2.0	60			0.062	27	0.086	70			0	27	0.51	86			0.11	27	0.18	61
1999	JUN			0	27	0.043	620			0.010	27	1.5	60			0	27	0.035	97			0	27	0.79	67			0.18	27	0.27	59
1999	JUL			0.003	27	0.040	650			0.038	27	0.091	270			0	27	0.019	170			0	27	0.25	130			0.13	27	0.37	59
1999	AUG			0	27	0				0	27	0.50	79			0.11	27	0				0	27	1.6	61			0.028	27	0	
1999	SEP			0	27	0.16	230			0	27	0.74	71			0	27	0.026	150			0	27	0.37	100			0.069	27	0.16	63
1999	OCT			0	27	1.2	69			0.015	27	2.9	60			0	27	0				0	27	0.15	290			0	27	0.12	71
1999	NOV			0	27	0.12	400			0.024	27	0.20	210			0.043	27	0.020	270			0	27	0				0.082	27	0.14	73
1999	DEC			0	27	0.94	94			0	27	2.6	63			0	27	0.24	70			0	27	7.5	59			0	27	0.10	92
2000	JAN			0	27	0.22	130			0	27	0.57	74			0.042	27	0.018	500			0	27	0.99	66			0.89	27	0	
2000	FEB			0	27	0.57	73			0.090	27	0.89	64			0	27	0.040	220			0	27	0				0	27	0	
2000	MAR			0	27	0.051	430			0.077	27	0.27	95			0	27	0.038	180			0	27	0.35	87			0	27	0	
2000	APR			0	27	0.83	63			0	27	0.17	140			0	27	0.027	230			0	27	0.12	180			0	27	0	
2000	MAY			0	27	0.33	77			0	27	0.31	83			0	27	0.027	200			0	27	0.13	160			0.096	27	0.11	80
2000	JUN			0	27	0				0	27	0.12	160			0	27	0.037	140			0	27	0.87	62			0.10	27	0.063	110
2000	JUL			0	27	0.22	91			0	27	0				0.056	27	0.040	120			0	27	0.84	63			0	27	0.089	83
2000	AUG			0	27	0				0.005	27	0.023	700			0.045	27	0.093	78			0	27	0.056	300			0.039	27	0.13	74
2000	SEP			0	27	0				0	27	0			0	27	0.080	99			0.024	27	0				0.072	27	0.23	65	
2000	OCT			0	27	0.16	150			0	27	0.26	100			0	27	0.037	170			0	27	0.18	120			0	27	0.019	360
2000	NOV			0	27	0.025	970			0	27	0.087	290			0.11	27	0.074	110			0.067	27	0.66	71			0	27	0.062	150
2000	DEC			0	27	0.57	95			0.14	27	1.5	65			0	27	0.037	140			0.058	27	0.090	530			0.34	27	0.14	74

PP_DDT (ng/lm²/day)

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	
1992	JAN			0.18	27	0	1.6	62														
1992	FEB						0.32	120														
1992	MAR			0.39	27	0.57	81	0.054	27	0.22	150											
1992	APR			0.027	27	0.44	89															
1992	MAY			0	27	1.3	59															
1992	JUN			0.18	27	0.77	160															
1992	JUL			5.3	27	4.2	64															
1992	AUG					27	4.2	65														
1992	SEP			0.11	27	0.17	980															
1992	OCT					27	3.0	77														
1992	NOV			3.5	27	0.84	240															
1992	DEC			0	27																	
1993	JAN			0	27	0.39	910															
1993	FEB			1.9	27	0																
1993	MAR			1.7	27	0																
1993	APR			0	27	0.22	1200															
1993	MAY			0	27	0.93	250															
1993	JUN			0	27	1.3	27	3.2	84													
1993	JUL			110	27	1.9	130															
1993	AUG			1.5	27	0.66	300															
1993	SEP			0.39	27	1.2	230															
1993	OCT					27	1.8	180														
1993	NOV			0	27	0.10	3300															
1993	DEC					0.24	820															
1994	JAN			0	27	0																
1994	FEB			3.0	27	0.029	2200															
1994	MAR			0.63	27	0																
1994	APR			0.12	27																	
1994	MAY			0.57	27																	
1994	JUN			6.1	27																	
1994	JUL			1.6	27																	
1994	AUG			0	27	0.63	85															
1994	SEP			10	27	0.21	210															
1994	OCT			0	27	0																
1994	NOV			0	27	0																
1994	DEC			0	27	0.35	920															
1995	JAN			0	27	0																
1995	FEB			0	27	1.4	250															
1995	MAR			0.15	27	2.8	110															
1995	APR			0	27	0.78	320															
1995	MAY			0.029	27	0.25	830															
1995	JUN			0.012	27	0.11	1600															
1995	JUL			0.33	27	0.45	380															
1995	AUG			0.030	27	1.3	150															
1995	SEP					0.12	1900															
1995	OCT					0.49	570															
1995	NOV			0	27	0.040	7500															
1995	DEC			1.3	27	1.7	72															
1996	JAN			0	27	0																
1996	FEB			0	27	0																
1996	MAR			0	27	0.88	61															
1996	APR			0	27	0																
1996	MAY			0.18	27	0																
1996	JUN			0.039	27	3.6	56															
1996	JUL			0.34	27	2.1	59															
1996	AUG			0.13	27	1.1	59															
1996	SEP			0	27	0.54	62															
1996	OCT			0.003	27	0.61	64															
1996	NOV			0.073	27	0.79	62															
1996	DEC			0	27	0																

PP_DDT (ng/m³/day)

YEAR	MONTH	SUPERIOR			MICHIGAN			HURON			ERIE			ONTARIO							
		DRY	DRY_e	WET	DRY	DRY_e	WET_e	DRY	DRY_e	WET_e	DRY	DRY_e	WET_e	DRY	DRY_e	WET_e					
1997	JAN			0.39	27	0.046	420	0.46	66	0.27	0.13	160	0.006	27	0.79	64	0	27	0.15	79	
1997	FEB			0.11	27	0.088	180	0.26	27	0.18	92	0.18	27	2.0	59	0.22	27	0.68	59	0.68	59
1997	MAR			0.11	27	0.056	260	1.3	27	0	27	0.85	27	2.1	59	0.32	27	0.19	65	0.63	59
1997	APR			0.051	27	0.59	62	0.021	27	0	27	0.16	110	0.38	27	2.1	59	0	27	0.19	65
1997	MAY			0	27	0.75	60	0.53	27	0.89	60	0.42	27	3.5	58	0.42	27	2.7	27	0.39	60
1997	JUN			0	27	0.90	59	0.50	27	2.6	68	0.23	27	4.8	58	0.23	27	5.0	27	1.9	58
1997	JUL			0	27	0.25	70	0.003	27	1.8	59	4.3	27	3.8	58	0.049	27	0	27	2.7	58
1997	AUG			0.011	27	1.2	59	0	27	2.5	58	2.3	27	3.8	58	0.11	27	0	27	0.89	58
1997	SEP			0.0020	27	0.96	60	0.14	27	3.7	58	14	27	5.3	58	1.0	27	0	27	1.2	58
1997	OCT			0.064	27	0.14	120	0.013	27	0.72	61	0	27	3.9	58	0.14	27	0	27	0.61	59
1997	NOV			0.006	27	0.25	83	0.14	27	0	27	0.080	240	0.12	27	0.97	61	0	27	0.087	93
1997	DEC			0.14	27	0.23	90	0.042	27	0.62	62	0	27	1.1	60	0	27	0	27	0.69	100
1998	JAN			0.077	27	0.008	4200	0.048	27	0	27	0.008	700	0.079	27	0.0050	7400	0	27	0.21	65
1998	FEB			0	27	0.11	290	0.011	27	0.064	380	0	27	0.054	100	0.046	27	0.016	27	0.19	64
1998	MAR			0.083	27	0.10	330	0.35	27	0.10	330	0	27	0.030	180	0.083	27	0.051	27	0.085	90
1998	APR			0.040	27	0.17	170	0.44	27	0.45	82	0	27	0.097	73	0.22	27	0	27	0.41	59
1998	MAY			1.0	27	0.71	69	0.22	27	3.4	59	0	27	0.13	65	0.30	27	0	27	0.40	59
1998	JUN			0.037	27	0.48	76	0.085	27	1.4	60	0	27	0.23	60	0.17	27	0	27	1.4	58
1998	JUL			0.022	27	1.8	60	0.029	27	5.0	58	0	27	0.066	70	0.15	27	0.060	27	0.96	58
1998	AUG			0.011	27	1.4	61	0.092	27	5.0	58	0	27	0.19	60	0.38	27	0.29	27	0.87	58
1998	SEP			0	27	0.37	94	0.03	27	0.60	67	0	27	0.34	59	0.075	27	0	27	1.8	58
1998	OCT			0.048	27	0.77	75	0.06	27	0.38	98	0.029	27	0.13	71	0.065	27	0	27	0.37	60
1998	NOV			0.003	27	0.096	390	0.12	27	0	27	0.076	93	0	27	1.3	65	0.36	27	0.54	59
1998	DEC			0.14	27	0.22	100	0.054	27	0.40	69	0	27	0.091	220	0	27	0.43	71	0.23	66
1999	JAN			0.13	27	0.35	510	0.27	27	0.55	260	0	27	0.095	100	0	27	1.9	120	0.18	160
1999	FEB			0.13	27	1.6	120	0.23	27	2.2	86	0	27	0.43	61	0.11	27	2.8	83	0.32	89
1999	MAR			0.033	27	2.2	89	0.027	27	3.0	75	0	27	0.062	130	0.43	27	1.9	110	0.25	110
1999	APR			0	27	1.3	120	0.51	27	0.36	360	0	27	0.16	70	0.066	27	0.89	190	0.22	100
1999	MAY			0.083	27	2.5	81	0.21	27	5.5	62	0.19	27	6.8	61	0.19	27	6.8	61	1.9	59
1999	JUN			0.040	27	1.3	98	0.12	27	6.6	60	0	27	0.57	59	0.085	27	5.5	61	2.0	59
1999	JUL			0.01	27	1.4	90	0.54	27	3.7	63	0	27	0.48	59	1.6	27	6.3	60	2.4	58
1999	AUG			0.045	27	0.89	130	0.043	27	1.5	85	0.092	27	0.32	60	0.053	27	3.1	67	0.40	66
1999	SEP			0.097	27	0.44	310	0.18	27	1.7	88	0.068	27	0.26	62	0.059	27	3.7	66	1.1	60
1999	OCT			0	27	0.43	390	0	27	1.5	110	0.084	27	0.24	66	0.31	27	3.2	77	0.88	63
1999	NOV			0.020	27	0.085	2200	0.059	27	0.62	260	0.28	27	0.054	170	0.029	27	2.1	110	0.78	66
1999	DEC			0.063	27	0.042	960	0.17	27	0.005	7100	0	27	0.21	67	0.13	27	2.0	63	0.46	60
2000	JAN			0	27	0.12	1300	0	27	0.23	720	0.10	27	0.061	270	0.12	27	0.63	320	0.27	100
2000	FEB			0.12	27	1.0	170	0.10	27	0.15	990	0.11	27	0.065	250	0.097	27	2.1	110	0.27	100
2000	MAR			0.045	27	0.073	11000	0.19	27	0.35	380	0.16	27	0.13	110	0.75	27	0.72	210	0.27	100
2000	APR			0.080	27	0.36	350	0.11	27	0.32	410	0.73	27	1.5	100	1.0	27	0.24	27	0.25	65
2000	MAY			0.059	27	0.48	230	0.23	27	1.6	92	0.34	27	0.33	65	0.32	27	5.9	62	1.6	58
2000	JUN			0.29	27	0.46	250	0.21	27	0.75	160	0.20	27	0.13	88	0.27	27	3.9	65	0.51	59
2000	JUL			0	27	0.91	120	0	27	1.2	96	0	27	0.12	84	0.11	27	1.6	79	0.27	61
2000	AUG			0.082	27	0.57	170	0.25	27	1.4	88	0	27	0.31	64	0.45	27	3.2	65	0.68	59
2000	SEP			0.042	27	1.8	93	1.3	27	2.4	79	0.50	27	0.39	65	0.37	27	4.0	66	0.61	59
2000	OCT			0	27	0.85	150	0.13	27	1.7	95	0.026	27	0.16	87	0.23	27	5.7	62	0.26	64
2000	NOV			0	27	0.12	1300	0	27	0.52	310	0.060	27	0.44	65	0.64	27	0.92	190	0.30	65
2000	DEC			0.065	27	0.040	4300	0.036	27	0.77	230	0.36	27	0.094	100	0.15	27	0.19	1000	0.55	75

A-ENDOS (ng/m²/day)

YEAR	MONTH	SUPERIOR			MICHIGAN			HURON			ERIE			ONTARIO					
		DRY	DRY_e	WET	DRY_e	WET	DRY_e	DRY_e	WET	DRY_e	DRY_e	WET	DRY_e	DRY_e	WET	DRY_e	WET		
1992	JAN			0	27											1.1	27	1.1	130
1992	FEB															0.41	27	0.97	130
1992	MAR			0	27											0.95	27	1.4	100
1992	APR			0	27											2.0	27	1.8	74
1992	MAY			0	27				1.6	27						15	27	30	58
1992	JUN			0	27				2.3	27						9.8	27	18	58
1992	JUL			0	27				7.9	27						97	27	140	58
1992	AUG								7.2	27						9.9	27	28	58
1992	SEP			0	27				1.4	27						8.2	27	8.1	59
1992	OCT			0	27				0.51	27						0.44	27	1.8	81
1992	NOV			0	27				1.3	27						1.1	27	2.6	74
1992	DEC			0	27											1.3	27		
1993	JAN			0	27				0.55	27						2.0	27	2.3	86
1993	FEB			0	27				0.29	27						0.88	27	1.8	97
1993	MAR			0	27				0.22	27						0.50	27	1.4	110
1993	APR			0	27				1.5	27						6.1	27	1.6	88
1993	MAY			0	27				6.4	27						9.8	27	54	58
1993	JUN			0	27				4.7	27						17	27	24	58
1993	JUL			0	27				9.0	27						5.6	27	76	58
1993	AUG			0	27				2.2	27						5.3	27	35	58
1993	SEP			0	27				1.3	27						3.3	27	15	59
1993	OCT			0	27				1.0	27						0.45	27	1.9	87
1993	NOV			0	27				0.52	27						0.78	27	2.1	87
1993	DEC								0.62	27						1.3	27	1.7	88
1994	JAN			0	27				2.2	27						0.96	27	1.5	74
1994	FEB			0	27				0.73	27						0.86	27	1.5	71
1994	MAR			0	27				0.97	27						1.1	27	1.6	65
1994	APR			0	27				1.6	27						3.7	27	6.7	59
1994	MAY			0	27				3.8	27						190	27	57	58
1994	JUN			0	27				6.5	27						4.1	27	28	58
1994	JUL			0	27				8.6	27						50	27	410	58
1994	AUG			1.2	27				6.4	27						11	27	120	58
1994	SEP			0.78	27				1.1	27						0.68	27	7.1	59
1994	OCT			0.34	27				0.38	27						0.19	27	3.1	59
1994	NOV			0.094	27				1.2	27						1.4	27	4.6	60
1994	DEC			0	27				0	27						0	27	1.5	100
1995	JAN			0.50	27				0.43	27						0.33	27	2.2	100
1995	FEB			7.6	27				0	27						1.1	27	0.84	230
1995	MAR			0.013	27				0.44	27						0.25	27	2.1	78
1995	APR			0	27				0.072	27						6.6	27	4.4	67
1995	MAY			0.026	27				13	27						3.1	27	14	59
1995	JUN			0.13	27				3.7	27						4.5	27	83	58
1995	JUL			4.5	27				3.9	27						1.2	27	67	58
1995	AUG			0.31	27				3.2	27						0.27	27	39	58
1995	SEP								0	27						0.014	27	14	59
1995	OCT			0.75	27				0.18	27						0.14	27	8.0	61
1995	NOV			9.3	27				1.5	27						1.2	27	1.6	120
1995	DEC			0.54	27				0.48	27						0.097	27	8.5	
1996	JAN			0.93	27				0.84	27						0.21	27	1.3	60
1996	FEB			0.12	27				1.0	27						0	27	0.56	62
1996	MAR			0.045	27				0.36	27						0	27	0.067	200
1996	APR			0.82	27				1.4	27						3.1	27	1.3	59
1996	MAY			0.96	27				1.2	27						0.11	27	18	58
1996	JUN			2.7	27				1.9	27						1.1	27	28	58
1996	JUL			3.9	27				4.8	27						0.064	27	40	58
1996	AUG			0	27				1.2	27						0.094	27	25	58
1996	SEP			0	27				2.9	27						0	27	8.8	58
1996	OCT			0.69	27				0.49	27						2.6	27	5.1	58
1996	NOV			0.79	27				0.78	27						5.1	27	1.1	59
1996	DEC			0.97	27				0	27						2.2	27	0.30	600

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO						
		DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e			
1997	JAN			1.6	27	0.11	200	61	0.72	27	0.33	59	0.41	27	0.33	59	0.21	27	0.72	27	1.5	27	1.0	70
1997	FEB			0.024	27	0.042	360	61	0.66	27	0.78	58	0.26	27	0.78	58	0	27	7.2	27	2.3	27	1.5	61
1997	MAR			0.87	27	0.033	400	85	0.19	85	0	0	0	0	0	0	0.83	27	2.6	59	0.41	27	2.2	60
1997	APR			0.019	27	0.29	71	60	0.028	27	0.74	60	0.32	27	1.6	58	0.16	27	3.5	58	1.0	27	1.6	60
1997	MAY			1.8	27	1.1	59	58	0.23	27	13	58	1.7	27	2.3	58	0.30	27	50	58	2.0	27	6.0	58
1997	JUN			0.63	27	4.1	58	58	0.47	27	54	58	0.94	27	6.8	58	0.95	27	47	58	5.7	27	15	58
1997	JUL			1.6	27	18	58	58	0.27	27	87	58	2.0	27	4.0	58	1.7	27	69	58	2.5	27	54	58
1997	AUG			0.15	27	16	58	58	0.65	27	50	58	1.8	27	11	58	0.39	27	69	58	2.9	27	25	58
1997	SEP			0.25	27	7.8	58	58	0.78	27	34	58	1.1	27	5.0	58	0.54	27	24	58	0.97	27	13	58
1997	OCT			0.30	27	5.1	58	58	0.48	27	7.1	58	2.4	27	2.5	58	0.37	27	8.8	58	0.29	27	3.5	59
1997	NOV			0.66	27	0.28	77	58	0.28	27	0.067	190	0.33	27	1.5	58	0.85	27	0.86	62	0.86	27	1.7	61
1997	DEC			0.11	27	0.24	75	63	0.34	27	0.98	63	0.36	27	0.60	73	0	27	1.2	59	0.40	27	0.98	65
1998	JAN			0.63	27	0.80	64	60	0.54	27	1.1	60	1.0	27	1.5	64	0.82	27	1.1	62	1.4	27	1.4	61
1998	FEB			0	27	0.68	61	59	0.68	27	1.4	59	0.13	27	1.3	63	0.19	27	2.5	59	0.66	27	1.0	62
1998	MAR			0.16	27	0.28	93	63	0.65	27	0.84	63	0.91	27	1.9	62	0	27	0.39	87	0.94	27	1.2	62
1998	APR			0.055	27	0.59	64	58	1.3	27	6.9	58	1.2	27	3.1	59	0.26	27	9.8	58	7.9	27	4.5	58
1998	MAY			0.50	27	1.9	59	58	0.25	27	130	58	3.7	27	2.6	59	0.082	27	18	58	1.5	27	7.1	58
1998	JUN			0.32	27	5.7	58	58	0.67	27	34	58	3.6	27	5.1	58	0.25	27	25	58	2.1	27	5.5	58
1998	JUL			0.19	27	11	58	58	0.011	27	40	58	2.6	27	3.6	59	0	27	98	58	10	27	9.5	58
1998	AUG			0.049	27	21	58	58	0.15	27	42	58	1.6	27	6.5	58	0.11	27	44	58	6.8	27	9.5	58
1998	SEP			0.32	27	3.4	58	58	0.16	27	3.9	58	0.86	27	3.3	59	0.070	27	25	58	1.4	27	6.6	58
1998	OCT			0.083	27	1.6	60	59	0.17	27	1.5	59	0.31	27	1.5	63	0.207	27	4.4	58	0.71	27	2.1	59
1998	NOV			0.081	27	0.40	81	71	0.46	27	0.49	71	0.46	27	1.5	65	0	27	2.8	59	0.43	27	2.3	59
1998	DEC			0.74	27	0.49	69	59	0.44	27	1.3	59	0.79	27	1.1	58	0.068	27	1.9	59	0.59	27	1.3	63
1999	JAN			0.19	27	0.18	170	99	0.059	27	0.28	99	0.58	27	0.95	59	0	27	0.47	94	6.1	27	1.6	62
1999	FEB			0.049	27	0		59	0.016	27	1.9	59	0.29	27	1.1	59	0.033	27	1.7	60	0.37	27	1.2	62
1999	MAR			0.027	27	0.21	120	59	0.074	27	2.1	59	0.067	27	0.66	59	0.13	27	1.6	61	1.5	27	1.6	61
1999	APR			0	27	0.11	180	87	0.14	27	0.52	87	0.66	27	1.2	59	0.10	27	1.9	60	0.21	27	2.2	59
1999	MAY			1.6	27	12	58	58	0.11	27	37	58	0.88	27	22	58	1.4	27	31	58	1.8	27	69	58
1999	JUN			2.2	27	8.0	58	58	2.2	27	62	58	2.8	27	12	58	0.79	27	21	58	8.9	27	90	58
1999	JUL			2.8	27	22	58	58	4.1	27	32	58	2.6	27	14	58	3.8	27	53	58	5.9	27	41	58
1999	AUG			0.61	27	28	58	58	0.61	27	34	58	3.3	27	4.8	58	1.5	27	60	58	2.8	27	9.4	58
1999	SEP			0.68	27	2.7	59	58	0.68	27	17	58	0.91	27	3.9	58	1.9	27	14	58	3.0	27	9.1	58
1999	OCT			1.3	27	4.8	59	58	0.27	27	7.3	58	0.86	27	3.3	58	0.86	27	9.2	58	1.2	27	6.4	58
1999	NOV			0.28	27	1.4	62	62	0.20	27	1.1	62	0.50	27	1.2	59	0.63	27	3.1	59	1.1	27	3.7	59
1999	DEC			0.32	27	1.2	63	63	0.55	27	0.14	170	0.59	27	1.7	66	0.63	27	0.68	73	0.71	27	1.9	61
2000	JAN			0	27	0.47	89	84	0	27	1.1	64	0.37	27	0.59	58	0.34	27	1.5	64	2.3	27		
2000	FEB			0.15	27	0.51	83	83	0.62	27	1.7	60	0.39	27	0.79	58	0.50	27	1.7	62	0.38	27		
2000	MAR			0.36	27	0.48	78	78	0.49	27	1.6	60	0.30	27	0.97	58	0.82	27	3.3	59	0.51	27		
2000	APR			0.41	27	1.8	59	59	1.3	27	4.0	59	1.1	27	0.96	58	0.56	27	2.4	59	1.6	27	4.3	58
2000	MAY			0.61	27	3.0	59	58	4.1	27	11	58	2.0	27	3.1	58	3.1	27	61	58	9.5	27	120	58
2000	JUN			1.9	27	2.5	59	58	2.4	27	6.8	58	1.5	27	1.3	58	7.7	27	33	58	10	27	3.6	58
2000	JUL			0	27	4.2	58	58	1.6	27	13	58	1.9	27	0.96	58	4.1	27	19	58	3.1	27	5.1	58
2000	AUG			0.16	27	3.1	58	58	1.3	27	30	58	1.9	27	3.5	58	3.4	27	24	58	7.7	27	11	58
2000	SEP			0.44	27	3.7	59	58	1.3	27	17	58	1.9	27	4.6	58	1.0	27	18	58	1.0	27	5.8	58
2000	OCT			0.26	27	0.66	67	67	0.47	27	2.8	59	0.28	27	1.1	58	1.3	27	5.2	58	0	27	1.8	58
2000	NOV			1.5	27	0.86	320	65	0.90	27	0.97	65	0.70	27	1.2	58	0.73	27	6.6	58	0.70	27	1.8	58
2000	DEC			0.45	27	1.0	64	60	0.17	27	1.8	60	0.88	27	0.66	60	0.31	27	1.4	63	1.0	27	1.1	65

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YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	WET	ABS	ABS	DRY	WET	ABS	ABS	DRY	WET	ABS	ABS	DRY	WET	ABS	ABS	DRY	WET	ABS	ABS	
1992	JAN		0.062	27	0.23	87	1.7	59														
1992	FEB				0.32	71	0.70	60														
1992	MAR		0.043	27	0.72	61	0.10	27	0.97	59												
1992	APR		0	27	0.61	61	0.033	27	1.4	59												
1992	MAY		0.13	27	2.1	290	0.028	27	3.4													
1992	JUN		0.046	27	0.48	150	0.071	27	0.21	230												
1992	JUL		0	27	0.69	110	0.063	27	0.81	83												
1992	AUG				1.5	76			0.95	89												
1992	SEP		0.11	27	1.1	130	0.048	27	1.4	88												
1992	OCT				0.86	140	0.014	27	0.74	160												
1992	NOV		0.17	27	0.38	400	0.068	27	4.4	65												
1992	DEC		0.23	27	1.4	61	0.046	27	3.5	59												
1993	JAN		0.10	27	1.1	170	0	27	1.7	100												
1993	FEB		0.031	27	3.9	71	0	27	2.2	87												
1993	MAR		0.050	27	0.69	180	0	27	1.7	93												
1993	APR		0.048	27	3.5	68	0.066	27	1.5	110												
1993	MAY		0.089	27	2.0	74	0.062	27	1.3	91												
1993	JUN		0.082	27			0.074	27	0.93	74												
1993	JUL		0.12	27	0.85	96	0.050	27	0.84	78												
1993	AUG		0.067	27	0.59	110	0	27	0.52	140												
1993	SEP		0	27	0.60	160	0.084	27	1.6	78												
1993	OCT				0.34	340	0	27	1.2	100												
1993	NOV		0	27	0.40	340	0.044	27	0.81	140												
1993	DEC				1.1	170			6.2	64												
1994	JAN		0	27	0.36	98	0.038	27	0.78	91												
1994	FEB		0	27	0.57	71	0.057	27	1.4	61												
1994	MAR		0.011	27	0.52	67	0	27	0.69	63												
1994	APR		0	27	0.28	96	0.012	27	1.3	63												
1994	MAY		0	27	0.36	70	0	27	1.5	59												
1994	JUN				0	27	0.027	27	0.26	61												
1994	JUL		0.049	27	0.31	60	0	27	0.59	59												
1994	AUG		0.12	27	0.44	60	0.33	27	0.97	59												
1994	SEP		0.20	27	0.67	60	0.055	27	0.58	60												
1994	OCT		0.024	27	3.3	59	0.17	27	1.1	59												
1994	NOV		0.35	27	1.3	62	0.16	27	4.5	58												
1994	DEC		0	27	0.47	300	0	27	0.69	170												
1995	JAN		0.038	27	0.86	76	0	27	0.69	76												
1995	FEB		0.047	27	0.43	120			0.71	79												
1995	MAR		0.042	27	0.49	90	0.12	27	0.66	72												
1995	APR		0.062	27	0.64	75	0.097	27	0.52	84												
1995	MAY		0.020	27	0.80	64	0.14	27	1.7	200												
1995	JUN		0.036	27	0.46	66	0.066	27	0.44	62												
1995	JUL		0.089	27	0.56	62	0.050	27	0.28	66												
1995	AUG		0.052	27	0.52	61	0.15	27	0.37	61												
1995	SEP				0.64	63	0.026	27	1.0	60												
1995	OCT				0.53	78	0.089	27	0.71	66												
1995	NOV		0.10	27	0.25	150	0.14	27	0.61	80												
1995	DEC		0.50	27	0.86	67	0.10	27	2.1	60												
1996	JAN		0.22	27	0.37	150	0	27	0.68	93												
1996	FEB		0.011	27	0.32	160	0.038	27	0.53	110												
1996	MAR		0.013	27	0.65	92	0.023	27	0.78	87												
1996	APR		0.037	27	0.53	94	0	27	0.43	110												
1996	MAY		0.012	27	0.35	92	0	27	0.64	75												
1996	JUN		0.025	27	0.37	81	0.15	27	0.36	77												
1996	JUL		0.12	27	0.42	78	0.044	27	0.81	60												
1996	AUG		0.26	27	0.45	66	0.023	27	1.0	59												
1996	SEP		0.39	27	0.31	81	0.052	27	0.80	61												
1996	OCT		0.25	27	0.73	77	0.057	27	0.86	67												
1996	NOV		0.089	27	1.9	63	0.029	27	0.70	78												
1996	DEC		0.35	27	0.62	78	0.31	27	0.42	89												

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YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO									
		DRY	DRY _e	WET	WET _e	ABS	ABS _e	DRY	DRY _e	WET	WET _e	ABS	ABS _e	DRY	DRY _e	WET	WET _e	ABS	ABS _e	DRY	DRY _e	WET	WET _e	ABS	ABS _e		
1997	JAN			0.10	27	0.37	90			0.080	27	0.52	66					0.046	27	1.4	62					1.6	69
1997	FEB			0.003	27	0.37	79			0.056	27	0.58	64					0.044	27	2.8	59					7.0	59
1997	MAR			0.15	27	0.24	92			0.021	27	0.37	72					0.043	27	2.8	59					2.3	62
1997	APR			0.029	27	0.49	67			0.012	27	0.74	61					0.013	27	2.5	59					1.5	63
1997	MAY			0.068	27	0.50	64			0.041	27	0.55	62					0.050	27	3.6	58					1.4	63
1997	JUN			0.11	27	0.93	59			0.10	27	0.55	62					0.063	27	2.1	58					1.1	59
1997	JUL			0.19	27	0.51	60			0.017	27							0.110	27	1.2	56					1.3	59
1997	AUG			0.033	27	0.40	60			0.066	27							0.071	27	1.6	56					1.0	59
1997	SEP			0.22	27	0.37	64			0.044	27							0.056	27	1.7	58					1.4	60
1997	OCT			0.077	27	0.85	61			0.028	27	2.3	58					0.023	27	2.8	58					1.5	60
1997	NOV			0.031	27	0.34	75			0.042	27	0.58	62					0.016	27	1.8	59					1.1	66
1997	DEC			0.066	27	0.45	110			0.016	27	0.55	83					0.023	27	1.9	63					2.4	110
1998	JAN			0.047	27	0.31	89			0.043	27	0.70	62					0.082	27	1.2	61					1.8	91
1998	FEB			0	27	0.67	64			0.018	27	1.0	59					0.033	27	2.4	59					1.4	93
1998	MAR			0.023	27	0.56	68			0.041	27	1.3	60					0.080	27	1.1	62					1.5	99
1998	APR			0.015	27	0.53	65			0.063	27	1.9	59					0.045	27	2.9	59					1.4	81
1998	MAY			0.015	27	0.51	63			0.033	27	2.1	58					0.018	27	1.8	58					1.1	67
1998	JUN			0.074	27	0.39	62			0.13	27	1.2	58					0.026	27	3.4	56					1.1	68
1998	JUL			0.21	27	0.30	61			0.045	27	1.3	58					0	27	1.8	58					0.60	71
1998	AUG			0.098	27	0.64	59			0.046	27	1.3	58					0.033	27	2.7	56					0.38	69
1998	SEP			0.064	27	0.27	65			0.046	27	0.37	59					0.029	27	1.2	59					1.2	64
1998	OCT			0.040	27	0.48	67			0.096	27	0.36	65					0	27	1.4	59					1.5	72
1998	NOV			0.076	27	0.40	74			0.13	27	0.60	64					0	27	1.9	59					2.1	74
1998	DEC			0.016	27	0.43	76			0	27	0.77	62					0.006	27	1.8	59					1.7	64
1999	JAN			0.10	27	0.62	63			0.11	27	0.54	61					0	27	2.1	59					3.7	71
1999	FEB			0.20	27	1.2	60			0.057	27	1.2	59					0.053	27	2.0	59					2.5	75
1999	MAR			0.028	27	0.58	61			0.032	27	0.75	60					0.092	27	3.5	58					1.7	93
1999	APR			0	27	0.43	62			0.14	27	1.5	59					0.061	27	2.2	59					1.4	88
1999	MAY			0.039	27	1.8	59			0.098	27	2.6	58					0.092	27	2.5	58					1.8	64
1999	JUN			0.072	27	0.75	59			0.13	27	1.6	58					0.031	27	2.2	56					1.3	60
1999	JUL			0.45	27	0.48	59			0.17	27	1.4	58					0.052	27	1.2	58					0.94	62
1999	AUG			0.070	27	0.45	59			0.12	27	1.1	58					0.056	27	2.0	58					0.72	67
1999	SEP			0.11	27	2.6	58			0.025	27	1.5	58					0.028	27	1.0	58					0.90	67
1999	OCT			0.37	27	3.3	58			0.078	27	1.8	58					0.042	27	1.6	59					1.7	70
1999	NOV			0.022	27	1.2	59			0.025	27	0.78	60					0.022	27	1.7	59					2.2	77
1999	DEC			0.074	27	0.69	68			0.13	27	0.40	75					0.094	27	2.4	59					3.0	74
2000	JAN			0	27	1.2	64			0	27	0.91	66					0.11	27	1.6	63						
2000	FEB			0.050	27	1.1	64			0.058	27	0.96	64					0.052	27	1.5	63						
2000	MAR			0.20	27	0.76	66			0.077	27	0.88	63					0.034	27	1.5	61						
2000	APR			0.090	27	1.9	59			0.11	27	1.0	62					0.14	27	1.7	59					1.2	79
2000	MAY			0.14	27	0.93	61			0.086	27	1.1	60					0.061	27	2.3	59					2.1	61
2000	JUN			0.29	27	2.5	59			0.25	27	0.63	61					0.12	27	1.3	59					0.80	68
2000	JUL			0	27	1.7	59			0.084	27	0.48	60					0.051	27	0.73	59					0.54	67
2000	AUG			0.12	27	1.0	59			0.031	27	0.43	60					0.12	27	0.50	59					0.73	63
2000	SEP			0.059	27	0.88	60			0.20	27	0.86	60					0.028	27	1.4	59					0.87	66
2000	OCT			0.021	27	0.52	66			0.025	27	0.65	62					0.074	27	1.2	59					0.66	77
2000	NOV			0.069	27	0.37	80			0.061	27	0.56	67					0.047	27	1.3	60					1.3	72
2000	DEC			0.079	27	1.3	59			0.063	27	1.7	59					0.026	27	1.7	59					2.5	80

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO						
		DRY	WET	ABS.	ABS.	DRY	WET	ABS.	ABS.	DRY	WET	ABS.	ABS.	DRY	WET	ABS.	ABS.	DRY	WET	ABS.	ABS.			
1992	JAN		0.088	27	0.099	200	0.030	27	1.4	59														
1992	FEB				0.12	150			0.84	61														
1992	MAR		0.062	27	0.40	70			0	27	1.1	60												
1992	APR				0.38	69			0.038	27	1.0	60												
1992	MAY				0	27	1.5	440			0.069	27	2.6											
1992	JUN		0.039	27	0.58	120			0.065	27	0.16	280												
1992	JUL				0	27	0.46	140			0.022	27	1.5	66										
1992	AUG				1.5	73			1.4	71														
1992	SEP		0.084	27	0.87	140			0.017	27	1.1	95												
1992	OCT				0.93	120			0.025	27	3.7	64												
1992	NOV				0	27	0.48	290			0.041	27	17	59										
1992	DEC				0	27	0.97	64			0.073	27	2.3	59										
1993	JAN		0.037	27	1.2	160			0	27	2.9	76												
1993	FEB				0	27	5.6	65			0.32	69												
1993	MAR		0.014	27	1.1	130			0	27	4.7	64												
1993	APR		0.026	27	7.1	61			0.060	27	1.1	130												
1993	MAY				0	27	5.0	61			0.040	27	1.7	80										
1993	JUN		0.046	27					0.074	27	3.2	60												
1993	JUL				0	27	1.0	88			0.072	27	0.77	83										
1993	AUG				0	27	0.30	200			0	27	6.4	59										
1993	SEP				0	27	1.1	110			0.053	27	1.5	82										
1993	OCT						0.86	150			0	27	1.0	120										
1993	NOV				0	27	0.56	240			0.008	27	0.35	310										
1993	DEC				1.4	130					27	11	60											
1994	JAN				0	27	1.0	140				27	1.3	100										
1994	FEB				0	27	0.49	220			0.072	27	3.1	67										
1994	MAR		0.058	27	0.52	190			1.9	27	1.2	90												
1994	APR		0.025	27	0.13	750			0.045	27	0.62	160												
1994	MAY				0	27	0.20	320			0	27	1.0	92										
1994	JUN				0	27			0.011	27	0.19	130												
1994	JUL		0.047	27	0.67	67					0	27	0.41	86										
1994	AUG		0.074	27	0.27	120			0.053	27	0													
1994	SEP		0.11	27	2.8	60			0.073	27	0.045	940												
1994	OCT				0	27	1.6	59			0.078	27	0.45	150										
1994	NOV		0.42	27	2.6	75			0.21	27	2.1	75												
1994	DEC		0.010	27	0.48	300			0.046	27	0.39	290												
1995	JAN		0.035	27	0.74	270					0.31	520												
1995	FEB		0.068	27	0.71	310					1.2	150												
1995	MAR		0.088	27	1.2	150			0.12	27	1.2	120												
1995	APR		0.050	27	1.5	110			0.10	27	1.3	120												
1995	MAY		0.041	27	2.9	68			0.065	27	2.1	74												
1995	JUN		0.038	27	1.1	86			0.046	27	2.1	62												
1995	JUL		0.067	27	2.0	66			0.045	27	0													
1995	AUG				0.052	27	1.3	70			0.039	27												
1995	SEP				1.4	80			0.024	27	2.5	63												
1995	OCT				2.3	82			0.073	27	0.39	280												
1995	NOV		0.11	27	0.55	310			0.087	27	0.34	470												
1995	DEC		0.53	27	0.46	280			0.085	27	1.0	130												
1996	JAN		0.23	27	0.44	98			0.038	27	0.34	110												
1996	FEB				0	27	0.59	81			0.017	27	0.31	120										
1996	MAR		0.009	27	0.43	93			0.019	27	0.41	100												
1996	APR		0.032	27	0.52	77			0	27	0.52	79												
1996	MAY		0.060	27	0.38	75			0	27	0.11	190												
1996	JUN		0.025	27	0.26	80			0.066	27	0.30	72												
1996	JUL		0.055	27	0.30	78			0.019	27	0.58	60												
1996	AUG		0.082	27	0.45	62			0.078	71	0.45	59												
1996	SEP		0.094	27	0.21	83			0.041	27	2.5	58												
1996	OCT		0.10	27	0.49	77			0.048	27	0.85	63												
1996	NOV		0.14	27	0.65	75			0.037	27	0.55	74												
1996	DEC				0.36	27	0.47	330			0.22	27	0.23	600										

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO									
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e		
1997	JAN			0.10	27	0.19	160			0.075	27	0.42	72			0.023	27	3.3	59			0.023	27	3.3	59	0.43	62
1997	FEB			0.048	27	1.9	59			0.099	27	0.22	94			0.077	27	4.7	59			0.077	27	4.7	59	2.0	58
1997	MAR			0.13	27	0.14	150			0.10	27	0.23	95			0	27	3.7	59			0	27	3.7	59	0.59	60
1997	APR			0.046	27	0.27	87			0.022	27	0.72	62			0.047	27	4.3	58			0.047	27	4.3	58	0.36	61
1997	MAY			0.069	27	0.79	61			0.12	27	0.29	75			0.088	27	2.9	59			0.088	27	2.9	59	0.47	59
1997	JUN			0.074	27	0.77	59			0.054	27					0.52	60	4.5	58			0.11	27	4.5	58	0.42	58
1997	JUL			0.10	27	0.61	60			0.021	27					0.036	27	1.4	58			0.036	27	1.4	58	0.58	58
1997	AUG			0.026	27	0.38	61			0.083	27					0.16	70	1.4	58			0	27	1.4	58	0.39	58
1997	SEP			0.066	27	0.83	60			0.027	27					0.22	72	3.3	58			0.05	27	3.3	58	0.47	59
1997	OCT			0.10	27	0.58	65			0.026	27	1.2	59			0.029	27	12	58			0.029	27	12	58	0.48	59
1997	NOV			0.075	27	0.17	120			0.033	27	0				0.13	140	5.5	58			0	27	5.5	58	0.21	65
1997	DEC			0.084	27	1.6	61			0.047	27	1.1	62			0.041	27	3.5	59			0.041	27	3.5	59	0.49	87
1998	JAN			1.0	27	0.17	300			0.14	27	0.33	130			0.23	120	0.63	110			0.15	27	0.63	110	0.46	70
1998	FEB			0	27	0.26	170			0.042	27	0.49	84			0.26	95	1.6	65			0.060	27	1.6	65	0.35	72
1998	MAR			0.32	27	0.35	150			0.061	27	0.54	100			0.28	100	0.87	89			0.21	27	0.87	89	0.34	77
1998	APR			0.13	27	0.57	88			0	27	1.1	65			0.27	88	1.6	62			0.37	27	1.6	62	0.47	63
1998	MAY			0.28	27	1.6	61			0.059	27	1.0	62			0.21	79	5.5	58			0.14	27	5.5	58	0.37	60
1998	JUN			0.16	27					0.11	27	1.3	59			0.16	77	1.9	59			0.053	27	1.9	59	0.35	60
1998	JUL			0.36	27	0.53	64			0.063	27	0.69	60			0.12	78	7.5	56			0.15	27	7.5	56	0.22	61
1998	AUG			0.44	27	0.62	63			0.074	27	0.84	59			0.11	77	1.9	59			0.13	27	1.9	59	0.15	60
1998	SEP			0.082	27	0.77	64			0.16	27	1.0	59			0.17	74	3.2	59			0.045	27	3.2	59	0.51	59
1998	OCT			0.21	27	0.33	130			0.19	27	0.29	110			0.16	110	1.0	64			0.14	27	1.0	64	0.48	61
1998	NOV			0.22	27	0.21	220			0.32	27	0.26	150			0.25	99	1.4	65			0	27	1.4	65	0.58	63
1998	DEC			0.15	27	0.18	140			0.021	27	0.50	67			0.18	120	0.84	64			0.041	27	0.84	64	0.45	61
1999	JAN			0.11	27	0.35	190			0.076	27	0.32	150			0.26	79	1.6	74			0	27	1.6	74	0.79	62
1999	FEB			0.16	27	0.50	140			0.046	27	0.66	90			0.35	69	1.1	78			0.041	27	1.1	78	0.59	62
1999	MAR			0.038	27	0.34	160			0.031	27	1.9	63			0.17	97	2.2	65			0.12	27	2.2	65	0.23	83
1999	APR			0	27	0.28	160			0.28	27	0.78	76			0.50	62	1.6	66			0.11	27	1.6	66	0.46	62
1999	MAY			0.16	27	2.0	62			0.15	27	1.8	61			0.35	62	2.0	60			0.20	27	2.0	60	0.73	59
1999	JUN			0.16	27	1.1	62			0.037	27					0.30	59	4.6	58			0.096	27	4.6	58	0.54	58
1999	JUL			0.30	27	0.77	63			0.41	27	2.1	59			0.28	60	0.84	60			0.21	27	0.84	60	0.52	58
1999	AUG			0.21	27					0.25	27					0.22	60	2.3	59			0.24	27	2.3	59	0.32	59
1999	SEP			0	27					0.076	27	0.91	61			0.37	60	3.9	58			0	27	3.9	58	0.40	59
1999	OCT			0.45	27	1.2	70			0.20	27	0.96	67			0.49	61	0.71	77			0.043	27	0.71	77	0.70	59
1999	NOV			0	27	0.58	120			0.19	27	0.43	120			0.30	74	1.3	71			0.14	27	1.3	71	0.91	60
1999	DEC			0.074	27	0.41	150			0.11	27	0.41	120			0.31	110	1.5	72			0.069	27	1.5	72	0.78	64
2000	JAN			0	27	0.43	270			0	27	0.57	200			0.31	99	1.0	150			0.32	27	1.0	150		
2000	FEB			0.089	27	0.53	220			0	27	0.59	180			0.33	96	0	150			0	27	0.95	150		
2000	MAR			0.19	27	1.2	97			0	27	0.53	160			0.32	80	1.1	110			0	27	1.1	110		
2000	APR			0.12	27	1.8	71			0.19	27	0.84	110			0.24	87	5.2	60			0	27	5.2	60	0.53	62
2000	MAY			0.091	27	2.2	65			0.12	27					0.26	71	2.5	27			0	27	2.5	27	0.75	59
2000	JUN			0.19	27	3.7	60			0.16	27					0.14	81	1.3	65			0.46	27	1.3	65	0.41	60
2000	JUL			0	27	1.3	64			0.092	27	1.8	60			0.099	74	1.9	59			0	27	1.9	59	0.21	60
2000	AUG			0.081	27	0.54	67			0.11	27	0.84	65			0.15	67	2.2	59			0.42	27	2.2	59	0.28	59
2000	SEP			0.079	27	0.58	110			0.16	27	0.87	77			0.32	65	2.6	60			0.045	27	2.6	60	0.39	60
2000	OCT			0.057	27	0.27	240			0.031	27	0.93	81			0.17	80	0.91	76			0.12	27	0.91	76	0.18	66
2000	NOV			0.22	27	0.19	420			0.11	27	0.33	230			0.29	73	1.1	88			0.21	27	1.1	88	0.45	62
2000	DEC			0	27	0.56	120			0	27	0.93	80			0.35	68	2.8	62			0.19	27	2.8	62	0.85	61

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YEAR	MONTH	SUPERIOR						MICHIGAN						HURON						ERIE						ONTARIO						
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	
1997	JAN			0.013	27	0.40	120			0.15	27	0.51	80																			
1997	FEB			0.060	27	0.41	100			0.17	27	0.47	80																			
1997	MAR			0	27	0.24	140			0.094	27	0.42	87																			
1997	APR			0.015	27	0.51	80			0.025	27	0.78	67																			
1997	MAY			0	27	0.53	72			0.14	27	0.64	68																			
1997	JUN			0.082	27	1.1	59			0.076	27																					
1997	JUL			0.14	27	0.66	60			0.037	27																					
1997	AUG			0.033	27	0.59	61			0	27																					
1997	SEP			0.020	27	0.67	64			0.054	27																					
1997	OCT			0.067	27	1.1	63			0.050	27	2.0	59																			
1997	NOV			0.019	27	0.31	110			0.072	27	0.60	70																			
1997	DEC			0.23	27	0.48	140			0.033	27	0.88	92																			
1998	JAN			0.16	27	0.38	170			0.097	27	0.62	93																			
1998	FEB			0	27	0.76	88			0	27	0.90	71																			
1998	MAR			0.036	27	0.55	120			0.037	27	1.0	81																			
1998	APR			0.067	27	0.62	92			0.11	27	1.7	62																			
1998	MAY			0.038	27	0.58	86			0.069	27	1.8	60																			
1998	JUN			0.16	27	0.51	77			0.087	27	1.1	60																			
1998	JUL			0.15	27	0.51	68			0.063	27	1.1	59																			
1998	AUG			0.041	27	0.90	61			0.092	27	1.4	59																			
1998	SEP			0	27	0.45	79			0.057	27	0.38	68																			
1998	OCT			0.062	27	0.57	100			0.10	27	0.42	92																			
1998	NOV			0.11	27	0.42	140			0.23	27	0.49	110																			
1998	DEC			0.012	27	0.40	110			0.047	27	0.84	66																			
1999	JAN			0.17	27	0.70	180			0.14	27	0.60	150																			
1999	FEB			0.21	27	0.96	140			0.094	27	1.1	98																			
1999	MAR			0.031	27	0.67	160			0.036	27	1.1	100																			
1999	APR			0	27	0.53	160			0.22	27	1.3	81																			
1999	MAY			0.068	27	1.8	75			0.061	27	2.3	63																			
1999	JUN			0.11	27	0.91	80			0.078	27	1.5	60																			
1999	JUL			0.23	27	0.68	77			0.24	27	1.4	60																			
1999	AUG			0.056	27	0.66	75			0.18	27	1.0	63																			
1999	SEP			0.19	27	2.0	64			0.083	27	1.5	62																			
1999	OCT			0.38	27	2.7	67			0.41	27	1.6	70																			
1999	NOV			0.024	27	0.98	130			0.041	27	0.80	120																			
1999	DEC			0.13	27	0.79	110			0.19	27	0.52	120																			
2000	JAN			0	27	0.79	81			0	27	0.82	78																			
2000	FEB			0.10	27	0.78	82			0.21	27	0.94	72																			
2000	MAR			0.15	27	0.63	82			0.19	27	0.89	69																			
2000	APR			0.21	27	1.6	61			0.39	27	1.1	65																			
2000	MAY			0.14	27	0.86	65			0.14	27	1.2	61																			
2000	JUN			0.33	27	2.3	59			0.30	27	0.75	62																			
2000	JUL			0	27	1.7	59			0.17	27	0.65	61																			
2000	AUG			0.097	27	1.2	59			0.042	27	0.60	60																			
2000	SEP			0.12	27	1.0	62			0.26	27	0.97	61																			
2000	OCT			0.098	27	0.54	74			0.059	27	0.74	64																			
2000	NOV			0.36	27	0.37	100			0.18	27	0.60	76																			
2000	DEC			0.17	27	1.0	120			0.11	27	1.5	86																			

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	DRY	WET	WET_e	ABS_e	
1992	JAN		0.10	27	0.25	78	0.013	27	0.89	60												
1992	FEB		0.014	27	0.15	97	0.019	27	0.44	63												
1992	MAR		0	27	0.24	74	0.047	27	1.2	59												
1992	APR		0.15	27	1.0	690	0.062	27	1.5													
1992	MAY		0.031	27	0.43	110	0.039	27	1.4	210												
1992	JUN		0	27	0.40	110	0.032	27	0.61	74												
1992	JUL		0.095	27	1.0	72	0.028	27	0.84	82												
1992	AUG		0.14	27	0.49	180	0.059	27	1.1	59												
1992	SEP		0.040	27	0.85	180	0.11	27	1.4	59												
1992	OCT		0.074	27	1.5	110	0	27	2.5	76												
1992	NOV		0	27	1.0	120	0	27	1.4	97												
1992	DEC		0.012	27	3.4	66	0.060	27	1.4	100												
1993	JAN		0.086	27	2.3	68	0.019	27	1.1	93												
1993	FEB		0	27	1.1	79	0.020	27	0.75	77												
1993	MAR		0.031	27	0.58	89	0.031	27	0.58	89												
1993	APR		0	27	0.66	97	0	27	0.22	180												
1993	MAY		0.033	27	0.66	130	0.060	27	1.0	92												
1993	JUN		0.16	27	4.0	59	0.084	27	0.69	140												
1993	JUL		0	27	0.56	210	0.051	27	0.23	390												
1993	AUG		0.082	27	1.1	79	0	27	4.3	62												
1993	SEP		0.033	27	0.66	130	0.043	27	0.56	120												
1993	OCT		0.16	27	4.0	59	0	27	0.38	140												
1993	NOV		0	27	0.56	210	0.047	27	0.63	100												
1993	DEC		0.012	27	0.24	170	0.063	27	1.1	70												
1994	JAN		0.049	27	0.90	60	0.011	27	0.24	80												
1994	FEB		0.10	27	0.44	69	0	27	0.45	67												
1994	MAR		0.16	27	4.0	59	0.084	27	0.43	82												
1994	APR		0	27	1.7	58	0.23	27	0.87	72												
1994	MAY		0.43	27	2.6	65	0.024	27	1.9	65												
1994	JUN		0.008	27	0.62	200	0.024	27	0.42	230												
1994	JUL		0.065	27	0.66	330	0	27	0.40	450												
1994	AUG		0.086	27	0.3	790	0.11	27	0.34	450												
1994	SEP		0.17	27	1.3	150	0.12	27	0.36	460												
1994	OCT		0.063	27	1.3	140	0.090	27	1.2	110												
1994	NOV		0.030	27	1.7	75	0.041	27	0.32	170												
1994	DEC		0.10	27	1.4	76	0.057	27	0.28	170												
1995	JAN		0.079	27	1.0	80	0.036	27	0.30	130												
1995	FEB		0.15	27	0.89	270	0.029	27	0.78	100												
1995	MAR		0.26	27	0.54	120	0.099	27	1.0	89												
1995	APR		0.028	27	0.29	210	0.065	27	0.30	200												
1995	MAY		0.012	27	0.56	110	0.019	27	0.30	200												
1995	JUN		0.053	27	0.72	86	0	27	0.36	150												
1995	JUL		0.025	27	0.52	83	0.071	27	0.47	97												
1995	AUG		0.025	27	0.42	84	0.037	27	0.47	75												
1995	SEP		0.069	27	0.43	85	0.005	27	0.51	65												
1995	OCT		0.10	27	0.73	63	0.005	27	0.63	60												
1995	NOV		0.13	27	0.34	86	0.041	27	0.63	65												
1995	DEC		0.077	27	0.67	87	0.057	27	0.57	83												
1996	JAN		0.096	27	0.77	90	0.047	27	0.42	120												
1996	FEB		0.50	27	0.53	320	0.22	27	0.19	810												
1996	MAR		0.22	27	0.53	320	0.22	27	0.19	810												
1996	APR		0.22	27	0.53	320	0.22	27	0.19	810												
1996	MAY		0.22	27	0.53	320	0.22	27	0.19	810												
1996	JUN		0.22	27	0.53	320	0.22	27	0.19	810												
1996	JUL		0.22	27	0.53	320	0.22	27	0.19	810												
1996	AUG		0.22	27	0.53	320	0.22	27	0.19	810												
1996	SEP		0.22	27	0.53	320	0.22	27	0.19	810												
1996	OCT		0.22	27	0.53	320	0.22	27	0.19	810												
1996	NOV		0.22	27	0.53	320	0.22	27	0.19	810												
1996	DEC		0.22	27	0.53	320	0.22	27	0.19	810												

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YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO					
		DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e		
1997	JAN			0.15	27	0.21	190			0.078	27	0.26	110			0.031	27	0.68	86			0.37	67
1997	FEB			0.051	27	0.27	120			0.11	27	0.25	110			0.055	27	1.4	63			0.62	60
1997	MAR			0.12	27	0.14	200			0.063	27	0.22	130			0.060	27	1.1	67			0.57	61
1997	APR			0.037	27	0.28	110			0.021	27	0.37	85			0.031	27	1.1	63			0.37	62
1997	MAY			0.11	27	0.30	90			0.068	27	0.33	84			0.063	27	1.6	61			0.48	60
1997	JUN			0.084	27	0.70	61			0.069	27					0.31	27	1.1	59			0.41	59
1997	JUL			0.12	27	0.66	61			0.027	27					0.061	27	0.94	59			0.62	58
1997	AUG			0.019	27	0.39	63			0.073	27					0.031	27	1.6	59			0.37	59
1997	SEP			0.072	27	0.63	64			0.040	27					0.064	27	2.1	59			0.45	59
1997	OCT			0.19	27	0.58	71			0.018	27	0.81	62			0.029	27	2.1	59			0.40	59
1997	NOV			0.15	27	0.21	130			0.048	27	0.28	94			0.053	27	0.79	68			0.18	73
1997	DEC			0.055	27	0.38	140			0.020	27	0.40	110			0.023	27	0.82	83			0.44	78
1998	JAN			0.67	27	0.22	270			0.088	27	0.34	140			0.15	27	1.3	72			0.36	64
1998	FEB			0	27	0.36	150			0.036	27	0.41	110			0.038	27	1.3	70			0.35	63
1998	MAR			0.13	27	0.31	190			0.047	27	0.49	130			0.11	27	0.88	91			0.23	72
1998	APR			0.17	27	0.38	130			0.078	27	0.76	76			0.20	95		66			0.43	60
1998	MAY			0.085	27	0.49	94			0.059	27	0.73	68			0.064	27	1.1	62			0.35	59
1998	JUN			0.25	27	0.34	95			0.089	27	0.54	65			0.051	27	1.9	59			0.37	59
1998	JUL			0.18	27	0.30	81			0.029	27	0.50	62			0.11	27	1.4	59			0.22	59
1998	AUG			0.15	27	0.60	65			0.032	27	0.88	60			0.11	27	2.0	59			0.15	59
1998	SEP			0.11	27	0.36	87			0.055	27	0.23	80			0.039	27	1.3	60			0.34	59
1998	OCT			0.11	27	0.43	120			0.15	27	0.27	120			0.11	27	1.4	63			0.30	61
1998	NOV			0.073	27	0.32	170			0.15	27	0.37	130			0	27	1.1	73			0.41	61
1998	DEC			0.30	27	0.22	160			0.026	27	0.37	87			0.040	27	0.81	69			0.43	63
1999	JAN			0.13	27	0.38	140			0.068	27	0.31	130			0	27	1.5	70			0.38	80
1999	FEB			0.27	27	0.41	130			0.052	27	0.55	88			0.042	27	1.1	72			0.31	80
1999	MAR			0.053	27	0.32	140			0.034	27	0.53	93			0.13	27	2.3	62			0.37	76
1999	APR			0	27	0.29	130			0.18	27	0.50	78			0.087	27	1.3	66			0.25	79
1999	MAY			0.088	27	1.2	65			0.039	27	1.3	61			0.28	27	1.8	60			0.54	60
1999	JUN			0.10	27	0.64	67			0.046	27	0.95	59			0.076	27	1.4	59			0.42	59
1999	JUL			0.22	27	0.52	65			0.15	27	0.75	59			0.12	27	1.2	59			0.35	59
1999	AUG			0.10	27	0.48	64			0.12	27	0.50	62			0.055	27	2.3	58			0.19	61
1999	SEP			0.20	27	0.75	65			0.076	27	0.74	61			0.068	27	1.7	59			0.25	61
1999	OCT			0.72	27	1.0	68			0.36	27	0.85	66			0.055	27	1.3	62			0.42	63
1999	NOV			0.037	27	0.45	120			0.032	27	0.45	96			0.066	27	1.2	68			0.55	65
1999	DEC			0.079	27	0.55	130			0.10	27	0.31	180			0.13	27	1.3	80			0.56	62
2000	JAN			0	27	0.34	210			0	27	0.46	150			0.26	27	0.85	120				
2000	FEB			0.081	27	0.37	190			0.18	27	0.48	140			0.12	27	0.76	120				
2000	MAR			0.14	27	0.35	170			0.14	27	0.53	110			0.079	27	1.1	80				
2000	APR			0.18	27	0.70	88			0.26	27	0.60	100			0.32	27	1.1	70			0.30	59
2000	MAY			0.13	27	0.46	100			0.11	27	0.63	81			0.11	27	2.2	60			0.33	58
2000	JUN			0.25	27	0.88	71			0.21	27	0.38	90			0.12	27	1.4	61			0.22	58
2000	JUL			0	27	0.86	63			0.13	27	0.47	68			0.042	27	1.2	59			0.13	58
2000	AUG			0.066	27	0.52	67			0.029	27	0.32	74			0.11	27	0.75	61			0.20	58
2000	SEP			0.19	27	0.53	86			0.25	27	0.62	72			0.050	27	2.0	59			0.11	59
2000	OCT			0.084	27	0.28	150			0.050	27	0.39	99			0.16	27	1.2	62			0.27	59
2000	NOV			0.30	27	0.19	260			0.14	27	0.29	160			0.11	27	1.2	70			0.32	59
2000	DEC			0.15	27	0.43	120			0.10	27	0.80	77			0.064	27	1.8	64			0.39	76

SUITE PCB (ng/m³/day)

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO					
		DRY _e	WET _e	ABS	ABS _e	DRY _e	WET _e	ABS	ABS _e	DRY _e	WET _e	ABS	ABS _e	DRY _e	WET _e	ABS	ABS _e	DRY _e	WET _e	ABS	ABS _e		
1997	JAN		3.9	27	56	110		2.4	27	7.6	73		9.6	83		0.90	27	24	63			7.5	73
1997	FEB		0.61	27	8.5	75		2.4	27	8.2	69		5.7	110		1.4	27	47	59			30	59
1997	MAR		4.0	27	3.3	120		1.1	27	5.7	81		5.3	98		1.4	27	41	59			11	64
1997	APR		0.93	27	7.5	73		0.48	27	12	63		6.7	87		0.61	27	40	59			6.0	67
1997	MAY		1.8	27	8.3	67		1.5	27	8.9	65		8.7	62		1.7	27	55	59			7.3	64
1997	JUN		2.3	27	18	59		1.6	27				6.1	64		7.1	27	36	58			6.6	59
1997	JUL		3.4	27	13	59		0.60	27				6.1	64		1.2	27	22	58			8.7	59
1997	AUG		0.57	27	8.2	60		0.40	27				4.2	71		0.57	27	32	58			6.2	59
1997	SEP		3.3	27	10	62		0.97	27				4.7	79		2.0	27	39	58			7.9	60
1997	OCT		4.4	27	17	61		0.62	27	39	59		7.7	74		0.83	27	67	58			8.0	60
1997	NOV		3.4	27	4.8	89		1.0	27	7.7	68		4.3	120		0.83	27	33	59			4.2	77
1997	DEC		2.1	27	12	95		0.54	27	12	83		5.9	160		2.1	27	33	65			15	110
1998	JAN		9.9	27	4.9	180		1.8	27	10	84		5.0	160		3.1	27	20	74			8.5	84
1998	FEB		0	27	12	83		0.51	27	15	67		4.0	160		0.70	27	40	61			6.7	86
1998	MAR		2.8	27	8.4	110		0.98	27	18	72		5.5	150		2.2	27	20	75			6.1	100
1998	APR		2.7	27	8.5	92		1.9	27	30	61		5.4	120		2.2	27	46	60			7.3	73
1998	MAY		1.7	27	9.8	77		1.0	27	34	59		6.3	80		1.2	27	33	59			6.2	64
1998	JUN		5.2	27	6.4	80		2.5	27	20	59		3.6	90		1.3	27	59	58			5.6	65
1998	JUL		4.5	27	6.6	68		0.99	27	21	59		2.3	100		2.3	27	41	58			3.6	65
1998	AUG		2.7	27	13	61		1.2	27	25	59		2.1	98		1.9	27	52	58			2.4	64
1998	SEP		1.9	27	6.5	77		1.3	27	7.4	63		3.2	96		0.92	27	27	59			7.6	61
1998	OCT		2.9	27	8.3	96		2.6	27	6.3	87		3.6	140		1.6	27	27	60			7.7	68
1998	NOV		2.1	27	6.4	130		3.5	27	10	82		5.5	130		0	27	34	61			10	71
1998	DEC		6.3	27	6.5	89		0.59	27	14	63		5.3	110		0.53	27	30	60			8.1	67
1999	JAN		2.9	27	10	88		2.0	27	9.2	79		12	79		0	27	39	62			14	68
1999	FEB		5.4	27	16	73		1.8	27	19	64		14	74		1.5	27	32	62			9.3	71
1999	MAR		1.0	27	11	79		0.78	27	15	69		7.9	97		3.2	27	63	59			9.0	74
1999	APR		0	27	7.2	87		3.6	27	24	61		11	76		1.9	27	38	60			6.5	74
1999	MAY		1.5	27	29	61		1.7	27	44	59		8.7	70		3.7	27	46	59			8.9	61
1999	JUN		3.1	27	14	62		2.0	27	27	58		4.7	65		1.3	27	45	58			6.6	59
1999	JUL		8.5	27	9.5	62		5.3	27	25	59		4.2	69		1.8	27	25	59			5.2	60
1999	AUG		2.0	27	8.7	62		5.0	27	18	59		5.2	66		0.97	27	53	58			3.6	62
1999	SEP		3.0	27	20	60		1.4	27	26	59		7.0	66		0.94	27	30	59			4.4	63
1999	OCT		12	27	41	60		6.4	27	29	60		9.6	74		1.5	27	29	60			8.3	64
1999	NOV		0.89	27	16	71		0.88	27	12	70		7.4	100		1.2	27	30	61			11	68
1999	DEC		1.8	27	13	91		3.0	27	7.9	110		6.5	150		2.6	27	40	64			14	72
2000	JAN		0	27	15	79		0	27	14	79		6.2	140		3.6	27	24	72				
2000	FEB		1.5	27	15	79		2.3	27	14	76		8.8	110		1.3	27	24	70				
2000	MAR		4.1	27	12	81		2.3	27	14	71		7.0	97		1.4	27	27	64				
2000	APR		3.1	27	29	61		3.7	27	18	66		8.3	82		5.8	27	31	60			6.5	83
2000	MAY		3.0	27	16	64		2.2	27	18	62		7.0	74		2.1	27	46	59			10	64
2000	JUN		5.6	27	41	59		5.0	27	11	64		2.7	110		2.9	27	28	59			5.5	67
2000	JUL		0	27	30	59		2.1	27	11	61		2.5	81		1.1	27	22	59			3.5	67
2000	AUG		1.8	27	19	59		0.76	27	9.0	61		3.4	73		2.8	27	14	59			5.5	62
2000	SEP		2.5	27	16	63		4.5	27	16	61		13	62		0.82	27	36	59			5.9	66
2000	OCT		0.80	27	8.2	79		0.52	27	12	66		4.6	84		1.9	27	24	60			3.9	81
2000	NOV		3.2	27	5.4	120		1.9	27	9.0	82		5.9	88		1.6	27	26	62			8.0	72
2000	DEC		2.2	27	19	67		1.8	27	28	62		6.7	100		1.2	27	36	61			9.0	76

YEAR	MONTH	PHENANTHRENE (ng/m ³ /day)																													
		SUPERIOR					MICHIGAN					HURON					ERIE					ONTARIO									
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e
1992	JAN	3.3	250	11	27	84	61	6.1	160	8.0	27	1100	58	11	100	100	74	27	1800	58	15	100	170	27	400	58					
1992	FEB																														
1992	MAR																														
1992	APR																														
1992	MAY																														
1992	JUN																														
1992	JUL																														
1992	AUG																														
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1996	AUG																														
1996	SEP																														
1996	OCT																														
1996	NOV																														
1996	DEC																														

Table with columns for Year, Month, DRY, WET, ABS, and sub-columns for SUPERIOR, MICHIGAN, HURON, and ONTARIO. Each sub-column contains DRY_e, WET_e, ABS_e, DRY, WET, ABS values. The table is organized into four main regions: SUPERIOR, MICHIGAN, HURON, and ONTARIO, with each region having its own set of sub-columns. The rows represent monthly data from 1992 to 1996.

ARSENIC: (µg/m³/day)

YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO										
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e			
1992	JAN																											
1992	FEB																											
1992	MAR																											
1992	APR																											
1992	MAY																											
1992	JUN																											
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1996	JUN																											
1996	JUL																											
1996	AUG																											
1996	SEP																											
1996	OCT																											
1996	NOV																											
1996	DEC																											

YEAR	MONTH	CADMIUM ($\mu\text{g}/\text{m}^3/\text{day}$)																				
		SUPERIOR			MICHIGAN			HURON			ERIE			ONTARIO								
		DRY	WET	WET_e	ABS	ABS_e	DRY	WET	WET_e	ABS	ABS_e	DRY	WET	WET_e	ABS	ABS_e	DRY	WET	WET_e	ABS	ABS_e	
1997	JAN						0.11	100	0.21	27							0.036	100	0.89	27		
1997	FEB						0.007	100	0.26	27							0.020	100	0.35	27		
1997	MAR						0.021	100	0.24	27							0.041	100	0.18	27		
1997	APR						0.004	100	0.85	27							0.016	100	0	27		
1997	MAY						0.010	100	0	27							0.017	100	0.57	27		
1997	JUN						0.013	100	0	27							0.036	100	0.16	27		
1997	JUL						0.007	100	0.56	27							0.022	100	0	27		
1997	AUG						0.029	100	0	27							0.019	100	0	27		
1997	SEP						0.019	100	0.11	27							0.033	100				
1997	OCT						0.047	100	0.12	27							0.028	100	0.13	27		
1997	NOV						0.014	100	0	27							0.017	100	0	27		
1997	DEC						0.012	100	0.015	27							0.047	100	0.044	27		
1998	JAN						0.01	100	0.20	27							0.019	100	0.36	27		
1998	FEB						0.019	100	0	27							0.053	100	0.11	27		
1998	MAR						0.017	100	0.86	27							0.015	100	0.27	27		
1998	APR						0.01	100	0.81	27							0.019	100	0.24	27		
1998	MAY						0.035	100	0.69	27							0.029	100	0.41	27		
1998	JUN						0.019	100	0.13	27							0.025	100	0.13	27		
1998	JUL						0	180		27							0.010	100	0	27		
1998	AUG						0.008	100	0	27							0.023	100	0.085	27		
1998	SEP						0.015	100	0.084	27							0.028	100	0.12	27		
1998	OCT						0.021	100	0	27							0.020	100	0	27		
1998	NOV						0.010	100	0.097	27							0.023	100	0.19	27		
1998	DEC						0.008	100	0	27							0.017	100	0.24	27		
1999	JAN						0.029	100		27							0.027	100				
1999	FEB						0.032	100		27							0.028	100				
1999	MAR						0.013	100	0	27							0.026	100	0.57	27		
1999	APR						0.010	100	0.31	27							0.072	100	0.36	27		
1999	MAY						0.016	100	0	27							0.026	100	0	27		
1999	JUN						0.031	100	0	27							0.030	100	0	27		
1999	JUL						0.014	100	0.13	27							0.022	100	0	27		
1999	AUG						0	180	0.097	27							0.015	100	0	27		
1999	SEP						0	180	0	27							0.018	100	0	27		
1999	OCT						0.005	100	0.14	27							0.022	100	0	27		
1999	NOV						0.014	100	0	27							0.013	100	0	27		
1999	DEC						0.036	100	0	27							0.044	100	0.34	27		
2000	JAN						0.028	100	0.085	27							0.019	100	0	27		
2000	FEB						0.016	100	0.24	27							0.064	100	0	27		
2000	MAR						0.014	100		27							0.027	100	0.26	27		
2000	APR						0.025	100	0	27							0.024	100	0	27		
2000	MAY						0.027	100	0.43	27							0.023	100	0.18	27		
2000	JUN						0.059	100	0.17	27							0.023	100	0.12	27		
2000	JUL						0.030	100	0.25	27							0.017	100	0	27		
2000	AUG						0.022	100	0.12	27							0.018	100	0.097	27		
2000	SEP						0.015	100	0.19	27							0.011	100	0	27		
2000	OCT						0.022	100	0	27							0.018	100	0.18	27		
2000	NOV						0.009	100	0.077	27							0.043	100	0.097	27		
2000	DEC						0.011	100	0	27							0.026	100	0	27		

YEAR	MONTH	SUPERIOR					MICHIGAN					HURON					ERIE					ONTARIO				
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	
1992	JAN																									
1992	FEB																									
1992	MAR																									
1992	APR																									
1992	MAY																									
1992	JUN																									
1992	JUL																									
1992	AUG																									
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1994	MAY																									
1994	JUN																									
1994	JUL																									
1994	AUG																									
1994	SEP																									
1994	OCT																									
1994	NOV																									
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1995	JAN																									
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1995	MAY																									
1995	JUN																									
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1995	DEC																									
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1996	MAY																									
1996	JUN																									
1996	JUL																									
1996	AUG																									
1996	SEP																									
1996	OCT																									
1996	NOV																									
1996	DEC																									

YEAR	MONTH	LEAD (µg/m ³ /day)																				
		SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO				
		DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	DRY	DRY_e	WET	WET_e	
1997	JAN																					
1997	FEB																					
1997	MAR																					
1997	APR																					
1997	MAY																					
1997	JUN																					
1997	JUL																					
1997	AUG																					
1997	SEP																					
1997	OCT																					
1997	NOV																					
1997	DEC																					
1998	JAN																					
1998	FEB																					
1998	MAR																					
1998	APR																					
1998	MAY																					
1998	JUN																					
1998	JUL																					
1998	AUG																					
1998	SEP																					
1998	OCT																					
1998	NOV																					
1998	DEC																					
1999	JAN																					
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1999	MAR																					
1999	APR																					
1999	MAY																					
1999	JUN																					
1999	JUL																					
1999	AUG																					
1999	SEP																					
1999	OCT																					
1999	NOV																					
1999	DEC																					
2000	JAN																					
2000	FEB																					
2000	MAR																					
2000	APR																					
2000	MAY																					
2000	JUN																					
2000	JUL																					
2000	AUG																					
2000	SEP																					
2000	OCT																					
2000	NOV																					
2000	DEC																					

YEAR	MONTH	SELENIUM (µg/m ³ /day)																															
		SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO															
		DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e	DRY	DRY_e	WET	WET_e	ABS	ABS_e		
1992	JAN																																
1992	FEB																																
1992	MAR																																
1992	APR																																
1992	MAY																																
1992	JUN																																
1992	JUL																																
1992	AUG																																
1992	SEP																																
1992	OCT																																
1992	NOV																																
1992	DEC																																
1993	JAN																																
1993	FEB																																
1993	MAR																																
1993	APR																																
1993	MAY																																
1993	JUN																																
1993	JUL																																
1993	AUG																																
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1996	MAR																																
1996	APR																																
1996	MAY																																
1996	JUN																																
1996	JUL																																
1996	AUG																																
1996	SEP																																
1996	OCT																																
1996	NOV																																
1996	DEC																																

		SELENIUM ($\mu\text{g}/\text{m}^2/\text{day}$)																									
YEAR	MONTH	SUPERIOR				MICHIGAN				HURON				ERIE				ONTARIO									
		DRY	DRY_e	WET	WET_e	ABS_e	ABS	DRY_e	DRY	WET	WET_e	ABS_e	ABS	DRY_e	DRY	WET	WET_e	ABS_e	ABS	DRY_e	DRY	WET	WET_e	ABS_e	ABS		
1997	JAN							0.077	100																		
1997	FEB							0	180																		
1997	MAR							0	180																		
1997	APR							0	180																		
1997	MAY							0	180																		
1997	JUN							0.042	110																		
1997	JUL							0.022	120																		
1997	AUG							0.082	100																		
1997	SEP							0.021	120																		
1997	OCT							0.16	100																		
1997	NOV							0.020	120																		
1997	DEC							0.027	110																		
1998	JAN							0.019	120																		
1998	FEB							0.042	110																		
1998	MAR							0.021	120																		
1998	APR							0.029	110																		
1998	MAY							0.019	120																		
1998	JUN							0.068	100																		
1998	JUL							0	180																		
1998	AUG							0.021	120																		
1998	SEP							0.10	100																		
1998	OCT							0.042	110																		
1998	NOV							0.042	110																		
1998	DEC							0.013	150																		
1999	JAN							0.043	110																		
1999	FEB							0.17	100																		
1999	MAR							0.057	100																		
1999	APR							0	180																		
1999	MAY							0.087	100																		
1999	JUN							0.26	100																		
1999	JUL							0.098	100																		
1999	AUG							0.021	120																		
1999	SEP							0.057	100																		
1999	OCT							0.020	120																		
1999	NOV							0	180																		
1999	DEC							0.17	100																		
2000	JAN							0.030	110																		
2000	FEB																										
2000	MAR							0.13	100																		
2000	APR							0.089	100																		
2000	MAY							0.062	100																		
2000	JUN							0.027	110																		
2000	JUL							0	180																		
2000	AUG							0.014	140																		
2000	SEP							0.17	100																		
2000	OCT							0.37	100																		
2000	NOV							0.067	100																		
2000	DEC							0.028	110																		