

Data Management Summary Report

Lower Fox River Remedial Investigation/ Feasibility Study

Prepared by:

**EcoChem, Inc.
100 South King Street, Suite 405
Seattle, Washington 98104-2885**

**ThermoRetec Consulting Corporation
413 Wacouta Street, Suite 400
St. Paul, Minnesota 55101-1957**

ThermoRetec Project No.: 3-3584-100

Prepared for:

**Wisconsin Department of Natural Resources
101 South Webster Street
Madison, Wisconsin 53707-7921**

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Prepared by:

**Richard A. Tremaglio, EcoChem, Project Manager
Bob Olsiewski, EcoChem, Senior Chemist**

Technically Reviewed by:

**Timothy Thompson, ThermoRetec, Senior Environmental Scientist
Paul F. Putzier, ThermoRetec, Project Manager**

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Executive Summary

Data management and data quality assessment for the Lower Fox River Remedial Investigation/Feasibility Study (RI/FS) and Risk Assessment (RA) has been conducted with two primary goals in mind:

- The identification and incorporation of available electronic data sets for immediate use in the support of RA and RI/FS activities and the assessment of these data sets for overall quality and defensability.
- The generation of a usable database of Lower Fox River data produced through the identification, acquisition, review (validation), catalog, classification and archive of all available data (electronic and hardcopy) pertinent to the Lower Fox River RA and RI/FS.

Environmental data generated by numerous sources in support of many different actions on the Lower Fox River were collected and assessed for overall quality and included into the Fox River Database (FRDB.)

For the purposes of this document the following definitions will apply:

Data Set - an electronic set of data that is associated with or is identified by a unique study name or sampling event. An identified data set may have been of any original data format (e.g., spreadsheets, databases, ASCII files, etc.).

Sample - a unique, representative fraction of a matrix of interest (sediment, fish tissue, water, etc.) collected during a discrete time period.

Record - collection of all data associated with a single analytical result in the FRDB (location, qualifiers, comments, etc.)

Data Validation - data validation is the process of independent data review which provides information pertaining to analytical limitations of data, based on specific quality control criteria.

Usable - usable data have been assessed to the maximum extent through review of the analytical data itself and associated quality assurance/quality control (QA/QC) documents and are of known and verifiable quality.

Supporting - supporting data have not been subjected to as rigorous an assessment as the usable data. As such, the precise quality of the data are not known. This is due to insufficient or incomplete QA/QC information available at the present time. The QA/QC information may or may not exist, and collection and assessment of this

information might render the data fully usable. Until a full data validation is conducted, these data should be used for supporting purposes only.

Indeterminate - if it is not known at the time of this report, whether or not a data set has undergone data validation, the data validation status has been described as indeterminate.

1 **Data Collection**

1.1 Electronic Data Collection

Electronic data management began with the initial collection of electronic data sets collected from the Wisconsin Department of Natural Resources (WDNR) the week of March 30, 1998. This initial data collection effort focused on those data sets that were easily accessible by WDNR. Data collection continued up to final preparation of this summary report. Work on assimilating the most recent electronic data deliverables (received November 30, 1998) was not completed in time for inclusion in this report. The data will be submitted as an addendum to the Fox River Database (FRDB).

1.2 Collection of Historical Analytical Data and Supporting QA/QC Documents

Collection of the historical data and documents occurred concurrently with the electronic data collection effort. The goal of the historical data/document review was to assess previously generated analytical data sets and associated Sampling and Analysis Plans (SAPs), Quality Assurance Project Plans (QAPPs), laboratory Standard Operating Procedures (SOPs), and other project specific documents which might set forth additional data quality objectives (DQOs).

1.3 Archive Data Collection

Source and secondary documents have been collected in order to create a hardcopy library (archive) of documents cited in support of the current Lower Fox River RI/FS and RA. These documents have been collected by the WDNR in Madison and the RA/RI/FS team (ThermoRetec, EcoChem, Inc., et al.). These reference documents have been entered into the database in a bibliographical format and have been assigned a unique number for easy hardcopy retrieval. These documents will be tagged with reference numbers and delivered to the WDNR offices once all RA/RI/FS reports have been finalized.

2 Data Manipulation and Assessment

2.1 Data Management and Data Validation Overview

Each of the data sets required a substantial amount of manipulation and massage to transform the structure to a database usable format. This occurred primarily because the data, as collected, were usually obtained from report documents that had undergone extensive formatting. This formatting had to be removed to restore the data set to its most basic state and transform individual data sets into a usable condition.

In addition to reducing the data to a simpler format, the disparate data sets required standardization. The following items offer examples of the standardization that took place:

- A single analyte list was developed. A cross-reference table was used to update each data set to a standardized list of analytes. For example, all instances of 4,4 -DDT were changed to p,p -DDT and all PCB congener results were put into the format PCB Congener XXX.
- Units were standardized to parts per million (mg/L or mg/kg) for inorganic constituents and parts per billion (ug/L or ug/kg) for organic analytes. This entailed straight unit changes (ng/ml to ug/L) as well as concentration changes (10 ug/kg to 0.01 mg/kg). All required changes are noted in the comments field of the FRDB.
- Unique sample identifiers (IDs) were generated for samples that did not have a single unique identifier. Tissue samples generated by different researchers often had identical sample IDs. In these cases, a letter in parenthesis was appended to the original sample ID to indicate the researcher. [(P) - Patnode data, (S) - Stromberg data, etc.]. In other cases, multiple researchers used an identical counting scheme to identify samples, based on the year and the numerical sample count (i.e., the first sample in 1995 was 95001, the second was 95002). In cases where more than one researcher collected samples in this manner, the samples were identified as 95001a, 95001b, and so forth.
- Qualifiers were standardized to the extent possible. For the most part, this consisted of changing < signs to U , and interpreting laboratory assigned qualifiers. Where this information is unavailable or has yet to be obtained, original qualifiers have been maintained. In those data

sets where multiple qualifiers are available (laboratory qualifiers and validation qualifier) the multiple qualifiers have been merged to a single qualifier (i.e., U qualified from laboratory and UJ qualified by the validator = UJ qualified).

- Individual samples from various data sets were assigned derived-location information to allow for comparison to other data sets. All samples were assigned one of the following six regional designations: Background or reference; Little Lake Butte des Morts; Appleton to Little Rapids; Little Rapids to De Pere; De Pere to Green Bay; and Green Bay. Descriptive location information and coordinate information were used to successfully associate 99.9% of the samples with one of the above areas. Where possible, samples collected on the upper stretch of the river were also associated with the sediment deposit they were sampled from.

An analysis of the data sets which have been currently reduced and are part of the Fox River Database is summarized in Table 2-1 Data Set Analysis.

The quality assessment of the historical data followed a stepwise approach. Initially, it was determined whether an independent validation had already been performed. If the data were validated, and the validation report or validation worksheets were available, they were reviewed. If the validation was determined to follow basic United States Environmental Protection Agency (EPA) guidelines (at a minimum), the data were considered to be acceptable for use (usable) in the RI/FS and risk assessment decision making process.

If the data were not validated or concurrence was not reached with the previous validation (and the QC results were available), a limited review was performed. This review consisted of initially reviewing available documents to determine what quality control measures were included, and what data quality objectives (DQOs) were required. The measures of accuracy and precision were evaluated against either the control limits/DQOs in the QAPP, the method, the laboratory SOPs, or EPA National Functional Guidelines. QC elements such as sample duplicates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and field duplicates were acceptable measures of precision. QC elements such as blanks, calibration standards (initial and continuing), surrogates, MS/MSD, LCS/LCSD, and standard reference materials (SRMs) were acceptable measures of accuracy. A determination of the useability of the data was made from the findings of these reviews. The analysis of the available QA/QC elements for each data set are summarized in Table 2-2 QC Elements for Data Sets.

**Table 2-1
DATA SET ANALYSIS**

Data Source	Number of Samples	Number of Records	Matrices ¹	Analyses Conducted ²	Number of files in delivery
1989/1990 Fox River Mass Balance Data	1692	24648	s,t,w	PCB-C, PCB-A, TOC, GS	6
1989/1990 Green Bay Mass Balance Data (GLNPO)	1974	199,226	s,t,w	PCB-C, M, TOC	91
1992/93 BBL Deposit A Sediment Data	35	559	s	PCB-A, TOC	1
1993 Triad Assessment	26	631	s,t	PAHs, M, PCB-A, Cl-P, invertebrate and benthos data	11
1994 GAS-SAIC Sediment Data	253	5654	s	V,S, M, P/P, DXN, TOC, Hg	6
1995 WDNR Sediment Collection	488	6490	s	PCB-A, M	8
1996 BBL Sample Collection	21	2771	s,t	PCB-C, TOC	6
1996 WDNR Fish Tissue Collection	200	1595	t	PCB-A, TOC	1
1996 NRDA Tissue Collection	123	7889	t	PCB-C, PCB-A, TOC	1
1997 NRDA Waterfowl Data	70	1680	t	Cl-Pest	2
1994-1995 Cormorant Data	193	6174	t	P/P, DXN	2
FR and GB Fish Contaminant Study Data	1757	9331	s,t	PCB-A, PCB-C, Cl-Pest, M, DXN	2
WDNR Fowl and Mammal Tissue	438	2681	t	Cl-Pest	3
Lake Michigan Tributary Monitoring Study	86	5720	w	Cl-Pest, PCB-C	5
Stromberg Eagle Data	31	954	t	Cl-Pest, PCB-C, DXN	1
1993-1996 Tree Swallow Data	200	5492	t	Cl-Pest, PCB-C, DXN	2
USGS National Water Quality Assessment Program	441	12330	s,t,w	Cl-Pest, Cl-Herb, OP-Pest, M, SVOA	21
1994 Woodward Clyde Deposit A Sediment Samples	66	593	s	PCB-A, TOC	12
WPDES Permit Influent Samples	8	892	w	V,S, M, P/P	1
WDNR Watershed Management Metals Data	8	78	w	M	1
WDNR Caged Fish Bioaccumulation Samples	25	1642	s,t	PCB-C, TOC	2
1998 Deposit N Demonstration Project	10	83	s,w	PCB-A,Hg	1
1998 Segments 56/57 Demonstration Project	295	3162	s	PCB-A,Hg, TOC	12
1998 RETEC RI/FS Supplemental Data Collection	225	7006	s	PCB-A, PCB-C, Cl-Pest, M, DXN, PAH	1
TOTAL: 23 Data Sets	8665	307281			199

¹Matrices

S = Sediment
T = Tissue
W = Water

NA - Not available at time of writing.

Cl-P = Chlorinated Pesticides

²Analyses

PCB-C = PCB Congener
PCB-A = PCB Aroclor
TOC = Total Organic Carbon
GS = Grain Size
PAH = Polynuclear Aromatic Hydrocarbon
M = Metals

V = Volatiles
P/P = Pesticides/PCBs
DXN = Dioxins
Hg = Mercury
Cl-Herb = Chlorinated Herbicides
OP-Pest = Organophosphorus Pesticides

**TABLE 2-2
QC ELEMENTS FOR DATA SETS**

		1989 GREEN BAY MASS BALANCE STUDY	1995 WDNR BELOW DEPERE			1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS										
Parameters		PCBs	PCBs	TOC	Metals	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs	PCBs	Dioxins	CLP Pest/PCBs	
Types	Requirements	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	
SDG#s		Multiple SDGs	Hazleton SDG #'s TBD2,10, 1 and 20	Hazleton SDG #'s TBD2,10, 1 and 20	Hazleton SDG #'s TBD2, and 20	ARI M172	ARI M174	ARI M176	ARI M177	ARI M178/M179/M364	ARI M365	ARI M367/M368	ARI M370	Triangle Lab SDG # 35589	Swanson/SDG 948521	
Data Review	1) Third Party Validation Performed	No	Y/MAKuehl	Y/MAKuehl	Y/MAKuehl	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	
Deliverables	1) Electronic Deliverables	Y - (Yes)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	2) Hard copy	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Data Review Details	1) Package Completeness	Not Available - (NA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	2) Chain of Custody Procedures	None - Not required	Acceptable	Acceptable	Acceptable	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	
	2) Holding Times	NA	Y	Y	Y	Y (Frozen)	Y/Some exceedances	Y	Y	Y/some exceedances, one sample qualified J for gross exceedances (M178)	several sample qualified J for gross exceedances (M365)	Yes/Minor violations	Yes/Minor violations	Yes/Minor violations	N/Samples sent to lab 10 days after collection	
	3) Initial Calibration	Single pt or three pt curve used.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y/Not consistent with CLP protocol	
	4) Calibration Verification	Varies; Lab dependant	15%	20%	10% for metals & 20% for Hg	3-5pt 10% D but Ave was higher. Results flagged (J/UJ).	3-5pt 10% D but Ave was higher. Results flagged (J/UJ).	5pt 10% D but Ave was higher. Results flagged (J/UJ).	5pt 10% D but Ave was higher. Results flagged (J/UJ).	5pt 15% D but Ave was higher. Results flagged (J/UJ).	5pt 15% D but Ave was higher. Results flagged (J/UJ).	5pt 15% D but Ave was higher. Results flagged (J/UJ).	5pt 15% D but Ave was higher. Results flagged (J/UJ).	5pt 15%	5pt 20%RSD	not used. Certain analytes outside RT window
	secondary column	was qualitative only. Criteria varies; lab dependant.	25% D for CC on 2nd column	Not applicable (N/A)	N/A	Not available (NA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	5) Laboratory Blanks	Yes - Blank conc less than or equal to 10% of sample concentration.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	6) Surrogate Recoveries	50-120%	60-150%	N/A	N/A	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCMX 55-115/DCB 70-125	TCFD 25-150/TCDD 25-150	TCMX 55-115/DCB 70-125	
	7) Matrix Spike	50-120%	65-125%	75-125%	75-125%	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	35 min - 130 max	TCDD/-TCDF 54-162 18/9 Required 29 min - 152 max
	8) Lab Duplicate	to 5X LOD, the average RSD must be less than or equal to 50%. Congeners less than 5X LOD, the ave. RSD must be less than or equal to 100%.	26%	20%	20%	No - (N)	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	Lab Control Sample (SRM results?)	None. QA states that a series of binary coded QA samples were to be successfully analyzed prior to program.	NA	Not available (NA)	Y/EPA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	9) Gel Permeation/Forisil Cleanup	NA	Y	N/A	N/A	Y - If necess.	Y - If necess.	Not sure	Not sure	Not sure	Not sure	Not sure	Not sure	Not sure	Not sure	
	10) Detection Limit	5.0 pg on column per congener - water and algae. 25 pg on column for sediment, zooplankton and fish.	50 ppb	NA	CRDL	50 ppb wet wt	NA	NA	NA	NA	NA	NA	NA	NA	NA	samples due to blank cont. and noise Elevated in some samples due to blank cont. and noise
	11) Calc and transposition verification. Qualitative verification?	No	Yes/Recalc performed > 10% frequency	NA	10%	Y /10%?	N - No chros	ID and Quants Could not be verified. Raw data not provided	ID and Quants Could not be verified. Raw data not provided	ID and Quants Could not be verified. Raw data not provided	Data verified	N	Not verified	Y - Sample Identifications. Sample Quant not reviewed.	Not Verifiable	
	12) Field QC Results	NA	None	None	None	None	None	None	Not identified	Not identified	Not identified	Not identified	Not identified	Not identified	Not identified	
	13) Usability	Yes - supporting	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - supporting	
	Qualifiers	Lab flags only.	Yes - Minor J Flags due to low surrogate recovery or below PQL and above MDL	Yes - Minor J Flags due to poor lab RPD	None	Yes - Minor quals assigned due to CCV (J/UJ)	Yes - Minor quals assigned due to CCV (J/UJ)	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	Yes - Minor quals assigned due to CCV, surrogate recoveries J/UJ	cont. and elevated matrix spike recovery sample results may be biased positive (J+)	Yes/Major issues about overall quality of data. Associated with RT drift, quality of work poor.	
	14) Other	NA	N/A	N/A	NA	NA	NA									
	IC Samples	NA	N/A	N/A	20%	N/A										
SAP		N/Study Plan	Y	Y	Y	Y										
QAPP		Y	Y	Y	Y	Y										
Lab QAM		NA for review.	Y - Hazleton SOPs	Y - Hazleton SOPs	Y - Hazleton SOPs	N										

**TABLE 2-2
QC ELEMENTS FOR DATA SETS**

		1994 SAIC/GAS REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATA SETS										1996 WDNR Fish Tissue	1994 Woodward Clyde Deposit A Data	
Parameters		CLP SVOCs	CLP Metals	TCLP Metals	Mercury	Mercury	Mercury	Mercury	Mercury	Mercury	Mercury	PCB	PCBs	TOC
Types	Requirements	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Fish Tissue	Sediment	Sediment
SDG#s		Swanson/ SDG 948521	Swanson SDGs 12716, 12724, 12745, 12806, 12816, 12941	Swanson SDGs 12716, 12724, 12730, 12827, 12718, 12802, 12833, 12844	Swanson WL12941	Swanson WL12745	Swanson WL12806	WL12812/12724/12718	WL12816/12882/12929/12922/12853/12852/12851	WL12688/12725/12783/12777	Swanson WL12693	SLOH Fish SDG-1	Laboratory Multiple SDGs	Laboratory Multiple SDGs
Data Review	1) Third Party Validation Performed	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/SAIC	Y/MAKuehl	Y/Limited by EcoChem	Y/Limited by EcoChem
Deliverables	1) Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2) Hard copy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No - Summary Data Only	No - Summary Data Only
Data Review Details	1) Package Completeness	N/Form 1's not supplied by lab	Yes	Yes	N/Form 1's not supplied by lab	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N - Chain of Custody not provided	N - Chain of Custody not provided
	2) Chain of Custody Procedures	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Not determined	Acceptable	Not determined	Not determined
	2) Holding Times	N/All samples exceeded HT and are qualified as estimated (J, UJ).	Y/Hg results are flagged for exceeding HT by 27 to 42 days (J/UJ).	Y	N/All samples exceeded HT and are qualified as estimated (J, UJ).	Y	Y	Y	N/Quals J/UJ	Y	Y	Y	Unable to document	Unable to document
	3) Initial Calibration	Y/Not consistent with CLP protocol	Y (validator recal results)	Y	Y/exceedance	Y/exceedance	Y/exceedance	Y (validator recal results)	Y (Validator recal results)	Y (validator recal results)	Y (validator recal results)	Y (25%)	NA/Data not provided	NA/Data not provided
	Curve - # of standards	5pt	Lin Reg	Lin Reg	5pt	5pt	5pt	5pt	5pt	5pt	5pt	5pt	QAPP/SOP indicates 3pt	QAPP/SOP indicates daily 1pt
	4) Calibration Verification	no exceedances qualified samples as estimated J/UJ	10%D	10%D	Y/15%	Y/15%	Y/15%	Y/15%	Y/15%	Y/15%	Y/15%	15%D	QAPP/SOP indicates 15% RSD	20%
	secondary column	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25%D	QAPP/SOP indicates Optional/15%	N/A
	5) Laboratory Blanks	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	6) Surrogate Recoveries	8 Required/ 18 min - 137 max	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y - 70-120	62%-125%	N/A
	7) Matrix Spike	11 Required/11 min 142 max	75-125	75-125	75-125	75-125	75-125	75-125	75-125	75-125	75-125	Y - 65-125	46%-145%	75-125%
	8) Lab Duplicate	NA	Y 20%/some exceedances qualified J/UJ	Y	Y	Y	Y	Used MS/MSD (not always performed) CLs were 75-125	Y/Occ. Used MS/MSD/12922 >35%	Y/Used MS/MSD	Y	Y/26% Limit	Yes/Not clear if field or lab dups were performed	20%
	Lab Control Sample (SRM results?)	Y/acenaphthene fell outside @53	Y	Y	Y	Y	Y	Used MS/MSD (75-125)	Used MS/MSD (80-120)	Y	Y	N	N	NA
	9) Gel Permeation/Forisil Cleanup	Not sure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Not Documented	NA
	10) Detection Limit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 ug/kg	50 ug/kg	NA
	11) Calc and transposition verification. Qualitative verification?	Y	Y. Some calc errors.	Y	N	N	N	Y	Y/Recalc	Y/Recalc	Y/Recalc	Y/Recalc	Not performed	NA
	12) Field QC Results	Not identified	None	N	Y/Field Duplicate<35%	N	N	Y/Ok on rinsate/FD (12812) failed No Action	Y/Ok on rinsate/<35% on FD	Y/Ok on rinsate/<20% on FD	Y/Ok on rinsate/OK on FD	N/A	Y	None
	13) Usability	Yes - as qualified	Yes - as qualified (1 data point rejected for Zn)	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - supporting	Yes - as qualified	Yes - as qualified
	Qualifiers	qualifications due to HT exceedances and low surr and spike recoveries (J/UJ)	Yes/Minor and Major qualifications due poor spike recoveries (J/UJ) and (R) on Zinc	No Qualifications	Yes - Minor J Flags	Yes - Minor UJ/J Flags	Yes - Minor UJ/J Flags	Yes/Minor qualifications due to incorrect ICB calc.	Yes/Minor J/UJ Flags due to HT exceedances/12853 also qualified on poor FD values.	No Qualifications	Not apparent if none or some minor qualifications	Y/Minor J Quals due to detections below PQL.	Y/Minor J Quals due to spike outliers	N/No qualifiers based on review
	14) Other IC Samples											N/A	N/A	N/A
SAP												N	Y	Y
QAPP												N	Y	Y
Lab QAM												Y	Y/SOPs Only	Y - Hazleton SOPs

**TABLE 2-2
QC ELEMENTS FOR DATA SETS**

		1997-1998 SMU 56/57 Data		1997 Fox River Deposit N			1992 - 1995 USGS NAWQA Data	1993 Triad Assessment	1998 RETEC RIF/S Supplemental Data Collection		1996 USFWS/Hagler Bailly Data
Types	Parameters	PCBs Sediment enCnem	Mercury Sediment enCnem	PCBs Sediment/Water enCnem	Mercury Sediment/Water enCnem	TOC Sediment enCnem	Multiple Parameters Multiple Matrices	Multiple Parameters Multiple Matrices	PCBs Sediment	Metals Sediment	PCB Fish Tissue
SDG#s		Laboratory Multiple SDGs	Laboratory Multiple SDGs	Laboratory Multiple SDGs	Laboratory Multiple SDGs	Laboratory Multiple SDGs	USGS NWQL Multiple SDGs	SLOH Multiple SDGs	ARI Multiple SDGs	ARI Multiple SDGs	Battelle Laboratory Multiple SDGs
Data Review	1) Third Party Validation Performed	Y/Montgomery Watson	Y/Montgomery Watson	Y/MAKuehl	Y/MAKuehl	Y/MAKuehl	Y/NAWQA Program	None	Yes	Yes	Y/EcoChem
Deliverables	1) Electronic Deliverables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	2) Hard copy	No - Summary Data Only	No - Summary Data Only	Not Available	Not Available	Not Available	Not Available	Not Available	Yes	Yes	Yes
Data Review Details	1) Package Completeness Chain of Custody Procedures	N - Chain of Custody not provided	N - Chain of Custody not provided	N - Chain of Custody not provided	N - Chain of Custody not provided	N - Chain of Custody not provided	Summary review of QC Sample results	Not Available	Yes/Minor qualifiers applied	Yes	Yes
	2) Holding Times	Not determined	Not determined	Acceptable	Acceptable	Acceptable	Not determined	Not determined	Yes/Minor issues	Acceptable	Yes/Minor issues
	3) Initial Calibration	Y	Y	Y	Y	Y	Not Available	Not Available	Yes/Minor qualifiers	Yes	Y(35%)
	Curve - # of standards	5pt	6pt	5pt	3pt	3 replicates	Not Available	Not Available	5pt	Blank plus 5pt	Not Available
	4) Calibration Verification	15% RSD	Y	15% D	Yes/90-110	Yes/90-110	Not Available	Not Available	Yes < 20%	90-110 every 10 samples	Varies between GC/ECD and GC/MS. <25% for 75% analytes
	secondary column	Y	N/A	Y/25%	N/A	N/A	Not Available	Not Available	Y/Qualifiers applied	N/A	Not mentioned
	5) Laboratory Blanks	Y	Y	Y	Y	Y	Not Available	Not Available	Yes	Yes	Y
	6) Surrogate Recoveries	60%-150%	N/A	60%-150%	N/A	N/A	Not Available	Not Available	Yes/65%-125%	N/A	Y - 50 - 125
	7) Matrix Spike	65%-125%	75%-125%. One exceedance	65%-125%. One exceedance. No action due to high conc.	60%-135%	75%-125%. All w/in 20%RPD	Not Available	Not Available	Yes/65%-125%	70%-130%	deca 30-125 for mono and dichloro
	8) Lab Duplicate	Y (20%)	Y (20%)/Several exceedances	20%	Y (35%)	Y/20%	Not Available	Not Available	Y/RPD <30%	NA	Y/50%
	Lab Control Sample (SRM results?)	N	Y (80-120)	N	N	N	Not Available	Not Available	w/in 35% of certified value	Yes/w/in 35% of certified value	SRM Carp-1 %D <35%
	9) Get Permeation/Forsitt Cleanup	Not noted	NA	N	NA	NA	Not Available	Not Available	Not determined	N/A	Not mentioned
	10) Detection Limit	20 ug/kg dw	0.04 mg/kg dry wt per QAPP	50 ug/kg A 1242 for sediment and 0.05 ug/L A1242 for waters	0.40 mg/kg or 0.25 ug/L	110 ug/kg	Not Available	Not Available	1.0-2.0 ug/kg	0.1-50 mg/Kg	Not Available
	11) Calc and transposition verification. Qualitative verification?	Y	Y	Y/10%	Y/10%	Not discussed	Not discussed	Not Available	Yes/10%	Yes/10%	Y/Recalc and Verification
	12) Field QC Results	Not specified in DV report	Not specified in DV report	sediment. Not enough volume for H2O	field water and sediment duplicates acceptable	Y. Field duplicate	matrices. Evaluated in summary and table format.	Not Available	exceedances. No action taken on this basis.	exceedances of 50%. No action taken.	None
	13) Usability	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - as qualified	Yes - supporting	Yes - supporting	Yes - as qualified	Yes - as qualified	Yes - as qualified
	Qualifiers	Y/Minor qualifiers assigned due to holding time exceedances	Y/Qualifiers due to ht exceedances, lab dups, and spike recoveries.	Yes/Minor qualifiers	N/No qualifiers based on review	N/No qualifiers based on review	Data not qualified but summaries infer low and high bias in QC Results Summary.	Not Available	Y/Data qualified due to ht exceedance, calibration, surrogate, internal standard outliers etc.	Yes/Minor qualifiers assigned due to lab RPD exceedances.	Y/Qualifiers due to CCV %D outliers, BS results, surrogate outliers, lab dups, SRM results and interfer.
	14) Other IC Samples	N/A	NA	N/A	NA	NA	NA	NA	N/A	NA	N/A
SAP		Y	Y	Y	Y	Y	NA	NA	NA	NA	N
QAPP		N - QAPP Tables only	N - QAPP Tables only	Y	Y	Y	NA	NA	Y	Y	Y/Tech Memo
Lab QAM		N	N	N	N	N	NA	NA	Y	Y	Y/Tech Memo

2.2 Data Sets

The reduced and standardized data sets were compiled into an interim database for use in support of the ongoing RA and RI/FS. This interim database was essentially a large flat file, containing more than 307,000 records from 23 individual data sets. Each data set is discussed in the following sub-sections of this report.

2.2.1 1989/1990 Fox River and Green Bay Mass Balance Data

The 1989/1990 Fox River Mass Balance data were collected by WDNR along the length of the river in 1989 and 1990. The sediment and water matrices of this data set were received from WDNR in six spreadsheet files (1989-1.wks, 1989-2.wks, allsed.wks, basic-5.wks, deep-cor.wks, and gravity.wks). These spreadsheets contain PCB congener and total PCB concentrations, as well as grain size and total organic carbon (TOC) information. Each file exists in a unique format and was transformed into a standard database format. This data represents 1,692 samples and 24,648 analytical records in the FRDB.

The Green Bay Mass Balance (GBMB) data are represented in their entirety in the files posted on the Great Lakes National Program Office (GLNPO) website; there is considerable overlap with the Fox River Mass Balance Data provided by WDNR. Several mass balance studies have been conducted by different regulatory agencies and groups. Consequently there is a significant overlap of data which is considered common data amongst the different studies. Redundant data identified in the collective GLNPO set were segregated and removed prior to inclusion of the GLNPO data into the FRDB (1,974 samples and 199,226 records).

Samples were analyzed and data were generated by eight different laboratories for the GBMB study. Seven of the laboratories performed PCB analyses; one laboratory performed metals analyses. Each of the seven laboratories analyzing samples for PCBs were required to analyze a series of 10 performance evaluation (PE) samples (of differing concentration levels) prior to analyzing samples for the study. The results of these PE sample analyses were available for review by EcoChem, Inc. (EcoChem) for four laboratories. A wide range of percent recovery values were reported (60% to 233%).

Prior to the study, each laboratory was given a copy of the document, Quality Assurance Plan Green Bay Mass Balance Study - PCBs and Dieldrin, which outlined general guidelines and data quality objectives. According to this document data sets generated for the GBMB Study were reviewed and approved by the Green Bay Quality Assurance Coordinator (QAC) prior to the release of

data. EcoChem, Inc. (EcoChem) interviewed the GBMB QAC at the University of Minnesota in September 1998 regarding the data review procedures. It was determined from that meeting that the data were not fully validated. The review of the data consisted of verification of laboratory generated QA/QC forms prior to data release. A formal comparison to any specific project DQOs was not made, thus no validation qualifiers were assigned to the data.

One of the participating laboratories, the Wisconsin State Laboratory of Hygiene (SLOH), was visited by EcoChem personnel, and analysts and managers were interviewed. Sample handling, preparation and analysis systems were reviewed. In-depth discussions occurred concerning peak identification and quantitation. All hardcopy and electronic data are available, and could be validated if requested. The disposition of the data and supporting information for the other labs is not known. Thus, it was determined that, in general, the data from the GBMB Study should be used as supporting data only.

2.2.2 1992/93 BBL Deposit A Sediment Data Collection

The quality of the 1992/1993 BBL Deposit A sediment data set is currently unknown. The data were received just prior to issuance of this report and were not assessed as part of this effort. This data set consists of 35 samples and 559 records in the FRDB. The validation status of this data set is considered indeterminate.

2.2.3 1993 Triad Assessment

The Triad sediment data were collected by WDNR from several sites and analyzed in 1992 and 1993. EchoChem received the data from WDNR in eleven spreadsheet files (joint.wb2, orgpest.wb2, rtrben.wb2, tables.wb2, toxicity.wb2, triad92.wb2, triad82b.wb2, triad93.wb2, triaddat.wb2, triadhis.wb2, and foxriver.wq1). All data were represented in files triad92b and triad93, and were redundant in the rest of the files. These spreadsheets contain PAH, metals, PCB, chlorinated pesticide, invertebrate, and benthos data. Both of the file formats were transformed into a standard database format. These data represent 26 samples and 631 analytical records in the FRDB. The original Triad data were modified to create unique sample IDs. A designation of (*Tr*) was appended to the existing sample IDs to ensure uniqueness.

Samples collected for the Triad Study were submitted to several different laboratories for physical and chemical characterization. These laboratories include University of Wisconsin-Extension's Soil and Plant Analysis (particle size and soil texture analyses); the State Lab of Hygiene (bulk sediment chemistry); and Hazleton Laboratory (PAHs collected in 1993). Quality control data for the

Triad data were not available for review; however, full data validation on SLOH data could be conducted if requested. As these data have not undergone full validation, these data should be used as supporting data only.

2.2.4 1994 GAS/SAIC Sediment Data

The GAS/SAIC data were collected during late 1994 for the Fox River Coalition. This data set includes sediment data collected at several deposits above the DePere Dam. Samples were analyzed for polychlorinated biphenyls (PCBs), chlorinated pesticides, volatile organics, semi-volatile organics, metals, and dioxins. These data were delivered by WDNR to EcoChem in six files (clp_data.xls, cnv_data.xls, dxn_data.xls, hg_data.xls, pcb_data.xls, and frgrnsiz.xls). These data were complete and correct as received and were incorporated directly into the FRDB. The GAS/SAIC data set consists of 253 samples that comprise 5,654 records in the FRDB.

Approximately 20% of the GAS/SAIC data set underwent a full data validation. The remainder of the data underwent a cursory review that excluded verification of compound identifications and raw data calculation checks. This evaluation followed specified methods described in the November 1994 Final Report Sampling and Analysis Plan Fox River Remedial Investigation. The data validation reports do not specifically address chain of custody records associated with the samples.

SAIC found incorrect PCB quantitations, inconsistent pesticide identifications, consistently poor surrogate recoveries, retention time shifts, and overall poor quality of work associated with the pesticides/PCB data. Based on EcoChem's review, these data should be used as supporting data only.

PCB-only and dioxin analyses were performed by different laboratories than performed the pesticide/PCB analyses. In general, precision and accuracy were judged acceptable by SAIC for these analyses. PCB results were qualified as estimated by SAIC due to calibration verification percent difference exceedances and poor surrogate recoveries. The dioxin results received minor qualifications due to blank contamination and elevated matrix spike recovery values. These data, as qualified by SAIC, are considered usable.

2.2.5 1995 Sediment Collection - WDNR

The 1995 sediment data collection was conducted by WDNR and consists of sediment data collected from below De Pere Dam. Samples were analyzed for PCB Aroclors and metals. These data were provided by WDNR in eight files (corelocs.xls, convdata.xls, 95sedata.xls, metals.xls, metals2.xls, pcbdata.xls,

pcbdata2.xls, sumdata.xls). The data set consists of 488 samples comprising 6,490 records. These data were manipulated into a suitable database format in the spreadsheets and appended to the FRDB.

Data validation was conducted by the M. A. Kuehl Company (M. A. Kuehl) on approximately 20% of the 1995 data. The data validation reports were reviewed by EcoChem. Based on this evaluation, it was determined that the laboratory followed the specified methods described in the September 1995 Quality Assurance Project Plan for Assessment of PCBs in Sediment of the Lower Fox River from De Pere to Green Bay. Chain of custody records were reviewed, and they indicated that samples were received in good condition. These data, as qualified by M. A. Kuehl, are considered usable.

2.2.6 Sediment and Tissue Data for the Fox River Group (FRG) by Blasland, Bouck, & Lee (BBL) in 1996

The 1996 BBL data set consists of 21 sediment and fish tissue samples collected for the FRG. These samples were analyzed for PCB congeners and TOC. These data were provided by WDNR in six spreadsheet files (02771543.wq1, 02671543.wq1, 02571543.wq1, 03071543.wq1, 03171543.wq1, 03271543.wq1) and comprises 2,771 records in the FRDB. These data were manipulated into a suitable database format in the spreadsheets and appended to the FRDB.

These data were validated by BBL to ensure that they met method quality control criteria and the project data quality objectives. No formal SAP or QAPP was issued prior to implementation of sample collection or analysis; however, BBL stated they used collection and analytical procedures that had been approved by EPA Region V for other projects. Samples were submitted to Inchcape Testing Services Laboratory of Vermont for chemical analysis. PCB results were not surrogate-corrected.

The memorandum written by BBL dated April 4, 1998 indicates that PCB and TOC data for sediment samples and PCB data for biota were reviewed. Chain of custody procedures were not documented by BBL in this Data Quality Assessment Memorandum. Qualifiers were applied to sediment and biota data because of quantitative confirmation differences, blank contamination, and surrogate and matrix spike outlier values. The data, as qualified by BBL, are considered usable.

2.2.7 1996 Fish Tissue Collection - WDNR

The WDNR collected fish tissue samples along the length of the river in 1996. These data were provided by WDNR in a single, multiple page spreadsheet

(all_fish.wb1). Samples were analyzed for PCB Aroclors and TOC. This data set comprises 1,595 records in the FRDB and consists of 200 samples. The data were manipulated into a suitable database format in the spreadsheets and appended to the FRDB.

Data validation was performed by the M. A. Kuehl on 20 fish tissue samples collected by the WDNR in 1996. The data validation report for SDG-1 was reviewed by EcoChem. The data validation was performed using the specified methods described in the April 1996 Addendum to the Quality Assurance Project Plan for Assessment of PCBs in Sediment of the Lower Fox River from De Pere to Green Bay for PCB Analysis of Fish Tissue. Chain of custody records were reviewed and they indicated that samples were received in good condition. Precision and accuracy were judged to be acceptable by the M. A. Kuehl. PCB results were qualified because they were detected above the MDL but below the PQL. The data, as qualified by the M. A. Kueh, are considered usable.

2.2.8 1996 NRDA Fish Tissue Collection - USFWS

As part of the Natural Resource Damage Assessment (NRDA) investigation, the US Fish & Wildlife Service (USFWS) collected and analyzed 123 tissue samples in 1996. Samples were collected below De Pere and in Green Bay. The samples were analyzed for PCB congeners or PCB Aroclors and TOC. The USFWS NRDA data represents 7,889 records in the FRDB and were provided by the USFWS to EcoChem in a single file (pcbsecd.dbf). This data set was provided in database format that was appended to the FRDB.

A full data validation was conducted by EcoChem on 123 tissue samples analyzed for the Natural Resource Damage Assessment project. This data validation was performed based on the specified method criteria described in the Battelle laboratory standard operating procedure, "Identification and Quantitation of Polychlorinated Biphenyls (by Congener and Aroclor) and Chlorinated Pesticides by Gas Chromatography/Electron Capture Detection. Accuracy and precision were generally acceptable. Qualifiers were assigned by EcoChem due to blank contamination, continuing calibration verification percent difference outliers, blank spike results, surrogate outliers, laboratory duplicate results, reference material recovery results, and chromatographic interferences. Data, as qualified by EcoChem, are considered usable.

2.2.9 1997 USFWS NRDA Waterfowl Data/1994 - 1995 Cormorant Data/1993 - 1996 Tree Swallow Data

Results from waterfowl tissue sample analyses were provided by USFWS in two files (tcuster2.mdb and tcuster2.wpd). The samples were analyzed for chlorinated

pesticides. This data set consists of 70 samples and 1,680 records. Results from cormorant tissue sample analyses were provided by USFWS in two files (tcuster1.mdb and tcuster1.wpd). The samples were analyzed for PCB Aroclors , chlorinated pesticides, and dioxins. This data set consists of 193 samples and 6,178 records.

Results from tree swallow tissue sample analyses were provided by the USFWS in two files (ccuster.mdb and ccuster.wpd). The samples were analyzed for PCB congeners, chlorinated pesticides, and dioxins. This data set consists of 200 samples and 5,492 records.

Three electronic text files were reviewed by EcoChem for data validation information regarding these data sets. Files reviewed include 1997 waterfowl data from Green Bay & Lake Michigan (tcuster1.wpd), 1994-1995 double-crested cormorants data from Green Bay (tcuster2.wpd), and Fox River & Green Bay 1993-95 Tree Swallow Study (ccuster.wpd). Of these three documents, one (tcuster1.wpd) gives a brief synopsis of field sampling and chemical analysis procedures used to collect and analyze the samples. The information provided did not specifically address chain of custody records associated with the samples. No qualifiers were assigned based on this review although the statement concentrations of PCB 118 may be overestimated because of coelution with PCB 106 may be considered a qualification. With regards to quality assurance and quality control approval, a reference is made to the Patuxent Analytical Control Facility (Patuxent) of US Fish and Wildlife Service, Lurel, Maryland. It is not clear from this statement if Patuxent established the quality control criteria, approved the method of analysis, or reviewed the results of the study. For these reasons the data should be used only as supporting data.

2.2.10 Fox River Fish Contaminant Study Data - Fox River and Green Bay

The fish contaminant data in the FRDB represents tissue samples collected by WDNR in the Fox River and Green Bay between 1971 and 1996. These samples were analyzed for PCB congeners, PCB Aroclors , metals, chlorinated pesticides, and dioxins. The FRDB contains 1,757 samples from the fish contaminant study comprising 9,331 records. This data set is primarily tissue data with a small number of sediment samples. These data were provided by WDNR in two files (frmb.zip and gbmb.zip).

In 1995 a laboratory audit was conducted by M. A. Kuehl at the Wisconsin State Laboratory of Hygiene. The purpose of this audit was to assess the laboratory capability to analyze tissue and sediment samples for PCB, TOC, and metals. M.

A. Kuehl found the laboratory to be capable of performing the requested analyses. The Wisconsin State Laboratory of Hygiene, was also visited by EcoChem personnel, and analysts and managers were interviewed. Sample handling, preparation and analysis systems were reviewed. In-depth discussions occurred concerning peak identification and quantitation. All hardcopy and electronic data are available, and could be fully validated if requested. As these data have not undergone full validation, these data should be used as supporting data only.

2.2.11 WDNR Fowl and Mammal Tissue

This data set is a collection of tissue sample data collected by WDNR and collated in three files (all.db, geese.db, and ducks.db). The data set represents bird and mammal tissue samples analyzed for chlorinated pesticides. This data set contains 438 samples and 2,681 records.

Quality control information was not available, therefore these data should be used as supporting data only.

2.2.12 Lake Michigan Tributary Monitoring Study

The Lake Michigan Tributary Monitoring samples from the Lower Fox River were collected by the U. S. Geological Survey (USGS) in support of the Lake Michigan Mass Balance Study, administered by GLNPO. These water samples were analyzed for PCB congeners, chlorinated pesticides, and mercury. This data set consists of 86 samples and 5,720 records.

These data are currently being validated by the M. A. Kuehl, and it is expected that these data will be usable, as qualified, once the validation process has been completed. These data, in the meantime, should be used as supporting data only.

2.2.13 Stromberg Eagle Data

Eagle samples were collected for the USFWS under the direction of Ken Stromberg between 1991 and 1996. The data were provided to EcoChem by the USFWS in a text file report (strmborg.wpd) and required manual extraction point by point. The samples were analyzed for PCB congeners, chlorinated pesticides, and dioxins. This data set contains 31 samples and 954 records. Quality control information was not available, therefore these data should be used as supporting data only.

2.2.14 USGS National Water Quality Assessment Program (NAWQA)

The NAWQA data represent samples collected by the USGS between 1992 and 1997. There are 441 samples of sediment, water, and tissue. These samples were analyzed for an extensive list of chlorinated pesticides and herbicides, organophosphorus pesticides, semivolatile, and metallic analytes. These data were provided by the USGS in 21 files with additional information obtained on the NAWQA website. These sample analyses represent 12,330 records in the FRDB, approximately 90% of which are from waterways other than the Lower Fox River and are noted as 'reference.'

Of the 441 environmental samples collected between 1992 and 1997, approximately 15% were quality control samples collected concurrently during field sampling activities. Types of quality control samples collected include field blanks and trip blanks for surface water and groundwater matrices, and field replicates and splits for all matrices. Surface water and groundwater samples were spiked to assess precision and accuracy of the volatile and pesticide methods. Surrogates were added to all environmental samples undergoing pesticide, volatile, and other trace organic analyses.

The results of the quality control samples were reviewed by the USGS NAWQA group and were reported in the U. S. Geological Survey Water-Resources Investigations Report 97-4148, *Results of Quality-Control Sampling of Water, Bed Sediment, and Tissue in the Western Lake Michigan Drainages Study Unit of the National Water-Quality Assessment Program*. All results were found to be acceptable by NAWQA. Accuracy was generally acceptable, as demonstrated by the percent recovery values of the surrogate and matrix spike values. Precision was generally acceptable, as demonstrated by the relative percent difference values of the sample duplicates. While thorough investigations, and in some cases corrective actions, were performed to explain quality control anomalies (e.g., blank contamination, occasional poor spike recovery values, and possible interferences causing bias), no qualifiers were applied directly to the analytical results. In summary, the data user should refer to this report when using these data to gain a complete understanding of its limitations. As the content of the data packages is not known, the data may or may not be amenable to independent validation. For the reasons mentioned above, the NAWQA data should be used as supporting data only.

2.2.15 1994 Woodward Clyde Deposit A Sediment Samples

Sediment samples were collected by Woodward Clyde in 1994 at Deposit A. These samples were analyzed for PCB Aroclors and TOC. They were provided by WDNR to EcoChem in 12 files, only one of which contained analytical data (pcb_to~1.xls). This data set contains 66 samples and represents 593 records in the FRDB.

A limited data validation was conducted by EcoChem (September, 1998) on 65 soil and 2 water samples analyzed for the Little Lake Butte des Morts (LLBdM) Deposit A Project. The data validation was performed using the specified methods described in the August 1994 *Quality Assurance Project Plan (QAPjP) for the Pre-Design Study on Little Lake Butte Des Mortes*. It should be noted that the specific procedures to be used for data validation (Sections 2 and 9 of the QAPjP) were slightly modified to account for differences in laboratory deliverables. For instance, holding times could not be assessed since chain of custody forms were not provided and a case narrative describing any deviations from proposed analysis was not provided. Accuracy was generally acceptable, as demonstrated by the percent recovery values of the surrogate and matrix and blank spikes. Precision was generally acceptable, as demonstrated by the relative percent difference values of the sample and laboratory duplicates. Qualifiers were assigned by EcoChem due to poor matrix spike recovery values. Based on this limited review, all data, as qualified by EcoChem, are considered usable.

2.2.16 WPDES Permit Influent Data for Water Intakes along the Fox River

Influent water samples along the Fox River were collected by various entities (commercial and governmental), then analyzed for various fractions. These data were provided by WDNR in a spreadsheet and consist of samples collected throughout the 1990s. These data do not adhere to a regular sampling schedule and were provided as supplemental water quality data. These data do not have associated QA/QC data, as the samples were not collected for an RI/FS-type activity. This data set consisted of 8 samples and 878 records.

As QC information was not available, these data should be used only as supporting data.

2.2.17 Fox River Background - WDNR Watershed Management Program

This data set consists of 8 water samples and 78 records in the FRDB. Raw data and accompanying quality control information were not available for review. The quality and usability of this data set has not been determined at this time and data validation is considered indeterminate.

2.2.18 1997 WDNR Caged Fish Bioaccumulation Study Data

WDNR placed caged fish near the demonstration projects conducted at Deposit N and SMU 56/57 prior to the initiation of the projects. The fish and co-located

sediment samples were collected and analyzed for PCB congeners by SLOH (see section 2.2.10). This dataset consists of 25 samples and 1,642 records in the FRDB. The hardcopy data are available, but the data set has not been fully validated. At this time these data should be used as supporting data only.

2.2.19 1998 Demonstration Project Data - Deposit N

Sediment and water samples were collected by Foth & Van Dyke from Deposit N. The environmental samples were analyzed for PCB Aroclors , mercury, and TOC. This data set contains 10 samples and represents 83 records in the FRDB.

Full data validation was conducted by the M. A. Kuehl on approximately 10% of the data (PCBs and mercury). A limited data review was conducted on the remainder of the data (PCBs, mercury, and TOC). Based on this evaluation, the laboratory followed the specified methods described in the October 1997 Fox River Deposit N Removal Project Pre-Design Phase Quality Assurance Project Plan. Chain of custody documentation, although not referred to directly by M. A. Kuehl's December 26, 1997 *Technical Memorandum - Data Validation for Fox River Deposit N*, was acceptable (report mentions discrepancies only). PCB data were qualified due to holding time exceedances and poor matrix spike recovery. No qualifiers were assigned to the TOC and mercury data. Matrix spike and lab duplicates were not performed on water samples submitted for PCB analysis due to insufficient sample volumes. No action was taken because the laboratory performed alternative QC measures (control spikes) with acceptable recoveries. The data, as qualified by M. A. Kuehl, are considered usable.

2.2.20 1998 Demonstration Project Data - Segments 56/57

Sediment samples were collected in late 1997 (and/or early 1998). Montgomery Watson and Harrington Engineering & Construction implemented a Sediment Removal Demonstration Project at SMU 56/57 on behalf of the WDNR. The environmental samples were analyzed for a full suite of parameters which included PCB Aroclors , mercury, and TOC. This data set contains 295 samples and represents 3,162 records in the FRDB.

Data validation was performed by Montgomery Watson on over 100 analytical batches of data collected at SMU 56/57 in 1997 and 1998. Full data validation was performed on sediment PCB and mercury data and a limited data review was conducted on all other analytical parameters. The full data validation and limited review were performed using the specified methods described in the Field Sampling Plan Pre-Design Investigation Sediment Management Unit 56/57 Sediment Removal Demonstration Project and accompanying Quality Assurance Project Plan (May 1998) and EPA Contract Laboratory Program National

Functional Guidelines for Organic Analysis Review (2/94). Chain of custody documentation was not covered in the data validation or the review. Precision and accuracy were judged to be acceptable by Montgomery Watson. PCB results were qualified as estimated by Montgomery Watson because PCBs were analyzed beyond holding times. Mercury results were qualified as estimated because matrix spike percent recovery values exceeded the control limit criteria. Results from other analytical methods were qualified for holding time exceedances (total Kjeldahl nitrogen results) and blank contamination (variety of conventionals analyses). Only the QC elements for the PCB and mercury sediment results were summarized in Table 2-1 due to the number of analytical tests performed on the effluent samples. Based on Montgomery Watson's limited review, no data were considered unusable. The data, as qualified by Montgomery Watson, are considered usable.

2.2.21 1998 ThermoRetec RI/FS Supplemental Data Collection

Supplemental sediment samples were collected from the Lower Fox River in June of 1998 by ThermoRetec and Natural Resource Technology, Inc. for the WDNR. Samples were collected according to procedures outlined in the *Sampling and Analysis Plan and Quality Assurance Project Plan for Supplemental Data Collection Fox River RI/FS*. This data set consists of 225 samples and 7,006 records in the FRDB. In addition, ThermoRetec analyzed fish tissue samples as part of the supplemental data collection effort. The results of the fish tissue analysis were not available at the time this report was finalized.

A full data validation was conducted by EcoChem. Analytical data were reviewed using quality control criteria documented in the analytical method, National Functional Guidelines, and the project QAPP. Validation was performed on PCB, semivolatile, pesticide, metals, and conventional (TOC and total solids) data packages. Accuracy and precision were generally acceptable.

Qualifiers were assigned by EcoChem due to holding time exceedances, blank contamination, continuing calibration verification percent difference outliers, lack of secondary column confirmation, blank and matrix spike outliers, surrogate outliers, laboratory duplicate results, and reference material recovery results. Data, as qualified by EcoChem, are considered usable.

2.3 Data Useability

2.3.1 Fully Validated Data

The following data sets have been validated by an independent party and are considered usable, as qualified:

- 1994 GAS Sediment Collection
- 1994 Woodward-Clyde Deposit A Sediment Samples
- 1995 WDNR Sediment Data Collection
- 1996 USFWS Fish Tissue Data Collection
- 1996 WDNR Fish Tissue Data Collection
- 1998 Demonstration Project Data - Segment 56/57
- 1998 ThermoRetec RI/FS Supplemental Data Collection
- 1996 BBL Sediment/Tissue Data Collection
- 1998 Demonstration Project Data - Deposit N

Although the data sets (listed above) were found to be validated and usable, it must be stressed that there were individual data points that were rejected. These rejected data points have not been used in the RI/FS or RA.

2.3.2 Supporting Data

The following data sets have not been validated and, in general, should be used only as supporting data. The data have been collected within different programs and with different data quality objectives; therefore, varying degrees of supporting documentation may be available. This documentation might allow a data set to be validated.

- 1989/90 Green Bay/Fox River Mass Balance Study (GLNPO)
- 1993 Triad Assessment
- 1993-1996 Tree Swallow Data Collection
- 1994-1995 Cormorant Data Collection
- 1997 USFWS NRDA Waterfowl Tissue Data Collection
- 1997 WDNR Caged Fish Bioaccumulation Study Data
- Fox River Fish Contaminant Study Data
- Stromberg Eagle Data Collection
- USGS NAWQA Data
- WDNR Fowl and Mammal Tissue Data
- WPDES Permit Influent Data
- Lake Michigan Tributary Monitoring Data

2.3.2 Indeterminate

The quality and usability of the following data sets has not been determined at this time:

- 1992/93 BBL Deposit A Sediment Data Collection
- Fox River Background - WDNR Watershed Management Program

3 Analytical and Archive Databases

Electronic data have undergone reduction and standardization and currently reside in both an interim database (designed for the internal support of the ongoing RA and RI/FS processes) and a Fox River Database (FRDB). The interim database has been maintained for internal data support throughout the duration of the RA/RI/FS process.

The development of the FRDB required the data management and manipulation of the source data as described previously. Data were acquired prior to design and development of an appropriate and complete underlying data structure. An outline of the data structure is included in Appendix A.

The FRDB, designed in Microsoft Access, includes available environmental analytical data as well as capacity to store bibliographical information concerning available reports, research studies, and other documents compiled on the Lower Fox River. The basic structure of the database includes several tables that store the actual data and bibliographical information along with several other "lookup" tables (Appendix B) and indices that will allow flexibility in searching for information included in the database. The basic table structure and relationships are depicted in Appendix C. A summary of each table's function within the database is described as follows:

- **Analytical Table.** This table stores all of the analytical information including fields such as analyte, result, qualifier, etc. This is the core of the analytical data processed and validated by EcoChem. Searches of the database can run on several of the fields contained in this table. This table has relationships with the Analysis Type and Qualifier Lookup tables.
- **Data Dictionary Table.** This table contains definitions of the fields used in the FRDB.
- **DataSet Table.** This table, along with the QA Status Lookup table listed below, is used to store information regarding the quality assurance or validation level of each of the overall data sets that encompass a sample grouping. A relationship exists with the Document Archive table that enables reference to a document that exclusively describes a data set.

- **Document Archive Table.** This table contains document and bibliographical information related to Fox River sample data. This table includes information such as the main author's name, additional author names, year of publication or release, subject, title, publication type, keywords and, when available, an abstract of the document and/or a hyperlink to online or electronic copies of the document and associated analytical data. Complete bibliographies from several sources (some not directly related to this project) have been added to this table creating a reference library of over 2,000 sources.
- **Sample Attribute Table.** Information regarding each unique sample is stored in this table. This table has relationships with DataSet and Analytical tables, in addition to six Lookup tables. The Deposit, Location, Matrix, Sample Area, Sample Type, and Species Lookup tables enable fast and efficient searches of sample attributes.
- **Analysis Type Lookup Table.** This table contains the key data on the type of each analyte in the Analytical table.
- **Deposit Lookup Table.** This table contains the key data on the named deposit from which a sample was extracted, if a deposit exists for a particular sample.
- **Location Lookup Table.** This table contains the key data on the general location of a sample's origin.
- **Matrix Lookup Table.** This table holds the key data for the matrix type of each sample.
- **QA Status Lookup Table.** The key data on the quality assurance level of each data set contained in the DataSet table is stored in this table.
- **Qualifier Lookup Table.** This table holds key data on the data qualifier assigned to each analyte in the Analytical table.
- **Sample Area Lookup Table.** This table contains the key data on more specific locations for sample origins than the Location table.
- **Sample Type Lookup Table.** This table contains key data on the type or form of each sample that is more specific than that contained in the Matrix table.

- **Species Lookup Table.** This table contains key data on the common or specific name for a sample and the risk pathway that the sample is associated with. For example, a sample originating from the fish carp is listed under benthic fish for an ecological risk pathway and under food fish for an human health risk pathway.

The FRDB has been customized to include various user interfaces and search capabilities that enable access to the stored data by those who are not familiar with retrieving data from a database application. Help capability and integral database definitions are included.

Finally, the FRDB is designed with a basic relational structure that will allow data addition in the future as well as the easy migration of the data to other relational database systems. Instructions for importing additional data are included in Appendix D.

APPENDIX A
OUTLINE OF DATA STRUCTURE

TABLE	FOX RIVER DB FIELD	ECOCEM FIELD	DATA TYPE	LENGTH	INDEX
<u>DATASET TABLE</u>	DataSet_ID	Primary key	autonumber	---	yes, no dups
	DataSet	DATASET	text	50	yes, no dups
	Description	to be added	text	100	
	QA_Status_ID	foreign key from QA STATUS lookup	long integer	---	yes
	Validator	VALIDATOR	text	20	yes
<u>QA STATUS LOOKUP</u>	QA_Status_ID	Primary key	autonumber	---	yes, no dups
	QA_Status	QASTATUS	text	15	yes, no dups
	Description	to be added	text	100	
<u>SAMPLE ATTRIBUTE TABLE</u>	SampleAttribute_ID	Primary key	autonumber	---	yes, no dups
	Sample_ID	SAMPID	text	30	yes
	DataSet_ID	foreign key from DATASET table	long integer	---	yes
	Location_ID	foreign key from LOCATION table	long integer	---	yes
	Deposit_ID	foreign key from DEPOSIT table	long integer	---	yes
	SampleArea_ID	foreign key from SAMPLEAREA table	long integer	---	yes
	BlindID	BLIND_ID	text	12	
	Depth	DEPTH	text	14	
	StartDepth	DEPTHFROM	text	10	yes
	EndDepth	DEPTHTO	text	10	yes
	DepthUnits	DEPTHUNITS	text	5	
	CoreGrab	CORE_GRAB	text	20	yes
	Northing	NORTHING	text	15	yes
	Easting	EASTING	text	15	yes
	County	COUNTY	text	20	yes
	SampleDate	SAMPDATE	text	10	yes
	SampledBy	SAMPLER	text	10	yes
	CollectionCompany	COMPANY	text	30	yes
	DateLabReceived	DATE_RCV	text	10	
	DateLabExtracted	DATE_EXT	text	10	
	Matrix_ID	foreign key from MATRIX lookup	long integer	---	yes
	SampleType_ID	foreign key from SAMPLE TYPE lookup	long integer	---	yes
	Species_ID	foreign key from SPECIES lookup	long integer	---	yes
DBTimeStamp	TIMESTAMP	date/time	---		
<u>SAMPLEAREA LOOKUP</u>	SampleArea_ID	Primary key	autonumber	---	yes, no dups
	SampleArea	LOC_DESC	text	100	yes, no dups
<u>LOCATION LOOKUP</u>	Location_ID	Primary key	autonumber	---	yes, no dups
	Location	LOCATION	text	50	yes, no dups
	Description	to be added	text	100	
<u>DEPOSIT LOOKUP</u>	Deposit_ID	Primary key	autonumber	---	yes, no dups
	Deposit	DEPOSIT	text	15	yes, no dups
	Description	to be added	text	100	
<u>MATRIX LOOKUP</u>	Matrix_ID	Primary key	autonumber	---	yes, no dups
	Matrix	MEDIA	text	25	yes, no dups
	Description	to be added	text	50	
<u>SAMPLE TYPE LOOKUP</u>	SampleType_ID	Primary key	autonumber	---	yes, no dups
	SampleType	SAMPLETYPE	text	30	yes, no dups
	Description	to be added	text	50	
<u>SPECIES LOOKUP</u>	Species_ID	Primary key	autonumber	---	yes
	CommonName	SPECIES	text	30	yes, no dups
	EcoRisk	GROUP	text	20	same index
	HHRisk	GROUP2	text	20	same index
	Species	TRUESPECIES	text	20	

TABLE	FOX RIVER DB FIELD	ECOCEM FIELD	DATA TYPE	LENGTH	INDEX
<u>ANALYTICAL TABLE</u>	Analytical_ID	Primary key	autonumber	---	yes
	SampleAttribute_ID	foreign key from SAMPLE ATTRIBUTE table	text	30	yes
	Analyte	ANALYTE	text	50	yes
	Result	RESULT	text	15	yes
	Qualifier	foreign key from QUALIFIER lookup	text	6	yes
	Units	UNITS	text	15	
	AnalysisType_ID	foreign key from ANALYSIS TYPE table	long integer	---	yes
	ReportingBasis	BASIS	text	20	
	SDG	SDG	text	10	
	DetectionLimit	DETLIMIT	text	15	
	Aliquot	ALIQOT	text	10	
	Method	METHOD	text	20	yes
	LabID	LABID	text	15	
	AnalyteOld	ANALYTEOLD	text	50	
	ResultOld	RESULTOLD	text	50	
	QualifierOld	QUALOLD	text	6	
	Comments	COMMENT	text	110	
	Lab	LAB	text	20	yes
	ImportFile	IMPORTFILE	text	15	
	Source	SOURCE	text	100	yes
	<u>QUALIFIER LOOKUP</u>	Qualifier	QUAL (primary key)	text	6
Description		to be added	text	50	
<u>DOCUMENT ARCHIVE</u>	Document_ID	Primary key	autonumber	---	yes, no dups
	DataSet_ID	foreign key from DATASET table	long integer	---	yes, no dups
	Author		text	200	
	Year		text	4	
	Title		text	255	
	SecondaryTitle		text	150	
	Journal		text	75	
	Volume		text	3	
	Issue		text	10	
	Pages		text	10	
	AlternateJournal		text	75	
	CallNumber		text	25	
	Label		text	20	
	Keywords		text	225	
	Abstract		memo	---	
	Notes		text	40	
	City		text	20	
	Institution		text	75	
	Date		text	20	
	Publisher		text	50	
	SeriesEditor		text	35	
	SeriesTitle		text	100	
	Edition		text	5	
	Newspaper		text	75	
	ConferenceLocation		text	50	
	ConferenceYear		text	4	
	ConferenceName		text	50	
	AcedemicDepartment		text	50	
	University		text	30	
	Programmer		text	40	
	Cartographer		text	40	
Scale		text	20		
AccessYear		text	4		
AccessDate		text	25		
<u>ANALYSIS TYPE LOOKUP</u>	AnalysisType_ID	Primary key	autonumber	---	yes, no dups
	AnalysisType	METHODTYPE	text	15	yes, no dups

TABLE	FOX RIVER DB FIELD	ECOCEM FIELD	DATA TYPE	LENGTH	INDEX
<u>DATA DICTIONARY</u>	Field	Primary key	text	30	yes, no dups
	Description	to be added	text	150	

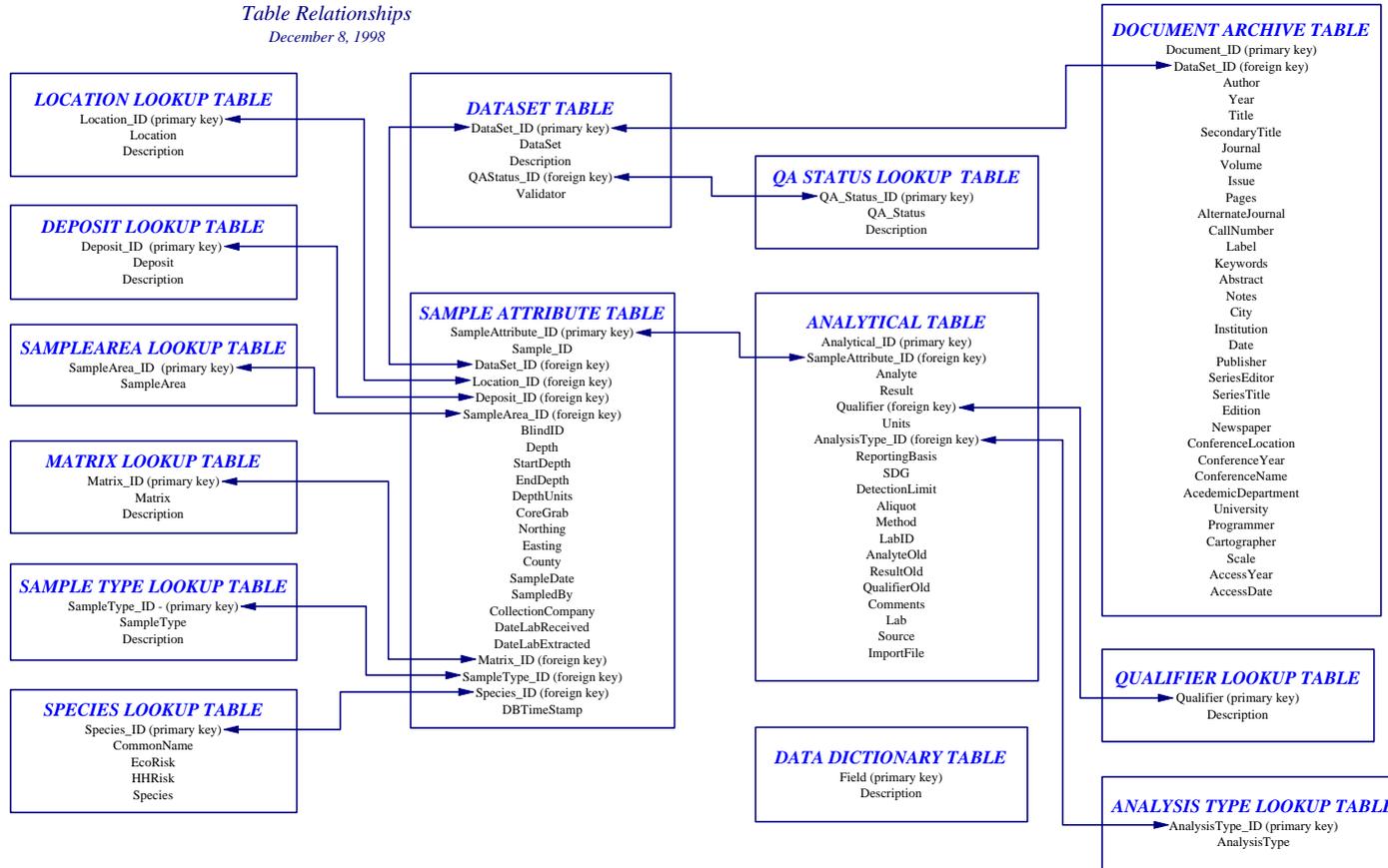
**APPENDIX B
LOOKUP TABLES**

LOCAL LOOKUP TABLES AND QUERIES FOR FOX RIVER DATABASE FORMS.mdb FILE (TABLE 1)

Table name	Query to populate the table	Forms using the table
tblLookup_CriteriaForLists	None – static table (DO NOT ALTER)	frmDataList
tblLookup_FieldsForLists	None – static table (DO NOT ALTER)	frmDataList
tblLookup_SortFieldsForSearches	None – static table (DO NOT ALTER)	frmDataSearch
tblLookup_Unique_AnalysisType	Append tblLookup_Unique_AnalysisType	frmDataList
tblLookup_Unique_Analyte	Append tblLookup_Unique_Analyte	frmDataList, frmDataSearch, frmStatistic
tblLookup_Unique_CollectionCompany	Append tblLookup_Unique_CollectionCompany	frmDataList
tblLookup_Unique_CommonName	Append tblLookup_Unique_CommonName	frmDataList
tblLookup_Unique_CoreGrab	Append tblLookup_Unique_CoreGrab	frmDataList
tblLookup_Unique_County	Append tblLookup_Unique_County	frmDataList
tblLookup_Unique_DataSet	Append tblLookup_Unique_DataSet	frmDataSearch
tblLookup_Unique_Deposit	Append tblLookup_Unique_Deposit	frmDataList
tblLookup_Unique_EcoRisk	Append tblLookup_Unique_EcoRisk	frmDataList
tblLookup_Unique_EcoRiskAndCommonName	Append tblLookup_Unique_EcoRiskAndCommonName	frmDataSearch
tblLookup_Unique_HHRisk	Append tblLookup_Unique_HHRisk	frmDataList
tblLookup_Unique_HHRiskAndCommonName	Append tblLookup_Unique_HHRiskAndCommonName	frmDataSearch
tblLookup_Unique_Lab	Append tblLookup_Unique_Lab	frmDataList
tblLookup_Unique_Location	Append tblLookup_Unique_Location	frmDataList
tblLookup_Unique_LocationAndDeposit	Append tblLookup_Unique_LocationAndDeposit	frmDataSearch
tblLookup_Unique_Matrix	Append tblLookup_Unique_Matrix	frmDataList
tblLookup_Unique_MatrixAndSampleType	Append tblLookup_Unique_MatrixAndSampleType	frmDataSearch
tblLookup_Unique_Method	Append tblLookup_Unique_Method	frmDataList
tblLookup_Unique_QAStatus	Append tblLookup_Unique_QAStatus	frmDataList
tblLookup_Unique_Qualifier	Append tblLookup_Unique_Qualifier	frmDataSearch
tblLookup_Unique_SampledBy	Append tblLookup_Unique_SampledBy	frmDataList
tblLookup_Unique_SampleID	Append tblLookup_Unique_SampleID	frmDataList
tblLookup_Unique_SampleType	Append tblLookup_Unique_SampleType	frmDataList
tblLookup_Unique_Source	Append tblLookup_Unique_Source	frmDataList
tblLookup_Unique_StatisticsChoices	Append tblLookup_Unique_StatisticsChoices	frmStatistic
tblLookup_Unique_Validator	Append tblLookup_Unique_Validator	frmDataList

FOX RIVER DATABASE

Table Relationships
December 8, 1998



APPENDIX C
BASIC TABLE STRUCTURE AND RELATIONSHIPS

APPENDIX D
INSTRUCTIONS FOR IMPORTING ADDITIONAL DATA

I. IMPORTING DATA TO THE FOX RIVER DATABASE FOR THE FIRST TIME (empty database):

Steps for the FoxRiverData.mdb database file:

- 1) Import raw data to a new table called SAMPLES in the Fox River Data Tables database. Fields in this import table should be named as below (names in parentheses are the actual database field names). All fields should be of text data type except for TIMESTAMP, which should be of date/time type. TIMESTAMP should be left blank in the import file because the a date/time value is added when the data is entered into the database.

a.	SAMPID (Sample_ID)	y.	ALIQUOT (Aliquot)
b.	ANALYTE (Analyte)	z.	METHODTYPE
c.	RESULT (Result)		(AnalysisType)
d.	QUAL (Qualifier)	aa.	METHOD (Method)
e.	UNITS (Units)	bb.	BLIND_ID (BlindID)
f.	SAMPDATE (SampleDate)	cc.	SAMPLER (SampledBy)
g.	MEDIA (Matrix)	dd.	COMMENT (Comments)
h.	LABID (LabID)	ee.	DEPOSIT (Deposit)
i.	DATE_RCV	ff.	NORTHING (Northing)
	(DateLabReceived)	gg.	EASTING (Easting)
j.	DATE_EXT	hh.	GROUP (EcoRisk)
	(DateLabExtracted)	ii.	GROUP2 (HHRisk)
k.	DETLIMIT (DetectionLimit)	jj.	COREGRAB (CoreGrab)
l.	SDG (SDG)	kk.	ANALYTEOLD (AnalyteOld)
m.	IMPORTFILE (ImportFile)	ll.	LOC_DESC (SampleArea)
n.	SOURCE (Source)	mm.	SAMPLETYPE (SampleType)
o.	DATASET (DataSet)	nn.	COUNTY (County)
p.	LAB (Lab)	oo.	RESULTOLD (ResultOld)
q.	VALIDATOR (Validator)	pp.	QUALOLD (QualifierOld)
r.	QASTATUS (QA_Status)	qq.	TRUESPECIES (Species)
s.	LOCATION (Location)	rr.	COMPANY
t.	DEPTH (Depth)		(CollectionCompany)
u.	DEPTHFROM (StartDepth)	ss.	BASIS (ReportingBasis)
v.	DEPTHTO (EndDepth)	tt.	TIMESTAMP
w.	DEPTHUNITS (DepthUnits)		(DBTimeStamp)
x.	SPECIES (CommonName)		

- 1) Run qryTimeStamp_ImportFile to date/time stamp the entry of new samples into the database. This allows for easier importing of new samples in the future as well as keeping a record of when samples were first entered into the database.
- 2) Populate lookup tables by running the these queries in the exact order listed below:
 - a. qryPopulate_Unique_AnalysisType
 - b. qryPopulate_Unique_QAStatus
 - c. qryPopulate_Unique_DataSet
 - d. qryPopulate_Unique_Deposit
 - e. qryPopulate_Unique_Location
 - f. qryPopulate_Unique_Matrix
 - g. qryPopulate_Unique_Qualifier
 - h. qryPopulate_Unique_SampleArea
 - i. qryPopulate_Unique_SampleType

j. qryPopulate_Unique_Species

- 1) Run qryPopulate_Unique_SampleAttribute to populate tblSampleAttribute.
- 2) Run qryPopulate_Unique_Analytical to populate tblAnalytical.
- 3) Run qryPopulate_tblDocumentArchive_WithDataSets to populate DataSet_ID field in tblDocumentArchive with DataSet_IDs from tblDataSet.

Steps for the Fox River Database Forms.mdb database file:

- 1) Run the queries listed in Table 1 to populate the local lookup tables. The queries must be run in the order that they are listed in Table 1. The first three database tables listed in Table 1 are static tables and should never be altered.

II. SUBSEQUENT IMPORTING OF DATA TO THE FOX RIVER DATABASE (populated database):

- 1) To import additional data to the Fox River database after the database has been filled initially, follow the same steps as outlined above for entering data into the FoxRiverData.mdb file. The lookup tables have indexed fields to prevent entry of duplicate data. When the lookup queries are run and you are trying to enter duplicate data, Access will show an error message that some data will not be added due to key violations. Choose the option to run the query anyway, and only the new data will be added to the database.
- 2) After the new data has been added, you must change the lookup tables in the Fox River Database Forms.mdb file. Open the database lookup tables listed in Table 1, and delete all records in each table. After all data has been deleted from all lookup tables, run the Table 1 queries in the order listed to repopulate the lookup tables with the updated database data.
- 3) The updated Fox River Database Forms.mdb must then be distributed to all users. Replace the old copy of the file with the updated version.

III. POPULATING THE FOX RIVER WEB DATABASE FILE (FoxRiver Web DB.mdb):

- 1) For first time populating of data to the web database file (empty database), import the following tables from the respective Access database files created above:

FoxRiverData.mdb: tblAnalysisType
 tblAnalytical
 tblDataDictionary
 tblDataSet
 tblDeposit
 tblDocumentArchive
 tblLocation
 tblMatrix
 tblQA_Status
 tblQualifier
 tblSampleArea

tblSampleAttribute
tblSampleType
tblSpecies

Fox River Database Forms.mdb: tblLookup_CriteriaForLists
tblLookup_FieldsForLists
tblLookup_SortFieldsForSearches
tblLookup_Unique_AnalysisType
tblLookup_Unique_Analyte
tblLookup_Unique_CollectionCompany
tblLookup_Unique_CommonName
tblLookup_Unique_CoreGrab
tblLookup_Unique_County
tblLookup_Unique_DataSet
tblLookup_Unique_Deposit
tblLookup_Unique_EcoRisk
tblLookup_Unique_EcoRiskAndCommonName
tblLookup_Unique_HHRisk
tblLookup_Unique_HHRiskAndCommonName
tblLookup_Unique_Lab
tblLookup_Unique_Location
tblLookup_Unique_LocationAndDeposit
tblLookup_Unique_Matrix
tblLookup_Unique_MatrixAndSampleType
tblLookup_Unique_Method
tblLookup_Unique_QAStatus
tblLookup_Unique_Qualifier
tblLookup_Unique_SampledBy
tblLookup_Unique_SampleID
tblLookup_Unique_SampleType
tblLookup_Unique_Source
tblLookup_Unique_StatisticsChoices
tblLookup_Unique_Validator

- 2) When new data is imported into the Access database as above, you must repopulate the web database file to reflect the new data. To do this, delete all tables in the FoxRiver Web DB.mdb file except for the static tables listed below. After the tables have been deleted, compact the database file to clear the deleted tables file space. Then, import all tables as described in Step 1 above.

tblLookup_CriteriaForLists
tblLookup_FieldsForLists
tblLookup_SortFieldsForSearches