

RWQCB

**TOXIC SUBSTANCES MONITORING PROGRAM  
(TSMP)**

**FRESH WATER BIOACCUMULATION  
MONITORING PROGRAM**

**DATA BASE DESCRIPTION**

**Revised  
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## **DATA BASE DESCRIPTION**

### **TOXIC SUBSTANCES MONITORING PROGRAM (TSMP) FRESH WATER MONITORING PROGRAM Revised September 1995**

#### **I. INTENT**

The TSMP was initiated in 1976 by the California State Water Resources Control Board (State Water Board). The TSMP was organized to provide a uniform statewide approach to the detection and evaluation of the occurrence of toxic substances in fresh water and, to a limited extent, in estuarine and marine waters through the analysis of fish and other aquatic life.

A total of 10 trace elements (metals) and approximately 45 pesticides and PCBs (organic chemicals) are analyzed in the TSMP on a regular basis. Additional substances, such as polynuclear aromatic hydrocarbons (PAHs), are looked for on a request basis only. Over the years a large body of analytical information has been gathered and is available for review. While most users may prefer to review TSMP results in written form, those with personal computer (PC) and data base program experience may wish to access a copy of the TSMP data base directly.

The goal of this document is to provide interested parties with background information on the structure of the data base used to store and manage TSMP bioaccumulation results.

#### **II. OVERVIEW**

The TSMP is an annual monitoring program run in cooperation with the nine Regional Water Quality Control Boards (Regional Water Boards). The California Department of Fish and Game (DFG) carries out the statewide TSMP for the State Water Board by collecting and analyzing samples. The presence of toxic substances in fresh waters is determined by analyzing tissues from fish and other aquatic organisms. Concentrations of these substances in water are often too low or transitory to be reliably detected through the more traditional methods of analysis of water samples. Also, many toxic substances are not water soluble, but can be found associated with sediment or organic matter. Fish and other aquatic organisms are sampled because they bioaccumulate and bioconcentrate toxic substances to levels which may be many hundreds of times the levels actually in the water. This concentration factor facilitates detection of toxic pollutants.

The TSMP is a sentinel program; it provides the State Water Board, other agencies, and the public with an early warning of higher than expected concentrations of pollutants at specific sites. TSMP findings often lead to more intensive local follow-up studies for identifying sources of pollutants, and to cleanup and abatement orders and enforcement actions by the Regional Water Boards.

Tissue concentrations of trace elements are reported in parts per million (ppm), while concentrations of organic chemicals are reported in parts per billion (ppb). Results are determined on a wet weight basis. These values are mathematically converted to concentrations in lipid weight bases using percent moisture and percent lipid values determined for each sample. Lipid weight results are calculated only for fish samples analyzed for organic chemicals since these substances tend to accumulate more readily in fatty tissues than trace elements.

Composite samples, using six fish of each species, are collected whenever possible. The number and size uniformity of the fish in each composite depends upon their availability. Replicate composites are collected and analyzed to measure the variability of toxicant concentrations in single species composites collected at the same time and place. Collection of the same species from all stations is desirable to minimize possible variation in the data due to differences in pollutant uptake between species. However, this is not possible over the entire State due to the variety of habitat sampled and limited collection time available in the program. All reasonable efforts are made to maintain both station-to-station and year-to-year uniformity in collections.

### III. DESCRIPTION OF THE DATA BASE AND COMPUTER FILES

The TSMP data base is presently maintained using the commercial PC software R:Base (current version: R:Base 4.0). R:Base maintains the contents and supplemental information of a data base in three PC files. File names for each data base file set have the form: "\_\_\_\_\_1.rbf", "\_\_\_\_\_2.rbf", or "\_\_\_\_\_3.rbf" ("\_\_\_\_\_" stands for an exclusive name given the data base; e.g. "TSM"). The second data base file ("\_\_\_\_\_2.rbf") contains all of the actual alpha-numeric information for the data base, and can grow quite large.

As structured by R:Base, each data base contains individual "tables" made up of columns (variables) and rows (cases) for organizing and displaying stored information. In the PC software dBASE data base tables would occupy linked but separate PC files. In R:Base, all tables in a data base are stored in a single, large file. TSMP data base columns are repeated in various tables to organize results and for ease of data comparison. The primary data base tables containing bioaccumulation results and important supplementary information are listed in Table 1. Column variables in each primary data table are listed in Tables 2 to 4.

The "TSM" data base contains the trace element (metals) results in **MET\_WET** (Table 2) and organic chemical results in **ORG\_WET**, **LIP\_FISH**, and **ORG\_DRY** tables (Table 3). Polynuclear aromatic hydrocarbon (PAHs) results are contained in **PAH\_W** (wet weight) and **PAH\_L** (lipid weight) tables (Table 4). Supplementary information tables **BIODAT**, **STALOC**, **YEARTABL** and are also presented (Table 5).

### IV. COLUMNS (VARIABLES) IN THE DATA BASES

Column names and descriptions for the primary data base tables are listed in Tables 2 through 4. The type of R:Base variable (column name) is categorized as either **TEXT** (alpha-numeric characters, including spaces), **REAL** (decimal equivalents of real numbers only; the program may round off values), **INTEGER** (integers only), or **DATE** (e.g., 12/27/86 for December 27, 1986). The length for **TEXT** variables is the maximum number of characters allowed for the variable in the assigned field. **REAL** variables are automatically assigned a field length of 8; **INTEGER** variables a length of 10; **DATE** variables a length of 8.

## Column Descriptions

The following column variables are used to list supplementary information about each sample. Variables marked with an "\*" are found in all data base tables containing analytical results.

- \* 1. **AGE** - The approximate age in years is estimated for each fish sample when possible.
- \* 2. **BOT** (Bottle Number) - Each individual sample is given a unique six digit bottle number followed by a tissue identifier and the year sampled. For example, Bottle Number **013.010.F.91** represents the Sacramento River/Hood station (013.), sample number 010., filet tissue was analyzed (F.), and was collected in 1991 (91). Starting in 1988, Bottle Numbers were standardized like the example above. Bottle Numbers prior to 1988 were converted to the new format and listed in the column **NEWBOT**. In the table **BIODATS**, Bottle Number is truncated to **BIOBOT** to indicate that all tissues analyzed for each sample are combined.
- \* 3. **CDATE** (Date Sample Collected) - The date that each sample was collected in the field is listed as month, day, and year (MM/DD/YY).
4. **COUNTY** - The California county where the station is located is listed.
- \* 5. **GENUS, SPECIES, COMMON** - Scientific, as well as common names, are provided for fish and other aquatic organisms. Fish names were obtained from Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1991. Common and Scientific Names of Fishes from the United States and Canada. American Fisheries Society Special Publication 20, Bethesda, Maryland.
6. **LATITUDE, LONGITUDE** - The latitude and longitude of each station is listed. Latitude and longitude columns are computed columns from **LATDEG - LATMIN - LATSEC** and **LONGDEG - LONGMIN - LONGSEC**, respectively (see Table 5).
- \* 7. **LENGTH** - Length measurements are in millimeters (mm). Fork length is measured for fish while total length is measured for all other organisms. Measurements are either individual or mean values as indicated by sample number (**NUMBER**).
- \* 8. **NUMBER** - This is the number of individual organisms per sample. Composite samples are collected whenever possible. The number and size uniformity of the organisms in each composite depends upon their availability.
9. **PLIPID** (Percent of Lipid [Fat] Materials in Sample Tissues) - For samples analyzed for organic chemicals, the percent of lipid in the sample is listed (**PLIPID** values before 1980 are not recorded in the data base). This value is used to calculate organic chemical tissue concentrations on a lipid weight basis, using the formula in Table 7. **PLIPF, PLIPW**, and **PLIPO** in the table **BIODATS** are the same as **PLIPID** only listed by tissue type (ie. F = Filet, W = Whole, O = Ova).

- \* 10. **PWATER** (Percent Moisture in Samples) - The percent of moisture in samples analyzed for trace elements or organic chemicals is listed. **PWATF**, **PWATL**, **PWATW**, and **PWATO** in the table **BIODATS** are the same as **PWATER** only listed by tissue type (ie. F = Filet, L = Liver, W = Whole, and O = Ova). If a sample is analyzed for both metals and organic substances, the default is to list the organic chemical Percent Moisture in **BIODATS**.
- \* 11. **SPECTYPE** (Species Type) - Fish samples are identified as either fresh water fish (**FF**) or marine fish (**MF**). Fresh water fish include estuarine fish species. Other codes are used for non-fish samples (see Table 6).
- 12. **STADESC** - (Station Description) The location of each station is described based on local landmarks.
- \* 14. **STANAME** (Sample Station Name) - Each station site is given a unique station name, usually based on a local landmark. Each Station Name is exclusively assigned to only one Station Number. The "/" found in many Station Names means "at" or "near" while "d/s" or "u/s" means downstream or upstream, respectively. For example, Beaughton Creek/d/s Highway 97 Bridge refers to a station on Beaughton Creek. Samples were collected starting at the Highway 97 Bridge that crosses the creek and continuing downstream a specified distance identified in **STADESC**.
- \* 15. **STANUM** (Sample Station Number) - Each TSMP station is identified by a unique seven digit number derived from the State Water Board's hydrologic basin planning maps. The first digit of a station number signifies one of the nine Regional Water Boards. The second and third digits represent a hydrologic area, while the fourth and fifth digits identify a hydrologic subarea. The sixth and seventh digits represent the distance in miles above the downstream hydrologic boundary. For example, station 519.21.01 is in Region 5, hydrologic area 19, subarea 21, and is one mile upstream from the hydrologic unit boundary. Not all mileage indicators are accurate, however. In certain instances, it was necessary to assign an arbitrary mileage indicator. For example, the arbitrary designation is used when two or more stations within the same hydrologic subarea are located within the same number of miles of the hydrologic boundary, resulting in the same station number. In this case, one or more of the stations is arbitrarily assigned a mileage designator from 90 to 99.
- \* 16. **TISSUE** - (**F** = Filet, **L** = Liver, **W** = Whole Body, and **O** = Ova). Prior to 1993, all trace elements, except mercury and selenium, were routinely analyzed in liver tissue (selenium analysis in liver was discontinued starting in 1985). Starting in 1993, arsenic, cadmium, nickel, mercury, and selenium are analyzed in muscle tissue (filet) while silver, chromium, copper, lead, and zinc are analyzed in liver tissue. All organic chemicals are analyzed in muscle tissue (filet). When only very small fish are available, metal and/or organic chemical analysis is performed on a whole body composite of larger than usual numbers of individual fish. Ova or fish eggs are only analyzed upon special request.
- 17. **USGS\_MAP** - The USGS 7.5' map for each station is listed. If a 7.5' map is not available the appropriate 15' map is listed.
- \* 18. **WEIGHT** - Weight measurements are in grams (g). Measurements are either individual or mean values as indicated by sample number (**NUMBER**).

19. **YEAR\_78 - YEAR\_94** - Station sampling history by year. "TM" means trace elements (metals) were analyzed, "TO" means trace organic chemicals were analyzed, and "TOTM" means both trace elements and trace organics were analyzed. "ns" means the station was not sampled that year.

### Additional Information on Analytical Variables

Analytical variables are listed in Tables 2 to 4. When a trace element or organic chemical is not detected the detection limit is specified in the data column for each metal and organic substance. For example, the detection limit for dieldrin is 5 ppb and is indicated in the data base as -5. The following special negative numbers are also used as entries for analytical results under the following special circumstances:

-99.0 = **Not Detected** - Used for total organic chemical columns (**ORG\_WET** and **ORG\_DRY**), such as Total DDT which does not have a detection limit. Also used in the lipid weight data columns (**LIP\_FISH**) since there are no lipid weight detection limits for lipid weight values.

-888.0 = **Not Analyzed** - An analysis or measurement was not performed.

The following analytical variables are totals and are defined here:

#### Chemical Group A

**CMGPA** = ALDRN + DIELD + ENDRN + HEP + HEPOX + TOTCL + THCH + TENDO + TOXAP

#### Total of DDT Substances:

**DDI** = DDDOP + DDDPP + DDEOP + DDEPP + DDMSPP + DDMUPP + DDTOP + DDTPP

#### Total of Endosulfan Substances:

**IENDO** = ENDO1 + ENDO2 + ENDOS

#### Total Hexachlorocyclohexane:

**IHCH** = HCHA + HCHB + HCHD + HCHG

#### Total of Chlordane Substances:

**IQICL** = ACDEN + GCDEN + CCDAN + TCDAN + CNONA + OCDAN + TNONA

#### Total of PCB Arochlor Compounds:

**IPCB** = PCB48 + PCB54 + PCB60 (sum of PCB arochlor concentrations)

Totals are calculated as follows:

1. If one or more compounds that make up a total are present at a level above the detection limit, regardless if any of the other compounds for that total are analyzed or not, the total is the individual detected value or the some of the detected values.
2. If any of the compounds that make up a total are reported as less than the detection limit, the total is reported as -99 even if the rest of the compounds are not analyzed.
3. For the total to be not analyzed (-888), all of the compounds that make up that total must be reported as not analyzed (-888).

Trace element and organic chemical variable names for wet weight concentrations are distinguished by the suffice "**\_W**". Lipid weight variable names are distinguished by the suffice "**\_L**". Sediment and soil samples are analyzed dry weight and metal and organic chemical results are distinguished by the suffice "**\_D**".



**TABLE 1. Data Tables in the Data Base TSM:**

**Primary Data Tables**

<u>Table</u>	<u>Contents</u>
MET_WET	trace element data for aquatic organisms (ppm, wet weight)
ORG_WET	organic chemical data for aquatic organisms (ppb, wet weight)
LIP_FISH	organic chemical lipid data for fish only (ppb, lipid weight)
ORG_DRY	organic chemical data for sediment (ppb, dry weight)
PAH_W*	polynuclear aromatic hydrocarbons (PAHs) data (ppb, wet weight)
PAH_L*	polynuclear aromatic hydrocarbons (PAHs) data (ppb, lipid weight)

**Supplementary Information Tables**

<u>Table</u>	<u>Contents</u>
BIODATS	MET_WET and ORG_WET sample information (length, weight, etc.) combined per sample.
STALOC	station location information (lat-long, etc.).
YEARTABL	station sampling history.

\* Analyzed only upon request. PAHs have not been detected as of 1994.

**TABLE 2. Contents of Trace Element Table in TSM Data Base.**

Table: MET\_WET (wet weight trace element tissue concentrations)

#	Column Name	Type	Length	Contents
1.	STANUM	TEXT	11 char	sample station number
2.	STANAME	TEXT	40 char	sample station name
3.	CDATE	DATE	8 char	date of collection
4.	BOT	TEXT	15 char	unique sample identifier
5.	GENUS	TEXT	17 char	sample genus name
6.	SPECIES	TEXT	20 char	sample species name
7.	COMMON	TEXT	25 char	sample common name
8.	SPECTYPE	TEXT	2 char	type of sample
9.	NUMBER	TEXT	5 char	number of individuals/sample
10.	AGE	TEXT	5 char	estimated age of fish in years
11.	WEIGHT	REAL	8 char	measurements are in grams (g)
12.	LENGTH	REAL	8 char	measurements are in millimeters (mm)
13.	TISSUE	TEXT	3 char	sample tissue type
14.	PWATER	REAL	8 char	percent moisture
15.	AG_W	REAL	8 char	silver (ppm)
16.	AS_W	REAL	8 char	arsenic (ppm)
17.	CD_W	REAL	8 char	cadmium (ppm)
18.	CR_W	REAL	8 char	chromium (ppm)
19.	CU_W	REAL	8 char	copper (ppm)
20.	HG_W	REAL	8 char	mercury (ppm)
21.	NI_W	REAL	8 char	nickel (ppm)
22.	PB_W	REAL	8 char	lead (ppm)
23.	SE_W	REAL	8 char	selenium (ppm)
24.	ZN_W	REAL	8 char	zinc (ppm)

**TABLE 3. Contents of Organic Chemical Tables in TSM Data Base.**

Tables: ORG\_WET, LIP\_FISH, ORG\_DRY (wet and lipid weight organic chemical tissue concentrations and dry weight sediment concentrations)

#	ORG_WET	LIP_FISH	ORG_DRY	Type	Length	Contents
	Column Name	Column Name	Column Name			
1.	STANUM	STANUM	STANUM	TEXT	11 char	sample station number
2.	STANAME	STANAME	STANAME	TEXT	40 char	sample station name
3.	CDATE	CDATE	CDATE	DATE	8 char	date of collection
4.	BOT	BOT	BOT	TEXT	15 char	unique sample identifier
5.	GENUS	GENUS	NA	TEXT	17 char	sample genus name
6.	SPECIES	SPECIES	NA	TEXT	20 char	sample species name
7.	COMMON	COMMON	NA	TEXT	25 char	sample common name
8.	SPECTYPE	SPECTYPE	NA	TEXT	2 char	type of sample
9.	NUMBER	NUMBER	NA	TEXT	5 char	number of individuals/sample
10.	AGE	AGE	NA	TEXT	5 char	estimated age of fish in years
11.	WEIGHT	WEIGHT	NA	REAL	8 char	measurements are in grams (g)
12.	LENGTH	LENGTH	NA	REAL	8 char	measurements are in millimeters (mm)
13.	TISSUE	TISSUE	NA	TEXT	3 char	sample tissue type
14.	PWATER	PWATER	PWATER	REAL	8 char	percent moisture
15.	PLIPID	PLIPID	NA	REAL	8 char	percent lipid
16.	ALDRN_W	ALDRN_L	ALDRN_D	REAL	8 char	aldrin
17.	ACDEN_W	ACDEN_L	ACDEN_D	REAL	8 char	alpha-chlordene
18.	CCDAN_W	CCDAN_L	CCDAN_D	REAL	8 char	cis-chlordane
19.	GCDEN_W	GCDEN_L	GCDEN_D	REAL	8 char	gamma-chlordene
20.	TCDAN_W	TCDAN_L	TCDAN_D	REAL	8 char	trans-chlordane
21.	CNONA_W	CNONA_L	CNONA_D	REAL	8 char	cis-nonachlor
22.	TNONA_W	TNONA_L	TNONA_D	REAL	8 char	trans-nonachlor
23.	OCDAN_W	OCDAN_L	OCDAN_D	REAL	8 char	oxychlordane
24.	TOTCL_W	TOTCL_L	TOTCL_D	REAL	8 char	total chlordane
25.	CLPYR_W	CLPYR_L	CLPYR_D	REAL	8 char	chlorpyrifos
26.	DACTH_W	DACTH_L	DACTH_D	REAL	8 char	dacthal
27.	DDDOP_W	DDDOP_L	DDDOP_D	REAL	8 char	o,p'-DDD
28.	DDDPP_W	DDDPP_L	DDDPP_D	REAL	8 char	p,p'-DDD
29.	DDEOP_W	DDEOP_L	DDEOP_D	REAL	8 char	o,p'-DDE
30.	DDEPP_W	DDEPP_L	DDEPP_D	REAL	8 char	p,p'-DDE
31.	DDTOP_W	DDTOP_L	DDTOP_D	REAL	8 char	o,p'-DDT
32.	DDTPP_W	DDTPP_L	DDTPP_D	REAL	8 char	p,p'-DDT
33.	DDMUPP_W	DDMUPP_L	DDMUPP_D	REAL	8 char	p,p'-DDMU
34.	DDMSPP_W	DDMSPP_L	DDMSPP_D	REAL	8 char	p,p'-DDMS
35.	TDDT_W	TDDT_L	TDDT_D	REAL	8 char	total DDT

NA = Not Applicable.

(continued on next page)

**TABLE 3 (continued).** Contents of Organic Chemical Tables in TSM Data Base.

Tables: ORG\_WET, LIP\_FISH, ORG\_DRY (wet and lipid weight organic chemical tissue concentrations and dry weight sediment concentrations)

#	ORG_WET	LIP_FISH	ORG_DRY	Type	Length	Contents
	Column Name	Column Name	Column Name			
36.	DIAZN_W	DIAZN_L	DIAZN_D	REAL	8 char	diazinon
37.	DICOF_W	DICOF_L	DICOF_D	REAL	8 char	dicofol
38.	DBP_W	DBP_L	DBP_D	REAL	8 char	dichlorobenzophenone-p,p'
39.	DIELD_W	DIELD_L	DIELD_D	REAL	8 char	dieldrin
40.	ENDO1_W	ENDO1_L	ENDO1_D	REAL	8 char	endosulfan I
41.	ENDO2_W	ENDO2_L	ENDO2_D	REAL	8 char	endosulfan II
42.	ENDOS_W	ENDOS_L	ENDOS_D	REAL	8 char	endosulfan sulfate
43.	TENDO_W	TENDO_L	TENDO_D	REAL	8 char	total endosulfan
44.	ENDRN_W	ENDRN_L	ENDRN_D	REAL	8 char	endrin
45.	ETHIO_W	ETHIO_L	ETHIO_D	REAL	8 CHAR	ethion
46.	HCHA_W	HCHA_L	HCHA_D	REAL	8 char	alpha HCH
47.	HCHB_W	HCHB_L	HCHB_D	REAL	8 char	beta HCH
48.	HCHD_W	HCHD_L	HCHD_D	REAL	8 char	delta HCH
49.	HCHG_W	HCHG_L	HCHG_D	REAL	8 char	gamma HCH
50.	THCH_W	THCH_L	THCH_D	REAL	8 char	total HCH
51.	HEP_W	HEP_L	HEP_D	REAL	8 char	heptachlor
52.	HEPOX_W	HEPOX_L	HEPOX_D	REAL	8 char	heptachlor epoxide
53.	HCB_W	HCB_L	HCB_D	REAL	8 char	hexachlorobenzene
54.	EPARA_W	EPARA_L	EPARA_D	REAL	8 char	ethyl parathion
55.	MPARA_W	MPARA_L	MPARA_D	REAL	8 char	methyl parathion
56.	MTHOX_W	MTHOX_L	MTHOX_D	REAL	8 char	methoxychlor
57.	PCB48_W	PCB48_L	PCB48_D	REAL	8 char	PCB arochlor 1248
58.	PCB54_W	PCB54_L	PCB54_D	REAL	8 char	PCB arochlor 1254
59.	PCB60_W	PCB60_L	PCB60_D	REAL	8 char	PCB arochlor 1260
60.	TPCB_W	TPCB_L	TPCB_D	REAL	8 char	total PCB
61.	PCP_W	PCP_L	NA	REAL	8 char	pentachlorophenol*
62.	TCP_W	TCP_L	NA	REAL	8 char	2,3,5,6 tetrachlorophenol*
63.	TOXAP_W	TOXAP_L	TOXAP_D	REAL	8 char	toxaphene
64.	OXADI_W	OXADI_L	OXADI_D	REAL	8 char	oxadiazon
65.	CMGPA_W	CMGPA_L	NA	REAL	8 char	chemical group A

NA = Not Applicable.

\* Analyzed only upon request.

**TABLE 4. Contents of PAH Tables in TSM Data Base.**

Tables: PAH\_W, PAH\_L (wet and lipid weight polynuclear aromatic hydrocarbon tissue concentrations)

#	PAH_W Column Name	PAH_L Column Name	Type	Length	Contents
1.	STANUM	STANUM	TEXT	11 char	sample station number
2.	STANAME	STANAME	TEXT	40 char	sample station name
3.	CDATE	CDATE	DATE	8 char	date of collection
4.	BOT	BOT	TEXT	15 char	unique sample identifier
5.	GENUS	GENUS	TEXT	17 char	sample genus name
6.	SPECIES	SPECIES	TEXT	20 char	sample species name
7.	COMMON	COMMON	TEXT	25 char	sample common name
8.	SPECTYPE	SPECTYPE	TEXT	2 char	type of sample
9.	NUMBER	NUMBER	TEXT	5 char	number of individuals/sample
10.	AGE	AGE	TEXT	5 char	estimated age of fish in years
11.	WEIGHT	WEIGHT	REAL	8 char	measurements are in grams (g)
12.	LENGTH	LENGTH	REAL	8 char	measurements are in millimeters (mm)
13.	TISSUE	TISSUE	TEXT	3 char	sample tissue type
14.	PWATER	PWATER	REAL	8 char	percent moisture
15.	PLIPID	PLIPID	REAL	8 char	percent lipid
16.	TPAH_W	TPAH_L	REAL	8 char	total PAHs
17.	ANTH_W	ANTH_L	REAL	8 char	anathracene
18.	ANTHA_W	ANTHA_L	REAL	8 char	benzo [a] anathracene
19.	ANTHAH_W	ANTHAH_L	REAL	8 char	dibenz [a,h] anthracene
20.	BIPHEN_W	BIPHEN_L	REAL	8 char	biphenyl
21.	CHRYSN_W	CHRYSN_L	REAL	8 char	chrysene
22.	FLRA_W	FLRA_L	REAL	8 char	fluoranthene
23.	FLRABB_W	FLRABB_L	REAL	8 char	benzo [b] fluoranthene
24.	FLRABK_W	FLRABK_L	REAL	8 char	benzo [k] fluoranthene
25.	FLUORE_W	FLUORE_L	REAL	8 char	fluorene
26.	NAP_W	NAP_L	REAL	8 char	naphthalene
27.	NAP1_W	NAP1_L	REAL	8 char	1-methylnaphthalene
28.	NAP2_W	NAP2_L	REAL	8 char	2-methylnaphthalene
29.	NAP26_W	NAP26_L	REAL	8 char	2,6-dimethylnaphthalene
30.	NAP235_W	NAP235_L	REAL	8 char	2,3,5-trimethylnaphthalene
31.	NAPHEN_W	NAPHEN_L	REAL	8 char	acenaphthene
32.	NAPHYL_W	NAPHYL_L	REAL	8 char	acenaphthylene
33.	PERY_W	PERY_L	REAL	8 char	perylene
34.	PERYGH_W	PERYGH_L	REAL	8 char	benzo [g,h,i] perylene
35.	PHENA_W	PHENA_L	REAL	8 char	phenanthrene
36.	PHENA1_W	PHENA1_L	REAL	8 char	1-methylphenanthrene
37.	PYRE_W	PYRE_L	REAL	8 char	pyrene
38.	PYREBA_W	PYREBA_L	REAL	8 char	benzo [a] pyrene
39.	PYREBE_W	PYREBE_L	REAL	8 char	benzo [e] pyrene
40.	PYREIN_W	PYREIN_L	REAL	8 char	indeno [1,2,3-c,d] pyrene

**TABLE 5. Contents of Supplementary Data Tables in the TSM Data Base.**

Table: BIODATS (combines together MET\_WET and ORG\_WET sample information)

#	Column Name	Type	Length	Contents
1.	STANUM	TEXT	11 char	sample station number
2.	STANAME	TEXT	40 char	sample station name
3.	CDATE	DATE	8 char	date of collection
4.	BIOBOT	TEXT	15 char	truncated version of BOT.
5.	COMMON	TEXT	25 char	sample common name
6.	SPECTYPE	TEXT	2 char	type of sample
7.	NUMBER	TEXT	5 char	number of individuals/sample
8.	AGE	TEXT	5 char	estimated age of fish in years
9.	WEIGHT	REAL	8 char	measurements are in grams (g)
10.	LENGTH	REAL	8 char	measurements are in millimeters (mm)
11.	PWATF	REAL	8 char	percent moisture in filet tissue
12.	PWATL	REAL	8 char	percent moisture in liver tissue
13.	PWATW	REAL	8 char	percent moisture in whole body tissue
14.	PWATO	REAL	8 char	percent moisture in ova tissue
15.	PLIPF	REAL	8 char	percent lipid in filet tissue
16.	PLIPW	REAL	8 char	percent lipid in whole body tissue
17.	PLIPO	REAL	8 char	percent lipid in ova tissue

Table: STALOC (station location information)

#	Column Name	Type	Length	Contents
1.	STANUM	TEXT	11 char	sample station number
2.	STANAME	TEXT	40 char	sample station name
3.	LATDEG	TEXT	2 char	latitude degree
4.	LATMIN	TEXT	2 char	latitude minute
5.	LATSEC	TEXT	2 char	latitude second
6.	LONGDEG	TEXT	3 char	longitude degree
7.	LONGMIN	TEXT	2 char	longitude minute
8.	LONGSEC	TEXT	2 char	longitude second
9.	LATITUDE	TEXT	10 char	station latitude (computed column)
10.	LONGITUDE	TEXT	11 char	station longitude (computed column)
11.	USGS MAP	TEXT	25 char	USGS 7.5' map identified for each station
12.	STADISC	NOTE	*	station location description
13.	COUNTY	TEXT	30 char	county listed for each station

\* NOTE can vary in size. Special setting in R:Base.

(continued on next page)

**TABLE 5 (continued).** Contents of Supplementary Data Tables in the  
TSM Data Base.

Table: YEARTABL (station sampling history by year)

#	Column Name	Type	Length	Contents
1.	STANUM	TEXT	11 char	sample station number
2.	STANAME	TEXT	40 char	sample station name
3.	YEAR_78	TEXT	4 char	1978 sampling history
4.	YEAR_79	TEXT	4 char	1979 sampling history
5.	YEAR_80	TEXT	4 char	1980 sampling history
6.	YEAR_81	TEXT	4 char	1981 sampling history
7.	YEAR_82	TEXT	4 char	1982 sampling history
8.	YEAR_83	TEXT	4 char	1983 sampling history
9.	YEAR_84	TEXT	4 char	1984 sampling history
10.	YEAR_85	TEXT	4 char	1985 sampling history
11.	YEAR_86	TEXT	4 char	1986 sampling history
12.	YEAR_87	TEXT	4 char	1987 sampling history
13.	YEAR_88	TEXT	4 char	1988 sampling history
14.	YEAR_89	TEXT	4 char	1989 sampling history
15.	YEAR_90	TEXT	4 char	1990 sampling history
16.	YEAR_91	TEXT	4 char	1991 sampling history
17.	YEAR_92	TEXT	4 char	1992 sampling history
18.	YEAR_93	TEXT	4 char	1993 sampling history
19.	YEAR_94	TEXT	4 char	1994 sampling history

**Table 6. Species Type Codes (Spectype)**

<u>Spectype</u>	<u>Definition</u>
FF	fresh water fish
MF	marine fish
IV	invertebrate (crayfish, shrimp)
IS	insect (caddis fly larvae)
MO	mollusk (clams and mussels)
OT	other (turtle, plankton)
SS	sediment or soil

**TABLE 7. Conversion Formula for Wet Weight to Lipid Weight Concentrations.**

<u>Conversion:</u>	<u>Formula:</u>
wet to lipid	$W * \frac{100}{\text{PLIPID}} = L$

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Key:

- W = tissue concentration on a wet-weight basis
- L = tissue concentration on a lipid-weight basis
- PLIPID = percent of lipid in sample