Hylebos Waterway Fish Injury Studies
Individual Data and Quality Assurance Results
CASE NARRATIVES

Toxicopathic Conditions in Flatfish

Semivolatile Organics (Tables 1, 2)

Calibrations

The calibration data used to quantitate the analytes met the initial (Tables 1J, 2G) and continuing (Tables IK, 1L and 2H) calibration criteria detailed in the "Commencement Bay Quality Assurance Plan, 12/95" (QAP).

Method Blank Analysis

Method blanks were analyzed for CHs (Tables 1E, IF) and AHs (Table 2D). The criteria in the QAP for method blanks were met (no more than 4 analytes to exceed 3 X the MDLs listed in Tables IM, 2I).

Surrogate Recoveries

Surrogate recoveries for samples analyzed by GC/MS for AHs and by GC/ECD for PCBs, DDTs and pesticides (Tables 1A, 1D, 2A, and 2C) were within the guidelines detailed in the QA Plan (50-125% recovery).

SRMAnalyses

An aliquot of NIST tissue SRM 1974a was analyzed with each of the sample sets, and the results (Tables IE, IF, and 2D) met the criteria in the QA plan (>70% of concentrations for the certified analytes that were present in NIST SRM 1974a in concentrations greater than 10 times the MDL were within 35% of either end of the NIST values. Noncertified values for the other analytes in the SRM and concentrations from samples of the SRM analyzed previously are also shown in the tables.

Sample Duplicates

Three samples were analyzed in duplicate for CHs (Tables 1H, 1I), one sample was analyzed in duplicate for AHs (Table 2F) and the criteria in the QAP were met (QA plan, Table 6.2).

Reanalyses

There is no plan to reanalyze any samples.

GC/MS Confirmations

Six samples (Table 1N, 1O) were analyzed using GOMS to confirm the presence of the pesticides and PCBs determined previously by GC/ECD.

Hylebos Toxicopathic Conditions in Flatfish Study

Analyses for Chlorinated Hydrocarbons
Table 1 Notes

The concentrations of analytes were calculated using 4,4'-dibromooctafluorobiphenyl as the surrogate standard.

The "less than" symbol (<) indicates that the analyte was not detected in concentrations above the stated value.

Results were determined by gas chromatography with electron capture detection (GC/ECD).

Concentrations less than 10 ng/g are rounded to two significant figures; concentrations greater than or equal to 10 ng/g are rounded to three significant figures.

The percent recoveries of the surrogate standard were calculated using tetrachloro-o-xylene to correct for the fraction of the total extract used for the HPLC cleanup step.

The concentration reported for "Total PCBs" is the sum of the 17 PCB congeners multiplied by 2 (as defined in the QA Plan).

Set # and Sample # designations are intended for internal lab use and identification only. Jar # and site name represent Hylebos Damage Assessment official sample identification designations.

The sample weights used to calculate concentrations for the method blank are the mean sample weights calculated for the field samples in the same set.

Table 1A-p1: Sample information for flatfish liver and stomach contents analyzed for chlorinated hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample#	Sample Type	Species	Jar #*	Site	Collection Date	Sample Wt. (g)	DOB Rec. (%)
H303R	110-388R	Tissue - liver	English sole	94.3002,3003,3014/3016	UPPER TURNING BASIN	7/21/94	3.00	98
H303R	110-389R	Tissue - liver	English sole	94.3039,3046,3048,3049,3053	UPPER TURNING BASIN	7/22/94	3.00	99
H303R	110-390R	Tissue - liver	English sole	94.3001,3005/3008	UPPER TURNING BASIN	7/21/94	3.01	92
H303R	110-391R	Tissue - liver	English sole	94.3010/3013,3034	UPPER TURNING BASIN	7/21/94	2.53	91
H303R	110-392R	Tissue - liver	English sole	94.3017/3021	UPPER TURNING BASIN	7/21/94	3.01	98
H303R	110-393R	Tissue - liver	English sole	94.3022/3026	UPPER TURNING BASIN	7/21/94	3.01	98
H303R	110-394R	Tissue - liver	English sole	94.3001,3005/3008	UPPER TURNING BASIN	7/21/94	2.99	99
H303R	110-395R	Tissue - liver	English sole	94.3063,3064,3068,3072,3081	LOWER TURNING BASIN	7/21/94	3.00	96
H303R	110-396R	Tissue - liver	English sole	94.3061,3062,3067,3082,3084	LOWER TURNING BASIN	7/21/94	3.02	98
H303R	110-397R	Tissue - liver	English sole	94.3065,3066,3069/3071	LOWER TURNING BASIN	7/21/94	3.01	100
H304	110-417	Tissue - liver	English sole	94.3071, 3073/3076	LOWER TURNING BASIN	7/22/94	3.00	119
H304	110-418	Tissue - liver	English sole	94.3078, 3083, 3086/3088	LOWER TURNING BASIN	7/25/94	3.05	115
H304	110-419	Tissue - liver	English sole	94.3089, 3092/3095	LOWER TURNING BASIN	7/25/94	3.03	113
H304	110-420	Tissue - liver	English sole	94.3121, 3123, 3124, 3126, 3131	11TH STREET BRIDGE	7/26/94	3.01	121
H304	110-421	Tissue - liver	English sole	94.3132, 3139, 3145, 3146, 3149	11TH STREET BRIDGE	7/26/94	3.02	121
H304	110-422	Tissue - liver	English sole	94.3122, 3128, 3130, 3133, 3134	11TH STREET BRIDGE	7/26/94	3.03	114
H304	110-423	Tissue - liver	English sole	94.3136, 3142, 3175/3177	11TH STREET BRIDGE	7/26/94	3.00	120
H304	110-424	Tissue - liver	English sole	94.3179, 3180, 3182/3184	11TH STREET BRIDGE	7/26/94	3.02	121
H304	110-425	Tissue - liver	English sole	94.3185/3189	11TH STREET BRIDGE	7/28/94	3.01	112
H304	110-426	Tissue - liver	Rock Sole	94.3152, 3153, 3155/3157	11TH STREET BRIDGE	7/26/94	3.01	115
H306	110-431	Tissue - liver	Rock Sole	94.3437/3440,3442	COLVOS PASSAGE	10/20/94	2.90	107
H306	110-432	Tissue - liver	Rock Sole	94.3443/3444,3446/3448	COLVOS PASSAGE	10/20/95	1.88	97
H306	110-433	Tissue - liver	English sole	94.3325/3326,3329/3330,3339	COLVOS PASSAGE	9/22/94	1.96	107
H306	110-434	Tissue - liver	English sole	94.3311/3312,3314/3316	COLVOS PASSAGE	9/22/94	3.02	106
H306	110-435	Tissue - liver	English sole	94.3317/3319,3333,3335	COLVOS PASSAGE	9/22/94	2.64	109
H306	110-436	Tissue - liver	English sole	94.3321/3324,3327	COLVOS PASSAGE	9/22/94	2.62	108

DOB = dibromooctafluorobiphenyl

*Jar #s represent official Hylebos Damage Assessment sampling numbers. If more than one jar # is given, the sample analyzed was a composite of those jars.

Table 1A-p2: Sample information for flatfish liver and stomach contents analyzed for chlorinated hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample#	Sample Type	Species	Jar #*	Site	Collection Date	Sample Wt. (g)	DOB Rec. (%)
H306	110-437	Tissue - liver	English sole	94.3331/3332,3336/3338	COLVOS PASSAGE	9/22/94	3.03	111
H306	110-438	Tissue - liver	English sole	94.3341/3345	COLVOS PASSAGE	9/22/94	2.35	112
H305	110-443	Tissue - liver	Rock Sole	94.3158/3160,3162/3163	11TH STREET BRIDGE	7/26/94	1.62	102
H305	110-444	Tissue - liver	Rock Sole	94.3151,3164/3167	11TH STREET BRIDGE	7/26/94	1.68	108
H305	110-445	Tissue - liver	Rock Sole	94.3169/3172,3174	11TH STREET BRIDGE	7/26/94	1.83	107
H305	110-446	Tissue - liver	Rock Sole	94.3206/3210	11TH STREET BRIDGE	7/28/94	2.69	107
H305	110-447	Tissue - liver	Rock Sole	94.3211/3215	11TH STREET BRIDGE	7/28/94	3.10	107
H305	110-448	Tissue - liver	Rock Sole	94.3206/3210	11TH STREET BRIDGE	7/28/94	2.74	104
H305	110-449	Tissue - liver	Rock Sole	94.3416/3417,3421,3423/3424	COLVOS PASSAGE	10/19/94	2.55	102
H305	110-450	Tissue - liver	Rock Sole	94.3425/3429	COLVOS PASSAGE	10/19/94	1.95	103
H305	110-451	Tissue - liver	Rock Sole	94.3418/3420,3422,3430	COLVOS PASSAGE	10/19/94	2.88	102
H305	110-452	Tissue - liver	Rock Sole	94.3431/3433,3435/3436	COLVOS PASSAGE	10/20/94	1.70	100
H307	110-402	Tissue - stomach contents	English sole	94.3002,3003,3015,3016,3034	UPPER TURNING BASIN	7/21/94	3.01	100
H307	110-403	Tissue - stomach contents	English sole	94.3039,3046,3048,3049,3053	UPPER TURNING BASIN	7/21/94	3.06	104
H307	110-404	Tissue - stomach contents	English sole	94.3063,3064,3068,3072,3081	LOWER TURNING BASIN	7/22/94	3.02	99
H307	110-405	Tissue - stomach contents	English sole	94.3061,3062,3067,3082,3084	LOWER TURNING BASIN	7/22/94	3.06	100
H307	110-406	Tissue - stomach contents	English sole	94.3121/3124,3126,3131	11TH STREET BRIDGE	7/26/94	1.86	107
H307	110-407	Tissue - stomach contents	English sole	94.3132,3139,3145,3146,3149	11TH STREET BRIDGE	7/26/94	3.01	124
H307	110-408	Tissue - stomach contents	Rock Sole	94.3152,3153,3155/3157	11TH STREET BRIDGE	7/25/94	3.00	116
H307	110-409	Tissue - stomach contents	Rock Sole	94.3158/3160,3162,3163	11TH STREET BRIDGE	7/26/94	3.01	105
H307	110-410	Tissue - stomach contents	Rock Sole	94.3416,3417,3421,3423,3424	COLVOS PASSAGE	7/19/94	3.01	100
H307	110-411	Tissue - stomach contents	Rock Sole	94.3425/3429	COLVOS PASSAGE	7/19/94	2.78	101
H308	110-457	Tissue - stomach contents	English sole	94.3325,3326,3329,3330,3339	COLVOS PASSAGE	9/22/94	1.70	79
H308	110-458	Tissue - stomach contents	English sole	94.3311,3312,3314,3315,3316	COLVOS PASSAGE	9/22/94	3.00	79
H308	110-459	Tissue - stomach contents	English sole	94.3317,3318,3319,3333,3335	COLVOS PASSAGE	9/22/94	2.53	76
H308	110-460	Tissue - stomach contents	Rock Sole	94.3152,3153,3155/3157	11TH STREET BRIDGE	7/25/94	3.00	90

DOB = dibromooctafluorobiphenyl

*Jar #s represent official Hylebos Damage Assessment sampling numbers. If more than one jar # is given, the sample analyzed was a composite of those jars.

Table 1B-p1: Concentrations (ng/g, wet weight) of pesticides in flatfish liver and stomach contents samples analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample#	HCBD	HCB	LIND	HEPT	Aldrin	α + γ Chlordane	Dieldrin	p,p'-DDE	p,p'-DDD	p,p'-DDT
110-388R	3.6	13.9	0.35	3.5	<0.24	6.8	3.1	96.6	68.1	13.2
110-389R	5.3	15.9	0.49	3.6	<0.24	12.9	3.1	67	95.7	11.7
110-390R	3.3	12	0.48	3.4	<0.34	7.6	2.7	51.4	62.5	11.9
110-391R	4.7	12.8	0.49	7.7	<0.42	9.9	2.7	30	49.3	6.2
110-392R	6	19.9	0.46	4.3	<0.22	8.2	2.7	68.4	90	11.3
110-393R	4.6	13.4	0.42	2	<0.24	8.4	3.3	43.9	73.4	7
110-394R	3.3	12.1	0.32	3.1	<0.23	6.7	2.2	55.1	65.6	11.4
110-395R	6.4	18.4	0.53	3.6	<0.24	7.9	2.4	50.9	75.5	17.6
110-396R	4.8	16.6	0.36	2.9	<0.25	6.6	1.9	33.2	55.6	12.9
110-397R	8.3	24.2	0.62	4.1	<0.16	11.6	2.6	72.2	116	24.9
110-417	4.4	16.3	0.5	<0.17	0.5	6.2	3.3	33.3	71	10.4
110-418	4.6	24.5	0.62	<0.18	0.53	7.9	3.4	47.6	59.2	9.3
110-419	4.9	18	0.54	<0.14	0.56	6.1	3.5	52.8	133	23.3
110-420	11.1	36.6	0.84	<0.14	0.85	6.1	3.7	40.1	59.6	12.5
110-421	16.4	62	1.4	<0.14	2	6.4	2.3	26.6	41.8	6.6
110-422	11	44.3	0.73	<0.15	1.2	4.6	<0.09	20	22.1	5.6
110-423	15.1	52	0.73	<0.13	2.1	5.4	<0.078	21.9	38.2	5.1
110-424	23.4	59	1	<0.13	1.7	6	3.7	17	28.7	5.9
110-425	9.3	51.5	1.3	<0.15	0.98	6.5	<0.086	37.1	48.1	14.8
110-426	23.2	98.5	0.98	<0.15	4.1	9.2	8.9	39.7	32	13.3
110-431	0.25	0.87	0.52	<0.16	<0.089	1	0.82	6.2	1.1	0.7
110-432	0.41	1.4	0.76	<0.29	<0.16	1.7	1.3	6.5	1.8	0.79
110-433	0.33	1.6	0.82	0.68	<0.13	2	1.6	10.5	3.9	1.5
110-434	0.25	1.1	0.54	0.25	<0.1	1.6	1.2	7.1	3	1
110-435	<0.07	0.74	0.35	<0.18	<0.1	0.8	0.65	4	1.3	0.54
110-436	0.37	0.81	0.47	<0.22	<0.12	1.2	0.78	2.6	1.2	0.36
110-437	0.28	1.1	0.52	0.27	<0.1	1.1	1.1	5.4	2.1	0.78
110-438	0.37	1.3	0.75	0.52	<0.12	1.6	1.2	3.6	2.1	0.66
110-443	243	102	0.81	<0.16	<0.13	4.4	<0.13	22	20.8	8.1
110-444	16.5	33.2	0.35	<0.16	<0.13	2.3	<0.13	14.4	9.5	3

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; LIND = lindane; HEPT = heptachlor.

Table 1B-p2: Concentrations (ng/g, wet weight) of pesticides in flatfish liver and stomach contents samples analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample#	HCBD	HCB	LIND	HEPT	Aldrin	α + γ Chlordane	Dieldrin	p,p'-DDE	p,p'-DDD	p,p'-DDT
110-445	34.7	41.8	0.47	< 0.17	< 0.14	3.7	2.1	12.5	12.8	3.2
110-446	105	153	0.81	< 0.17	< 0.14	5.2	2.8	49.9	28.4	8.1
110-447	82.8	112	0.65	< 0.15	< 0.13	5.1	4	25.1	17.8	5
110-448	105	156	0.79	< 0.18	< 0.15	5.1	3.2	51.1	29.8	8.8
110-449	0.28	1.6	0.66	< 0.22	< 0.19	1.5	1.5	4	1.2	0.45
110-450	0.28	1.5	0.64	< 0.17	< 0.14	2.7	1.5	8	1.9	1.2
110-451	0.35	2.5	1	< 0.24	< 0.2	3.3	3	8	2.9	1.5
110-452	< 0.13	1.3	0.48	< 0.21	< 0.18	1.4	1.4	5.6	1.2	0.61
110-402	0.52	1.9	< 0.13	< 0.16	1.9	0.83	0.76	6.3	11.2	1.5
110-403	0.62	1.7	0.15	< 0.17	0.27	1.5	1.2	3.3	11.1	0.42
110-404	0.87	1.9	< 0.15	< 0.19	< 0.1	1.3	1.2	3.4	11.3	2.2
110-405	0.64	2	< 0.14	< 0.17	< 0.096	1	1.2	3.2	10.3	1.8
110-406	7.8	8	0.43	< 0.29	< 0.16	8.4	0.38	1.2	3.7	2
110-407	8.2	32.3	2.2	< 0.14	0.26	4.2	< 0.085	0.7	4.1	0.93
110-408	7.5	12.7	0.27	< 0.15	< 0.082	1.9	0.98	0.77	4.4	1.6
110-409	3.8	4.6	< 0.15	< 0.19	< 0.11	0.49	< 0.12	0.55	1.2	0.3
110-410	< 0.073	< 0.073	< 0.15	< 0.19	< 0.1	0.29	0.15	0.52	< 0.2	< 0.22
110-411	< 0.089	< 0.089	< 0.18	< 0.23	< 0.13	< 0.26	< 0.14	0.31	< 0.24	< 0.26
110-457	0.52	< 0.16	< 0.24	< 0.32	< 0.21	< 0.4	< 0.22	0.32	0.46	< 0.38
110-458	0.31	< 0.097	< 0.15	< 0.2	< 0.13	< 0.24	< 0.14	0.29	< 0.21	< 0.23
110-459	0.24	0.1	< 0.12	< 0.16	< 0.1	0.23	0.17	0.36	0.3	< 0.19
110-460	7.5	12.1	0.53	< 0.19	< 0.12	1.6	0.55	0.73	3	1.2

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; LIND = lindane; HEPT = heptachlor.

Table 1C-p1: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (chlorination level/IUPAC number) in flatfish liver and stomach contents samples analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample#	3/18	3/28	4/44	4/52	4/66	5/101	5/105	5/118	6/128	6/138	6/153	7/170	7/180	7/187	8/195	9/206	10/209	Total PCBs*
110-388R	16.1	33.2	46.4	114	77.6	581	122	561	72.8	572	763	52.7	50.3	95.4	5.5	22	10.1	6400
110-389R	13.2	20.5	35.7	113	63.3	399	82.4	314	39.6	350	366	23.6	26.8	41.8	3.3	16.3	8.9	3800
110-390R	11.7	17.3	27.3	95.4	57	348	63.5	280	30.1	267	320	21.4	19.7	39	2.6	11.1	6.3	3200
110-391R	12.4	15.7	25.8	66.8	37.6	202	35.3	478	21.1	146	217	16.6	17.6	30.6	2.7	14.6	7.7	2700
110-392R	15.6	23.2	42	156	94.7	500	96.7	273	49.3	343	462	28.5	30.3	46.7	3.7	19.1	10.6	4400
110-393R	13	17.6	31.5	105	55.3	339	53.5	285	32	243	322	16.9	16.7	27.2	1.9	9.1	6	3100
110-394R	11.3	17.6	27.1	93	57.4	351	61.5	331	31	279	336	22.4	20.9	39.9	2.7	11.4	6.8	3400
110-395R	10.8	15.7	35.6	114	55.4	427	86.5	242	48	362	479	39.5	34.4	65.9	4.2	19.1	12.7	4100
110-396R	6.5	9.9	26.5	85	37.5	317	54.2	446	34.1	262	321	20.7	19.9	39.3	3.3	18.3	11.5	3400
110-397R	10.8	19.8	49.2	167	54.3	581	116	< 0.21	66	437	561	37.5	38	58.9	4.2	21.2	13.8	4500
110-417	14.7	11.1	30.3	99.4	30.2	383	69.1	297	34.1	273	357	20.7	18.4	35.2	2.5	12.6	8.3	3400
110-418	16.8	10.3	21.8	55	15.4	218	31.7	152	22.6	178	325	20.5	27.7	38	3.3	18.2	11.5	2300
110-419	17.1	15.1	34.1	110	30.9	437	63.1	345	43.2	348	443	26.2	22	39.6	2.9	16.4	10.8	4000
110-420	26.1	5.6	19.4	71.3	20.4	349	51.4	259	30.8	255	370	24.3	26.8	49.4	4.5	30.4	18.2	3200
110-421	62.5	3.3	32.3	37.6	12.4	175	35.9	117	24.1	195	300	28.3	34.8	64.4	8.1	64.6	37.9	2500
110-422	24	2.6	14.4	20.9	6.5	79.8	19	60.7	13.7	102	137	16.5	25.7	38.1	4.8	38.7	23.7	1300
110-423	37.1	7.7	21.6	39.5	10.8	118	22	89.9	16	117	173	17.6	24.4	39	5.5	47.9	28.5	1600
110-424	46.6	2.8	23.1	22.7	7	81.5	18.6	58.9	14.2	105	145	18.6	24.9	41.5	6	50.9	29.1	1400
110-425	44	6	20	52.4	14.1	223	33.8	171	21.8	198	310	25.2	30.2	47.8	4.9	33	20.7	2500
110-426	165	4.8	59.9	47	8.8	172	41.5	275	38	369	467	62.3	121	124	17.1	153	68	4400
110-431	< 0.3	0.69	1.1	1.7	1.2	4.9	1.3	7.1	1.9	15.3	20.5	2.5	6.4	5	0.36	1.2	0.74	140
110-432	< 0.53	0.9	2.2	2.6	1.6	7	0.7	7.9	2.6	18.1	24.8	3.1	6.4	6.6	0.52	1.7	1	180
110-433	0.58	0.95	2.2	3.5	2.8	12.2	2.3	10.7	3.7	27.6	36.2	5.3	8.4	14	1	3.7	2.3	270
110-434	< 0.35	0.62	1.5	2.5	1.9	8.7	1.7	7.4	2.4	18	23.2	3.1	6.6	8.6	0.49	1.7	1.1	180
110-435	0.37	0.64	1.5	1.5	2	5.9	1.2	5.1	1.7	12.2	15.7	2	4.7	5.9	0.32	1.1	0.75	130
110-436	< 0.4	0.66	1.6	1.5	1.6	4.7	0.92	4	1.1	8.6	11.6	1.4	2.6	4.4	0.23	0.8	0.58	94

* The concentration reported for "Total PCBs" is the sum of the 17 PCB congeners multiplied by 2 (as defined in the QA Plan).

Table 1C-p2: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (chlorination level/IUPAC number) in flatfish liver and stomach contents samples analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample#	3/18	3/28	4/44	4/52	4/66	5/101	5/105	5/118	6/128	6/138	6/153	7/170	7/180	7/187	8/195	9/206	10/209	Total PCBs*
110-437	< 0.35	0.62	1.5	2.1	2.3	7.1	1.5	7.1	2.1	16	20.9	2.7	5.7	7.7	0.43	1.5	1.1	160
110-438	0.55	0.85	1.8	2.4	2.4	6.9	1.5	5.4	1.4	11	13.8	1.7	3.4	4.6	0.23	0.75	0.54	120
110-443	56.7	3.7	7.7	28.9	19.3	83.2	23.8	89.8	20	176	255	44.3	72.9	73.8	10	120	42.4	2300
110-444	18.3	2	4.8	13.4	9.9	47.4	13	54.7	11.9	100	136	25.1	40.1	42.3	7.7	79.6	35.9	1300
110-445	25.6	2.2	4.1	14.4	12.1	40.8	9.9	43.4	11	83.6	109	22.2	39.1	36.7	5.7	57.1	24.4	1100
110-446	95.6	4.9	10	51.1	24	185	47.9	270	41.9	422	550	97.6	134	197	22	212	86.5	4900
110-447	71.6	3.8	3.6	27.5	20.3	74.4	18.9	108	20.3	204	270	45.5	77.2	88.1	12.7	127	55.6	2500
110-448	98.3	4.7	9.6	52.4	22.5	193	47.9	281	43.1	441	576	103	142	214	23.3	231	94	5200
110-449	< 0.7	1	1.5	2.4	1.3	5.4	1.3	5.7	2.1	12.2	15.7	2.4	4.8	5.1	0.44	1.6	1.4	130
110-450	0.58	1.3	1.8	3.3	2.3	9.2	2.4	9	2.9	21.2	25.9	4.1	9.5	9.3	0.77	2.6	2	220
110-451	< 0.74	1.8	1.9	5.3	3.5	11.5	2.7	10.4	3	20.5	26.1	3	10.3	7.5	0.41	1.3	1.2	220
110-452	0.7	1.3	1.9	2.3	1.3	5.5	2.4	8.1	2.4	17.4	21.4	3.1	6.1	5.9	0.5	1.8	1.5	170
110-402	4.5	7.4	10.8	20.2	10.7	47.7	8.5	38.5	5.6	33	43.6	2.9	1.8	4.3	0.23	0.8	0.61	480
110-403	3.5	4.9	9.5	19.5	9.2	38.4	5.3	28	3.4	32.7	29.6	2.9	1.1	3	0.15	0.7	0.81	390
110-404	< 0.35	2.4	8	18.1	13.7	39.5	4.7	29.8	4.1	26.3	37.3	2.8	1.4	3.4	0.21	0.95	1.2	390
110-405	< 0.32	2	6.2	13.6	9	34.7	6	28.5	4.6	26.6	33.7	3	1.7	3.9	0.27	1.1	1	350
110-406	< 0.53	1.1	3.1	4	2.2	9.2	1.7	13	1.8	11	13.1	2.2	1.7	4.3	0.66	3.8	4.1	150
110-407	2.6	1.7	1.9	3.5	3.6	11.9	1.9	8.9	2.8	12.2	18.2	2.7	2	4.4	0.59	3.8	4.1	170
110-408	0.28	0.78	2.5	5.1	9.2	12.2	0.88	11.6	2.2	17.8	25.1	2.8	3.5	8.3	0.65	3.2	3.6	220
110-409	< 0.36	0.64	1.5	2.4	0.98	4.3	0.64	4	0.99	5.5	8.2	1.5	1.6	3.1	0.27	3.2	2.6	83
110-410	< 0.35	0.34	1.2	0.3	< 0.14	0.58	0.17	0.56	0.15	1.1	0.95	0.08	0.23	0.52	< 0.063	< 0.06	< 0.074	13
110-411	< 0.43	0.4	1.3	0.42	< 0.17	0.8	0.25	0.75	0.14	1.4	1.7	0.18	0.25	0.43	< 0.077	0.097	0.11	17
110-457	< 0.64	0.75	2.2	0.51	0.87	1	0.21	0.72	< 0.16	1.6	1.6	0.33	0.26	0.52	< 0.14	< 0.15	0.22	21
110-458	0.57	0.61	1.4	0.41	0.64	0.77	0.17	0.53	0.14	1.1	1.3	0.25	0.22	0.46	< 0.088	0.1	0.18	18
110-459	0.38	0.54	1.5	0.43	0.81	1.1	0.2	0.56	0.19	1.6	1.5	0.4	0.3	0.66	< 0.07	0.13	0.26	21
110-460	0.4	0.91	3	4.9	7.2	12.1	1.2	9.8	2.1	16.8	23.7	2.8	3.3	8.7	0.59	3.4	4.1	210

* The concentration reported for "Total PCBs" is the sum of the 17 PCB congeners multiplied by 2 (as defined in the QA Plan).

Table 1D-p1: Quality assurance sample information in method blanks and standard reference material (SRM 1974a) analyzed for chlorinated hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample #	Sample Type	Sample Wt (g)	DOB Rec (%)
Method Blank				
H303R	110-399R	Method Blank	2.96	87
H304	110-428	Method Blank	3.02	97
H305	110-454	Method Blank	2.27	91
H306	110-440	Method Blank	2.55	98
H307	110-413	Method Blank	2.88	93
H308	110-467	Method Blank	2.04	65
SRM 1974a				
H303R	110-398R	SRM 1974a	3.00	89
H304	110-427	SRM 1974a	3.01	104
H305	110-453	SRM 1974a	3.12	100
H306	110-439	SRM 1974a	3.03	107
H307	110-412	SRM 1974a	3.06	104
H308	110-466	SRM 1974a	3.01	74

DOB = dibromooctafluorobiphenyl

Table 1E-p1: QA: Concentrations (ng/g, wet weight) of pesticides in method blanks and standard reference material (SRM 1974a) analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	Sample Type	HCBD	HCB	Lindane	HEPT	Aldrin	α + γ Chlordane	Dieldrin	p,p'-DDE	p,p'-DDD	p,p'-DDT
Method Blank											
110-399R	Method Blank	<0.27	<0.27	<0.35	<0.45	<0.33	<0.64	<0.34	<0.33	<0.55	<0.59
110-428	Method Blank	<0.077	<0.077	<0.16	<0.19	<0.11	<0.21	<0.11	<0.095	<0.18	<0.19
110-454	Method Blank	<0.23	<0.23	<0.31	<0.36	<0.3	<0.59	<0.3	<0.27	<0.42	<0.44
110-440	Method Blank	0.47	<0.091	<0.19	<0.23	<0.13	<0.26	<0.14	<0.12	<0.25	<0.27
110-413	Method Blank	<0.084	<0.084	<0.17	<0.22	<0.12	<0.24	<0.13	<0.11	<0.23	<0.25
110-467	Method Blank	0.17	<0.072	<0.11	<0.14	<0.094	<0.18	<0.1	<0.088	<0.16	<0.17
	Average*	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Standard Deviation	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Relative	Standard Deviation	162.7%	?	?	?	?	?	?	?	?	?
SRM 1974a											
110-398R	SRM 1974a	<0.26	<0.26	<0.34	<0.44	<0.32	4	0.68	4.1	5.9	0.66
110-427	SRM 1974a	<0.076	<0.076	<0.16	<0.19	<0.1	3.9	0.83	4.6	6.4	0.62
110-453	SRM 1974a	0.21	<0.12	<0.16	<0.19	<0.16	4.2	0.74	4.2	5.8	0.25
110-439	SRM 1974a	0.31	<0.064	<0.13	<0.16	<0.091	3.3	0.54	5.2	6.3	0.21
110-412	SRM 1974a	<0.079	<0.079	<0.16	<0.2	<0.11	3.4	<0.12	2.8	6.3	0.32
110-466	SRM 1974a	0.15	<0.091	<0.14	<0.18	<0.12	3.9	0.74	4.2	6.3	0.27
	Average*	0.11	0.00	0.00	0.00	0.00	3.80	0.59	4.18	6.18	0.39
	Standard Deviation	0.12	0.00	0.00	0.00	0.00	0.35	0.28	0.71	0.24	0.18
Relative	Standard Deviation	108.7%	?	?	?	?	9.1%	47.2%	17.0%	3.9%	47.2%
SRM 1974a Certified concentrations (ng/g, wet wt)	$\bar{x}$	---	---	---	---	---	---	0.7[1]	5.84	4.90	0.45
	95% CI								0.83	0.72	0.07
	UCL								6.73	7.59	0.69
	LCL								3.39	2.72	0.25
SRM 1974a Previously analyzed concentrations (ng/g, wet wt, n=10)	$\bar{x}$	nd	nd	nd	nd	nd	2.66‡	0.69‡	3.9	6.0	0.35
	S.D.	---	---	---	---	---	0.15	0.29	0.7	0.7	0.07

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; HEPT = heptachlor.

$\bar{x}$ = the average concentration (ng/g, wet wt); 95% CI = the 95% confidence interval; UCL = the upper confidence limit (95% confidence limit + 35%); LCL = the lower confidence limit (95% confidence limit - 35%).

n = the number of values being averaged; S.D.= the standard deviation; nd = not detected in previous samples, or detected at levels below the limit of detection.

[1]Dieldrin is given as a noncertified value.

‡ Indicates that n<10 because the analyte was either not detected or not analyzed for in some samples.

* When an analyte was detected in some, but not all of the method blanks or SRMs, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the method blanks or SRMs, zero is reported for the average and the SD and a "?" is reported for the RSD.

Table 1F-p1: QA: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (chlorination level/IUPAC number) in method blanks and standard reference material (SRM 1974a) analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	3/18	3/28	4/44	4/52	4/66	5/101	5/105	5/118	6/128	6/138	6/153	7/170	7/180	7/187	8/195	9/206	10/209	Total PCBs**
Method Blank																		
110-399R	< 1	0.61	1.3	< 0.69	< 0.47	< 0.5	< 0.31	< 0.41	< 0.28	0.81	< 0.41	< 0.26	< 0.29	< 0.37	< 0.26	< 0.26	< 0.31	5.4
110-428	< 0.29	0.22	0.97	0.26	0.24	0.3	0.11	0.3	< 0.072	0.35	0.23	< 0.064	< 0.071	< 0.088	< 0.061	< 0.06	< 0.073	6
110-454	< 1.1	0.92	1.6	< 0.74	0.46	0.55	< 0.27	0.53	< 0.24	1.2	0.64	< 0.2	< 0.24	< 0.34	< 0.2	< 0.21	< 0.25	12
110-440	< 0.43	0.41	1.2	< 0.29	0.23	0.27	< 0.12	0.29	< 0.1	0.37	0.24	< 0.085	< 0.096	< 0.13	< 0.078	< 0.074	< 0.092	6.1
110-413	< 0.4	0.55	1.2	0.27	< 0.16	0.29	0.12	0.35	< 0.093	0.37	0.29	< 0.078	< 0.088	< 0.12	< 0.072	< 0.068	< 0.085	6.8
110-467	< 0.29	0.94	0.92	0.23	< 0.13	0.28	0.11	0.31	< 0.072	0.46	0.37	< 0.065	< 0.075	< 0.095	< 0.065	< 0.066	< 0.078	7.3
Average*	0.00	0.61	1.20	0.13	0.15	0.28	0.06	0.30	0.00	0.60	0.29	0.00	0.00	0.00	0.00	0.00	0.00	7.24
Standard Deviation	0.00	0.26	0.23	0.13	0.17	0.16	0.06	0.15	0.00	0.32	0.19	0.00	0.00	0.00	0.00	0.00	0.00	2.17
Relative Stand. Dev.	?	42.4%	19.4%	100.4%	112.1%	57.0%	100.3%	52.2%	?	53.5%	64.5%	?	?	?	?	?	?	30.0%
SRM 1974a																		
110-398R	4.5	9.4	10.7	15.9	14	18.3	4.5	16.2	2.5	17.7	23.8	0.96	1.1	5	< 0.25	< 0.25	< 0.3	290
110-427	3.8	5.7	9.6	13.7	7.6	16.2	5.4	14.9	2.4	15.9	14.7	1	1.2	4.4	0.27	0.66	0.42	240
110-453	3.9	8.8	9.5	13.7	12.2	16.6	5	14.8	2.4	15.6	20.3	0.96	1.1	4.1	< 0.11	0.3	0.19	260
110-439	3.6	5.6	9.1	13	7.3	14.5	4.8	13.6	2.1	14.3	13.9	0.66	0.93	3.9	0.087	< 0.052	0.086	220
110-412	3.7	9.4	10	15.3	13.9	16.6	4.8	15.6	2.5	16.1	21.2	0.82	0.98	4.4	< 0.068	< 0.065	< 0.08	270
110-466	4	6.4	10.1	14.2	8.1	16.6	5.1	15.1	2.5	16.5	16	0.65	1.1	4.5	< 0.082	0.15	0.31	240
Average*	3.92	7.56	9.84	14.32	10.52	16.47	4.95	15.03	2.41	16.02	18.34	0.85	1.06	4.37	0.06	0.19	0.17	252.14
Standard Deviation	0.31	1.67	0.49	1.01	2.90	1.09	0.28	0.79	0.13	1.02	3.66	0.15	0.09	0.37	0.10	0.24	0.16	24.11
Relative Stand. Dev.	7.8%	22.0%	5.0%	7.0%	27.6%	6.6%	5.7%	5.3%	5.5%	6.4%	20.0%	17.9%	8.2%	8.4%	166.3%	128.2%	93.1%	9.6%

SRM 1974a Certified concentrations (ng/g, wet wt)	$\bar{x}$	3.7'	9'	8.28	13.1	11.54	14.6	6.04	14.9	2.5	15.2	16.54	0.63	1.95	3.87	--	--	--
	95% CI			0.84	1.30	0.50	1.10	0.39	0.40	0.39	1.10	0.86	0.12	0.43	0.27			
	UCL			12.31	19.44	16.25	21.2	8.68	20.7	3.90	22.0	23.5	1.01	3.21	5.59			
	LCL			4.84	7.76	7.18	8.78	3.67	9.43	1.37	9.17	10.2	0.33	0.99	2.34			
SRM 1974a Previously Analyzed conce (ng/g, wet wt, n=10)	$\bar{x}$	3.7	9.0	9.5	13.5	13.0	16.0	5.1	15.3	2.4	16.1	20.3	0.68	1.5	4.1	0.08	0.12‡	0.12‡
	S.D.	0.6	1.3	1.4	1.7	2.0	2.4	1.0	2.0	0.4	2.1	2.5	0.17	0.9	0.7	0.04	0.08	0.04

$\bar{x}$ = the average concentration (ng/g, wet wt); 95% CI = the 95% confidence interval; UCL = the upper confidence limit (95% confidence limit + 35%); LCL = the lower confidence limit (95% confidence limit - 35%).

n = the number of values being averaged; S.D.= the standard deviation; nd = not detected in previous samples, or detected at levels below the limit of detection.

'PCBs 3/18 and 3/28 are given as a noncertified values.

‡ Indicates that n<10 because the analyte was either not detected or not analyzed for in some samples.

* When an analyte was detected in some, but not all of the method blanks or SRMs, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the method blanks or SRMs, zero is reported for the average and the SD and a "?" is reported for the RSD.

**The concentration reported for "Total PCBs" is the sum of the 17 PCB congeners multiplied by 2 (as defined in the QA Plan).

Table 1G-p1: QA: Sample information for flatfish tissue analyzed in replicate for chlorinated hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample#	Sample Type	Species	Jar #	Site	Date Collected	Sample Wt. (g)	DOB Rec. (%)
H303R	110-390R	Tissue - liver	English sole	94.3001,3005/3008	UPPER TURNING BASIN	7/21/94	3.01	92
H303R	110-394R	Tissue - liver	English sole	94.3001,3005/3008	UPPER TURNING BASIN	7/21/94	2.99	99
H305	110-446	Tissue - liver	Rock Sole	94.3206/3210	11TH STREET BRIDGE	7/28/94	2.69	107
H305	110-448	Tissue - liver	Rock Sole	94.3206/3210	11TH STREET BRIDGE	7/28/94	2.74	104
H307	110-408	Tissue - stomach contents	Rock Sole	94.3152,3153,3155/3157	11TH STREET BRIDGE	7/25/94	3.00	116
H308	110-460	Tissue - stomach contents	Rock Sole	94.3152,3153,3155/3157	11TH STREET BRIDGE	7/25/94	3.00	90

DOB = dibromooctafluorobiphenyl

Replicate sample analyses are identified by jar #.

*Jar #s represent official Hylebos Damage Assessment sampling numbers. If more than one jar # is given, the sample analyzed was a composite of those jars.

Table 1H-p1: QA: Concentrations (ng/g, wet weight) of pesticides in flatfish tissue analyzed in replicate as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	HCBD	HCB	Lindane	HEPT	Aldrin	α + γ Chlordane	Dieldrin	p,p'-DDE	p,p'-DDD	p,p'-DDT
Tissue - liver										
110-390R	3.3	12	0.48	3.4	< 0.34	7.6	2.7	51.4	62.5	11.9
110-394R	3.3	12.1	0.32	3.1	< 0.23	6.7	2.2	55.1	65.6	11.4
Average*	3.32	12.03	0.40	3.25	0.00	7.15	2.43	53.25	64.05	11.61
Standard Deviation	0.02	0.05	0.08	0.15	0.00	0.46	0.24	1.89	1.52	0.25
Relative Standard Deviation	0.7%	0.4%	19.6%	4.5%	?	6.5%	9.9%	3.5%	2.4%	2.1%
110-446	105	153	0.81	< 0.17	< 0.14	5.2	2.8	49.9	28.4	8.1
110-448	105	156	0.79	< 0.18	< 0.15	5.1	3.2	51.1	29.8	8.8
Average*	104.88	154.88	0.80	0.00	0.00	5.18	2.98	50.54	29.10	8.44
Standard Deviation	0.37	1.53	0.01	0.00	0.00	0.03	0.21	0.61	0.71	0.32
Relative Standard Deviation	0.4%	1.0%	1.3%	?	?	0.7%	7.0%	1.2%	2.4%	3.8%
Tissue - stomach contents										
110-408	7.5	12.7	0.27	< 0.15	< 0.082	1.9	0.98	0.77	4.4	1.6
110-460	7.5	12.1	0.53	< 0.19	< 0.12	1.6	0.55	0.73	3	1.2
Average*	7.46	12.38	0.40	0.00	0.00	1.75	0.76	0.75	3.69	1.37
Standard Deviation	0.00	0.28	0.13	0.00	0.00	0.17	0.21	0.02	0.69	0.21
Relative Standard Deviation	0.1%	2.3%	32.2%	?	?	9.5%	28.1%	2.6%	18.8%	15.7%

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; HEPT = heptachlor.

Replicate sample analyses are identified by jar #.

* When an analyte was detected in some, but not all of the replicates, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the replicates, zero is reported for the average and the SD and a "?" is reported for the RSD.

Table 1l-p1: QA: Concentrations (ng/g, wet weight) of chlorobiphenyl congeners (chlorination level/IUPAC number) in flatfish tissue analyzed in replicate as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	3/18	3/28	4/44	4/52	4/66	5/101	5/105	5/118	6/128	6/138	6/153	7/170	7/180	7/187	8/195	9/206	10/209	Total PCBs**
Tissue - liver																		
110-390R	11.7	17.3	27.3	95.4	57	348	63.5	280	30.1	267	320	21.4	19.7	39	2.6	11.1	6.3	3200
110-394R	11.3	17.6	27.1	93	57.4	351	61.5	331	31	279	336	22.4	20.9	39.9	2.7	11.4	6.8	3400
Average*	11.50	17.47	27.17	94.20	57.20	349.52	62.47	305.14	30.53	272.78	328.09	21.90	20.30	39.45	2.65	11.24	6.54	3316.32
Standard Deviation	0.17	0.17	0.09	1.21	0.21	1.51	0.98	25.56	0.48	6.20	8.00	0.45	0.60	0.49	0.02	0.18	0.25	83.38
Relative Stand. Dev.	1.4%	1.0%	0.3%	1.3%	0.4%	0.4%	1.6%	8.4%	1.6%	2.3%	2.4%	2.1%	3.0%	1.2%	0.8%	1.6%	3.9%	2.5%
110-446	95.6	4.9	10	51.1	24	185	47.9	270	41.9	422	550	97.6	134	197	22	212	86.5	4900
110-448	98.3	4.7	9.6	52.4	22.5	193	47.9	281	43.1	441	576	103	142	214	23.3	231	94	5200
Average*	96.95	4.79	9.79	51.72	23.25	189.05	47.92	275.33	42.51	431.23	562.72	100.29	138.17	205.46	22.65	221.61	90.26	5027.40
Standard Deviation	1.36	0.11	0.22	0.64	0.73	3.97	0.00	5.62	0.61	9.32	12.78	2.67	3.99	8.29	0.63	9.19	3.76	123.54
Relative Stand. Dev.	1.4%	2.3%	2.2%	1.2%	3.2%	2.1%	0.0%	2.0%	1.4%	2.2%	2.3%	2.7%	2.9%	4.0%	2.8%	4.1%	4.2%	2.5%
Tissue - stomach contents																		
110-408	0.28	0.78	2.5	5.1	9.2	12.2	0.88	11.6	2.2	17.8	25.1	2.8	3.5	8.3	0.65	3.2	3.6	220
110-460	0.4	0.91	3	4.9	7.2	12.1	1.2	9.8	2.1	16.8	23.7	2.8	3.3	8.7	0.59	3.4	4.1	210
Average*	0.34	0.85	2.76	5.00	8.22	12.15	1.05	10.73	2.10	17.26	24.39	2.84	3.38	8.50	0.62	3.30	3.83	214.67
Standard Deviation	0.06	0.07	0.22	0.08	1.01	0.04	0.16	0.91	0.05	0.51	0.68	0.00	0.08	0.18	0.03	0.14	0.27	4.58
Relative Stand. Dev.	18.5%	7.7%	7.9%	1.6%	12.3%	0.4%	15.7%	8.5%	2.3%	2.9%	2.8%	0.1%	2.4%	2.2%	5.5%	4.2%	7.0%	2.1%

* When an analyte was detected in some, but not all of the replicates, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the replicates, zero is reported for the average and the SD and a "?" is reported for the RSD.

** The concentration reported for "Total PCBs" is the sum of the 17 PCB congeners multiplied by 2 (as defined in the QA Plan).

Table 1J-p1: Standard curve correlation (r) from the linear regression of the concentration of the analyte to the area response for the multilevel standards.

Analyte	H303R[b] r	H304[a] r	H305[b] r	H306[b] r	H307[a] r	H308[a] r
hexachlorobenzene	1.0000	0.9999	0.9996	0.9999	0.9995	0.9998
lindane	1.0000	0.9995	0.9989	0.9994	0.9997	0.9999
3\18	0.9996	0.9999	0.9998	0.9997	0.9999	0.9997
3\28	0.9999	1.0000	1.0000	0.9999	1.0000	1.0000
heptachlor	0.9996	0.9993	0.9994	0.9997	0.9997	0.9992
4\52	0.9998	0.9999	0.9998	0.9997	0.9999	0.9998
aldrin	0.9998	0.9998	0.9997	0.9997	0.9998	0.9998
4\44	0.9998	0.9999	0.9999	0.9998	0.9999	0.9998
4\66	0.9999	1.0000	0.9999	0.9999	1.0000	1.0000
gamma-chlordane	1.0000	1.0000	0.9996	0.9997	1.0000	1.0000
5\101	0.9999	0.9999	0.9999	0.9998	1.0000	0.9999
alpha-chlordane	1.0000	1.0000	0.9998	0.9998	1.0000	1.0000
dieldrin	0.9999	1.0000	0.9995	0.9997	0.9999	0.9998
p,p'-DDE	0.9999	0.9999	0.9997	0.9999	0.9999	0.9999
5\118	1.0000	1.0000	0.9999	0.9998	1.0000	1.0000
p,p'-DDD	0.9999	0.9998	0.9998	0.9999	1.0000	0.9998
6\153	0.9999	1.0000	0.9999	0.9998	0.9999	0.9999
5\105	1.0000	0.9999	1.0000	0.9997	0.9999	1.0000
p,p'-DDT	0.9998	0.9993	0.9999	1.0000	0.9999	0.9996
6\138	1.0000	1.0000	0.9999	1.0000	1.0000	1.0000
7\187	0.9999	1.0000	0.9999	0.9849	1.0000	1.0000
6\128	1.0000	1.0000	0.9999	0.9999	1.0000	1.0000
7\180	1.0000	1.0000	0.9999	0.9999	1.0000	1.0000
7\170	1.0000	1.0000	0.9998	0.9999	0.9999	1.0000
8\195	1.0000	0.9999	0.9997	0.9998	0.9999	1.0000
9\206	1.0000	0.9999	0.9996	0.9998	0.9999	1.0000
10\209	1.0000	0.9999	0.9997	0.9998	0.9999	1.0000

[a]Based on six concentration levels of standards.
[b]Based on eight concentration levels of standards (except HCB, which is based on seven levels).

Table 1K-p1: Continuing calibration verification data* for chlorinated pesticides in standards run before, during and after the samples in a flatfish tissue set analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

ML Name	HCB	LIND	HEPT	Aldrin	α-CHLOR	γ-CHLOR	Dieldrin	p,p'-DDE	p,p'-DDD	p,p'-DDT
H303R										
H303RCH5E1A	96	98	96	101	98	98	99	101	100	98
H303RCH5E1B	95	96	96	99	97	97	98	99	98	96
H303RCH5E1C	90	88	80	90	89	89	87	91	88	81
Average	93	94	91	97	95	95	95	97	95	92
SD	2.8	4.5	7.5	4.6	3.9	4.0	5.4	4.4	5.2	7.2
RSD	3.0%	4.8%	8.3%	4.8%	4.2%	4.3%	5.7%	4.5%	5.5%	7.9%
H304										
H304CH5E1-A	100	95	93	100	97	97	97	99	97	95
H304CH5E1-B	98	102	98	97	97	96	96	97	97	97
H304CH5E1C	99	97	95	98	97	96	96	99	97	92
Average	99	98	95	98	97	96	96	98	97	95
SD	0.6	2.9	2.1	1.1	0.2	0.3	0.5	0.9	0.2	2.2
RSD	0.6%	2.9%	2.2%	1.1%	0.2%	0.3%	0.5%	0.9%	0.2%	2.3%
H305										
H305CH5E1A	88	67	77	69	77	69	72	70	66	91
H305CH5E1B	89	69	83	71	79	71	74	71	68	93
H305CH5E1C	85	64	73	68	75	68	71	70	65	79
Average	88	67	78	69	77	69	72	70	66	87
SD	1.7	2.2	4.3	1.1	1.5	1.3	1.4	0.6	1.1	6.3
RSD	1.9%	3.4%	5.6%	1.5%	1.9%	1.8%	1.9%	0.9%	1.6%	7.2%

HCB = hexachlorobenzene; LIND = lindane; HEPT = heptachlor; CHLOR = chlordane

*Data are reported as percent recovery calculated using the multilevel curve analyzed with each set.

Table 1K-p2: Continuing calibration verification data* for chlorinated pesticides in standards run before, during and after the samples in a flatfish tissue set analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

ML Name	HCB	LIND	HEPT	Aldrin	α-CHLOR	γ-CHLOR	Dieldrin	p,p'-DDE	p,p'-DDD	p,p'-DDT
H306										
H306CH5E1A	95	66	77	72	78	70	69	78	75	93
H306CH5E1B	95	75	78	73	79	71	71	78	79	96
H306CH5E1C	94	72	71	73	78	69	69	76	72	87
Average	95	71	75	73	78	70	70	77	75	92
SD	0.4	4.0	2.9	0.4	0.7	0.8	1.0	1.0	2.7	3.7
RSD	0.4%	5.6%	3.8%	0.6%	0.9%	1.2%	1.4%	1.3%	3.6%	4.1%
H307										
H307CH5E1A	88	95	93	99	96	96	97	98	96	93
H307CH5E1B	89	97	95	97	95	95	95	96	96	94
H307CH5E1C	83	82	86	94	92	92	92	95	89	89
Average	87	91	91	97	94	94	94	97	94	92
SD	2.4	6.7	3.5	2.3	1.9	1.7	1.9	1.3	3.2	2.4
RSD	2.7%	7.4%	3.9%	2.4%	2.0%	1.8%	2.0%	1.4%	3.4%	2.6%
H308										
H308CH5E1-A	112	119	116	122	119	119	121	122	121	117
H308CH5E1-B	92	91	83	98	95	95	90	99	92	86
H308CH5E1-C	95	102	96	104	102	102	103	104	102	97
Average	100	104	98	108	105	105	105	108	105	100
SD	9.1	11.5	13.4	10.3	10.0	10.1	12.7	9.8	11.9	13.1
RSD	9.1%	11.1%	13.6%	9.5%	9.5%	9.6%	12.1%	9.0%	11.3%	13.1%

HCB = hexachlorobenzene; LIND = lindane; HEPT = heptachlor; CHLOR = chlordane

*Data are reported as percent recovery calculated using the multilevel curve analyzed with each set.

Table 1L-p1: Continuing calibration verification data* for chlorobiphenyl congeners (chlorination level/IUPAC number) in standards run before, during and after the samples in a flatfish tissue set analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

ML Name	3/18	3/28	4/44	4/52	4/66	5/101	5/105	5/118	6/128	6/138	6/153	7/170	7/180	7/187	8/195	9/206	10/209
H303R																	
H303RCH5E1A	94	96	95	95	96	96	98	97	98	97	96	98	98	96	98	98	98
H303RCH5E1B	93	95	94	94	96	94	98	95	95	95	95	96	96	94	96	96	96
H303RCH5E1C	90	90	90	90	91	90	89	90	90	90	88	89	89	90	89	89	89
Average	92	93	93	93	94	93	95	94	94	94	93	95	94	93	95	94	94
SD	1.6	2.5	2.2	1.9	2.3	2.3	4.1	3.0	3.4	3.0	3.4	3.8	3.6	2.4	3.9	4.1	4.0
RSD	1.7%	2.7%	2.3%	2.1%	2.5%	2.5%	4.4%	3.2%	3.6%	3.2%	3.7%	4.1%	3.8%	2.6%	4.1%	4.3%	4.2%
H304																	
H304CH5E1-A	94	96	95	95	96	96	97	96	97	96	96	97	97	96	98	98	98
H304CH5E1-B	95	96	95	95	95	95	97	96	96	96	94	96	96	96	96	97	97
H304CH5E1C	96	97	96	96	97	97	99	97	97	97	95	97	97	96	97	96	96
Average	95	96	96	95	96	96	98	96	97	96	95	97	97	96	97	97	97
SD	0.5	0.4	0.5	0.6	0.7	0.6	0.6	0.4	0.4	0.4	0.8	0.5	0.4	0.2	0.6	0.8	0.9
RSD	0.6%	0.4%	0.6%	0.6%	0.7%	0.6%	0.7%	0.4%	0.4%	0.4%	0.9%	0.5%	0.4%	0.2%	0.6%	0.8%	0.9%
H305																	
H305CH5E1A	125	104	119	125	114	126	101	124	113	114	126	101	103	122	99	103	109
H305CH5E1B	125	105	120	126	114	125	98	124	112	114	132	100	103	122	98	102	107
H305CH5E1C	118	101	114	119	108	118	96	117	106	108	120	95	98	115	93	95	100
Average	123	103	118	123	112	123	98	122	111	112	126	99	101	120	97	100	105
SD	3.1	1.7	2.8	2.9	2.7	3.5	2.2	3.5	3.2	3.0	5.2	2.6	2.6	3.2	2.5	3.5	4.0
RSD	2.5%	1.7%	2.4%	2.4%	2.4%	2.9%	2.3%	2.9%	2.9%	2.7%	4.1%	2.6%	2.6%	2.7%	2.6%	3.5%	3.8%

*Data are reported as percent recovery calculated using the multilevel curve analyzed with each set.

Table 1L-p2: Continuing calibration verification data* for chlorobiphenyl congeners (chlorination level/IUPAC number) in standards run before, during and after the samples in a flatfish tissue set analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

ML Name	3/18	3/28	4/44	4/52	4/66	5/101	5/105	5/118	6/128	6/138	6/153	7/170	7/180	7/187	8/195	9/206	10/209
H306																	
H306CH5E1A	134	116	127	132	121	131	108	130	116	119	130	107	108	123	103	106	112
H306CH5E1B	133	117	127	133	123	131	108	131	117	119	134	106	108	124	101	104	110
H306CH5E1C	131	115	124	130	119	127	107	127	113	115	126	103	105	121	98	99	104
Average	133	116	126	132	121	130	108	129	116	118	130	105	107	123	101	103	109
SD	1.3	0.8	1.1	1.1	1.5	1.5	0.4	1.8	1.7	1.7	3.3	1.8	1.4	1.5	2.0	2.8	3.2
RSD	1.0%	0.7%	0.9%	0.8%	1.3%	1.2%	0.4%	1.4%	1.4%	1.4%	2.5%	1.7%	1.3%	1.2%	1.9%	2.7%	3.0%
H307																	
H307CH5E1A	93	95	94	93	94	94	96	95	96	95	94	96	96	95	97	97	97
H307CH5E1B	96	96	96	96	96	96	95	95	95	95	97	95	95	95	95	95	95
H307CH5E1C	88	90	89	88	90	89	93	90	90	90	87	91	91	89	91	90	90
Average	92	94	93	93	93	93	95	93	94	94	93	94	94	93	94	94	94
SD	3.1	2.6	2.7	3.2	2.4	2.9	1.4	2.4	2.5	2.4	3.9	2.5	2.4	2.6	2.6	2.7	2.8
RSD	3.4%	2.8%	2.9%	3.4%	2.6%	3.1%	1.5%	2.6%	2.6%	2.6%	4.2%	2.6%	2.5%	2.8%	2.7%	2.9%	3.0%
H308																	
H308CH5E1-A	115	117	116	116	117	116	119	118	119	118	116	119	119	117	119	119	118
H308CH5E1-B	94	96	94	95	95	95	94	95	96	95	97	96	96	95	96	95	95
H308CH5E1-C	96	99	98	96	98	97	100	98	99	98	98	99	99	97	99	99	98
Average	102	104	103	102	104	103	104	104	104	104	104	104	105	103	105	104	104
SD	9.5	9.6	9.4	9.5	9.7	9.8	10.7	10.0	10.1	10.0	8.9	10.4	10.0	10.0	10.3	10.5	10.4
RSD	9.4%	9.2%	9.1%	9.3%	9.3%	9.5%	10.3%	9.7%	9.7%	9.6%	8.6%	10.0%	9.6%	9.7%	9.9%	10.1%	10.1%

*Data are reported as percent recovery calculated using the multilevel curve analyzed with each set.

Table 1M-p1: Concentrations of analytes in 7 replicates of spiked clean matrix and calculated method detection limits (MDL, ng/g, wet weight) for pesticides, DDTs and chlorobiphenyl congeners. MDLs were calculated by the method in appendix B of 40CFR part 136 (sample set 11288, 3/95).

Sample#	HCB	LIND	HEPT	Aldrin	alpha chlordan	gamma chlordan	Dieldrin	p,p'-DDD	p,p'-DDE	p,p'-DDT	3\18	3\28	4\44	4\52
110-288	6.7	6.5	7.3	5.8	6.5	0.2	6.5	6.9	7.3	7.4	6.7	6.7	7.1	6.9
110-289	6.6	6.2	7.1	5.4	6.2	0.1	6.1	6.4	7.0	7.2	6.7	6.5	7.1	7.0
110-290	6.4	6.2	7.2	5.5	6.3	0.1	6.2	6.5	7.1	7.4	6.4	6.5	7.0	6.8
110-291	6.5	6.4	7.4	5.7	6.4	0.1	6.4	6.8	7.3	7.6	6.1	6.8	7.1	6.9
110-292	6.6	6.8	7.7	5.9	6.5	0.2	6.6	7.8	7.5	7.7	6.1	6.7	7.2	6.8
110-293	6.3	6.6	7.5	5.4	6.3	0.2	6.3	6.8	7.2	7.4	6.4	6.4	7.1	6.8
110-294	6.5	6.4	7.4	5.5	6.4	0.1	6.3	6.7	7.2	7.8	6.6	6.5	7.1	6.9
Average	6.5	6.4	7.4	5.6	6.4	0.2	6.4	6.8	7.2	7.5	6.4	6.6	7.1	6.9
Std Dev	0.13	0.22	0.19	0.21	0.13	0.02	0.18	0.45	0.17	0.22	0.25	0.15	0.05	0.07
MDL	0.41	0.68	0.58	0.65	0.41	0.06	0.57	1.41	0.54	0.70	0.78	0.46	0.16	0.21
3XMDL	1.22	2.03	1.75	1.95	1.24	0.18	1.70	4.23	1.63	2.11	2.34	1.38	0.48	0.63

Sample#	4\66	5\101	5\105	5\118	6\128	6\138	6\153	7\170	7\180	7\187	8\195	9\206	10\209
110-288	6.8	6.7	6.2	5.6	6.3	6.9	6.9	6.4	6.3	6.4	6.1	6.2	6.3
110-289	6.7	6.7	5.8	5.4	6.1	6.8	6.9	6.1	6.1	6.3	5.9	6.0	6.2
110-290	6.6	6.6	6.0	5.5	6.1	6.8	6.7	6.1	6.0	6.3	6.0	6.1	6.1
110-291	6.8	6.7	6.2	5.6	6.2	7.1	6.9	6.3	6.1	6.4	6.1	6.2	6.3
110-292	6.8	6.6	6.2	5.5	6.3	7.0	6.9	6.3	6.2	6.4	6.2	6.3	6.3
110-293	6.7	6.7	6.2	5.7	6.1	7.0	6.6	6.4	6.2	6.2	6.1	6.3	6.4
110-294	6.7	6.7	6.2	5.5	6.2	7.0	6.8	6.3	6.3	6.4	6.1	6.2	6.3
Average	6.7	6.7	6.1	5.5	6.2	7.0	6.8	6.3	6.2	6.3	6.1	6.2	6.3
Std Dev	0.06	0.06	0.15	0.08	0.09	0.11	0.10	0.12	0.11	0.09	0.08	0.10	0.09
MDL	0.20	0.18	0.48	0.26	0.28	0.34	0.32	0.38	0.33	0.27	0.27	0.31	0.29
3XMDL	0.60	0.55	1.43	0.77	0.85	1.03	0.96	1.14	1.00	0.82	0.80	0.92	0.86

HCB = Hexachlorobutadiene, LIND = Lindane, HEPT = Heptachlor.

MDLs were determined using 3g of tissue. MDLs for samples that are smaller that 3g will need to be adjusted for the difference in sample weight.

Table 1N-p1: GC/MS confirmation of pesticides in 10% of the flatfish tissue samples analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study. (Concentrations shown are originally reported data determined by GC/ECD, Table 1B.)

Set#	Sample#	Jar #*	HCBD[3]	HCB[1]	LIND[2]	HEPT[2]	Aldrin[2]	α + γ Chlordane[1]	Dieldrin[2]	p,p'-DDE[1]	p,p'-DDD[1]	p,p'-DDT[1]
H303R	110-397R	94.3065,3066,3069/3071	8.3	24.2	0.62	4.1	< 0.16	11.6	2.6	72.2	116	24.9
H304	110-419	94.3089, 3092/3095	4.9	18	0.54	< 0.14	0.56	6.1	3.5	52.8	133	23.3
H306	110-433	94.3325/3326,3329/3330,3339	0.33	1.6	0.82	0.68	< 0.13	2	1.6	10.5	3.9	1.5
H305	110-443	94.3158/3160,3162/3163	243	102	0.81	< 0.16	< 0.13	4.4	< 0.13	22	20.8	8.1
H307	110-402	94.3002,3003,3015,3016,3034	0.52	1.9	< 0.13	< 0.16	1.9	0.83	0.76	6.3	11.2	1.5
H308	110-465	94.3575,3576,3577	0.96	7.1	3	< 0.13	< 0.087	1.6	3.3	30.4	116	90.4

HCBD = hexachlorobutadiene; HCB = hexachlorobenzene; LIND = lindane; HEPT = heptachlor

*Jar #s represent official Hylebos Damage Assessment sampling numbers. If more than one jar # is given, the sample analyzed was a composite of those jars.

[1] The presence of this analyte has been confirmed by GC/MS using a selected ion monitoring mode for the samples listed.
[2] The concentration of this analyte was too low to be confirmed by GC/MS in these tissue samples.
[3] The presence of this analyte has been confirmed by GC/MS using a selected ion monitoring mode for the samples listed, except in 110-433 and 110-402.

Approximate detection limits determined by GC/MS (based on the CH3E1 ML Std for chlorinated pesticides) range from ≈0.5 to ≈ 3 ng/g.

Table 1O-p1: GC/MS confirmation of chlorobiphenyl congeners (chlorination level/IUPAC number) in 10% of the flatfish tissue samples analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study. (Concentrations shown are originally reported data determined by GC/ECD, Table 1C.)

Sample#	3/18[1]	3/28[1]	4/44[1]	4/52[1]	4/66[1]	5/101[1]	5/105[1]	5/118[1]	6/126[1]	6/138[1]	6/153[1]	7/170[1]	7/180[1]	7/187[1]	8/195[1]	9/206[1]	10/209[1]
110-397R	10.8	19.8	49.2	167	54.3	581	116	< 0.21	66	437	561	37.5	38	58.9	4.2	21.2	13.8
110-419	17.1	15.1	34.1	110	30.9	437	63.1	345	43.2	348	443	26.2	22	39.6	2.9	16.4	10.8
110-433	0.58	0.95	2.2	3.5	2.8	12.2	2.3	10.7	3.7	27.6	36.2	5.3	8.4	14	1	3.7	2.3
110-443	56.7	3.7	7.7	28.9	19.3	83.2	23.8	89.8	20	176	255	44.3	72.9	73.8	10	120	42.4
110-402	4.5	7.4	10.8	20.2	10.7	47.7	8.5	38.5	5.6	33	43.6	2.9	1.8	4.3	0.23	0.8	0.61
110-465	6.8	6.7	36.2	110	35.2	286	59.2	190	14.4	100	111	9.2	3.2	6.6	0.35	2.6	1.9

[1]The presence of this analyte has been confirmed by GC/MS using a selected ion monitoring mode for the samples listed.

Detection limits determined by GC/MS (based on the CH3E1 ML Std, for chlorobiphenyl congeners) range from ≈0.5 to ≈1 ng/g.

Hylebos Toxicopathic Conditions in Flatfish Study

Analyses for Aromatic Hydrocarbons
Table 2 Notes

The concentrations of the analytes naphthalene and 2-methylnaphthalene were calculated using naphthalene-d8 as the surrogate standard; analytes from acenaphthylene through pyrene were calculated using acenaphthene-d10 as the surrogate standard; and analytes from benz[a]anthracene through benzo[ghi]perylene were calculated using benzo[alpyrene-d12 as the surrogate standard.

The “less than” symbol (<) indicates that the analyte was not detected in concentrations above the stated value.

Results were determined by gas chromatography/mass spectrometry (GC/MS).

Concentrations less than 10 ng/g are rounded to two significant figures; concentrations greater than or equal to 10 ng/g are rounded to three significant figures.

The percent recoveries of the surrogate standards were calculated using phenanthrene-d10 to correct for the fraction of the total extract used for the HPLC clean-up step.

Set # and Sample # designations are intended for internal lab use and identification only. Jar # and site name represent Hylebos Damage Assessment official sample identification designations.

The sample weights used to calculate concentrations for the method blank are the mean sample weights calculated for the field samples in the same set.

Table 2A-p1: Sample information for flatfish stomach contents analyzed for aromatic hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample#	Sample Type	Species	Jar #*	Site	Date Collected	Sample Wt. (g)	DNPH Rec. (%)	DACE Rec. (%)	DBAP Rec. (%)
H307	110-402	Tissue - stomach contents	English sole	94.3002,3003,3015,3016,3034	UPPER TURNING	7/21/94	3.01	62	81	77
H307	110-403	Tissue - stomach contents	English sole	94.3039,3046,3048,3049,3053	UPPER TURNING	7/21/94	3.06	64	78	85
H307	110-405	Tissue - stomach contents	English sole	94.3061,3062,3067,3082,3084	LOWER TURNING	7/22/94	3.06	68	81	77
H307	110-404	Tissue - stomach contents	English sole	94.3063,3064,3068,3072,3081	LOWER TURNING	7/22/94	3.02	69	78	77
H307	110-406	Tissue - stomach contents	English sole	94.3121/3124,3126,3131	11TH STREET BRIDGE	7/26/94	1.86	75	86	91
H307	110-407	Tissue - stomach contents	English sole	94.3132,3139,3145,3146,3149	11TH STREET BRIDGE	7/26/94	3.01	63	77	85
H307	110-408	Tissue - stomach contents	Rock Sole	94.3152,3153,3155/3157	11TH STREET BRIDGE	7/25/94	3.00	68	78	87
H308	110-460	Tissue - stomach contents	Rock Sole	94.3152,3153,3155/3157	11TH STREET BRIDGE	7/25/94	3.00	59	77	90
H307	110-409	Tissue - stomach contents	Rock Sole	94.3158/3160,3162,3163	11TH STREET BRIDGE	7/26/94	3.01	74	80	82
H308	110-458	Tissue - stomach contents	English sole	94.3311,3312,3314,3315,3316	COLVOS PASSAGE	9/22/94	3.00	92	83	83
H308	110-459	Tissue - stomach contents	English sole	94.3317,3318,3319,3333,3335	COLVOS PASSAGE	9/22/94	2.53	85	80	84
H308	110-457	Tissue - stomach contents	English sole	94.3325,3326,3329,3330,3339	COLVOS PASSAGE	9/22/94	1.70	106	89	84
H307	110-410	Tissue - stomach contents	Rock Sole	94.3416,3417,3421,3423,3424	COLVOS PASSAGE	7/19/94	3.01	70	77	76
H307	110-411	Tissue - stomach contents	Rock Sole	94.3425/3429	COLVOS PASSAGE	7/19/94	2.78	70	80	89

DNPH = naphthalene-d8; DACE = acenaphthene-d10; DBAP = benzo[a]pyrene-d12.

*Jar #s represent official Hylebos Damage Assessment sampling numbers. If more than one jar # is given, the sample analyzed was a composite of those jars.

Table 2B-p1: Concentrations (ng/g, wet weight) of aromatic hydrocarbons in flatfish stomach contents analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	NPH	2MN	ACY	ACE	FLU	PHN	ANT	ΣLAHs	FLA	PYR	BAA	CHR	BFLA	BAP	IDP	DBA	BZP	ΣHAHs
110-402	10	18.6	9.6	62.8	65.8	286	211	663	3140	2670	611	1180	1040	535	70.5	23.8	90.8	9370
110-403	5.1	5	4.4	19.4	18.7	120	57.4	230	1680	3590	430	1090	1330	393	99.2	35.4	127	8780
110-405	5.3	7.4	1.9	18.2	24.1	142	38.1	237	451	642	101	269	330	89.6	51.6	8.6	40.1	1980
110-404	6.1	6.2	7.9	71.7	21.1	96.1	43.7	253	676	905	155	400	431	117	32.8	12.3	56.8	2790
110-406	11.5	9.4	2.7	7.6	16	74.5	54.2	176	215	211	67	117	154	50.9	19.4	5.9	28.3	868
110-407	18.1	11.8	5	13	18.7	114	37.7	218	362	354	108	173	257	80.7	32	10.6	45.5	1420
110-408	6.7	6.2	3	6.4	10.2	80.6	23.3	136	254	238	108	204	324	122	61.9	16.2	88.6	1420
110-460	8.3	7.1	2	4.1	6.3	46.1	17.7	91.7	170	182	87.3	159	288	93.3	56.9	13	77.6	1130
110-409	6.2	3.3	.96	5.8	7.3	56.6	9.3	89.5	102	83.4	38.5	50.9	62.2	21.5	7.6	2.1	8.5	376
110-458	0.89	0.87	< 0.13	< 0.18	0.23	1.1	0.15	3.3	3.8	2.9	1	2.1	3.1	0.84	0.87	0.12	1.2	15.9
110-459	1.5	1.5	< 0.18	< 0.24	0.31	2.1	0.26	5.7	6.1	4.6	1.3	2.8	5.1	1.4	1.4	0.18	2.3	25.1
110-457	1.3	1.4	< 0.22	< 0.29	0.34	1.4	0.21	4.6	3.3	2.6	0.73	1.7	3.3	1.1	1	0.12	1.1	14.9
110-410	1.1	1	< 0.4	< 0.53	< 0.41	0.87	< 0.27	3	3.3	1.6	0.46	1.7	1.7	0.43	0.28	< 0.15	2	11.4
110-411	1.6	1.3	< 0.39	< 0.52	< 0.4	0.89	< 0.26	3.8	2.6	1.8	0.3	0.88	.95	0.36	0.2	< 0.13	0.38	7.5

NPH = naphthalene; 2MN = 2-methylnaphthalene; ACY = acenaphthylene; ACE = acenaphthene; FLU = fluorene; PHN = phenanthrene; ANT = anthracene; FLA = fluoranthene; PYR = pyrene; BAA = benz[a]anthracene; CHR = chrysene; BFLA = benzo[b]fluoranthene + benzo[k]fluoranthene; BAP = benzo[a]pyrene; IDP = indeno[1,2,3-cd]pyrene; DBA = dibenz[a,h]anthracene; BZP = benzo[ghi]perylene.

ΣLAHs = NPH + 2MN + ACY + ACE + FLU + PHN + ANT; ΣHAHs = FLA + PYR + BAA + CHR + BLFA + BAP + IDP + DBA + BZP.

† Chrysene (CHR) and triphenylene are not resolved by our gas chromatographic procedure. In addition, the two compounds have very similar spectra, therefore we report their combined concentrations as "CHR".

Table 2C-p1: Quality assurance sample information in method blanks and standard reference material (SRM 1974a) analyzed for aromatic hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample #	Sample type	Sample Wt. (g)	DNPH Rec. (%)	DACE Rec. (%)	DBAP Rec. (%)
Method Blank						
H307	110-413	Method Blank	2.88	79	85	66
H308	110-467	Method Blank	2.04	85	79	50
SRM 1974a						
H307	110-412	SRM 1974a	3.06	70	81	85
H308	110-466	SRM 1974a	3.01	84	79	80

DNPH = naphthalene-d8; DACE = acenaphthene-d10; DBAP = benzo[a]pyrene-d12.

Table 2D-p1: QA: Concentrations (ng/g, wet weight) of aromatic hydrocarbons in method blanks and standard reference material (SRM 1974a) analyzed as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	Sample Type	NPH	2MN	ACY	ACE	FLU	PHN	ANT	ΣLAHs	FLA	PYR	BAA	CHR†	BFLA	BAP	IDP	DBA	BZP	ΣHAHs
Method Blank																			
110-413	Method Blank	1.1	0.86	<0.44	<0.58	<0.45	0.44	<0.3	2.5	<0.25	<0.23	<0.29	<0.28	<0.22	<0.24	<0.21	<0.21	<0.19	0
110-467	Method Blank	0.77	0.55	<0.19	<0.26	<0.22	0.3	<0.17	1.6	0.17	0.13	<0.22	<0.17	<0.13	<0.14	<0.16	<0.15	<0.12	.29
	Average*	0.96	0.71	0.00	0.00	0.00	0.37	0.00	2.0	0.08	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.1
	Standard Deviation	0.2	0.2	0.0	0.0	0.0	0.1	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Relative Standard Dev.	19.4%	22.2%	?	?	?	18.9%	?	20.3%	100.0%	100.0%	?	?	?	?	?	?	?	100.0%
SRM 1974a																			
110-412	SRM 1974a	1.8	1.4	<0.32	1.7	0.39	2.2	0.6	8.3	23.5	21.4	3.3	10.4	9	1.7	1.4	0.36	2.8	73.9
110-466	SRM 1974a	1.3	1	0.5	<0.34	0.45	2.8	0.87	7	28.7	27.4	4.9	11.8	10.6	2.1	1.7	0.32	3.4	90.8
	Average*	1.56	1.20	0.41	0.83	0.42	2.48	0.74	7.6	26.07	24.39	4.09	11.09	9.79	1.91	1.54	0.34	3.11	82.3
	Standard Deviation	0.2	0.2	0.1	0.8	0.0	0.3	0.1	0.7	2.6	3.0	0.8	0.7	0.8	0.2	0.1	0.0	0.3	8.4
	Relative Standard Dev.	13.9%	15.4%	22.8%	100.0%	7.4%	11.8%	18.3%	9.0%	10.0%	12.2%	19.7%	6.3%	8.2%	8.5%	7.3%	5.9%	9.2%	10.2%
SRM 1974a Certified Concentrations (ng/g, wet wt)	$\bar{x}$	2.68	1.16[1]	0.598[1]	0.359[1]	0.65[1]	2.68	0.69		18.6	17.3	3.7	5.04	7.58[1]	1.78	1.62	0.142[1]	2.50	
	95% CI	0.50					0.28	0.20		1.0	0.74	0.54	0.26		0.073	0.32		0.25	
	UCL	4.29					4.00	1.20		26.5	24.3	5.74	7.16		2.50	2.62		3.71	
	LCL	1.42					1.56	0.32		11.4	10.7	2.06	3.11		1.11	0.85		1.46	
SRM 1974a Previously Analyzed Concs (ng/g, wet wt, n=6)	$\bar{x}$	2.2	1.7	0.42	nd	0.46	2.4	0.61		25	23	4.0	11	9.2	2.0	2.0	0.36	3.0	
	S.D.	0.5	0.4	0.06	--	0.05	0.2	0.16		2.3	2.2	0.6	0.4	0.3	0.1	0.2	0.07	0.3	

NPH = naphthalene; 2MN = 2-methylnaphthalene; ACY = acenaphthylene; ACE = acenaphthene; FLU = fluorene; PHN = phenanthrene; ANT = anthracene; FLA = fluoranthene; PYR = pyrene; BAA = benz[a]anthracene; CHR = chrysene; BFLA = benzo[b]fluoranthene + benzo[k]fluoranthene; BAP = benzo[a]pyrene; IDP = indeno[1,2,3-cd]pyrene; DBA = dibenz[a,h]anthracene; BZP = benzo[ghi]perylene.

ΣLAHs = NPH + 2MN + ACY + ACE + FLU + PHN + ANT; ΣHAHs = FLA + PYR + BAA + CHR + BLFA + BAP + IDP + DBA + BZP.

$\bar{x}$ = the average concentration (ng/g, wet wt); 95% CI = the 95% confidence interval; UCL = the upper confidence limit (95% confidence limit + 35%); LCL = the lower confidence limit (95% confidence limit - 35%).

n = the number of values being averaged; S.D.= the standard deviation; nd = not detected in previous samples, or detected at levels below the limit of detection.

† Chrysene (CHR) and triphenylene are not resolved by our gas chromatographic procedure, whereas these compounds are resolved by the NIST procedure. In addition, the two compounds have very similar mass spectra, therefore we report their combined concentrations as "CHR". Consequently, the value we report for CHR is higher than the NIST value.

[1]2MN, ACY, ACE, FLU, BFLA, and DBA are reported as noncertified values.

* When an analyte was detected in some, but not all of the method blanks or SRMs, the average concentration is based on the concentration when detected and zero when not detected. When an analyte was not detected in any of the method blanks or SRMs, zero is reported for the average and the SD and a "?" is reported for the RSD.

Table 2E-p1: QA: Sample information for flatfish stomach contents analyzed in replicate for aromatic hydrocarbons as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Set #	Sample #	Sample Type	Species	Site	Date Collected	Sample Wt. (g)	DNPH Rec. (%)	DACE Rec. (%)	DBAP Rec. (%)
H307	110-408	Tissue - stomach contents	Rock Sole	11TH STREET BRIDGE	7/25/94	3.00	68	78	87
H308	110-460	Tissue - stomach contents	Rock Sole	11TH STREET BRIDGE	7/25/94	3.00	59	77	90

DNPH = naphthalene-d8; DACE = acenaphthene-d10; DBAP = benzo[a]pyrene-d12

Replicate sample analyses are identified by jar #.

*Jar #s represent official Hylebos Damage Assessment sampling numbers. If more than one jar # is given, the sample analyzed was a composite of those jars.

Table 2F-p1: QA: Concentrations (ng/g, wet weight) of aromatic hydrocarbons in flatfish stomach contents analyzed in replicate as part of the Hylebos Toxicopathic Conditions in Flatfish Study.

Sample #	NPH	2MN	ACY	ACE	FLU	PHN	ANT	ΣLAHs	FLA	PYR	BAA	CHR	BFLA	BAP	IDP	DBA	BZP	ΣHAHs
Tissue - stomach contents																		
110-408	6.7	6.2	3	6.4	10.2	80.6	23.3	136	254	238	108	204	324	122	61.9	16.2	88.6	1420
110-460	8.3	7.1	2	4.1	6.3	46.1	17.7	91.7	170	182	87.3	159	288	93.3	56.9	13	77.6	1130
Average	7.5	6.6	2.5	5.3	8.2	63.4	20.5	114.0	212	210	98	182	306	107	59	15	83	1271.7
Standard Deviation	0.8	0.5	0.5	1.2	2.0	17.2	2.8	22.35	42.0	28.1	10.6	22.4	17.9	14.2	2.5	1.6	5.5	144.90
Relative Standard Dev.	11.2%	7.2%	19.2%	22.7%	23.8%	27.2%	13.6%	19.6%	19.8%	13.4%	10.8%	12.3%	5.8%	13.2%	4.3%	11.1%	6.6%	11.4%

NPH = naphthalene; 2MN = 2-methylnaphthalene; ACY = acenaphthylene; ACE = acenaphthene; FLU = fluorene; PHN = phenanthrene; ANT = anthracene; FLA = fluoranthene; PYR = pyrene; BAA = benz[a]anthracene; CHR = chrysene; BFLA = benzo[b]fluoranthene + benzo[k]fluoranthene; BAP = benzo[a]pyrene; IDP = indeno[1,2,3-cd]pyrene; DBA = dibenz[a,h]anthracene; BZP = benzo[ghi]perylene.

ΣLAHs = NPH + 2MN + ACY + ACE + FLU + PHN + ANT; ΣHAHs = FLA + PYR + BAA + CHR + BLFA + BAP + IDP + DBA + BZP.

Replicate sample analyses are identified by jar #.

† Chrysene (CHR) and triphenylene are not resolved by our gas chromatographic procedure. In addition, the two compounds have very similar spectra, therefore we report their combined concentrations as "CHR".

Table 2G-p1: Standard curve correlation (r) from the linear regression of the concentration of the analyte to the area response for the multilevel standards.

Analyte	H307 r	H308 r
naphthalene	0.9998	0.9999
2-methylnaphthalene	0.9998	0.9998
acenaphthylene	0.9994	0.9994
acenaphthene	0.9998	0.9998
fluorene	0.9998	0.9997
phenanthrene	0.9996	0.9998
anthracene	0.9996	0.9996
fluoranthene	0.9995	0.9997
pyrene	0.9996	0.9997
benz[a]anthracene	0.9995	0.9994
chrysene	0.9994	0.9998
benzofluoranthenes (b+k)	0.9994	0.9997
benzo[a]pyrene	0.9995	0.9998
indeno[1,2,3-cd]pyrene	0.9995	0.9995
dibenz[a,h]anthracene	0.9994	0.9995
benzo[ghi]perylene	0.9995	0.9998
d8-naphthalene	0.9998	0.9999
d10-acenaphthene	0.9997	0.9998
d12-benzo[a]pyrene	0.9995	0.9997

Based on five concentration levels of standards.

Table 2H-p1: Continuing calibration verification data* for aromatic hydrocarbons in standards run before, during and after the samples in a tissue set analyzed as part of the Hylebos Flatfish Toxicopathic Conditions in Flatfish Study.

ML Name	NPH	2MN	ACY	ACE	FLU	PHN	ANT	FLA	PYR	BAA	CHR	BFLA	BAP	IDP	DBA	BZP
H307																
H307AH4J2A	97	103	101	100	108	104	101	104	102	100	102	101	102	97	99	101
H307AH4J2B	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
H307AH4J2C	88	93	95	93	97	106	103	107	105	106	107	104	106	103	108	103
Average	95	99	99	98	102	103	101	104	102	102	103	102	103	100	102	101
SD	5.1	4.0	2.5	3.1	4.8	2.5	1.1	3.0	2.0	2.8	3.1	2.0	2.3	2.4	3.7	1.3
RSD	5.4%	4.1%	2.6%	3.2%	4.7%	2.4%	1.1%	2.9%	2.0%	2.8%	3.0%	1.9%	2.3%	2.4%	3.7%	1.3%
H308																
H308AH4J2A	116	118	101	105	104	100	94	93	92	84	98	89	92	77	78	80
H308AH4J2B	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
H308AH4J2C	99	126	107	106	100	99	105	100	97	106	95	95	91	102	100	92
Average	105	114	103	104	101	100	100	98	97	96	98	95	94	93	93	91
SD	7.7	10.7	3.3	2.8	2.0	0.4	4.2	3.4	3.3	9.3	2.0	4.3	4.0	11.3	10.4	8.2
RSD	7.3%	9.3%	3.2%	2.6%	1.9%	0.4%	4.2%	3.4%	3.4%	9.6%	2.1%	4.6%	4.3%	12.1%	11.2%	9.1%

NPH = naphthalene; 2MN = 2-methylnaphthalene; ACY = acenaphthylene; ACE = acenaphthene; FLU = fluorene; PHN = phenanthrene; ANT = anthracene; FLA = fluoranthene; PYR = pyrene; BAA = benz[a]anthracene; CHR = chrysene; BFLA = benzo[b]fluoranthene + benzo[k]fluoranthene; BAP = benzo[a]pyrene; IDP = indeno[1,2,3-cd]pyrene; DBA = dibenz[a,h]anthracene; BZP = benzo[ghi]perylene.

*Data are reported as percent recovery calculated using the -B standard.

Table 21-p1: Concentrations of analytes in 7 replicates of spiked clean matrix and calculated method detection limits (MDL, ng/g, wet weight) for aromatic hydrocarbons. MDLs were calculated by the method in appendix B of 40CFR part 136 (sample set 11288, 3/95).

Sample	NPH	2MN	ACY	ACE	FLU	PHN	ANT	FLA	PYR	BAA	CHR	BBF	BKF	BAP
110-288	10.1	8.2	5.8	6.3	6.4	7.2	4.9	7.1	6.8	4.4	4.9	5.0	5.3	4.6
110-289	11.0	8.1	5.9	6.6	6.6	7.3	4.9	7.1	7.0	4.5	5.1	5.1	5.6	4.7
110-290	9.6	7.8	5.6	6.3	6.3	6.9	4.6	6.7	6.6	4.4	5.0	4.9	5.2	4.5
110-291	9.9	7.9	5.7	6.5	6.3	7.1	4.8	6.9	6.8	4.7	5.3	5.0	5.5	4.8
110-292	10.4	8.0	5.8	6.6	6.6	7.3	4.9	7.2	7.2	4.7	5.5	5.1	5.6	4.7
110-293	10.0	7.7	5.8	6.6	6.5	7.3	4.8	7.0	6.9	4.6	5.4	4.8	5.7	4.6
110-294	9.9	7.6	5.3	6.2	6.2	7.0	4.6	7.0	6.8	4.4	5.2	4.6	5.6	4.5
Average	10.1	7.9	5.7	6.5	6.4	7.1	4.8	7.0	6.9	4.5	5.2	4.9	5.5	4.6
Std Dev	0.47	0.21	0.18	0.18	0.16	0.16	0.15	0.16	0.18	0.14	0.20	0.20	0.19	0.12
MDL	1.47	0.66	0.57	0.55	0.51	0.51	0.48	0.52	0.56	0.45	0.64	0.62	0.60	0.37
3XMDL	4.40	1.99	1.70	1.66	1.54	1.52	1.44	1.55	1.67	1.35	1.91	1.85	1.80	1.12

Sample	IDP	DBA	BZP
110-288	4.1	3.7	4.4
110-289	4.8	3.8	4.4
110-290	4.6	3.9	4.4
110-291	4.6	3.9	4.5
110-292	4.6	3.8	4.5
110-293	4.1	3.7	4.4
110-294	3.8	3.1	3.6
Average	4.4	3.7	4.3
Std Dev	0.37	0.28	0.33
MDL	1.17	0.87	1.03
3XMDL	3.50	2.62	3.08

NPH = naphthalene; 2MN = 2-methylnaphthalene; ACY = acenaphthylene; ACE = acenaphthene; FLU = fluorene; PHN = phenanthrene; ANT = anthracene; FLA = fluoranthene; PYR = pyrene; BAA = benz[a]anthracene; CHR = chrysene; BBF = benzo[b]fluoranthene; BBK = benzo[k]fluoranthene; BAP = benzo[a]pyrene; IDP = indeno[1,2,3-cd]pyrene; DBA = dibenz[a,h]anthracene; BZP = benzo[ghi]perylene.

MDLs were determined using 3g of tissue. MDLs for samples that are smaller that 3g will need to be adjusted for the difference in sample weight.