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This is Appendices D-10 through D-13 for the report:

Control of Toxic Chemicals in Puget Sound: Assessment of Selected Toxic Chemicals in the Puget Sound Basin, 2007-2011. www.ecy.wa.gov/biblio/1103055.html

Appendix D-10. Table 1. Sediment quality values used to evaluate sediment chemistry data for effects to benthic organisms.

Chemical	Units unless otherwise noted	Freshwater Thresholds						Marine Thresholds						
		TEL	PEL	TEC	PEC	FP SQS	FP CSL	TEL	PEL	LAET	2AET	Units for SQS and CSL	SQS	CSL
Arsenic	mg/kg dw	5.9	17	9.79	33	20	51	7.24	41.6	35	63	mg/kg dw	57	93
Cadmium	mg/kg dw	0.596	3.53	0.99	4.98	1.1	1.5	0.676	4.21	2.7	4	mg/kg dw	5.1	6.7
Copper	mg/kg dw	35.7	196.6	31.6	149	80	830	18.7	108	231	300	mg/kg dw	390	390
Lead	mg/kg dw	35	91.3	35.8	128	340	430	30.2	112	245	336	mg/kg dw	450	530
Mercury	mg/kg dw	0.174	0.486	0.18	1.06	0.28	0.75	0.13	0.696	0.59	1.4	mg/kg dw	0.41	0.59
Zinc	mg/kg dw	123.1	314.8	121	459	130	400	124	271	403	530	mg/kg dw	410	960
Total PCBs	µg/kg dw	34.1	277.2	59.8	676	60	120	21.6	189	130	514	mg/kg OC	12	65
2,3,7,8-TCDD/TCDFs	µg/kg dw	0.00085	0.0215					0.00085	0.0215					
Total DDTs	µg/kg dw	7	4450	5.28	572			3.89	51.7	24	37			
Naphthalene	µg/kg dw	34.6	391	176	561	500	1300	34.6	391	850	1300	mg/kg OC	99	170
Acenaphthylene	µg/kg dw	5.87	128			470	640	5.87	128	73	130	mg/kg OC	66	66
Acenaphthene	µg/kg dw	6.71	88.9			1100	1300	6.71	88.9	500	580	mg/kg OC	16	57
Fluorene	µg/kg dw	21.2	144	77.4	536	1000	3000	21.2	144	410	500	mg/kg OC	23	79
Phenanthrene	µg/kg dw	41.9	514.9	204	1170	6100	7600	86.7	544	1500	2000	mg/kg OC	100	480
Anthracene	µg/kg dw	46.9	245	57.2	845	1200	1600	46.9	245	960	1500	mg/kg OC	220	1200
Pyrene	µg/kg dw	53	875	195	1520	8800	16000	153	1398	2600	3300	mg/kg OC	1000	1400
Benzo(a)anthracene	µg/kg dw	31.7	384.7	108	1050	4300	5800	74.8	693	1100	1600	mg/kg OC	110	270
Benzo(a)pyrene	µg/kg dw	31.9	782	150	1450	3300	4800	88.8	763	1000	1600	mg/kg OC	99	210
Chrysene	µg/kg dw	57.1	861.7	166	1290	5900	6400	108	846	1400	2800	mg/kg OC	110	460
Fluoranthene	µg/kg dw	111.3	2354.9	423	2230	11000	15000	113	1494	1700	2500	mg/kg OC	160	1200
Nonylphenol	µg/kg dw	1400	NA											
Dibenzo[a,h]anthracene	µg/kg dw	6.22	135	33		800	840	6.22	135	230	330	mg/kg OC	12	33
Indeno[1,2,3-cd]pyrene	µg/kg dw					4100	5300			600	690	mg/kg OC	34	88
Benzo[k]fluoranthene	µg/kg dw													
Benzo[g,h,i]perylene	µg/kg dw					4000	5200			640	1300	mg/kg OC	31	78
Total Benzofluoranthenes	µg/kg dw					600	4000			2650	3200	mg/kg OC	230	450
Sum LMW-PAHs	µg/kg dw					6600	9200	312	1442	3650	5200	mg/kg OC	370	780
Sum HMW-PAHs	µg/kg dw					31000	55000	655	6676	13080	17000	mg/kg OC	960	5300
Total PAHs	µg/kg dw			1610	22800			1684	16770					
nonylphenol	µg/kg dw	1400	NA					1000	NA					
Bis(2-ethylhexyl)phthalate	µg/kg dw					220	320	182	2647	1300	1400	mg/kg OC	47	78

TEL = Threshold Effects Level

PEL = Probable Effects Level

LEL = Lowest Effects Level

SEL = Severe Effect Level

TEC = Threshold Effects Concentration

PEC = Probable Effects Concentration

FP SQS = Floating percentile Sediment Quality Standard; Used as a threshold to assign Priority level of concern

FP CSL = Floating percentile Cleanup Screening Level

LAET = Lowest Apparent Effects Threshold

2AET = Second Apparent Effects Threshold

SQS = Sediment Quality Standard; Used as a threshold to assign Priority level of concern

CSL = Cleanup Screening Level

dw - dry weight

OC - organic carbon

Appendix D-11. Table 1. Tissue residue effects concentrations.

COC	Chemical Form	Animal	Fresh or Marine	Species	Endpoint	WB effect conc mg/kg ww	Exposure Route	Exposure Duration	Lifestage	Source	LW or LDW
Mercury		Decapod	FW	red swamp crayfish	Reproduction	0.5	Injection		Adult	Reddy et al. 1997	LDW
DDTs	DDT mix	Fish	FW	cutthroat trout	Mortality	2	Water		yearling	Allison et al. 1963	LDW
DDTs	DDT mix	Fish	FW	pinfish	Survival	0.55	Diet		4.8 g	Butler 1969	LDW
DDTs	Total DDT	Fish	FW	cutthroat trout	Mortality	1.8	Water	21 months		Allison et al. 1964	LW/LDW
DDTs	4,4'-DDT	Fish	FW	lake trout	Mortality	0.29	Water and Diet	176 days	started with eggs	Berlin et al. 1981	LW
DDTs	Total DDT	Fish	FW	coho	Mortality	33.8	Food	64 days	juvenile	Buhler et al. 1969	LW
DDTs	Total DDT	Fish	FW	chinook	Mortality	12.3	Food	64 days	juvenile	Buhler et al. 1969	LW
DDTs	Total DDT	Fish	FW	goldfish	Behavior linked to mortality	5.1	Water	6 hrs		Gakstatter and Weiss 1967	LW
DDTs	Total DDT	Fish	FW	bluegill	Behavior linked to mortality	4.2	Water	5 hrs		Gakstatter and Weiss 1967	LW
DDTs	Total DDT	Fish	FW	green sunfish	Mortality	24	Water	90 days		Hamelink et al. 1971	LW
DDTs	Total DDT	Fish	FW	pumpkinseed	Mortality	24	Water	90 days		Hamelink et al. 1971	LW
DDTs	Technical grade DDT	Fish	FW	fathead minnow	Mortality	56.8	Diet	266 days		Jarvinen et al. 1977	LW
DDTs	Total DDT	Fish	FW	brook trout	Reproduction	2.8	Food	156 days		Macek 1968	LW/LDW
DDTs	Total DDT	Fish	FW	goldfish	Mortality	200	Food and Water	38 days		Rhead and Perkins 1984	LW/LDW
DDTs	Total DDT	Fish	FW	chinook	Mortality	3.65	Food	40 days	0.61 g	Buhler et al. 1969	LDW
DDTs	Total DDT	Fish	FW	killifish	Survival	5.2	Water	24 hrs		Crawford and Guarino 1976	LDW
DDTs	DDT mix	Fish	FW	cutthroat trout	Survival	5.5	Food	21 month		Allison et al. 1964	LDW
DDTs	DDT mix	Fish	FW	pinfish	Survival	5.6	Food	21 days	3.0 g	Butler 1969	LDW
DDTs	DDT mix	Fish	FW	pinfish	Survival	7.89	Food	2 days	3.0 g	Butler 1969	LDW
DDTs	Total DDT	Fish	FW	chinook	Survival	12.1	Food	40 days	1.1 g	Buhler et al. 1969	LDW
DDTs	Total DDT	Fish	FW	brook trout	Survival	20.2	Food	26 wks	<yearling	Macek 1968	LDW
DDTs	Total DDT	Fish	FW	green sunfish	Survival	24	Water	90 days		Hamelink et al. 1971	LDW
DDTs	Total DDT	Fish	FW	mosquitofish	Survival	26.5	Water	16 days		Pillai et al. 1977	LDW
DDTs	Total DDT	Fish	FW	sailfin molly	Growth	92.7	Water	21 days		Benton et al. 1994	LDW
DDTs	Total DDT	Fish	FW	coho	Survival	69.6	Food	60 days	3.7 g	Buhler et al. 1969	LDW
Mercury		Fish	FW	fathead minnow	reduced spawning success	0.864	Diet	250 days		Drevnick and Sandheinrich 2003	LW

Appendix D-11. Table 1. Tissue residue effects concentrations.

COC	Chemical Form	Animal	Fresh or Marine	Species	Endpoint	WB effect conc mg/kg ww	Exposure Route	Exposure Duration	Lifestage	Source	LW or LDW
Mercury		Fish	FW	fathead minnow	reduced spawning success	0.56	Diet	>1 year		Hammerschmidt et al. 2002	LW
Mercury		Fish	FW	goldfish	80% mortality	4.4	Water	4 days		Heisinger et al. 1979	LW
Mercury		Fish	FW	bluegill	reduced survival	6.5	Water	12.5 days	juvenile	Cember et al. 1978	LDW
Mercury		Fish	FW	mosquitofish	decreased ability to avoid predation	0.67	Water	60 hours		Kania and O'Hara 1974	LW
Mercury		Fish	FW	creek chub	30% mortality	3.72		48 hours		Kim et al. 1977	LW
Mercury		Fish	FW	brook trout	reduced reproduction	3.4	Water	756 days		McKim et al. 1976	LW/LDW
Mercury		Fish	FW	goldfish	reduced survival	5.6	Water	2 days	4.5-6.5 cm	Heisinger et al. 1979	LDW
Mercury		Fish	FW	rainbow trout	reduced survival	11.2	Water	12-33 days		Niimi and Kissoon 1994	LW
Mercury		Fish	FW	rainbow trout	reduced growth	10	Diet	84 days	Fingerling	Rodgers and Beamish 1982	LW/LDW
Mercury		Fish	FW	mummichog	reduced survival	0.47	Water	42 days	Adult	Matta et al. 2001	LDW
Mercury		Fish	FW	mummichog	F1 fertilization success	11	Food	42 days		Matta et al. 2001	LDW
Mercury		Fish	FW	fathead minnow	reduced spawning	0.143	Diet	>21 days		Sandheinrich and Miller 2006	LW/LDW
Mercury		Fish	FW	fathead minnow	reduced growth	1.31	Food	60 days	3 months	Snarski and Olson 1982	LW/LDW
Mercury		Fish	FW	golden shiner	altered predator avoidance	0.536	Food	90 days		Webber and Haines 2003	LW
Mercury		Fish	FW	fathead minnow	reduced survival	4.18	Water	60 days	3 months	Snarski and Olson 1982	LDW
Mercury		Fish	FW	fathead minnow	reduced survival	4.47	Water	287 days	larvae-adult	Snarski and Olson 1982	LDW
PCBs	Clophen A50	Fish	FW	minnow	reduced time to hatch, fry death	25	Diet	45 days		Bengtsson 1980	LW
PCBs	Aroclor 1254	Fish	FW	lake trout	significant increase in fry mortality	1.53	Water and diet	176 days		Berlin et al. 1981	LW
PCBs	PCB 153	Fish	FW	chinook	24-28% mortality	3.6	Water	15 days		Broyles and Noveck 1979	LW
PCBs	PCB 153	Fish	FW	lake trout	51-87% mortality	9.2	Water	15 days		Broyles and Noveck 1979	LW

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COC	Chemical Form	Animal	Fresh or Marine	Species	Endpoint	WB effect conc mg/kg ww	Exposure Route	Exposure Duration	Lifestage	Source	LW or LDW
PCBs	Aroclor 1248 and 1260 mix	Fish	FW	fathead minnow	33% reduction in weight, 30% reduction in standing crop	50	Water	30 days		DeFow et al. 1978	LW
PCBs	PCB Aroclor mix	Fish	FW	Atlantic salmon	reduction in live fry body weight	1.1	Water	48 hours		Fisher et al. 1994	LW
PCBs	Aroclor 1254	Fish	FW	sheepshead minnow	23% reduction in fry survival	9.3	Water	28 days	Adult	Hansen et al. 1974	LW/LDW
PCBs	Aroclor 1016	Fish	FW	sheepshead minnow	86% fry mortality	200	Water	28 days	Fry	Hansen et al. 1975	LW/LDW
PCBs	Aroclor 1242	Fish	FW	channel catfish	40% reduction in growth rate	14.3	Diet	20 weeks		Hansen et al. 1976	LW
PCBs	Clophen A50	Fish	FW	goldfish	lethal body burden	250	Water	5-21 days		Hattula and Karlog 1972	LW/LDW
PCBs	Aroclor 1260	Fish	FW	barbel	reduced fecundity	0.52	Diet	50 days	Adult	Hugla and Thome 1999	LW/LDW
PCBs	Aroclor 1260	Fish	FW	barbel	no spawning in first reproductive season; egg and larval mortality	2.64		75 days	Adult	Hugla and Thome 1999	LW/LDW
PCBs	Aroclor 1254	Fish	FW	brook trout	reduced survival	125	Water	10 days prior to hatch and 118 days after hatch	Eggs - fry	Mauck et al. 1978	LW/LDW
PCBs	Aroclor 1254	Fish	FW	brook trout	Reduced fry growth	71	Water	Adult	embryos	Mauck et al. 1978	LW/LDW
PCBs	Aroclor 1254	Fish	FW	coho	100% mortality	645	Diet	~260 days		Mayer et al. 1977	LW
PCBs	Aroclor 1254:1260 ratio 1:2	Fish	FW	rainbow trout	decreased length	120	Water	90 days	Young	Mayer et al. 1985	LW/LDW
PCBs	Aroclor 1254	Fish	FW	fathead minnow	reduced spawning	196	Water	30 days		Nebeker et al. 1974	LW
PCBs	2 PCB congener mix	Fish	FW	guppy	increased mortality; loss of equilibrium; color change	190	Water	65 days		Opperhuizen and Schrap 1968	LW
DDTs	DDT	Invertebrate	FW	*Daphnia magna*	Survival	128	Water	26 hrs		Crosby and Tucker 1971	LW

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COC	Chemical Form	Animal	Fresh or Marine	Species	Endpoint	WB effect conc mg/kg ww	Exposure Route	Exposure Duration	Lifestage	Source	LW or LDW
DDTs	p,p'-DDT	Invertebrate	FW	Diporeia sp.	Survival	5	Water	28 days		Lotufo et al. 2000	LW
DDTs	p,p'-DDT	Invertebrate	FW	*Hyalella azteca*	Survival	2.1	Water	28 days		Lotufo et al. 2000	LW
DDTs	p,p'-DDT	Invertebrate	FW	Diporeia sp.	Survival	5.9	Sediment	28 days		Lotufo et al. 2001	LW
DDTs	p,p'-DDT	Invertebrate	FW	*Hyalella azteca*	Survival	2.8	Sediment	28 days		Lotufo et al. 2001	LW
PCBs	PCB 101	Invertebrate	FW	waterflea	Biomass reduction	0.6	Water	21 days		Dillion et al. 1990	LW
PCBs	PCB 153	Invertebrate	FW	oligochaete	reduced biomass and reproduction	126	Diet	35 days		Fisher et al. 1999	LW
PCBs	Aroclor 1242	Invertebrate	FW	midge	LR50	89		4 days		Kwon and Fisher unpub	LW
PCBs	Aroclor 1268	Invertebrate	FW	Waterflea	LR50	11.6		4 days		Kwon and Fisher unpub	LW
PCBs	Aroclor 1254	Invertebrate	FW	amphipod	38% reduction in reproduction	76	Water	2 months		Nebeker and Puglishi 1974	LW
PCBs	Aroclor 1254	Invertebrate	FW	mosquito larvae	Metamorphosis failure	6	Water	7 days	Pupae	Sanders and Chandler 1972	LW
DDTs	4,4'-DDT	Decapod	SW	blue crab	Survival	0.2	Food		juvenile	Leffler 1975	LDW
DDTs	DDD, DDE, DDT	Decapod	SW	pink shrimp	Survival	0.06	Water			Nimmo et al. 1970	LDW
Mercury		Decapod	SW	shore crab	Survival	1	Water		Adult	Bianchini and Gilles 1996	LDW
PCBs	Aroclor 1254	Decapod	SW	pink shrimp	72% mortality	33	Water	20 days		Duke et al. 1970	LW
PCBs	Aroclor 1016	Decapod	SW	grass shrimp	33% mortality	1.1	Water	96 hours		Hansen et al. 1974	LW/LDW
PCBs	Aroclor 1016	Decapod	SW	brown shrimp	43% mortality	42	Water	96 hours		Hansen et al. 1974	LW/LDW
PCBs	Aroclor 1016	Decapod	SW	horseshoe crab	>=50% mortality	31.9	Water	96 days		Neff and Giam 1977	LW/LDW
PCBs	Aroclor 1254	Decapod	SW	grass shrimp	45% mortality	27	Water	16 days		Nimmo et al. 1974	LW/LDW
PCBs	Aroclor 1254	Decapod	SW	pink shrimp	Survival	3.9	Water			Duke et al. 1970	LDW
PCBs	Aroclor 1254	Decapod	SW	pink shrimp	Survival	16	Water			Duke et al. 1970	LDW
PCBs	Aroclor 1254	Fish	SW	pinfish	increased mortality	14	Water	14-35 days		Hansen et al. 1971	LW
PCBs	Aroclor 1254	Fish	SW	spot	LD17	46	Water	20 days		Hansen et al. 1971	LW/LDW
PCBs	Aroclor 1016	Fish	SW	pinfish	50% mortality	106	Water	42 days	fry	Hansen et al. 1974	LW/LDW
DDTs	DDT	Invertebrate	SW	polychaete	Survival	35.5	Diet			Lotufo et al. 2000	LW
DDTs	p,p'-DDT	Invertebrate	SW	amphipod	Survival	2.7	Sediment			Lotufo et al. 2001	LW
DDTs	p,p'-DDT	Invertebrate	SW	polychaete	Growth/behavior	1.4	Sediment			Mulsow et al. 2002	LW
PCBs	PCB mix	Invertebrate	SW	polychaete	lethal body burden	200	Sediment	90 days		Fowler et al. 1978	LW
PCBs	Aroclor 1016	Invertebrate	SW	Eastern oyster	38% reduction in growth	32	Water	96 hours		Hansen et al. 1974	LW

Appendix D-11. Table 1. Tissue residue effects concentrations.

COC	Chemical Form	Animal	Fresh or Marine	Species	Endpoint	WB effect conc mg/kg ww	Exposure Route	Exposure Duration	Lifestage	Source	LW or LDW
PCBs	Aroclor 1254	Invertebrate	SW	Eastern oyster	Body weight and height at 6 wks	119	Water	8 weeks		Lowe et al. 1972	LW
PCBs	Aroclor 1254	Invertebrate	SW	polychaete	25% growth rate reduction	35.8	Sediment	28 days		Rice et al. 2000	LW

WB = wholebody
LW = The Lower Willamette Remedial Investigation
LDW = The Lower Duwamish Remedial Investigation
FW - Freshwater
SW - Marine

Appendix D-12, Table 1A. Daily Doses Associated With Effects or No Effects for Birds

Chemical of Concern	Chemical Form	Test Animal	No Effects	Lowest Effects	Endpoint	Original Reference	Secondary Reference
Mercury	Methylmercury	American kestrel	NA	0.073	REP	Albers et al. 2007	Original
Mercury	Methylmercury	Japanese quail	0.26	0.52	REP	Eskeland and Nafstadd 1978	Great Lakes WQI
Mercury	Methylmercury	Chicken	NA	0.29	GRO	Fimreite 1970	Great Lakes WQI
Mercury	Methylmercury	Chicken	0.57	0.86	SUR	Fimreite 1970	Great Lakes WQI
Mercury	Methylmercury	Pheasants	NA	0.096	REP	Fimreite 1971	Great Lakes WQI
Mercury	Methylmercury	Red-tailed hawk	0.55	1	SUR	Fimreite and Karstad 1971	Great Lakes WQI
Mercury	Methylmercury	Mallard	0.05	0.3	REP	Heinz 1976	LW RI
Mercury	Methylmercury	Mallard	NA	0.064	REP	Heinz 1979, 1980	LW RI; Sample et al. 1993; Great Lakes WQI
Mercury	Methylmercury	Mallard	0.03	0.18	REP	Heinz and Locke 1976	Great Lakes WQI
Mercury	Methylmercury	Japanese quail	NA	0.9	SUR	Hill and Soares 1987	LW RI
Mercury	Methylmercury	American kestrel	0.75	NA	SUR	Peakall and Lincer 1972	LW RI
Mercury	Methylmercury	Zebra finch	0.88	1.75	SUR	Scheuhammer 1988	Great Lakes WQI
Mercury	Methylmercury	Chicken	NA	0.6	REP	Scott 1977	Great Lakes WQI
Mercury	Methylmercury	Pheasants	0.25	0.74	SUR	Spann et al. 1972	Great Lakes WQI
Mercury	Methylmercury	Northern bobwhite	0.43	1.6	SUR	Spann et al. 1986	LW RI
PCBs	Aroclor 1232	Chicken	NA	1.2	REP	Cecil et al. 1974	LW RI
PCBs	Aroclor 1242	Chicken	0.29	0.6	REP	Britton and Huston 1973	Great Lakes WQI; Portland
PCBs	Aroclor 1242	Mallard	NA	15.0	REP	Haseltine and Prouty 1980	LW RI
PCBs	Aroclor 1242	Japanese quail	NA	0.6	REP	Hill et al. 1975	LW RI
PCBs	Aroclor 1242	Chicken	NA	0.13	REP	Lillie et al. 1974	Great Lakes WQI
PCBs	Aroclor 1248	American kestrel	NA	0.35	REP	Lowe and Stendall 1991	LW RI
PCBs	Aroclor 1248	Screech owl	0.41	NA	REP	McLane and Hughes 1980	LW RI
PCBs	Aroclor 1248	Chicken	0.067	0.67	REP	Scott 1977	Great Lakes WQI
PCBs	Aroclor 1248	Chicken	0.061	0.6	REP	Scott et al. 1975	LW RI
PCBs	Aroclor 1254	Chicken	1.5	NA	REP	Ahmed et al. 1978	LW RI
PCBs	Aroclor 1254	American kestrel	NA	9.5	REP	Bird et al. 1983	LW RI
PCBs	Aroclor 1254	Mallard	1.5	NA	REP	Custer and Heinz 1980	Great Lakes WQI
PCBs	Aroclor 1254	Ring-necked pheasants	NA	1.6	REP	Dahlgren et al. 1972	Sample et al. 1996
PCBs	Aroclor 1254	Japanese quail	NA	12	SUR	Kreitzer and Heinz 1974	LW RI
PCBs	Aroclor 1254	Ringed turtle dove	NA	1.4	REP	Peakall et al. 1972; Peakall and Peakall 1973	LW RI
PCBs	Aroclor 1254	Chicken	NA	0.34	REP	Platanow and Reinhart 1973	Great Lakes WQI
PCBs	Aroclor 1254	Mallard	3.8	NA	REP	Risebrough and Anderson 1975	LW RI
PCBs	Aroclor 1254	Mourning dove	NA	1.6	REP	Tori and Peterle 1983	LW RI
PCBs	Total PCB	American kestrel	NA	5	SUR	Fernie et al. 2000 and 2001	Original
Dioxins/Furans	2,3,7,8-TCDD	Ring-necked pheasant	0.000014	0.00014	REP	Nosek et al. 1992	Great Lakes WQI
Dioxins/Furans	2,3,7,8-TCDD	Chicken	0.0001	0.001	SUR	Schwetz et al. 1973	Great Lakes WQI
DDT + metabolites	DDE	Mallard	NA	0.6	REP	Kolaja 1977	Great Lakes WQI
DDT + metabolites	DDE	American kestrel	0.11	1.1	REP	Lincer 1972	Great Lakes WQI

Appendix D-12, Table 1A. Daily Doses Associated With Effects or No Effects for Birds

Chemical of Concern	Chemical Form	Test Animal	No Effects	Lowest Effects	Endpoint	Original Reference	Secondary Reference
DDT + metabolites	DDE	Black duck	NA	0.60	REP	Longcore et al. 1971	Great Lakes WQI
DDT + metabolites	DDE	Barn owl	NA	0.32	REP	Mendenhall et al. 1983	LW RI
DDT + metabolites	DDE	Barn owl	0.32	NA	SUR	Mendenhall et al. 1983	LW RI
DDT + metabolites	DDE	American kestrel	NA	0.35	REP	Peakall et al. 1973	LW RI
DDT + metabolites	DDE	American kestrel	NA	1.00	REP	Wiemeyer and Porter 1970;Porter and Wiemeyer 1972	LW RI
DDT + metabolites	DDT	Pheasants	0.58	5.8	SUR	Azevedo et al. 1965	Great Lakes WQI
DDT + metabolites	DDT	Mallard	NA	0.6	REP	Kolaja 1977	Great Lakes WQI
DDT + metabolites	DDT	Quail	10	30	SUR	Robson et al 1976	Great Lakes WQI
DDT + metabolites	DDT	Bald Eagle	0.3	3	SUR	Stickel et al. 1966	Great Lakes WQI
DDT + metabolites	DDT mix	Pheasants	2.3	NA	REP	DeWitt 1956	LW RI
DDT + metabolites	DDT mix	Japanese quail	6	NA	REP	DeWitt 1956	LW RI
DDT + metabolites	DDTs	Pelican	NA	0.027	REP	Anderson et al. 1975	Great Lakes WQI
DDT + metabolites	p,p'-DDE	Japanese quail	24	NA	REP	Davison et al. 1976	LW RI
DDT + metabolites	p,p'-DDE	Ring Dove	NA	6.3	REP	Haegele and Hudson 1973	LW RI
DDT + metabolites	p,p'-DDE	Mallard	NA	4.3	REP	Haegele and Hudson 1974	LW RI
DDT + metabolites	p,p'-DDE	Mallard	NA	0.6	REP	Heath et al. 1969	Great Lakes WQI
DDT + metabolites	p,p'-DDE	Black duck	NA	1.0	REP	Longcore and Samson 1973	LW RI
DDT + metabolites	p,p'-DDE	White Pekin Duck	NA	3.1	REP	Pritchard et al. 1972	LW RI
DDT + metabolites	p,p'-DDE	Mallard	NA	5.9	REP	Risebrough and Anderson 1975	LW RI
DDT + metabolites	p,p'-DDT	Mallard	0.067	0.67	REP	Davison and Sell 1974	Great Lakes WQI
DDT + metabolites	p,p'-DDT	Mallard	0.6	1.5	REP	Heath et al. 1969	Great Lakes WQI
DDT + metabolites	p,p'-DDT	Quail	NA	0.25	REP	Stickel and Rhodes 1970	Great Lakes WQI
DDT + metabolites	Tech DDT	Japanese quail	0.3	3	REP	Shellenberger 1978	LW RI
DDT + metabolites	technical DDD	Mallard	NA	0.09	REP	Heath et al. 1969	Original
DDT + metabolites	Total DDT	Chicken	0.227	NA	GRO	Cecil et al. 1978 as cited in EPA 2007	Eco-SSL for DDT and metabolites (EPA 2007)

See references after Table C - 23
Notes: Units are mg/kg-BW/day
NA = Not available from this study
GRO = growth effects
REP = reproduction effects
SUR = survival effects

LW RI = Lower Willamette Remedial Investigation
LDW RI = Lower Duwamish Waterway Remedial Investigation
Great Lakes WQI = Great Lakes Water Quality Initiative

Appendix D-12, Table 1B. Daily Doses Associated with Effects or No Effects for Mammals

Chemical of Concern	Chemical Form	Test Animal	No Effects	Lowest Effects	Endpoint	Original Reference	Secondary Reference
Mercury	Methylmercury	Mink	0.02	0.07	REP	Dansereau et al. 1999	LW RI
Mercury	Methylmercury	Mink	0.07	0.13	SUR	Dansereau et al. 1999	LW RI
Mercury	Methylmercury	Rat	NA	0.0084	GRO	Verschuuren et al. 1976	LDW RI
Mercury	Methylmercury	Rat	0.19	NA	REP	Verschuuren et al. 1976	LDW RI
Mercury	Methylmercury	Rat	0.19	NA	SUR	Verschuuren et al. 1976	LDW RI
Mercury	Methylmercury	Mink	0.16	0.25	GRO	Wobeser et al. 1976	Great Lakes WQI
Mercury	Methylmercury	Mink	0.16	0.25	SUR	Wobeser et al. 1976	Great Lakes WQI
Mercury	Methylmercury	Mink	NA	0.64	GRO	Aulerich et al. 1974	Original
Mercury	Methylmercury	Mink	NA	0.64	SUR	Aulerich et al. 1974	Original
Mercury	Methylmercury	Rat	0.56	2.2	GRO	Fitzhugh et al 1950	Great Lakes WQI
Mercury	Methylmercury	Rat	0.25	NA	REP	Khera and Tabacova 1973	Great Lakes WQI
Mercury	Methylmercury	Rat	2	4	REP	Fuyata et al. 1978	Great Lakes WQI
Mercury	Methylmercury	Rat	1	2	REP	Geyer et al. 1985	Great Lakes WQI
Mercury	Methylmercury	Rat	1.6	4.8	REP	Vorhees 1985	Great Lakes WQI
Mercury	Methylmercury	Rat	0.21	NA	REP	Suter and Schon 1986	Great Lakes WQI
PCBs	Aroclor 1016	Mink	NA	3	REP	Bleavins et al. 1980	Great Lakes WQI
PCBs	Aroclor 1232	Rat	160	480	GRO	Harris et al. 1993	LW RI
PCBs	Aroclor 1242	Mink	NA	0.75	REP	Bleavins et al. 1980	Great Lakes WQI
PCBs	Aroclor 1248	Rhesus monkeys	NA	0.081	REP	Barsotti et al. 1976	Sample et al. 1996
PCBs	Aroclor 1254	Rat	4	8	REP	Linder et al. 1974	Original
PCBs	Aroclor 1254	Mink	NA	0.39	REP	Aulerich et al. 1985	Great Lakes WQI
PCBs	Aroclor 1254	Mink	1.2	1.8	GRO	Aulerich et al. 1986	LDW RI
PCBs	Aroclor 1254	Mink	NA	0.15	REP	Wren et al. 1987	Great Lakes WQI
PCBs	Aroclor 1254	Mink	NA	0.26	REP	Aulerich and Ringer 1977	Great Lakes WQI
PCBs	Aroclor 1254	Rhesus monkeys	0.005	0.02	REP	Arnold et al. 1995	Original
PCBs	Aroclor 1254	Mink	0.069	0.136	REP	Hornshaw et al. 1983	Great Lakes WQI
PCBs	Aroclor 1254	Mink	NA	1.31	GRO	Hornshaw et al. 1986	LDW RI
PCBs	Aroclor 1254	Mink	NA	1.64	REP	Kihlstrom et al. 1992	LW RI
PCBs	Aroclor 1254	Mink	NA	0.22	REP	Ringer 1983	LDW RI
PCBs	Aroclor 1260	Rat	8	NA	REP	Linder et al. 1974	Original
PCBs	PCB mixture	Mink	NA	0.49	REP	Jensen et al. 1977	LW RI
PCBs	PCBs	Mink	NA	0.089	REP	Brunstrom et al. 2001	Original
PCBs	Total PCBs	Mink	NA	0.037	REP	Restum et al. 1998	LW RI
PCBs	Total PCBs	Mink	NA	0.13	REP	Heaton et al. 1995	LW RI
Dioxins/Furans	2,3,7,8-TCDD	guinea pig	0.00000065	0.0000049	REP	DeCaprio et al. 1986	Original
Dioxins/Furans	2,3,7,8-TCDD	Mink	NA	0.00000224	REP	Tillitt et al. 1996	LW RI
Dioxins/Furans	2,3,7,8-TCDD	Mink	NA	0.00000236	REP	Brunstrom et al. 2001	LW RI
Dioxins/Furans	2,3,7,8-TCDD	Mink	NA	0.0000036	REP	Heaton et al. 1995	LW RI
Dioxins/Furans	2,3,7,8-TCDD	Rat	0.000001	0.00001	REP	Murray et al. 1979	Original
Dioxins/Furans	2,3,7,8-TCDD	mink	0.0000049	0.00005	SUR	Hochstein et al. 2001	Original
Dioxins/Furans	2,3,7,8-TCDD	Rat	0.00001	0.0001	SUR	Kociba et al. 1978	Great Lakes WQI
Dioxins/Furans	2,3,7,8-TCDD	Mink	NA	0.0001	REP	Aulerich et al. 1988	LW RI
Dioxins/Furans	2,3,7,8-TCDD	Rat	0.000125	0.00025	REP	Khera and Ruddick 1973	Great Lakes WQI
Dioxins/Furans	2,3,7,8-TCDD	Rat	NA	0.00032	GRO	Van Birgelen et al. 1994	Original

Appendix D-12, Table 1B. Daily Doses Associated with Effects or No Effects for Mammals

Chemical of Concern	Chemical Form	Test Animal	No Effects	Lowest Effects	Endpoint	Original Reference	Secondary Reference
Dioxins/Furans	2,3,7,8-TCDD	Rhesus monkeys	0.00012	0.00059	REP	Bowman et al. 1989	Great Lakes WQI
Dioxins/Furans	2,3,7,8-TCDD	Rhesus monkeys	NA	0.0021	REP	Allen et al. 1979	Great Lakes WQI
Dioxins/Furans	2,3,7,8-TCDD	Rat	0.0001	NA	GRO	Murray et al. 1979	Original
DDT + metabolites	DDE	Mouse	NA	42	GRO	Tomatis et al. 1974	LW RI
DDT + metabolites	DDT	Mouse	NA	34	REP	Bernard and Gaertner 1964	Great Lakes WQI
DDT + metabolites	DDT	Mouse	8.5	43	SUR	Turasov et al. 1973	Great Lakes WQI
DDT + metabolites	DDT	Rhesus monkeys	3.9	97	SUR	Durham et al. 1963	Great Lakes WQI
DDT + metabolites	o,p'-DDT	Rat	0.24	NA	REP	Duby et al. 1971	LDW RI
DDT + metabolites	o,p'-DDT	Rat	4	NA	REP	Wrenn et al. 1971	LDW RI
DDT + metabolites	p,p'-DDT	Mouse	0.6	NA	REP	Tarjan and Kemeny 1969	LDW RI
DDT + metabolites	p,p'-DDT	Mouse	0.6	NA	GRO	Tarjan and Kemeny 1969	LDW RI
DDT + metabolites	p,p'-DDT	Rat	1	NA	REP	Duby et al. 1971	LDW RI
DDT + metabolites	p,p'-DDT	Rat	1.6	16	REP	Clement and Okey 1974	Great Lakes WQI
DDT + metabolites	p,p'-DDT	Mouse	18	NA	SUR	Thorpe and Walker 1973	LDW RI
DDT + metabolites	p,p'-DDT	Rat	1.2	NA	REP	Duby et al. 1971	LDW RI
DDT + metabolites	Technical DDT	Dog	10	NA	REP	Ottoboni et al. 1977	LW RI
DDT + metabolites	Total DDT	Mouse	NA	37	SUR	Cannon and Halcomb 1968	LDW RI
DDT + metabolites	Total DDT	Rat	0.147	NA	REP	Wrenn et al. 1970	Eco-SSL for DDT and metabolites OSWER (EPA 2007)
DDT + metabolites	Total DDT	Rat	NA	2	REP	Nickerson and Sniffen 1973	LDW RI
DDT + metabolites	Total DDT	Rat	0.8	4	REP	Fitzhugh 1948	Great Lakes WQI
DDT + metabolites	Total DDT	Mouse	1.3	NA	REP	Ware and Good 1967	LDW RI
DDT + metabolites	Total DDT	Mouse	1.3	NA	SUR	Ware and Good 1967	LDW RI
DDT + metabolites	Total DDT	Mouse	2.4	NA	SUR	Wolfe et al. 1979	LDW RI
DDT + metabolites	Total DDT	Mouse	2.4	NA	REP	Wolfe et al. 1979	LDW RI
DDT + metabolites	Total DDT	Rat	6.7	13	REP	Jonsson et al. 1976	LDW RI
DDT + metabolites	Total DDT	Rat	13	NA	SUR	Jonsson et al. 1976	LDW RI
DDT + metabolites	Total DDT	Mouse	9.2	46	SUR	Turosov et al. 1973	LDW RI
DDT + metabolites	Total DDT	Rat	16	NA	SUR	Ottoboni 1969	LDW RI
DDT + metabolites	Total DDT	Rat	16	NA	REP	Ottoboni 1969	LDW RI
DDT + metabolites	Total DDT	Rat	16	NA	GRO	Ottoboni 1969	LDW RI
DDT + metabolites	Total DDT	Rat	1.6	NA	GRO	Ottoboni 1972	LDW RI
DDT + metabolites	Total DDT	Rat	1.6	NA	SUR	Ottoboni 1972	LDW RI
DDT + metabolites	Total DDT	Rat	1.6	NA	REP	Ottoboni 1972	LDW RI
DDT + metabolites	Total DDT	Mouse	9.2	46	REP	Turosov et al. 1973	LDW RI
DDT + metabolites	Total DDT	Rat	21	NA	GRO	Banarjee et al. 1996	LDW RI
DDT + metabolites	Total DDT	Rat	21	NA	SUR	Banarjee et al. 1996	LDW RI

See references after Table C - 23
Notes: Units are mg/kg-BW/day
NA = Not available from this study
GRO = growth effects
REP = reproduction effects
SUR = survival effects

LW RI = Lower Willamette Remedial Investigation
LDW RI = Lower Duwamish Waterway Remedial Investigation
Great Lakes WQI = Great Lakes Water Quality Initiative

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
1	10	Abel, T.H., and F. Barlocher	Effects of Cadmium on Aquatic Hyphomycetes	Appl. Environ. Microbiol.48(2): 245-251	1984	Y	No, paper listed a fungi, ECOTOX listed bindweed	No, none of the values were correct	Y	Cd	4	4
2	17	Adams, W.J., and B.B. Heidolph	Short-Cut Chronic Toxicity Estimates Using Daphnia magna	In: R.D.Cardwell, R.Purdy and R.C.Bahner (Eds.), Aquatic Toxicology and Hazard Assessment, Seventh Symposium, ASTM STP 854, Philadelphia, PA :87-103	1985	Y	Y	Y	Y	Hg	2	0
3	38	Aksmann, A., and Z. Tukaj		Arch. Environ. Contam. Toxicol.47(2): 177-184	2004	Y	Y	Y	Y	PAH	49	0
4	39	Al Akel, A.S., M.J.K. Shamsi, H.F. Al Kahem, M.A. Chaudhary, and Z. Ahmad	Effect of Cadmium on the Cichlid Fish, Oreochromis niloticus: Behavioral and Physiological Responses	J.Univ.Kuwait Sci. 15(2):341-345	1988	Y	No, Wrong species listed in ECOTOX	Y	Y	Cd	1	0
5	40	Alabaster, J.S.	Survival of Fish in 164 Herbicides, Insecticides, Fungicides, Wetting Agents and Miscellaneous Substances	Int.Pest Control 11(2):29-35 (Author Communication Used)	1969	Y	Y	No, values for COC not correct	Y	Hg	2	2
6	53	Anadu, D.I., G.A. Chapman, L.R. Curtis, and R.A. Tubb	Effect of Zinc Exposure on Subsequent Acute Tolerance to Heavy Metals in Rainbow Trout	Bull.Environ.Contam.Toxicol. 43(3):329-336	1989	Y	Y	Y	Y	Cd	1	0
7	73	Apte, S.C., G.E. Batley, K.C. Bowles, P.L. Brown, N. Creighton, L.T. Hales, R.V. Hyne, M. Julli, S.J. Markich, F. Pablo,	A Comparison of Copper Speciation Measurements with the Toxic Responses of Three Sensitive Freshwater Organisms	Environ.Chem. 2(1):320-330	2005	Y	Y	Y	Y	Cu	10	0
8	130	Bat, L., D. Raffaelli, and I.L. Marr	The Accumulation of Copper, Zinc and Cadmium by the Amphipod Corophium volutator (Pallas)	J.Exp.Mar.Biol.Ecol. 223(2):167-184	1998	Y	Y	Y	Y	Cu	2	0
8	130	Bat, L., D. Raffaelli, and I.L. Marr	The Accumulation of Copper, Zinc and Cadmium by the Amphipod Corophium volutator (Pallas)	J.Exp.Mar.Biol.Ecol. 223(2):167-184	1998	Y	Y	Y	Y	Zn	2	0
9	192	Bielecki, A.	The Effect of Phoschlorine, Carbatox and Copper Sulphate on the Development of Eggs and Hatching of Miracidia in Fasciola hepatica L.	Zool.Pol. 34(1-4):209-220	1987	Y	Y	Y	Y	Cu	4	0

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
10	214	Bishop, W.E., and A.W. McIntosh	Acute Lethality and Effects of Sub lethal Cadmium Exposure on Ventilation Frequency and Cough Rate of Bluegill (Lepomis macrochirus)	Arch.Environ.Contam.Toxicol. 10:519-530	1981	Y	No - this is a bluegill study, ECOTOX lists mostly marine species	Conc. are correct but don't match effect values, should be LC50s not other effects categories, they used data for each rep as a value.	Y	Cd	12	0
11	244	Borgmann, U., and K.M. Ralph	Copper Complexation and Toxicity to Freshwater Zooplankton	Arch.Environ.Contam.Toxicol. 13(4):403-409	1984	Y	Y	Rotifer value is correct, but not sure where the copepod value comes from, the paper presents mole wt concentrations.	Not sure for daphnia, ok for rotifer	Cu	2	1
12	275	Brackup, I., and D.G. Capone	The Effect of Several Metal and Organic Pollutants on Nitrogen Fixation (Acetylene Reduction) by the Roots and Rhizomes of Zostera marina L	Environ. Exp. Bot.25(2): 145-151	1985	Y	Y	Y	Y	PAHs	1	0
13	292	Bringolf, R.B., B.A. Morris, C.J. Boese, R.C. Santore, H.E. Allen, and J.S. Meyer	Influence of Dissolved Organic Matter on Acute Toxicity of Zinc to Larval Fathead Minnows (Pimephales promelas)	Arch.Environ.Contam.Toxicol. 51(3):438-444	2006	Y	Y	Y	Y	Zn	20	0
14	333	Burlinson, F.C., and A.J. Lawrence	Development and Validation of a Behavioral Assay to Measure the Tolerance of Hediste diversicolor to Copper	Environ.Pollut. 145(1):274-278	2007	Y	Y	Y	Y	Cu	5	0
15	336	Burton, G.A.Jr., and J.F. Nordstrom	An In Situ Toxicity Identification Evaluation Method Part I: Laboratory Validation	Environ.Toxicol.Chem. 23(12):2844-2850	2004	Y	Y	One of the effect concentrations was for pore water, not surface water	Y	PAHs	4	1
16	353	Calabrese, A., and D.A. Nelson	Inhibition of Embryonic Development of the Hard Clam, Mercenaria mercenaria, by Heavy Metals	Bull.Environ.Contam.Toxicol. 11(1):92-97	1974	Y	Y	Y	Y	Pb	1	0
17	353	Calabrese, A., and D.A. Nelson	Inhibition of Embryonic Development of the Hard Clam, Mercenaria mercenaria, by Heavy Metals	Bull.Environ.Contam.Toxicol. 11(1):92-97	1974	Y	Y	Y	Y	Hg	1	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
18	353	Calabrese, A., and D.A. Nelson	Inhibition of Embryonic Development of the Hard Clam, Mercenaria mercenaria, by Heavy Metals	Bull.Environ.Contam.Toxicol. 11(1):92-97	1974	Y	Y	Y	Y	Zn	1	0
19	409	Chapman, P.M., and C. McPherson	Comparative Zinc and Lead Toxicity Tests with Arctic Marine Invertebrates and Implications for Toxicant Discharges	In: E.G.Baddaloo, S.Ramamoorthy and J.W.Moore (Eds.), Proc.19th Annual Aquatic Toxicity Workshop, Oct.4-7, 1992, Edmondton, Alberta, Can.Tech.Rep.Fish.Aquat.Sci.No.1942:7-22// Polar Rec . 29(168):45-54	1993	Y	Y	Y	Y	Zn	1	0
20	410	Chari, M.S.	A Rapid Bioassay Procedure to Determine the Toxicity of Pesticides to Channa punctatus Bloch	J.Inl.Fish.Soc.India 24(2):88-90	1992	Y	Y	Y	Y	DDT	1	0
21	459	Collier, R.S., J.E. Miller, M.A. Dawson, and F.P. Thurberg	Physiological Response of the Mud Crab, Eurypanopeus depressus to Cadmium	Bull.Environ.Contam.Toxicol. 10(6):378-382	1973	Y	Y	Y	Y	Cd	1	0
22	489	Curtis, M.W., and C.H. Ward	Aquatic Toxicity of Forty Industrial Chemicals: Testing in Support of Hazardous Substance Spill Prevention Regulation	J.Hydrol. 51:359-367(Author Communication Used)	1981	Y	Y	Y	Y	Cu	2	0
22	489	Curtis, M.W., and C.H. Ward	Aquatic Toxicity of Forty Industrial Chemicals: Testing in Support of Hazardous Substance Spill Prevention Regulation	J.Hydrol. 51:359-367(Author Communication Used)	1981	Y	Y	Y	Y	Hg	2	0
23	533	De Schamphelaere, K.A.C., and C.R. Janssen	Bioavailability and Chronic Toxicity of Zinc to Juvenile Rainbow Trout (Oncorhynchus mykiss): Comparison with Other Fish Species and Development of a Biotic Ligand Model	Environ.Sci.Technol. 38(23):6201-6209	2004	Y	Y	Y	Y	Zn	79	0
24	562	Dey, S., and S. Bhattacharya	Ovarian Damage to Channa punctatus After Chronic Exposure to Low Concentrations of Elsan, Mercury, and Ammonia	Ecotoxicol.Environ.Saf. 17(2):247-257	1989	Y	Y	Y	Y	Hg	1	0
25	575	Dillon, T.M.	Mercury and the Estuarine Marsh Clam, Rangia cuneata Gray. I. Toxicity	Arch.Environ.Contam.Toxicol. 6(2/3):249-255	1977	Y	Y	Y	Y	Hg	4	0
25	597	Duarte, S., C. Pascoal, and F. Cassio	Functional Stability of Stream-Dwelling Microbial Decomposers Exposed to Copper and Zinc Stress	Fresh. Biol.54(8): 1683-1691	2009	Y	Y	Y	Y	Cu	1	0
26	624	Eisentraeger, A., W. Dott, J. Klein, and S. Hahn	Comparative Studies on Algal Toxicity Testing Using Fluorometric Microplate and Erlenmeyer Flask Growth-Inhibition Assays	Ecotoxicol. Environ. Saf.54(3): 346-354	2003	Y	Y	Tox value is for the salt not just Zn	Y	Zn	2	2

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
27	673	Fargasova, A.	Winter Third- to Fourth-Instar Larvae of Chironomus plumosus as Bioassay Tools for Assessment of Acute Toxicity of Metals and Their Binary Combinations	Ecotoxicol.Environ.Saf. 48(1):1-5	2001	Y	Y	Y	Y	Cu	3	0
27	673	Fargasova, A.	Winter Third- to Fourth-Instar Larvae of Chironomus plumosus as Bioassay Tools for Assessment of Acute Toxicity of Metals and Their Binary Combinations	Ecotoxicol.Environ.Saf. 48(1):1-5	2001	Y	Y	Y	Y	Zn	2	0
28	686	Fennikoh, K.B., H.I. Hirshfield, and T.J. Kneip	Cadmium Toxicity in Planktonic Organisms of a Freshwater Food Web	Environ.Res. 15(3):357-367	1978	Y	None of the species were correct	One of the 9 values were incorrect.	Y	Cd	9	1
29	716	Franklin, N.M., J.L. Stauber, R.P. Lim, and P. Petocz	Toxicity of Metal Mixtures to a Tropical Freshwater Alga (Chlorella sp.): The Effect of Interactions Between Copper, Cadmium, and Zinc on Metal Cell Binding and Uptake	Environ. Toxicol. Chem.21(11): 2412-2422	2002	Y	Y	One value appears to be for a mixture.	Y	Cd	5	1
30	716	Franklin, N.M., J.L. Stauber, R.P. Lim, and P. Petocz	Toxicity of Metal Mixtures to a Tropical Freshwater Alga (Chlorella sp.): The Effect of Interactions Between Copper, Cadmium, and Zinc on Metal Cell Binding and Uptake	Environ. Toxicol. Chem.21(11): 2412-2422	2002	Y	Y	One value appears to be for a mixture.	Y	Cu	5	1
30	716	Franklin, N.M., J.L. Stauber, R.P. Lim, and P. Petocz	Toxicity of Metal Mixtures to a Tropical Freshwater Alga (Chlorella sp.): The Effect of Interactions Between Copper, Cadmium, and Zinc on Metal Cell Binding and Uptake	Environ. Toxicol. Chem.21(11): 2412-2422	2002	Y	Y	One value appears to be for a mixture.	Y	Zn	5	1
31	772	Ghosh, A.R., and P. Chakrabarti	Toxicity of Arsenic and Cadmium to a Freshwater Fish Notopterus notopterus	Environ.Ecol. 8(2):576-579	1990	Y	Y	Y	Y	As	4	0
31	772	Ghosh, A.R., and P. Chakrabarti	Toxicity of Arsenic and Cadmium to a Freshwater Fish Notopterus notopterus	Environ.Ecol. 8(2):576-579	1990	Y	Y	Y	Y	Cd	4	0
32	794	Gomez, S., C. Villar, and C. Bonetto	Zinc Toxicity in the Fish Cnesterodon decemmaculatus in the Parana River and Rio de la Plata Estuary	Environ.Pollut. 99(2):159-165	1998	Y	Y	Y	Y	Zn	24	0
33	813	Green, F.A.J., J.W. Anderson, S.R. Petrocelli, B.J. Presley, and R. Sims	Effect of Mercury on the Survival, Respiration, and Growth of Postlarval White Shrimp, Penaeus setiferus	Mar.Biol.(Berlin) 37:75-81 (U.S.NTIS PB-261881)	1976	Y	Y	Y	Y	Hg	2	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
34	817	Griffiths, P.R.E.	Morphological and Ultra structural Effects of Sublethal Cadmium Poisoning on Daphnia	Environ.Res. 22(2):277-284	1980	Y	No, should be daphnia, not rainbow trout	Y	Y	Cd	1	0
35	820	Grindley, J.	Toxicity to Rainbow Trout and Minnows of Some Substances Known to be Present in Waste Water Discharged to Rivers	Ann.Appl.Biol. 33:103-112	1946	Y	Y	No, EC50 not presented, used non traditional method to calculate toxicity, looks like it was extrapolated wrong	Y	As	1	1
36	847	Guth, D.J., H.D. Blankespoor, and J. Cairns Jr.	Potentiation of Zinc Stress Caused by Parasitic Infection of Snails	Hydrobiologia 55(3):225-229 (Author Communication Used)	1977	Y	Y	Y	Y	Zn	4	0
37	906	Heijerick, D.G., K.A.C. De Schamphelaere, and C.R. Janssen	Biotic Ligand Model Development Predicting Zn Toxicity to the Alga Pseudokirchneriella subcapitata: Possibilities and Limitations	Comp. Biochem. Physiol. C Comp. Pharm. Toxicol.133(1-2): 207-218	2002	Y	Y	Not clear, the paper does not present the EC50 , but a EbC value that has been adjusted for cation activity. It is not clear how the ECOTOX values were obtained.	Unknown	Zn	5	5
38	922	Herbert, D.W.M., and D.S. Shurben	A Preliminary Study of the Effect of Physical Activity on the Resistance of Rainbow Trout (Salmo gairdnerii Richardson) to Two Poisons	Ann.Appl.Biol. 52:321-326	1963	Y	Y	Y	Y	Zn	2	0
39	924	Herkovits, J., and C.S. Perez-Coll	Stage-Dependent Susceptibility of Bufo arenarum Embryos to Cadmium	Bull.Environ.Contam.Toxicol. 50(4):608-611	1993	Y	No, paper is for an amphibian not a chironomid as stated in ECOTOX	The concentration is correct, but the endpoint is incorrect. The concentration represents 100% mortality	Y	Cd	1	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
40	1008	Ivorra, N., J. Hettelaar, M.H.S. Kraak, S. Sabater, and W. Admiraal	Responses of Biofilms to Combined Nutrient and Metal Exposure	Environ. Toxicol. Chem.21(3): 626-632	2002	Y	Y	No, it appears to be a unit conversion problem, Ecotox has the tox value as 957000 ug/l but the actual value is 957 ug/l	N	Zinc	1	1
41	1011	Jackim, E., and D. Nacci	Improved Sea Urchin DNA-Based Embryo Growth Toxicity Test	Environ.Toxicol.Chem. 5:561-565	1986	Y	Y	Y	Y	Cu	1	0
41	1011	Jackim, E., and D. Nacci	Improved Sea Urchin DNA-Based Embryo Growth Toxicity Test	Environ.Toxicol.Chem. 5:561-565	1986	Y	Y	Y	Y	Zn	1	0
42	1015	Jacobson, P.J., R.J. Neves, D.S. Cherry, and J.L. Farris	Sensitivity of Glochidial Stages of Freshwater Mussels (Bivalvia: Unionidae) to Copper	Environ.Toxicol.Chem. 16(11):2384-2392	1997	Y	Y	Y	Y	Cu	36	0
43	1034	Jezierska, B., and I. Slominska	The Effect of Copper on Common Carp (Cyprinus carpio L.) During Embryonic and Postembryonic Development	Pol.Arch.Hydrobiol. 44(1/2):261-272	1997	Y	Y	Exposure duration not correct	Y	Cu	7	0
44	1064	Juneau, P., A. El Berdey, and R. Popovic	PAM Fluorometry in the Determination of the Sensitivity of Chlorella vulgaris, Selenastrum capricornutum, and Chlamydomonas reinhardtii to Copper	Arch. Environ. Contam. Toxicol.42(2): 155-164	2002	Y	Y	Y	Y	Cu	2	0
45	1106	Keplinger, M.L., O.E. Fancher, F.L. Lyman, and J.C. Calandra	Toxicologic Studies of Four Fluorescent Whitening Agents	Toxicol.Appl.Pharmacol. 27(3):494-506	1974	Y	Y	Y	Y	DDT	2	0
46	1111	Khan, A.T., and J.S. Weis	Effect of Mercuric Chloride on Eggs and Juvenile Viability in Two Populations of Killifish	Mar.Pollut.Bull. 18(9):504-505	1987	Y	Y	Y	Y	Hg	2	0

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
47	1123	Khangarot, B.S., A. Sehgal, and M.K. Bhasin	"Man and Biosphere" - Studies on the Sikkim Himalayas. Part 2: Acute Toxicity of Mixed Copper-Zinc Solutions on Common Carp, Cyprinus carpio (Linn.)	Acta Hydrochim.Hydrobiol. 12(2):131-135	1984	The exposure was a mixture of Zn and Cu, but the individual LC50s were extrapolated, not clear how this was done.	Y	Yes, but exposure was a mixture	Y	Cu	7	7
48	1123	Khangarot, B.S., A. Sehgal, and M.K. Bhasin	"Man and Biosphere" - Studies on the Sikkim Himalayas. Part 2: Acute Toxicity of Mixed Copper-Zinc Solutions on Common Carp, Cyprinus carpio (Linn.)	Acta Hydrochim.Hydrobiol. 12(2):131-135	1984	The exposure was a mixture of Zn and Cu, but the individual LC50s were extrapolated, not clear how this was done.	Y	Yes, but exposure was a mixture	Y	Zn	7	7
49	1127	Khangarot, B.S., and P.K. Ray	Response of a Freshwater Ostracod (Cypris subglobosa sowerby) Exposed to Copper at Different pH Levels	Acta Hydrochim.Hydrobiol. 15(6):553-558	1987	Y	Y	Y	Y	Cu	8	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
50	1141	Kim, S.D., M.B. Gu, H.E. Allen, and D.K. Cha	Physicochemical Factors Affecting the Sensitivity of Ceriodaphnia dubia to Copper	Environ.Monit.Assess. 70(1/2):105-116	2001	Y	Y	ok, values pulled from figures	Y	Cu	27	0
52	1212	Langeland, K.A., O.N. Hill, T.J. Koschnick, and W.T. Haller	Evaluation of a New Formulation of Reward Landscape and Aquatic Herbicide for Control of Duckweed, Waterhyacinth, Waterlettuce, and Hydrilla	J. Aquat. Plant Manag.40(2): 51-53	2002	Y	Y	Y	Y	Cu	1	0
53	1249	Levy, J.L., J.L. Stauber, S.A. Wakelin, and D.F. Jolley	The Effect of Bacteria on the Sensitivity of Microalgae to Copper in Laboratory Bioassays	Chemosphere74(9): 1266-1274	2009	Y	Y	Y	Y	Cu	9	0
54	1268	Lincer, J.L., J.M. Solon, and J.H. Nair III	DDT and Endrin Fish Toxicity Under Static Versus Dynamic Bioassay Conditions	Trans.Am.Fish.Soc. 99(1):13-19	1970	Y	Y	Y	Y	DDT	2	0
55	1304	Ma, M., W. Zhu, Z. Wang, and G.J. Witkamp	Accumulation, Assimilation and Growth Inhibition of Copper on Freshwater Alga (Scenedesmus subspicatus 86.81 SAG) in the Presence of EDTA and Fulvic Acid	Aquat. Toxicol.63(3): 221-228	2003	Y	Y	Y	Y	Cu	1	0
56	1318	MacLeod, J.C., and E. Pessah	Temperature Effects on Mercury Accumulation, Toxicity, and Metabolic Rate in Rainbow Trout (Salmo gairdneri)	J.Fish.Res.Board Can. 30:485-492	1973	Y	Y	Y	Y	Hg	8	0
57	1337	Mallick, N., and L.C. Rai	Metal Induced Inhibition of Photosynthesis, Photosynthetic Electron Transport Chain and ATP Content of Anabaena doliolum and Chlorella vulgaris: Interaction with Exogenous ATP	Biomed. Environ. Sci.5(3): 241-250	1992	Y	Y	Y	Y	Cu	4	0
58	1351	Marino-Balsa, J.C., E. Poza, E. Vazquez, and R. Beiras	Comparative Toxicity of Dissolved Metals to Early Larval Stages of Palaemon serratus, Maja squinado, and Homarus gammarus (Crustacea: Decapoda)	Arch.Environ.Contam.Toxicol. 39(3):345-351	2000	Y	Y	3 of 6 values were correct, it appears there were unit problems with the 3 values that were not correct.	No, 3 of 6 values were incorrect	Y	6	3
59	1359	Marr, J.C.A., J.A. Hansen, J.S. Meyer, D. Cacela, T. Podrabsky, J. Lipton, and H.L. Bergman	Toxicity of Cobalt and Copper to Rainbow Trout: Application of a Mechanistic Model for Predicting Survival	Aquat.Toxicol. 43(4):225-238	1998	Y	Y	ok	ok	Cu	3	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
60	1375	Maund, S.J., E.J. Taylor, and D. Pascoe	Population Responses of the Freshwater Amphipod Crustacean Gammarus pulex (L.) to Copper	Freshw.Biol. 28(1):29-36	1992	Y	Y	Concentrations correct, but effect type does not match one of 2 values.	Y	Cu	2	0
61	1379	Mayes, M.A., D.C. Dill, K.M. Bodner, and C.G. Mendoza	Triclopyr Triethylamine Salt Toxicity to Life Stages of the Fathead Minnow (Pimephales promelas Rafinesque)	Bull.Environ.Contam.Toxicol. 33(3):339-347	1984	Y	Y	Y	Y	TPY	1	0
62	1411	Menezes, M.R., and S.Z. Qasim	Determination of Acute Toxicity Levels of Mercury to the Fish Tilapia mossambica (Peters)	Proc.Indian Acad.Sci.Anim.Sci. 92(5):375-380	1983	Y	Y	Y	Y	Hg	1	0
63	1461	Morgan, J.D., G.A. Vigers, A.P. Farrell, D.M. Janz, and J.F. Manville	Acute Avoidance Reactions and Behavioral Responses of Juvenile Rainbow Trout (Oncorhynchus mykiss) to Garlon 4, Garlon 3A, And Vision Herbicides	Environ.Toxicol.Chem. 10(1):73-79	1991	Y	Y	Y	Y	TPY	5	0
64	1468	Mount, D.I.	The Effect of Total Hardness and pH on Acute Toxicity of Zinc to Fish	Int.J.Air Water Pollut. 10:49-56	1966	Y	Y	Y	Y	Zn	18	0
65	1501	Nacci, D.E., and E. Jackim	Rapid Aquatic Toxicity Assay Using Incorporation of Tritiated-Thymidine into Sea Urchin, Arbacia punctulata, Embryo: Evaluation of Toxicant Exposure Procedures	In: R.C.Bahner and D.J.Hansen (Eds.), Aquatic Toxicology and Hazard Assessment, 8th Symposium, ASTM STP 891, Philadelphia, PA :382-394	1985	Y	Y	Y	Y	Cu	3	0
66	1551	Niederlehner, B.R., A.L. Buikema Jr., C.A. Pittinger, and J. Cairns Jr.	Effects of Cadmium on the Population Growth of a Benthic Invertebrate Aeolosoma headleyi (Oligochaeta)	Environ.Toxicol.Chem. 3(2):255-262	1984	Y	No, ECOTOX lists 5 species, the paper only looked at one that was not listed.	ECOTOX has 3 extra tox values that are not in the paper for endpoints not evaluated in the paper	Y	Cd	5	3
67	1612	Oris, J.T.Jr.	The Photoenhanced Toxicity of Anthracene to Juvenile Sunfish (Lepomis spp.)	Aquat.Toxicol. 6(2):133-146	1985	Y	There was an extra data point for mosquito in ECOTOX not listed in the paper - the paper only included bluegill data.	4 of the 5 data points were correct, the extra value fell between the other concentrations.	Y	PAHs	5	1

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
68	1660	Pavicic, J., and T. Jarvenpaa	Cadmium Toxicity in Adults and Early Larval Stages of the Mussel Mytilus galloprovincialis Lam	In: Proc.Comparative Studies of Food and Environmental Contamination, Int.Atomic Energy Agency, Vienna, Austria :179-188	1974	Y	No, ECOTOX lists a number of different species, but the paper only looked at one mussel.	Y	Y	Cd	6	0
69	1692	Petersen, S., and K. Gustavson	Replacement of the Medium for a Natural Phytoplankton Community by Tangential-Flow Filtration, with Special Emphasis on Toxicity Tests	Bull. Environ. Contam. Toxicol.57(4): 603-609	1996	Y	Y	Y	Y	Cu	4	0
70	1716	Poupardin, R., S. Reynaud, C. Strode, H. Ranson, J. Vontas, and J.P. David	Cross-Induction of Detoxification Genes by Environmental Xenobiotics and Insecticides in the Mosquito Aedes aegypti: Impact on Larval Tolerance to Chemical Insecticides	Insect Biochem.Mol.Biol. 38(3):540-551	2008	Y	Y	Y	Y	Cu	1	0
71	1767	Rao, K.S., and M. Balaji	Toxicity of Copper to Mytilopsis sallei (Recluz) and Some Aspects of Its Control in Indian Waters	In: M.F.Thompson, R.Nagabhushanam, R.Sarojini, and M.Fingerman (Eds.), Recent Developments in Biofouling Control, Oxford & IBH Publ.Co., New Delhi, India :409-415	1994	Y	Y	Y	Y	Cu	1	0
72	1813	Rice, D.W.Jr., F.L. Harrison, and A. Jerald Jr.	Effects of Copper on Early Life History Stages of Northern Anchovy, Engraulis mordax	Fish.Bull. 78(3):675-683	1980	Y	Y	Y	Y	Cu	18	0
73	1823	Ringwood, A.H.	The Relative Sensitivities of Different Life Stages of Isognomon californicum to Cadmium Toxicity	Arch.Environ.Contam.Toxicol. 19(3):338-340	1990	Y	Y	Difficult to extrapolate numbers form the histogram in paper, but range of values match up with histogram.	Y	Cd	13	0
74	1826	Ritter, A., S. Goulitquer, J.P. Salaun, T. Tonon, J.A. Correa, and P. Potin	Copper Stress Induces Biosynthesis of Octadecanoid and Eicosanoid Oxygenated Derivatives in the Brown Algal Kelp Laminaria digitata	New Phytol.180(4): 809-821	2008	Y	Y	Y	Y	Cu	2	0
75	1844	Rojickova-Padrtova, R., and B. Marsalek	Selection and Sensitivity Comparisons of Algal Species for Toxicity Testing	Chemosphere38(14): 3329-3338	1999	Mass of salt reported not mass of metal	Y	y	Y	Cu	7	7

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
75	1844	Rojickova-Padrtova, R., and B. Marsalek	Selection and Sensitivity Comparisons of Algal Species for Toxicity Testing	Chemosphere38(14): 3329-3338	1999	Mass of salt reported not mass of metal	Y	y	Y	Zn	7	7
76	1858	Rossi, S.S., and J.M. Neff	Toxicity of Polynuclear Aromatic Hydrocarbons to the Polychaete Neanthes arenaceodentata	Mar.Pollut.Bull. 9(8):220-223	1978	Y	Y	2 of the 6 values were NOECs	Y	PAH	6	2
77	1873	Saethre, L.J., I.B. Falk-Petersen, L.K. Sydnes, S. Lonning, and A.M. Naley	Toxicity of chemical reactivity of naphthalene and methylnaphthalene	Aquat.Toxicol. 5:291-306	1984	Y	Y	y	Y	PAH	2	0
78	1879	Samecka-Cymerman, A., and A.J. Kempers	Preliminary Investigations into the Bioaccumulation of Mercury by the Liverwort Scapania undulata L. (Dum)	Ecotoxicol. Environ. Saf.31(1)(): 57-61	1995	Y	Y	y	Y	Hg	10	0
79	1906	Saxena, A.B., D.S. Rao, and Z.U. Khan	Studies on the Acute Toxicities of Copper, Mercury, and Cadmium to Danio malabaricus and Puntius ticto	J.Environ.Sci.Health Part A 17(5):657-665	1982	Y	Y	Not clear if concentration represents Cu or Cu salt, text refers to both total Cu and Cu as Cu salt.	Y	Cu	2	2
80	1906	Saxena, A.B., D.S. Rao, and Z.U. Khan	Studies on the Acute Toxicities of Copper, Mercury, and Cadmium to Danio malabaricus and Puntius ticto	J.Environ.Sci.Health Part A 17(5):657-665	1982	Y	Y	Not clear if concentration represents Hg or Hg salt, refers to both.	Y	Hg	2	2
81	1945	Shaw, B.P., A. Sahu, and A.K. Panigrahi	Comparative Toxicity of an Effluent from a Chlor-Alkali Industry and HgCl2	Bull.Environ.Contam.Toxicol. 45(2):280-287	1990	Y	Y	One of 12 values in ECOTOX matches the paper, but is presented in the wrong units.	N	Hg	12	1
82	1961	Shrivastava, S., K.S. Rao, S. Dhanekar, and S.S. Pandya	Determination of Acute Mercury Toxicity to Developing Stages of Cyprinus carpio and Cirrhinus mrigala	Fish.Technol. 25(1):29-31	1988	Y	Y	Y	Y	Hg	6	0
83	2003	Sofyan, A., J.R. Shaw, and W.J. Birge	Metal Trophic Transfer from Algae to Cladocerans and the Relative Importance of Dietary Metal Exposure	Environ. Toxicol. Chem.25(4): 1034-1041	2006	Y	Y	One LOEC was not a toxicity effect it was a observable bioaccumulation threshold	y	Cd	3	1

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
83	2003	Sofyan, A., J.R. Shaw, and W.J. Birge	Metal Trophic Transfer from Algae to Cladocerans and the Relative Importance of Dietary Metal Exposure	Environ. Toxicol. Chem.25(4): 1034-1041	2006	Y	Y	LOEC was not a toxicity effect it was a observable bioaccumulation threshold	y	Cu	1	1
84	2027	Spehar, R.L., S. Poucher, L.T. Brooke, D.J. Hansen, D. Champlin, and D.A. Cox	Comparative Toxicity of Fluoranthene to Freshwater and Saltwater Species Under Fluorescent and Ultraviolet Light	Arch.Environ.Contam.Toxicol. 37(4):496-502	1999	Y	Y	Y	Y	PAHs	53	0
85	2044	Starodub, M.E., P.T.S. Wong, C.I. Mayfield, and Y.K. Chau	Influence of Complexation and pH on Individual and Combined Heavy Metal Toxicity to a Freshwater Green Alga	Can. J. Fish. Aquat. Sci.44(): 1173-1180	1987	Y	Y	y	y	Cu	1	0
85	2044	Starodub, M.E., P.T.S. Wong, C.I. Mayfield, and Y.K. Chau	Influence of Complexation and pH on Individual and Combined Heavy Metal Toxicity to a Freshwater Green Alga	Can. J. Fish. Aquat. Sci.44(): 1173-1180	1987	Y	Y	y	y	Zinc	1	0
86	2079	Suedel, B.C., J.H. Rodgers Jr., and E. Deaver	Experimental Factors that may Affect Toxicity of Cadmium to Freshwater Organisms	Arch.Environ.Contam.Toxicol. 33(2):188-193	1997	Y	Some correct, but various species in ECOTOX not reported by paper	Only 32 of the 51 numbers were correct - some values were for NOECs and some could not be matched to an effect.	y	Cd	83	51
87	2129	Thompson, R.S., and E.M. Burrows	The Toxicity of Copper, Zinc, and Mercury to the Brown Macroalga Laminaria saccharina	In: G.Persoone, E.Jaspers, and C.Claus (Eds.), Ecotoxicol.Testing for the Mar.Environ., Vol.2, State Univ.Ghent and Inst.Mar.Sci.Res., Bredene, Belgium(): 259-269	1984	Y	Y	Y	Y	Cu	3	0
87	2129	Thompson, R.S., and E.M. Burrows	The Toxicity of Copper, Zinc, and Mercury to the Brown Macroalga Laminaria saccharina	In: G.Persoone, E.Jaspers, and C.Claus (Eds.), Ecotoxicol.Testing for the Mar.Environ., Vol.2, State Univ.Ghent and Inst.Mar.Sci.Res., Bredene, Belgium(): 259-269	1984	Y	Y	Y	Y	Hg	6	0
87	2129	Thompson, R.S., and E.M. Burrows	The Toxicity of Copper, Zinc, and Mercury to the Brown Macroalga Laminaria saccharina	In: G.Persoone, E.Jaspers, and C.Claus (Eds.), Ecotoxicol.Testing for the Mar.Environ., Vol.2, State Univ.Ghent and Inst.Mar.Sci.Res., Bredene, Belgium(): 259-269	1984	Y	Y	Y	Y	Zn	4	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
88	2130	Thorp, V.J., and P.S. Lake	Toxicity Bioassays of Cadmium on Selected Freshwater Invertebrates and the Interaction of Cadmium and Zinc on the Freshwater Shrimp, Paratya	Aust.J.Mar.Freshw.Res. 25(1):97-104	1974	Y	No, the species listed in the paper (inverts) did not match ECOTOX (Fish and inverts)	Yes, but the effects type did not match up.	Y	Cd	4	0
89	2130	Thorp, V.J., and P.S. Lake	Toxicity Bioassays of Cadmium on Selected Freshwater Invertebrates and the Interaction of Cadmium and Zinc on the Freshwater Shrimp, Paratya	Aust.J.Mar.Freshw.Res. 25(1):97-104	1974	Y	Y	Y	Y	Zinc	1	0
90	2132	Thorpe, K.L., T.H. Hutchinson, M.J. Hetheridge, M. Scholze, J.P. Sumpter, and C.R. Tyler	Assessing the Biological Potency of Binary Mixtures of Environmental Estrogens Using Vitellogenin Induction in Juvenile Rainbow Trout (Oncorhynchus mykiss)	Environ.Sci.Technol. 35(12):2476-2481	2001	Y	Y	Y	Y	NP	2	0
91	2144	Toth, G., and H. Pavia	Lack of Phlorotannin Induction in the Brown Seaweed Ascophyllum nodosum in Response to Increased Copper Concentrations	Mar. Ecol. Prog. Ser.192(): 119-126	2000	Y	Y	Y	Y	Cu	2	0
92	2163	Tsuji, S., Y. Tonogai, Y. Ito, and S. Kanoh	The Influence of Rearing Temperatures on the Toxicity of Various Environmental Pollutants for Killifish (Oryzias latipes)	J.Hyg.Chem.(Eisei Kagaku) 32(1):46-53 (JPN) (ENG ABS)	1986	Mass of salt reported not COC	No, bluegills, protozoan etc but not Killifish	Y	n/a	Cd	6	6
92	2163	Tsuji, S., Y. Tonogai, Y. Ito, and S. Kanoh	The Influence of Rearing Temperatures on the Toxicity of Various Environmental Pollutants for Killifish (Oryzias latipes)	J.Hyg.Chem.(Eisei Kagaku) 32(1):46-53 (JPN) (ENG ABS)	1986	Mass of salt reported not COC	Y	y	y	Cu	18	18
92	2163	Tsuji, S., Y. Tonogai, Y. Ito, and S. Kanoh	The Influence of Rearing Temperatures on the Toxicity of Various Environmental Pollutants for Killifish (Oryzias latipes)	J.Hyg.Chem.(Eisei Kagaku) 32(1):46-53 (JPN) (ENG ABS)	1986	y	Y	y	y	DDT	6	0
92	2163	Tsuji, S., Y. Tonogai, Y. Ito, and S. Kanoh	The Influence of Rearing Temperatures on the Toxicity of Various Environmental Pollutants for Killifish (Oryzias latipes)	J.Hyg.Chem.(Eisei Kagaku) 32(1):46-53 (JPN) (ENG ABS)	1986	Mass of salt reported not COC	Y	y	y	Hg	18	18

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
92	2163	Tsuji, S., Y. Tonogai, Y. Ito, and S. Kanoh	The Influence of Rearing Temperatures on the Toxicity of Various Environmental Pollutants for Killifish (Oryzias latipes)	J.Hyg.Chem.(Eisei Kagaku) 32(1):46-53 (JPN) (ENG ABS)	1986	Mass of salt reported not COC	Y	y	y	Zn	12	12
93	2192	Van Heerden, D., A. Vosloo, and M. Nikinmaa	Effects of Short-Term Copper Exposure on Gill Structure, Metallothionein and Hypoxia-Inducible Factor-1alpha (HIF-1alpha) Levels in Rainbow Trout (Oncorhynchus mykiss)	Aquat.Toxicol. 69(3):271-280	2004	Y	Y	Y	Y	Cu	3	0
94	2235	Voyer, R.A., J.F. Heltsche, and R.A. Kraus	Hatching Success and Larval Mortality in an Estuarine Teleost, Menidia menidia (Linnaeus), Exposed to Cadmium in Constant and Fluctuating Salinity Regimes	Bull.Environ.Contam.Toxicol. 23(4/5):475-481	1979	Y	No, numerous species listed in ECOTOX, only one in the paper.	Yes, but the effects listed are not correct in ECOTOX, all values should be LC50's	Y	Cd	8	0
95	2247	Waller, D.L., J.J. Rach, W.G. Cope, L.L. Marking, S.W. Fisher, and H. Dabrowska	Toxicity of Candidate Molluscicides to Zebra Mussels (Dreissena polymorpha) and Selected Nontarget Organisms	J.Gt.Lakes Res. 19(4):695-702	1993	Y	Y	Y	Y	Cu	5	0
96	2328	Woodworth, J., and D. Pascoe	Cadmium Toxicity to Rainbow Trout, Salmo gairdneri Richardson: A Study of Eggs and Alevins	J.Fish Biol. 21(1):47-57	1982	Y	No, ECOTOX lists a mosquito and the paper is for a trout	No, the value in ECOTOX cannot be matched to the paper	Y	Cd	1	1
97	2345	Yan, H., and G. Pan	Toxicity and Bioaccumulation of Copper in Three Green Microalgal Species	Chemosphere49(5): 471-476	2002	Y	Y	Y	Y	Cu	3	0
98	2370	Ziegenfuss, P.S., W.J. Renaudette, and W.J. Adams	Methodology for Assessing the Acute Toxicity of Chemicals Sorbed to Sediments: Testing the Equilibrium Partitioning Theory	In: T.M.Poston and R.Purdy (Eds.), Aquatic Toxicology and Environmental Fate, 9th Volume, ASTM STP 921, Philadelphia, PA :479-493	1986	Y	Y	Y	Y	Cu	2	0
99	2370	Ziegenfuss, P.S., W.J. Renaudette, and W.J. Adams	Methodology for Assessing the Acute Toxicity of Chemicals Sorbed to Sediments: Testing the Equilibrium Partitioning Theory	In: T.M.Poston and R.Purdy (Eds.), Aquatic Toxicology and Environmental Fate, 9th Volume, ASTM STP 921, Philadelphia, PA :479-493	1986	Y	Y	Y	Y	DDT	2	0
100	2370	Ziegenfuss, P.S., W.J. Renaudette, and W.J. Adams	Methodology for Assessing the Acute Toxicity of Chemicals Sorbed to Sediments: Testing the Equilibrium Partitioning Theory	In: T.M.Poston and R.Purdy (Eds.), Aquatic Toxicology and Environmental Fate, 9th Volume, ASTM STP 921, Philadelphia, PA :479-493	1986	Y	Y	Y	Y	Hg	2	0

Appendix D-13. ECOTOX toxicity data QA/QC checklsit summary.

Count	Record/ Random Number	Author	Title	Source	Pub. Year	COC Correct?	Species Correct?	Concen. Correct?	Units Correct?	COC	Number of values	Number of Incorrect values
101	2371	Zitko, V.	Polychlorinated Biphenyls (PCB) Solubilized in Water by Nonionic Surfactants for Studies of Toxicity to Aquatic Animals	Bull.Environ.Contam.Toxicol. 5(3):279-285 (Used 9464)	1970	Yes, but they used Corexit to get PCB into solution	Y	Y	Y	PCBs	2	0

	Total Number of Values	Number of Incorrect Values
	821	171
Error Rate	20%	

Phth - Phthalates
NP - Nonylphenol
TPY - Triclopyr

Appendix D-13. Summary Table of ECOTOX Units QC

ID	Author	Title	Source	Year	Reported values	Converted correct	Percentage correct
14	Bellas, J., E. Vazquez, and R. Beiras	Toxicity of Hg, Cu, Cd, and Cr on Early Developmental Stages of Ciona intestinalis (Chordata, Ascidiacea) with Potential Application in Marine Water Quality Assessment	Water Res. 35(12):2905-2912	2001	3	3	100.0%
15	Brand, L.E., W.G. Sunda, and R.R.L. Guillard	Reduction of Marine Phytoplankton Reproduction Rates by Copper and Cadmium	J. Exp. Mar. Biol. Ecol.96(3): 225-250	1986	13	13	100.0%
21	Crawford, D.W., M.S. Lipsen, D.A. Purdie, M.C. Lohan, P.J. Statham, F.A. Whitney, J.N. Putland, W.K. Johnson, N. Sutherl	Influence of Zinc and Iron Enrichments on Phytoplankton Growth in the Northeastern Subarctic Pacific	Limnol. Oceanogr.48 (4): 1583-1600	2003	8	8	100.0%
41	Fisher, N.S., and G.J. Jones	Heavy Metals and Marine Phytoplankton: Correlation of Toxicity and Sulfhydryl-Binding	J. Phycol.17(1): 108-111	1981	5	5	100.0%
45	Grosell, M., C.M. Wood, and P.J. Walsh	Copper Homeostasis and Toxicity in the Elasmobranch Raja erinacea and the Teleost Myoxocephalus octodecemspinosus During Exposure to Elevated Water-Borne Copper	Comp.Biochem.Physiol.C 135(2):179-190	2003	8	8	100.0%
47	Gupta, M., and P. Chandra	Bioaccumulation and Toxicity of Mercury in Rooted-Submerged Macrophyte Vallisneria spiralis	Environ. Pollut.103(2-3): 327-332	1998	1	1	100.0%
52	Hadjoudja, S., C. Vignoles, V. Deluchat, J.F. Lenain, A.H. Le Jeune, and M. Baudu	Short Term Copper Toxicity on Microcystis aeruginosa and Chlorella vulgaris Using Flow Cytometry	Aquat. Toxicol.94(): 255-264	2009	64	64	100.0%

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ID	Author	Title	Source	Year	Reported values	Converted correct	Percentage correct
54	Heijerick, D.G., K.A.C. De Schamphelaere, and C.R. Janssen	Predicting Acute Zinc Toxicity for Daphnia magna as a Function of Key Water Chemistry Characteristics: Development and Validation of a Biotic Ligand Model	Environ.Toxicol.Chem. 21(6):1309-1315	2002	33	33	100.0%
60	Hjorth, M., I. Dahllof, and V.E. Forbes	Effects on the Function of Three Trophic Levels in Marine Plankton Communities Under Stress from the Antifouling Compound Zinc Pyrithione	Aquat. Toxicol.77(1): 105-115	2006	7	0	0.0%
61	Kefaloyianni, E., E. Gourgou, V. Ferle, E. Kotsakis, C. Gaitanaki, and I. Beis	Acute Thermal Stress and Various Heavy Metals Induce Tissue-Specific Pro- or Anti-Apoptotic Events via the p38-MAPK Signal Transduction Pathway in Mytilus galloprovincialis (Lam.)	J.Exp.Biol. 208(23):4427-4436	2005	19	19	100.0%
62	Khan, S.M.M.K., C. Yoshimura, M. Arikawa, G. Omura, S. Nishiyama, Y. Suetomo, S. Kakuta, and T. Suzaki	Axopodial Degradation in the Heliozoon Raphidiophrys contractilis: A Novel Bioassay System for Detecting Heavy Metal Toxicity in an Aquatic Environment	Environ.Sci. 13(4):193-200	2006	8	8	100.0%
64	Lee, T.M., Y.L. Huang, and M.H. Chen	Copper Induction of Phosphorus Deficiency in Ulva fasciata (Ulvales, Chlorophyta)	Phycologia44(6): 620-628	2005	7	7	100.0%
65	Li, T., and Z. Xiong	A Novel Response of Wild-Type Duckweed (Lemna paucicostata Hegelm.) to Heavy Metals	Environ. Toxicol.19(2): 95-102	2004	4	4	100.0%
69	Lyngby, J.E., and H. Brix	The Uptake of Heavy Metals in Eelgrass Zostera marina and Their Effect on Growth	Ecol. Bull.36(): 81-89	1984	18	18	100.0%
73	Mann, E.L., N. Ahlgren, J.W. Moffett, and S.W. Chisholm	Copper Toxicity and Cyanobacteria Ecology in the Sargasso Sea	Limnol. Oceanogr.47(4): 976-988	2002	5	5	100.0%
81	Oliveira, M., M. Pacheco, and M.A. Santos	Cytochrome P4501A, Genotoxic and Stress Responses in Golden Grey Mullet (Liza aurata) Following Short-Term Exposure to Phenanthrene	Chemosphere 66(7):1284-1291	2007	4	4	100.0%

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ID	Author	Title	Source	Year	Reported values	Converted correct	Percentage correct
88	Overnell, J.	The Effect of Some Heavy Metal Ions on Photosynthesis in a Freshwater Alga	Pestic. Biochem. Physiol.5(1): 19-26	1975	1	1	100.0%
89	Pacheco, M., and M.A. Santos	Naphthalene and beta-Naphthoflavone Effects on Anguilla anguilla L. Hepatic Metabolism and Erythrocytic Nuclear Abnormalities	Environ.Int. 28:285-293	2002	1	1	100.0%
93	Petersen, S., and K. Gustavson	Replacement of the Medium for a Natural Phytoplankton Community by Tangential-Flow Filtration, with Special Emphasis on Toxicity Tests	Bull. Environ. Contam. Toxicol.57(4): 603-609	1996	4	4	100.0%
95	Traczewska, T.M.	Changes of Toxicological Properties of Biodegradation Products of Anthracene and Phenanthrene	Water Sci.Technol. 41(12):31-38	2000	4	4	100.0%
99	Visviki, I., and J.W. Rachlin	Acute and Chronic Exposure of Dunaliella salina and Chlamydomonas bullosa to Copper and Cadmium: Effects on Growth	Arch. Environ. Contam. Toxicol.26(2): 149-153	1994	4	4	100.0%
106	Visviki, I., and J.W. Rachlin	The Toxic Action and Interactions of Copper and Cadmium to the Marine Alga Dunaliella minuta, in Both Acute and Chronic Exposure	Arch. Environ. Contam. Toxicol.20(2): 271-275	1991	2	2	100.0%
110	Warnau, M., M. Iaccarino, A. De Biase, A. Temara, M. Jangoux, P. Dubois, and G. Pagano	Spermiotoxicity and Embryotoxicity of Heavy Metals in the Echinoid Paracentrotus lividus	Environ.Toxicol.Chem. 15(11):1931-1936	1996	2	2	100.0%
112	Xia, J.R., Y.J. Li, J. Lu, and B. Chen	Effects of Copper and Cadmium on Growth, Photosynthesis, and Pigment Content in Gracilaria lemaneiformis	Bull. Environ. Contam. Toxicol.73(6): 979-986	2004	10	10	100.0%
				Total	235	228	97.0%