Table 1. Basin Plan Numeric Water Quality Objective (CRBRWQCB, 2006)

Constituent	Water Quality Objective	MCLs, units	Beneficial Use
Arsenic	0.05	ppm (mg/l)	MUN
Barium	1.0	ppm (mg/l)	MUN
Cadmium	0.005	ppm (mg/l)	MUN
Chromium	0.05	ppm (mg/l)	MUN
Combined Radium-226 and Radium-228	5	pCi/L	MUN
Endrin	0.002	ppm (mg/l)	MUN
Enterococci/E. coli	REC I / REC II E. coli: 126 per 100 ml / 630 per 100 ml enterococci: 33 per 100 ml / 165 per 100 ml nor shall any sample exceed the following maximum allowables: REC I / REC II E. coli: 400 per 100 ml / 200 per 100 ml enterococci: 100 per 100 ml / 500 per 100 ml except that for the Colorado River, the following maximum allowables shall apply: REC I / REC II E. coli: 235 per 100 ml / 1175 per 100 ml enterococci: 61 per 100 ml / 305 per 100 ml	MPN/100 ml	REC I/REC II
Fecal Coliform	The fecal coliform concentration based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200 MPN per 100 ml, nor shall more than ten percent of total samples during any 30-day period exceed 400 MPN per 100 ml.	MPN/100 ml	REC I
Fluoride	Annual Average of Maximum Daily Air Temperature — Fluoride Concentrations mg/l Degrees Fahrenheit / Degrees Celsius / Lower / Optimum / Upper / MCL below 53.8 / below 12.1 / 0.9 / 1.2 / 1.7 / 2.4 53.8 to 58.3 / 12.1 to 14.6 / 0.8 / 1.1 / 1.5 / 2.2 58.4 to 63.8 / 14.7 to 17.6 / 0.8 / 1.0 / 1.3 / 2.0 63.9 to 70.6 / 17.7 to 21.4 / 0.7 / 0.9 / 1.2 / 1.8 70.7 to 79.2 / 21.5 to 26.2 / 0.7 / 0.8 / 1.0 / 1.6 79.3 to 90.5 / 26.3 to 32.5 / 0.6 / 0.7 / 0.8 / 1.4	ppm (mg/l)	MUN
Gross Alpha Particle activity (excluding Radon and Uranium)	15	pCi/L	MUN
Gross Beta Particle activity	50	pCi/L	MUN
Lead	0.015	ppm (mg/l)	MUN
Lindane	0.0002	ppm (mg/l)	MUN

Attachment Three

Constituent	Water Quality Objective	MCLs, units	Beneficial Use
Mercury	0.002	ppm (mg/l)	MUN
Methoxychlor	0.03	ppm (mg/l)	MUN
Nitrate (as Nitrogen)	10.0	ppm (mg/l)	MUN
Oxygen (Dissolved)	The dissolved oxygen concentration shall not be reduced below the following minimum levels at any time: <u>Waters designated:</u> WARM……5.0 COLD……8.0 WARM and COLD……8.0	ppm (mg/l)	WARM/COLD
pH	6.0 – 9.0		WARM/COLD
Salinity	The flow-weighted average annual numeric criteria for salinity (total dissolved solids) were established at three locations on the lower Colorado River: Salinity in mg/l Below Hoover Dam, AZ-NV .....723 Below Parker Dam, AZ-CA.....747 Imperial Dam, AZ-CA 879	ppm (mg/l)	AQUA/COLD/ WARM/WILD
Selenium	0.05	ppm (mg/l)	MUN
	The following objectives apply to all surface waters that are tributaries to the Salton Sea: 1. A four day average value of selenium shall not exceed .005 mg/L; 2. A one hour average value of selenium shall not exceed .02 mg/L.	ppm (mg/l)	AQUA/WARM/ WILD
Silver	0.10	ppm (mg/l)	MUN
Strontium-90	8	pCi/L	MUN
TDS (Total Dissolved Solids)	Any discharge, excepting discharges from agricultural sources, shall not cause concentration of total dissolved solids (TDS) in surface waters to exceed the following limits **TDS (mg/L)** Annual Ave. / Maximum New River 4000 / 4500 Alamo River 4000 / 4500 Imperial Valley Drains 4000 / 4500 Coachella Valley Drains 2000 / 2500 Palo Verde Valley Drains 2000 / 2500	ppm (mg/l)	FRSH/WARM
Toxaphene	0.003	ppm (mg/l)	MUN
Tritium	20000	pCi/L	MUN
Uranium	20	pCi/L	MUN
2,4-D	0.07	ppm (mg/l)	MUN
2,4,5-TP Silvex	0.05	ppm (mg/l)	MUN

Table 2. California Toxics Rule (CTR) criteria (USEPA, 2000)

Associated Beneficial Uses	AQUA, COLD, COMM, FRSH, MUN, RARE, SAL, WARM, WILD					
Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, (organisms only)	Human Health (Water & organisms)	Saltwater chronic (CMC)	Saltwater chronic (CCC)
	ppb (µg/l)					
Acenapthene			2,700	1,200		
Acrolein			780	320		
Acrylonitrile			0.66	0.059		
Aldrin	3		0.00014	0.00013	1.3	
Aluminum						
Ammonia (as Nitrogen)						
Anthracene			110,000	9,600		
Anthrazene						
Antimony			4,300	14		
Arsenic	340	150				
Asbestos				7,000,000 fibers/L		
Benzene			71	1.2		
Benzidine			0.00054	0.00012		
Benzo[a]Anthracene			0.049	0.0044		
Benzo[a]Pyrene			0.049	0.0044		
Benzo(ghi)Perylene						
Benzo[b]Fluorathene			0.049	0.0044		
Benzo[k]Fluorathene			0.049	0.0044		
alpha-BHC			0.013	0.0039		
beta-BHC			0.046	0.014		
gamma-BHC (Lindane)	0.95		0.063	0.019	0.16	
delta-BHC						
Bis(2-Chloroethy)Ether			1.4	0.031		
Bis(2-Chloroisopropyl)Ether			170,000	1,400		
Bis(2-Ethylhexyl)Phthalate			5.9	1.8		
Bromoform			360	4.3		
Bromodichloromethane			46	0.56		
Butylbenzyl Phthalate			5,200	3,000		

Associated Beneficial Uses	AQUA, COLD, COMM, FRSH, MUN, RARE, SAL, WARM, WILD					
Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, (organisms only)	Human Health (Water & organisms)	Saltwater chronic (CMC)	Saltwater chronic (CCC)
	ppb (µg/l)					
Cadmium	Hardness dependent				42	9.3
Carbofuran						
Carbon Tetrachloride			4.4	0.25		
Chlorbenside						
Chlordane	2.4	0.0043	0.00059	0.00057	0.09	0.004
Chlordane (total)						
Chloride						
Chlorine Total Residual						
Chlorobenzene			21,000	580		
Chlorodibromomethane			34	0.401		
Chloroethane						
Chloroform						
2-Chloroethylvinyl Ether						
2-Chloronaphthalene			4,300	1.700		
2-Chlorophenol			400	120		
4-Chlorophenyl Phenyl Ether						
Chlorpyrifos (4-day average)						
Chlorpyrifos (1-hour day average)						
Chromium (total)						
Chromium III	Hardness dependent					
Chromium (6+)	16	11			1100	50
Chrysene			0.049	0.0044		
Color						
Copper	Hardness dependent			1300	4.8	3.1
Cyanide	22	5.2	220,000	700		
4,4'-DDD			0.00084	0.00083		
DDD (sum)						
4,4'-DDE			0.00059	0.00059		
DDE (sum)						
4,4'-DDT	1.1	0.001	0.00059	0.00059		

Associated Beneficial Uses	AQUA, COLD, COMM, FRSH, MUN, RARE, SAL, WARM, WILD					
Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, (organisms only)	Human Health (Water & organisms)	Saltwater chronic (CMC)	Saltwater chronic (CCC)
	ppb (µg/l)					
DDT (sum)						
DDTs (total)						
Diazinon (4-day average)						
Diazinon (1-hour average)						
1,2-Dichlorobenzene			17,000	2,700		
1,3-Dichlorobenzene			2,600	400		
1,4-Dichlorobenzene			2,600	400		
3,3'-Dichlorobenzidene			0.077	0.04		
1,1-Dichloroethane						
1,2-Dichloroethane			99	0.38		
1,1-Dichloroethylene			3.2	0.057		
Dichloromethane						
2,4-Dichlorophenol			790	93		
1,2-Dichloropropane			39	0.52		
1,3-Dichloropropylene			1,700	10		
1,3-Dichloropropene						
Dieldrin	0.24	0.056	0.00014	0.00014	0.71	0.0019
Diethyl Phthalate			120,000	23,000		
Dimethyl Phthalate			2,900,000	313,000		
2,4-Dimethylphenol			2,300	540		
Di-n-Butyl-Phthalate			12,000	2,700		
4,6-dinitro-2-methylphenol						
2.4-Dinitrophenol			14,000	70		
2,4-Dinitrotoluene			9.1	0.11		
1,2-Diphenylhydrazine			0.54	0.40		
Diquat						
Disulfoton						
Endosulfan I (alpha)	0.22	0.056	240	110	0.034	0.0087
Endosulfan II (beta)	0.22	0.056	240	110	0.034	0.0087
Endosulfan Sulfate			240	110		
Endothall						

Associated Beneficial Uses	AQUA, COLD, COMM, FRSH, MUN, RARE, SAL, WARM, WILD					
Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, (organisms only)	Human Health (Water & organisms)	Saltwater chronic (CMC)	Saltwater chronic (CCC)
	ppb (µg/l)					
Endrin	0.086	0.036	0.81	0.76	0.037	0.0023
Endrin Aldehyde			0.81	0.76		
Ethion						
Ethylbenzene			29,000	3,100		
Ethylene Dibromide						
Fluoranthene			370	300		
Fluorene			14,000	1,300		
Heptachlor	0.52	0.0038	0.00021	0.00021	0.053	0.0036
Heptachlor epoxide	0.52	0.0038	0.00011	0.00010	0.053	0.0036
Hexachlorobenzene			0.00077	0.00075		
Hexachlorobutadiene			50	0.44		
hexachlorocyclopentadiene			17,000	240		
Hexachloroethane			8.9	1.9		
Indeno(1,2,3-cd) Pyrene			0.049	0.0044		
Iron						
Isophorone			600	8.4		
Lead	Hardness dependent				210	8.1
Manganese						
MBAS (foaming agent)						
Mercury			0.051	0.050		
Methoxychlor						
Methyl Bromide			4,000	48		
2-Methyl-4,6-Dinitrophenol			765	13.4		
Methyl Chloride						
Methylene Chloride (dichloromethane)			1,600	4.7		
Nickel	Hardness dependent		4,600	610	74	8.2
Nitrate (NO_3)						
Nitrate + Nitrite						
Nitrite						
Nitrobenzene			1,900	17		

Associated Beneficial Uses	AQUA, COLD, COMM, FRSH, MUN, RARE, SAL, WARM, WILD					
Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, (organisms only)	Human Health (Water & organisms)	Saltwater chronic (CMC)	Saltwater chronic (CCC)
	ppb (µg/l)					
2-Nitrophenol						
4-Nitrophenol						
N-Nitrosodimethylamine			8.1	0.00069		
N-Nitrosodi-n-Propylamine			1.4	0.005		
N-Nitrosodiphenylamine			16	50		
Odor--Threshold						
Oxamyl						
Oxyfluorfen						
PAHs (high molecular weight)						
PAHs (low molecular weight)						
PAHs						
PAHs (total)						
PCBs						
PCBs (total)		0.014	0.00017	0.03		
Pentachlorophenol	19	15	8.2	0.28		
Perchlorate						
Phenanthrene						
Phenol			4,600,000	21,000		
Phenolic Compounds (non-chlorinated)						
Phenolic Compounds (chlorinated)						
Picloram						
Pyrene			11,000			
Radioacitivity						
Selenium		5			290	71
Silver	Hardness dependent				1.9	
Simazine						
Styrene						
Sulfate						
Terbufos						

Attachment Three

Associated Beneficial Uses	AQUA, COLD, COMM, FRSH, MUN, RARE, SAL, WARM, WILD					
Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, (organisms only)	Human Health (Water & organisms)	Saltwater chronic (CMC)	Saltwater chronic (CCC)
	ppb (µg/l)					
1,1,2,2-Tetrachloroethane			11	0.17		
2,3,7,8,-TCDD (Dioxin)						
Tetrachloroethylene			8.85	0.8		
Thallium			6.3	1.7		
Thiobencarb						
2,4,5-TP (Silvex)						
Toluene			200,000	6,800		
Toxaphene	0.73	0.0002	0.00075	0.00073	0.21	0.0002
1,2-Trans-Dichloroethylene			140,000	700		
1,2,4-Trichlorobenzene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane			42	0.60		
Trichloroethylene			81	2.7		
Trichlorofluoromethane						
2,4,6-Trichlorophenol			6.5	2.1		
Tributyltin						
Vinyl Chloride			525	2		
Xylenes						
Zinc	Hardness dependent				90	81

*Asbestos: The CWA 304(a) criterion for asbestos is the MCL. Only applies to inland waters without a MUN use designation.

Table 3 Primary and Secondary Maximum Contaminant Levels (MCLs) (CCR, Title 22)

Associated Beneficial Use		MUN	
Constituents	Primary MCLs (Table 64431-A; 64444- A)	Secondary MCLs (Table 64449-A; 64449-B	Unit
Alachlor	0.002		ppm (mg/l)
Aluminum	1	0.2	ppm (mg/l)
Antimony	0.006		ppm (mg/l)
Arsenic	0.010		ppm (mg/l)
Asbestos	7		MFL*
Atrazine	0.001		ppm (mg/l)
Barium	1		ppm (mg/l)
Bentazon	0.018		ppm (mg/l)
Benzene	0.001		ppm (mg/l)
Benzo[a]Pyrene	0.0002		ppm (mg/l)
Beryllium	0.004		ppm (mg/l)
Cadmium	0.005		ppm (mg/l)
Carbofuran	0.018		ppm (mg/l)
Carbon Tetrachloride	0.0005		ppm (mg/l)
Chlordane	0.0001		ppm (mg/l)
Chloride		250	ppm (mg/l)
Chromium	0.05		ppm (mg/l)
Color		15	Units
Copper		1.0	ppm (mg/l)
Cyanide	0.15		ppm (mg/l)
2,4-D	0.07		ppm (mg/l)
Dalapon	0.2		ppm (mg/l)
Dibromochloropropane	0.0002		ppm (mg/l)
1,2-Dichlorbenzen	0.6		ppm (mg/l)
1,4-Dichlorobenzene	0.005		ppm (mg/l)
1,1-Dichloroethane	0.005		ppm (mg/l)
1,2-Dichloroethane	0.0005		ppm (mg/l)
1,1-Dichloroethylene	0.006		ppm (mg/l)
cis-1,2-Dichloroethylene	0.006		ppm (mg/l)
trans-1,2-Dichloroethylene	0.01		ppm (mg/l)

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Associated Beneficial Use		MUN	
Constituents	Primary MCLs (Table 64431-A; 64444- A)	Secondary MCLs (Table 64449-A; 64449-B	Unit
Dichloromethane	0.005		ppm (mg/l)
1,2-Dichloropropane	0.005		ppm (mg/l)
1,3-Dichloropropylene	0.0005		ppm (mg/l)
Di(2-ethylhexyl)adipate	0.4		ppm (mg/l)
Di(2-ethylhexyl)phthalate	0.004		ppm (mg/l)
Dinoseb	0.007		ppm (mg/l)
Diquat	0.02		ppm (mg/l)
Endothall	0.1		ppm (mg/l)
Endrin	0.002		ppm (mg/l)
Ethylbenzene	0.3		ppm (mg/l)
Ethylene Dibromide	0.00005		ppm (mg/l)
Flouride	2		ppm (mg/l)
Glyphosate	0.7		ppm (mg/l)
Heptachlor	0.00001		ppm (mg/l)
Heptachlor epoxide	0.00001		ppm (mg/l)
Hexachlorobenzene	0.001		ppm (mg/l)
Hexachlorocyclopentadiene	0.05		ppm (mg/l)
Iron		0.3	ppm (mg/l)
Lindane (gamma hexachlorocyclohexane)	0.0002		ppm (mg/l)
Manganese		0.05	ppm (mg/l)
Mercury	0.002		ppm (mg/l)
Methoxychlor	0.03		ppm (mg/l)
Methyl-tert-butyl either(MTBE)	0.013	0.005	ppm (mg/l)
Molinate	0.02		ppm (mg/l)
Monochlorobenzene	0.07		ppm (mg/l)
Nickel	0.1		ppm (mg/l)
Nitrate (as NO_3)	45		ppm (mg/l)
Nitrate + Nitrite	10		ppm (mg/l)
Nitrite (as nitrogen)	1		ppm (mg/l)
Odor-Threshold		3	Units
Oxamyl	0.05		ppm (mg/l)

Associated Beneficial Use		MUN	
Constituents	Primary MCLs (Table 64431-A; 64444- A)	Secondary MCLs (Table 64449-A; 64449-B	Unit
Pentachlorophenol	0.001		ppm (mg/l)
Perchlorate	0.006		ppm (mg/l)
Picloram	0.5		ppm (mg/l)
Polychlorinated Biphenyls	0.0005		ppm (mg/l)
Selenium	0.05		ppm (mg/l)
Silver		0.1	ppm (mg/l)
Simazine	0.004		ppm (mg/l)
Specific Conductance		900	µS/cm
Styrene	0.1		ppm (mg/l)
Sulfate		250	ppm (mg/l)
Total Dissolved Solids		500	ppm (mg/l)
1,1,2,2-Tetrachloroethane	0.001		ppm (mg/l)
2,3,7,8-TCDD (Dioxin)	3×10^{-8}		ppm (mg/l)
Tetrachloroethylene	0.005		ppm (mg/l)
Thallium	0.002		ppm (mg/l)
Thiobencarb	0.07	0.001	ppm (mg/l)
2,4,5-TP (Silvex)	0.05		ppm (mg/l)
Toluene	0.15		ppm (mg/l)
Toxaphene	0.003		ppm (mg/l)
1,2,4-Trichlorobenzene	0.005		ppm (mg/l)
1,1,1-Trichloroethane	0.2		ppm (mg/l)
1,1,2-Trichloroethane	0.005		ppm (mg/l)
Trichloroethylene	0.005		ppm (mg/l)
1,1,2-Trichloro-1,2,2-Trifluroethane	1.2		ppm (mg/l)
Turbidity		5	Units
Vinyl Chloride	0.0005		ppm (mg/l)
Xylenes	1.75		ppm (mg/l)
Zinc		5	ppm (mg/l)

MFL*= Million Fibers per Liter; MCL for fibers exceeding 10 µm in length.

Table 4. Ambient Water Quality Criteria for Ammonia (USEPA, 1999)

Constituent	freshwater acute (CMC)	freshwater chronic (CCC)	Human Health, Surface water (organisms only)	Units
Ammonia as N	pH and Temperature dependent			ppm (mg/l)

Table 5. Fish Contaminant Goals (OEHHA, 2008) and Toxicity Equivalency Factor (USEPA, 2000)

Associated Beneficial Use			COMM
Constituent	Fish Contaminant Goals	Units (wet weight)	Reference
Arsenic	0.0034	ppm (mg/kg)	OEHHA, 2008; USEPA, 2000
Cadmium	2.2	ppm (mg/kg)	OEHHA, 2008; USEPA, 2000
Chlordane (total)	3.9	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Chlorpyrifos	660	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
DDTs	15	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Diazinon	1500	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Dicofol	880	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Dieldrin	0.32	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Disulfoton	88	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Endosulfan (Total)	13,000	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Endrin	660	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Ethion	1,100	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Heptachlor epoxide	0.93	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Hexachlorobenzene	2.8	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Lindane (gamma hexachloro-cyclohexane)	4.6	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Methylmercury	0.2	ppm (mg/kg)	OEHHA, 2008; USEPA, 2000
Mirex	0.28	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Oxyfluorfen	70	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
PAHs	0.7	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
PCBs (total)	2.6	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Selenium	7.4	ppm (mg/kg)	OEHHA, 2008; USEPA, 2000
Terbufos	44	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Toxaphene	4.3	ppb (µg/kg)	OEHHA, 2008; USEPA, 2000
Tributyltin	0.66	ppm (mg/kg)	OEHHA, 2008; USEPA, 2000

Table 6. Miscellaneous Criteria to protect aquatic organism in freshwater and saline water

Associated Beneficial Use			AQUA, WARM, COLD, FRSH, SAL, WILD, RARE		
Constituent	Freshwater Criteria	Saltwater Criteria *	Fish Tissue guidelines	Units	Reference
Aldrin			100	ppb (µg/kg)	NAS, 1972
Antimony	610			ppb (µg/l)	USEPA, 1986
Benzene hexachloride			100	ppb (µg/kg)	NAS, 1972
Beryllium	5.3			ppb (µg/l)	USEPA, 1986
Bifenthrin	0.0006			ppb (µg/l)	NAS, 1972
Chlordane (total)			100	ppb (µg/kg)	NAS, 1972
Chloride	230			ppm (mg/l)	USEPA, 2006
Chlorpyrifos (4-day average)	0.014			ppb (µg/l)	Siepmann and Finlayson, 2000
Chlorpyrifos (1-hour average)	0.02			ppb (µg/l)	Siepmann and Finlayson, 2000
Cyfluthrin	0.00005			ppb (µg/l)	Fojut et al., 2012
Cyhalothrin-lambda	0.0005				Fojut et al., 2012
Cypermethrin	0.0002			ppb (µg/l)	Fojut et al., 2012
DDTs (total)			1,000	ppb (µg/kg)	NAS, 1972
Diazinon (4-day average)	0.1	0.82		ppb (µg/l)	Finlayson, 2004
Diazinon (1-hour average)	0.16			ppb (µg/l)	Finlayson, 2004
Dieldrin			100	ppb (µg/kg)	NAS, 1972
Diuron	1.3			ppb (µg/l)	Fojut et al., 2012
Endosulfan (total)			100	ppb (µg/kg)	NAS, 1972
Endrin			100	ppb (µg/kg)	NAS, 1972
Esfenvalerate /fenvalerate	1.13			ppb (µg/l)	USEPA, 2005
Fenpropathrin	2.2			ppb (µg/l)	USEPA, 2005
HCH, gamma (Lindane)			100	ppb (µg/kg)	NAS, 1972
Heptachlor					
Lambda_cythalothrin	0.0005			ppb (µg/l)	Fojut et al., 2012
Malathion	0.028	0.1		ppb (µg/l)	Fojut et al., 2012
Mercury	0.77			ppb (µg/l)	USEPA
PCBs			500	ppb (µg/kg)	NAS, 1972
Permethrin	0.002			ppb (µg/l)	Fojut et al., 2012
Thallium	20			ppb (µg/l)	USEPA, 1986

Salt water criteria: National Recommended Water Quality Criteria, USEPA.

Table 7. Sediment quality guidelines for pollutants in freshwater and Saline Water ecosystems

Associated Beneficial Use		AQUA, WARM, COLD, FRSH, SAL, WILD, RARE		
Constituent	Fresh water Consensus-Based PEC*	Saline *** Water/ Sediment ERM/PEL/ SQG**	Units (Dry Weight)	References
Antimony		25	ppm (mg/kg)	Long et al., 1995
Anthrazene	845		ppb (µg/kg)	McDonald et al., 2000a
Arsenic	33	70	mg/kg (ppm)	Long et al., 1995
Benz[a]anthracene	1050	692.53	ppb (µg/kg)	McDonald et al., 1996
Benzp[a]pyrene	1450	763.22	ppb (µg/kg)	McDonald et al., 1996
Cadmium	4.98	4.21	ppm (mg/kg)	McDonald et al., 1996
Chlordane	17.6	6	ppm (mg/kg)	Long & Morgan, 1990
Chromium	111	370	ppm (mg/kg)	Long et al., 1995
Chrysene	1290	845.98	ppb (µg/kg)	McDonald et al., 2000a
Copper	149	270	ppm (mg/kg)	Long et al., 1995
DDD (sum)	28.0		ppb (µg/kg)	McDonald et al., 2000a
DDE (sum)	31.3		ppb (µg/kg)	McDonald et al., 2000a
DDT (sum)	62.9		ppb (µg/kg)	McDonald et al., 2000a
DDTs (total)	572		ppb (µg/kg)	McDonald et al., 2000a
Dibenz[a,h]anthracene		260	ppb (µg/kg)	Long et al., 1995
Dieldrin	61.8	8	ppb (µg/kg)	Long et al., 1995
Endrin	207	760	ppb (µg/kg)	USEPA, 1993
Fluoranthene	2230		ppb (µg/kg)	McDonald et al., 2000a
Fluorene	536		ppb (µg/kg)	McDonald et al., 2000a
Lead	128	112.18	ppm (mg/kg)	McDonald et al., 1996
Lindane (gamma-hexachlorocyclohexane)	4.99	370	ppb (µg/kg)	USEPA, 1993
Mercury	1.06	2.1	ppm (mg/kg)	PTI, 1991
Naphthalene	561		ppb (µg/kg)	McDonald et al., 2000a
2-methyl-naphthalene		201.28	ppb (µg/kg)	McDonald et al., 1996
Nickel	48.6		ppm (mg/kg)	McDonald et al., 2000a
PAHs (total)	2230	1,800****	ppb (µg/kg)	McDonald et al., 2000a
PCBs (total)	676	400	ppb (µg/kg)	McDonald, 2000b
Phenanthrene	1170	543.53	ppb (µg/kg)	McDonald et al., 2000a
Pyrene	1520	1397.4	ppb (µg/kg)	McDonald et al., 2000a
Silver		1.77	ppm (mg/kg)	McDonald et al., 1996
Zinc	459	410	ppm (mg/kg)	Long et al., 1995

*PEC = Probable Effect Concentrations; All Freshwater PECs are from McDonald et al., 2000a
**ERM=Effect Range Median; PEL= Probable Effects Level
**SQG= Other individual sediment quality guidelines
*** Saline Criteria = Sediment values (µg/kg) were from McDonald et al., 1996
**** Saline Criteria for PAHs= Fairey et al., 2001

Table 8 Ecotoxicity, LC50/EC50, guidelines in water (µg/l) and sediment (µg/g)

Associated Beneficial Uses				COLD, WARM
Constituent	Guideline Type	Values	Unit	Reference
Atrazine	EC50	43	ppb (µg/l)	USEPA, 2005
Bifenthrin	LC50	0.43	ppm (µg/g)	Amweg et al., 2005 Amweg and Weston, 2007
	4 days avg.	0.0006	ppb (µg/l)	Fojut et al., 2012
Chlorpyrifos	LC50	1.77	ppm (µg/g)	Amweg and Weston, 2007
Cyanazine	EC50	4.8	ppb (µg/l)	USEPA, 2005
Cyfluthrin, total	LC50	1.1	ppm (µg/g)	Amweg et al. 2005
	4 day avg.	0.0005	ppb (µg/l)	Fojut et al., 2012
Cyhalothrin, lambda	LC50	0.44	ppm (µg/g)	Amweg et al. 2005
	4 day avg.	0.0005	ppb (µg/l)	Fojut et al., 2012
Cypermethrin	LC50	0.3	ppm (µg/g)	Maund et al., 2002
	4 day avg.	0.0002	ppb (µg/l)	Fojut et al., 2012
Dacthal	LC50	6600	ppb (µg/l)	USEPA, 2005
Deltamethrin	MATC	0.02	ppb (µg/l)	USEPA, 2005
	LC50	0.79	ppm (µg/g)	Amweg et al. 2005
Diazinon	LC50	11	ppm (µg/g)	Ding et al., 2011
Dichlorvos	MATC	7.2	ppb (µg/l)	USEPA, 2005
Dimethoate	LC50	43	ppb (µg/l)	USEPA, 2005
Esfenvalerate/ Fenvalerate	LC50	1.5	ppm (µg/g)	Amweg et al. 2005
		1.13	ppb (µg/l)	USEPA, 2005
Fenpropathrin	LC50	1	ppm (µg/g)	Ding et al., 2011
		2.2	ppb (µg/l)	USEPA, 2005
Fipronil	LC50	0.13	ppm (µg/g)	Maul et al., 2008
Fipronil Sulfone	LC50	0.12	ppm (µg/g)	Maul et al., 2008
Fipronil Sulfide	LC50	0.16	ppm (µg/g)	Maul et al., 2008
Methidathion	MATC	0.86	ppb (µg/l)	USEPA, 2005
Molinate	MATC	0.6	ppb (µg/l)	USEPA, 2005
Methyl Parathion	CCC	6	ppm (µg/g)	Ding et al., 2011
Permethrin	LC50	8.9	ppm (µg/g)	Amweg et al. 2005
	4 day avg.	0.002	ppb (µg/l)	Fojut et al., 2012
Phorate	LC50	2	ppb (µg/l)	USEPA, 2005

Associated Beneficial Uses				COLD, WARM
Constituent	Guideline Type	Values	Unit	Reference
Phosmet	EC50	5.6	ppb (µg/l)	USEPA, 2005
Prometon	EC50	98	ppb (µg/l)	USEPA, 2005
Prometryn	EC50	1	ppb (µg/l)	USEPA, 2005
Propazine	EC50	25	ppb (µg/l)	USEPA, 2005
Simazine	EC50	90	ppb (µg/l)	USEPA, 2005
Thiobencarb	MATC	1.4	ppb (µg/l)	USEPA, 2005

LC50 (Lethal Concentration) – A concentration of a pollutant of effluent at which 50 percent of the test organisms die; a common measure of acute toxicity.

EC50 (half maximal Effective Concentration) - A concentration of a pollutant or effluent at which 50 percent of the test organisms display non-lethal effect.

MATC (Maximum Acceptable Toxicant Concentration) – The MATC is calculated as the geometric mean of the NOEC and the LOEC for a chronic level exposure.

NOEC (No-observable effect concentration) – The highest tested concentration of a substance that has been reported to have no harmful (adverse) effects on organisms tested.

LOEC (Lowest observable effect concentration) – The lowest tested concentration of a substance that has been reported to cause harmful (adverse) effects on organisms tested.